TNCore

Tennessee Department of Education

Common Core Leadership Course
Elementary School Class 2
Winter 2014

The contents of this manual were developed under a grant from the U.S. Department of Education. However, those contents do not necessarily represent the policy of the U.S. Department of Education, and you should not assume endorsement by the Federal Government.

Tennessee Department of Education
Common Core Leadership Course
Elementary School Class 2
Winter 2014

Agenda & Table of Contents

Agenda	Key Reference Materials
Opening Session	**Course Goals, Core Beliefs, and Training Series** Tab 1, pages 3
Literacy	**Promoting Student Growth and Common Core Writing** Tab 2, pages 15
Mathematics	**Lyãúŵdzŏûλ2y˜ûKl·ú 5ŜŜLJŜyã a l·ûKŜY˜l·ûλŏl·f ¦ yŘŜŵăûl·yŘλyƎ** Tab 3, pages 109
Closing	**Additional Resources** Tab 4, pages 153

TNCore

1 - Opening

Welcome to Common Core Leadership 202.

Our Goal in this Course:

Support collaborative leadership learning focused on increasing student achievement in the transition to Common Core State Standards.

How Will We Achieve that Goal:

- Peer-Led Discussions and Collaboration
- Direct Applications to Our Classrooms and Schools
- A Focus on Student Work

Course Norms:

- Keep students at the center of focus and decision-making.
- Balance urgency and patience.
- Be solutions-oriented.
- Speak Up!
- We need collective solutions. Be present and engaged.
- Challenge with respect.
- Risk productive struggle.
- Monitor airtime and share your voice.

Core Beliefs

TNCore

Earning a living wage has never demanded more skills. This generation must learn more than their parents' to do as well.

Tennessee is on a mission to become the fastest improving state in the nation. Doing so will require hard work and significant learning for all. We must learn to teach in ways we were not taught ourselves.

There is no recipe that will deliver a successful transition. Preparing for Common Core will demand effective leadership focused on student growth.

All children are capable of learning and thinking at a high level. Children in Tennessee are as talented as any in the country and often capable of more than we expect.

Our current education results pose a real threat to state and national competitiveness and security. Improving the skills of our children is vital for the future of Tennessee and America.

PARCC is coming. We need to use the transition wisely to make sure our students and our state are ready.

2

Notes:

Directors of Schools,

I hope this finds you well. It has been a pleasure to see many of you at PARCC meetings across the state.

This email contains information about upcoming TNCore training offerings for teachers.

This summer we will be offering two types of training for teachers:

1. For the first time this summer, we will offer two "**School Team Training Series**." These training series will engage a team of "learning leaders" from each school and learning leaders will then redeliver this training to all teachers at the school.
2. We will offer **additional direct training** opportunities for teachers on new content as well as reoffering previous content.

This email includes detailed information about the School Team Training Series and preliminary information about the focus for the direct training offerings.

2014-15 School Team Training Series

This year we will offer two School Team Training Series:

- **Math PARCC Design & Key Instructional Strategies:** The focus of this training will be deepening teacher understanding of the design and expectations of PARCC math sections and developing skill supporting student success with the most challenging math content.
- **Literacy PARCC Design & Key Instructional Strategies:** The focus of this training will be deepening teacher understanding of the design and expectations of the PARCC ELA/literacy sections and developing skill supporting student success with analytic writing.

The school team training series includes summer training and training across the school year. Schools that choose to participate in either School Team Training Series will be expected to hold time during the professional development schedule for their school dedicated to redelivery to all teachers. Additional details about the school team training series specifics are available in Attachment 1 and Attachment 2.

In addition, we seek to offer a menu of direct teacher training options this summer. These offerings will be subject to demand and budget availability. We are exploring training models that will allow access for as many teachers as possible. We will have more information about the training models and specifics soon.

Additional Direct Training Options

- **Reading Intervention Training:** This would focus on reading fundamentals to support tier III instruction and intervention.
- **Math Intervention Training:** This would focus on math intervention strategies to support tier II and tier III instruction in math.
- **Reoffer math training, literacy training and reading training from last summer:** This would be a direct reoffer of previous content and be offered in July targeted for new teachers or teachers who were not able to join.
- **Social Studies Training:** This would focus on the new social studies content standards.

I realize this is an active planning time for district budgets and calendars. The attachments include specifics about the School Team Training Series and we seek to share information about the additional offerings as quickly as we can once our budget is confirmed.

In the meantime, as always, please email or call if you have any questions.

Sincerely,
Emily Barton and the TNCore Team

2014-15 School Team Training Series

This year we will offer two School Team Training Series for school choice:

- **Math PARCC Design & Key Instructional Strategies:** The focus of this training will be deepening teacher understanding of the design and expectations of PARCC math sections and developing skill supporting student success with the most challenging math content.
- **Literacy PARCC Design & Key Instructional Strategies**: The focus of this training will be deepening teacher understanding of the design and expectations of the PARCC ELA/literacy sections and developing teacher skill supporting student success with analytic writing.

How will this work?	Each school can select a team of "learning leaders." Learning leaders will be expected to attend summer training and follow up training during the school year and then redeliver the content to all teachers at the school during school level PD time. They are called "learning leaders" because they are not going to be simply sharing information but engaging in their own learning and supporting the learning of others. The learning leaders will essentially serve as core coaches for that school.
When will the training of the school team learning leaders take place?	Learning leaders will engage in a series of trainings. - 3 days in June - 1 day in late September / early October (with Friday and Saturday options) - 1 day in late January (with Friday and Saturday options) In addition to the in-person trainings, learning leaders will be expected to attend 2-3 webinar/conference calls throughout the year. The specific dates for learning leader training are included at the bottom of this document.
Where will the learning leader trainings take place?	All learning leader training (the summer and follow up components) will take place regionally, in CORE regions.
When will the trainings of teachers take place?	Learning leaders will be expected to redeliver portions of the content to all teachers in the school. **Schools that opt into this training series will be expected to hold this time for redelivery school wide:** - 1 day prior to the start of the school year - 45 minutes in September - 45 minutes in October - 3 hours in January - 45 minutes in February - 45 minutes in March The training series will be designed to provide just-in-time information about the critical aspects of PARCC and support teacher learning with bridge to practice exercises between sessions.
Where will the teacher training take place?	Learning leaders will conduct the redelivery of the training in your school directly.

How many learning leaders can we send from our school?	The Math Training Series is offered to two learning leaders in each of the following grade bands (K-2, 3-5, 6-8, 9-12). The Literacy Training Series is offered to four learning leaders in literacy in each of the following grade bands (K-2, 3-5, 6-8, 9-12.) Schools are **highly** encouraged to include science, social studies and CTE teachers as literacy learning leaders in additional to ELA teachers. One school leader per subject per school is invited (though not required) to attend learning leader training. School leaders will be expected to engage as a participant in one content room for the full training. There will not be content specifically designed for leaders. Leaders are not required to attend but they are encouraged, particularly if the leader is not currently participating in Common Core Leadership 202.
Can districts send a team to learning leader training?	The content of this training is designed for a school team to experience. However, districts will also be able to send representatives to participate in learning leader training. District representatives will need to select a grade band and subject area of focus and engage in that area throughout the course. District allocation will be based on size with more information coming on specific district teams. (Note: there will be separate district team meetings focused on PARCC offered by CORE offices in May and August with content about PARCC designed for district leaders.)
How will we register?	Schools will need to register their learning leaders in a registration system for the dates of training. Registration will launch in early April. Specific location information will be shared prior to registration.
Will we get materials?	Learning leader materials will be provided at the training. However, all additional materials for participants and redelivery will be posted online. Schools will be responsible for printing materials required for redelivery.
What is the cost?	There is no cost for learning leader training. The space, content, training and materials for learning leader training will be covered. This does not include any cost for travel or lodging.
Do school teams need to attend together?	Learning leaders from the same school are encouraged, though not required to attend together. At the least, math learning leaders should plan to attend together and literacy learning leaders should plan to attend together.
How do I select my school team?	The Common Core Leadership Council urges thoughtful care in the decision of who you select for learning leaders. Learning leaders should be: - Highly effective teachers - Excellent facilitators and communicators - Passionate about the value of high standards and rigorous assessments - Learners open to feedback and continuous improvement - Individuals others teachers will enjoy learning from One of the things consistently rated favorably in all TNCore trainings is the opportunity to learn from peers. Schools are urged to consider peer-led learning. Schools are welcome to design local interview processes to determine selection. The attached rubric (used to select core coaches) can assist school leaders in evaluating learning leader applicants.

Will there be core coaches again this year?	We will engage a small number of TNCore Coaches again this year to train the learning leaders. Core coaches will be selected first from among prior core coaches to ensure alignment of content, however, there may be limited opportunities for additional core coaches. More information about core coach options will be shared in early March.

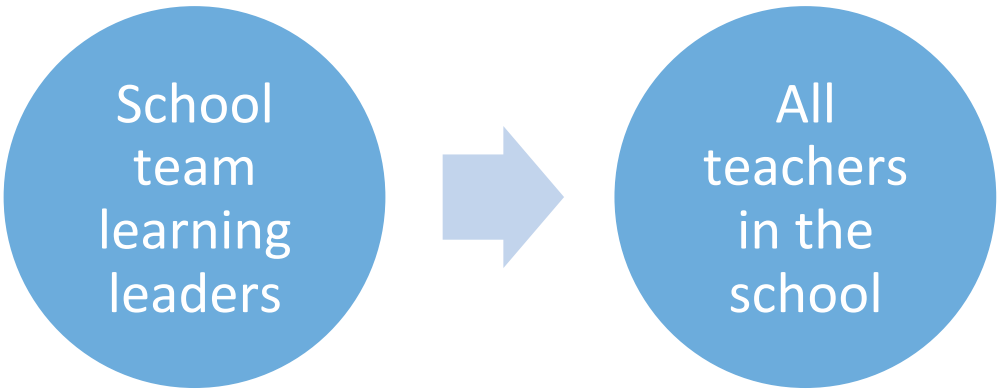
Date Options for Learning Leader Training

Training	Options
Training 1 (summer) 3 days, offered 3 times	- June 10-12 - June 17-19 - June 24-26
Training 2 (fall) 1 day, offered 3 times	- Sept. 26 - Sept. 27 - Oct. 4
Training 3 (winter) 1 day, offered 3 times	- Jan. 24 - Jan. 30 - Jan. 31
Conference Calls	- TBD (December and February)

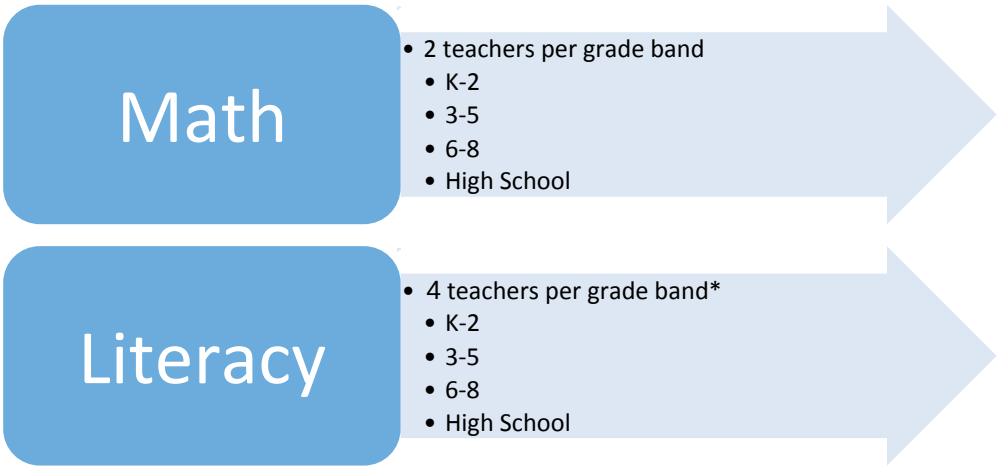
Dates for School Training

School Training Dates	- 1 day prior to the start of the school year - 45 minutes in September - 45 minutes in October - 3 hours in January - 45 minutes in February - 45 minutes in March

School Team Training Series Model



Learning Leaders – Suggested School Team Size



* School leaders are **strongly** encourage to include Social Studies, Science and CTE teachers as literacy learning leaders

Learning Leader Training Options

Summer
- June 10-12
- June 17-19
- June 24-26

Fall
- Sept. 26
- Sept. 27
- Oct. 4

Winter
- Jan. 24
- Jan. 30
- Jan. 31

Redelivery

(Schools would need to hold this time for redelivery)

Summer	• 6 hours (Before School Starts)
Fall	• 45 minutes (September) • 45 minutes (October)
Winter	• 3 hours (January) • 45 minutes (February)
Spring	• 45 minutes (March)

Learning Leaders Should Be

- Highly effective teachers
- Excellent facilitators and communicators
- Passionate about the importance of high standards and rigorous assessments
- Learners: open to feedback and continuous improvement

TNCore

Learning Leader Rubric (based on TNCore Coach Interview Rubric)

	3	2	1	Notes
Effective educators	Individual TVAAS Level 5 (3 year or most appropriate) in this subject **-or-** Evidence of **dramatic** student growth (2 grade levels of gains +)	Individual TVAAS Level 3 or 4 (3 year or most appropriate) in this subject **-or-** Evidence of **strong** student growth (1.5-2 grade levels of gains)	Individual TVAAS Level 1 or 2 (3 year or most appropriate) in this subject **-or-** Evidence **of less than expected** student growth (.75-1 grade levels of gains)	
Excellent facilitators and communicators	Establishes powerful, inspiring connection with participants Excellent presenter and clear communicator Effectively and thoughtfully responds to challenging situations and questions In your gut, you know this person will be well respected by their peers	Solid presenter and clear communicator Uses clear reason and logic to connect with interviewers and respond to role play Establishes good, meaningful connection Comfortably responds to challenging situations and questions In your gut, you know this person will be well respected by their peers	Concerns about communication Difficult to communicate with in person, difficult to understand In your gut, you know this person would not be taken seriously by peers. Weak or inconsistent presence	

Passionate about the importance of rigorous standards and assessments	Evidence of strong support for change that may be difficult for adults but good for kids Insightful about ways in which rigorous standards and assessments will make a dramatic, positive difference for students lives and Tennessee's future Expresses belief that all students can be successful, relentlessly focused on student learning	No evidence of concerns about fit or beliefs about importance of reform Clear communication of enthusiasm for rigorous standards and assessments and able to articulate specific ways implementation will benefit students Focused on student learning	Evidence of reservation about change, even when it helps students Expresses negative comments about the value of rigorous standards and assessments Not directly focused on student learning	
Learners: open to feedback and continuous improvement	Receives feedback in a positive and professional manner Strong evidence that this candidate continuously and independently reflects on his or her students' academic achievement Changes in his or her instruction drastically and positively impact student academic achievement	Receives feedback in a positive and professional manner Strong evidence that this candidate makes changes in their instruction that directly impact student academic achievement	Receives feedback in an negative or unprofessional manner Reflection is limited and/or unrelated to substantial changes in student gains.	

2 - Literacy

Promoting Student Growth and Common Core Writing

Tennessee Department of Education
Common Core Leadership Course 202

TNCore

Literacy Table of Contents

Course Goals and Objectives	19
Writing Rubric	20
Research Overview – Writing-to-Sources	21
Focus and Organization Scoring Guide	22
Development Anchor Scoring Guide	47
Sample Student Thesis	70
Evaluating Thesis Statements (Peer Review Exercise)	71
Quotes on the Writing Process	73
Providing Feedback on Writing	74
Accountable Talk	75
Peer Review Sample Exercise	78
State-Level Writing Practices	81
Curriculum Coverage Guidance	91
PARCC Literacy Model Content Framework	93
English Language Arts Unit	94

Course Goals/Objectives

1) Further develop our understanding of the expectations of the standards and PARCC in literacy. Examine student work for strengths and areas for growth.

2) Examine the role of revision, editing, proofreading and feedback in improving student writing.

3) Develop a plan of action to help all students meet expectation by class 3.

4) Step back and consider the implications of our work thus far on local planning for the coming year. Understand the available resources to support instructional planning in the coming year.

TCAP/WA Opinion Rubric – Grades 4-5

Tennessee Department of Education

Revised: April 2013

Score	Development	Focus & Organization	Language	Conventions
4	In response to the task and the stimuli, the writing: • utilizes well-chosen, relevant, and sufficient evidence[1] from the stimuli to insightfully support the writer's opinion. • thoroughly and accurately explains and elaborates on the evidence provided, connecting the evidence to the writer's opinion and demonstrating a clear understanding of the topic and the stimuli.	In response to the task and the stimuli, the writing: • contains an effective and relevant introduction. • states and maintains a clear and sophisticated opinion or point of view. • utilizes effective organizational strategies to logically order reasons and information. • effectively establishes relationships among opinions, reasons, and evidence. • contains an effective and relevant concluding statement or section.	The writing: • illustrates consistent and sophisticated command of precise language and domain-specific vocabulary appropriate to the task. • illustrates sophisticated command of syntactic variety for meaning, reader interest, and style. • utilizes sophisticated and varied transitional words and phrases.	The writing: • demonstrates consistent and sophisticated command of grade-level conventions of standard written English.[2] • may contain a few minor errors that do not interfere with meaning.
3	In response to the task and the stimuli, the writing: • utilizes relevant and sufficient evidence[1] from the stimuli to adequately support the writer's opinion. • adequately and accurately explains and elaborates on the evidence provided, connecting the evidence to the writer's opinion and demonstrating a sufficient understanding of the topic and the stimuli.	In response to the task and the stimuli, the writing: • contains a relevant introduction. • states and maintains a clear opinion or point of view. • utilizes adequate organizational strategies to logically order reasons and information. • adequately establishes most relationships among opinions, reasons, and evidence. • contains a relevant concluding statement or section.	The writing: • illustrates consistent command of precise language and domain-specific vocabulary appropriate to the task. • illustrates consistent command of syntactic variety for meaning, reader interest, and style. • utilizes appropriate and varied transitional words and phrases.	The writing: • demonstrates consistent command of grade-level conventions of standard written English.[2] • contains some minor and/or major errors, but the errors do not significantly interfere with meaning.
2	In response to the task and the stimuli, the writing: • utilizes mostly relevant but insufficient evidence[1] from the stimuli to partially support the writer's opinion. Some evidence may be inaccurate or repetitive. • explains some of the evidence provided, connecting some of the evidence to the writer's opinion and demonstrating only a partial understanding of the topic and the stimuli. There may be some level of inaccuracy in the explanation.	In response to the task and the stimuli, the writing: • contains a limited introduction. • states a weak opinion or point of view. • demonstrates an attempt to use organizational strategies to order some reasons and information, but ideas may be hard to follow at times. • establishes some relationships among opinions, reasons, and evidence, but there are lapses in focus. • contains a limited concluding statement or section.	The writing: • illustrates inconsistent command of precise language and domain-specific vocabulary. • illustrates inconsistent command of syntactic variety. • utilizes basic or repetitive transitional words and phrases.	The writing: • demonstrates inconsistent command of grade-level conventions of standard written English.[2] • contains many errors that may significantly interfere with meaning.
1	In response to the task and the stimuli, the writing: • utilizes mostly irrelevant or no evidence[1] from the stimuli, or mostly/only personal knowledge to inadequately support the writer's opinion. Evidence is inaccurate or repetitive. • inadequately or inaccurately explains the evidence provided; evidence and the writer's opinion appear disconnected, demonstrating little understanding of the topic and the stimuli.	In response to the task and the stimuli, the writing: • contains no or an irrelevant introduction. • states an unclear opinion or point of view. • demonstrates an unclear organizational structure; ideas are hard to follow most of the time. • fails to establish relationships among opinions, reasons, and evidence; concepts are unclear and/or there is a lack of focus. • contains no or an irrelevant concluding statement or section.	The writing: • illustrates little to no use of precise language and domain-specific vocabulary. • illustrates little to no syntactic variety. • utilizes no or few transitional words and phrases.	The writing: • demonstrates limited command of grade-level conventions of standard written English.[2] • contains numerous and repeated errors that seriously impede meaning.

[1] Evidence includes facts, concrete details, or other information as appropriate to the task and the stimuli.
[2] Conventions of standard written English include sentence structure, grammar, usage, spelling, capitalization, and punctuation.

Research Overview —Writing-to-Sources

Key Steps

1. **Prepare**:

   a.) Analyze the prompt to pose or clarify a question about text(s)
   b.) Gather and analyze textual evidence
   c.) Create a thesis. Test it: does it answer the question? Is it supported by evidence?
   d.) Create an outline

2. **Draft:** Put your ideas into sentences and paragraphs. Explain and support your ideas.

3. **Revise**: Consider your reader's needs and expectations. Have you successfully communicated/argued your point?

4. **Edit**: Correct errors in conventions; ensure correct citation

5. **Publish**

Based on http://writing.mit.edu/wcc/resources/writers/writingprocess

GRADES 4–5
ITEM 2
FOCUS AND ORGANIZATION ANCHOR

Copyright © 2013 by the University of Pittsburgh and published under contract with Tennessee State Department of Education by Measurement Incorporated, 423 Morris Street, Durham, North Carolina, 27701. Testing items licensed to the Tennessee State Department of Education. All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of Tennessee Department of Education and the University of Pittsburgh.

Score:	Focus & Organization
4	In response to the task and the stimuli, the writing: • contains an effective and relevant introduction. • states and maintains a clear and sophisticated opinion or point of view. • utilizes effective organizational strategies to logically order reasons and information. • effectively establishes relationships among opinions, reasons, and evidence. • contains an effective and relevant concluding statement or section.
3	In response to the task and the stimuli, the writing: • contains a relevant introduction. • states and maintains a clear opinion or point of view. • utilizes adequate organizational strategies to logically order reasons and information. • adequately establishes most relationships among opinions, reasons, and evidence. • contains a relevant concluding statement or section.
2	In response to the task and the stimuli, the writing: • contains a limited introduction. • states a weak opinion or point of view. • demonstrates an attempt to use organizational strategies to order some reasons and information, but ideas may be hard to follow at times. • establishes some relationships among opinions, reasons, and evidence, but there are lapses in focus. • contains a limited concluding statement or section.
1	In response to the task and the stimuli, the writing: • contains no or an irrelevant introduction. • states an unclear opinion or point of view. • demonstrates an unclear organizational structure; ideas are hard to follow most of the time. • fails to establish relationships among opinions, reasons, and evidence; concepts are unclear and/or there is a lack of focus. • contains no or an irrelevant concluding statement or section.

EXPLANATION OF FOCUS & ORGANIZATION RUBRIC TERMS

"In response to the task and stimuli"

- **As you assess focus and organization in a student's response, remember that you are scoring based upon how the student focuses on the task and organizes in response to the task and the stimuli. If a response does not address the task, organization would be considered irrelevant due to a lack of focus on the task.**

"organizational strategies"

- **Organizational strategies are techniques the student utilizes throughout in order to create a unified response and order information appropriately. These strategies can include the use of paragraphs to group related information, use of transitional words and phrases to connect ideas, and the use of comparison and contrast.**

"relationships among opinions, reasons, and evidence"

- **It is the responsibility of the student to explain how claims, reasons, evidence, and counterclaims(s) are related throughout his or her response. If these elements are disconnected, the score will be affected.**

"focus"

- **Focus refers to the student's ability to remain on-task. The student's ideas and concepts should always be connected to the task and stimuli and the student's central idea, thesis, or claim. If they are not, the response becomes irrelevant to the given task.**

"concluding statement or section"

- **The concluding statement or section refers to the conclusion. The relevance of a student's conclusion depends upon his or her ability to appropriately bring ideas to a close and his or her ability to relate closing statements to the overall focus of the response.**

You will now review 8 individual student responses, scored only in Focus & Organization, along with annotations to help you internalize the use of the rubric for this trait.

GRADE 4–5

Focus & Organization Anchor: Response #1

Hudson Tinner told about how long ago, the stone age was and he gives alot more detial about it. like he said inside of it there a sandstone tabel in it and in the front you can see the sun rising. The other author told about how it apeard and showd pictures it also doesn't show that much detail about it and Tinner told a lot of deteail and gave some questins what some scientists would say. But the other auther showed modern day picture of it and he should of took a pictures inside of it.

SCORE POINT: 1

Focus & Organization Anchor: Response #1

Annotations
SCORE POINT: 1

In response to the task and stimuli:

- **The response contains no introduction. The student simply launches into facts from the second text:**
  - *Hudson Tinner told about how long ago, the stone age was . . .*
- **The response states an unclear opinion:**
  - *The other author told about how it apeard and showd picturs it also doesn't show that much detail about it . . .*

  Although the student's opinion can be inferred, it remains unclear. It is difficult to assess whether statements such as "*told how it apeard and showd picturs*" are meant to support the student's opinion.
- **The response demonstrates an unclear organizational structure; ideas are hard to follow most of the time. Although the student attempts to organize by contrasting the two texts, the information in the response often seems random or repetitive.**
- **The response fails to establish relationships among opinions, reasons, and evidence. For example:**
  - *. . . Tinner told a lot of deteail and gave some questins what some scientists would say. But the other auther showed modern day picture of it and he should of took a pictures inside of it.*

  The student presents details from the texts randomly and does not establish why the details given by one author are better than the details given by the other author.
- **The response contains no concluding statement or section.**

Focus & Organization Anchor: Response #2

After reading both stories i deciced the First story was more informable because the second story mainly talked about the pourpose of the struture. The First one told me how it was probley Built, it also told us what it ment to. From my point of veiw it looks more reasonable to chose author #1

SCORE POINT: 1

Focus & Organization Anchor: Response #2

Annotations
SCORE POINT: 1

In response to the task and stimuli:

- **The response contains a limited introduction:**
  - *After reading both stories i deciced the First story was more informable because the second story mainly talked about the pourpose of the struture.*
- **The response states a weak opinion:**
  - *After reading both stories i deciced the First story was more informable . . .*

  The brief response provides little opportunity for the opinion to be maintained, and is therefore weak.
- **The response demonstrates an unclear organizational structure; ideas are hard to follow most of the time. Over half of the response is comprised of the introductory sentence. The organizational structure is unclear because there are so few ideas presented.**
- **The response fails to establish relationships among opinions, reasons, and evidence. The brief response presents so little evidence that relationships cannot be established and concepts remain unclear.**
- **The response contains a limited concluding statement:**
  - *From my point of veiw it looks more reasonable to chose author #1*

  With a limited introduction, weak opinion, and limited conclusion, the brief response is also inadequate due to unclear organizational structure and failure to establish relationships among concepts.

Focus & Organization Anchor: Response #3

I think the first text was better than the second one because, to me the first one had more facts about what and how people tried to findout about stonehenge. In the first story people were always trying to figure out why stonehenge was built and what it represents. A Detail that shows that is this, "Is it mere coincidence that the sun rises and sets over the Heel Stone on the summer and winter solstice, or was the placement of the stone chosen for that very purpose?" In the story they were always also wondering how they transported the ginourmous rocks from the mountains over to the Middle of an area. Another Detail that could represent this is. "Acorrding to these specialists the stones were dragged over land and perhaps towed along the shoreline to there destination." There are also many other facts about these two subjects in the story, but this why I injoyed this selection better than the second one.

SCORE POINT: 2

Focus & Organization Anchor: Response #3

Annotations
SCORE POINT: 2

In response to the task and stimuli:

- **The response contains a limited introduction:**
  - *I think the first text was better than the second one because, to me the first one had more facts about what and how people tried to findout about stonehenge.*

  The introduction does not accurately preview the response. The introduction indicates that there are two texts, one better than the other. However, the body of the response only references the first text.

- **The response states a weak opinion:**
  - *I think the first text was better than the second one . . .*

  The response only mentions the second text in the first and last sentences, providing little opportunity to maintain the opinion.

- **The response demonstrates an attempt to use organizational strategies to order some reasons and information. The student uses a simple organizational strategy that consists of making a statement and then providing a "detail" to support that statement. Ideas are hard to follow at times because the student does not use evidence from the second text and therefore only partially responds to the task.**

Continued on the next page . . .

Focus & Organization Anchor: Response #3

- **The response establishes some relationships among opinions, reasons, and evidence. For example:**

  - *. . . the first one had more facts about what and how people tried to findout about stonehenge. In the first story people were always trying to figure out why stonehenge was built and what it represents. A Detail that shows that is this, "Is it mere coincidence that the sun rises and sets over the Heel Stone on the summer and winter solstice, or was the placement of the stone chosen for that very purpose?"*

  The student attempts to connect the opinion to the evidence. However, the student never references the second text in the body of the response, demonstrating a lapse of focus.

- **The response contains a limited concluding statement:**

  - *There are also many other facts about these two subjects in the story, but this why I injoyed this selection better than the second one.*

  The last sentence does not serve as a relevant conclusion because the student omits any reference to the second text in the body of the response. Overall, the response demonstrates only a partial understanding of the task.

Focus & Organization Anchor: Response #4

I think "Stonehenge" by Jonh Hudson Tiner explaned more on how ideas could have been when it was built when "Stonhenge" by Marjori Frank explaned how it could not have been made. This is one idea in "Stonehenge" by Marjori Frank explained how it could not have been true. In 2000, a group of Welsh + English volenteers participated in a reenactment of the proccess of moving the bluestone from 250 miles away, to the Stonehenge. They used methods and boat they thought would have been used back then. They travled alonge the coast using two boats tied together. At some point along the way the ropes snapped and the stone sank. Here's one idea of why it could have been made in, "Stonehenge" by Jonh Hudson Tiner. In 1880, Proffesor William Gowland, a geology proffessor, dug around one of the towering stones of the larger circle. He found flint and sandstone axes and hammer used in its construction. The ancient tools came from the Stone age. That's why I think that Jonh Hudson Tiner's story best uses reason and evidence to support the mysteries of Stonehenge.

SCORE POINT: 2

Focus & Organization Anchor: Response #4

Annotations
SCORE POINT: 2

In response to the task and stimuli:

- **The response contains a limited introduction:**
  - *I think "Stonehenge" by Jonh Hudson Tiner explaned more on how ideas could have been when it was built when "Stonhenge" by Marjori Frank explaned how it could have not been made.*

  The student does not make the topic of the paper clear with the introduction. The topic of the response becomes clearer through context.

- **The response states a weak opinion:**
  - *I think "Stonehenge" by Jonh Hudson Tiner explaned more on how ideas could have been when it was built when "Stonhenge" by Marjori Frank explaned how it could have not been made.*

  The inferred opinion that Tiner wrote the better text only becomes clear in the last sentence of the response.

- **The response demonstrates an attempt to use organizational strategies to order some reasons and information. The student attempts to organize by presenting evidence from one text, and then presenting evidence from the other text. Ideas are hard to follow at times.**

Continued on the next page . . .

Focus & Organization Anchor: Response #4

- **The response establishes some relationships among opinions, reasons, and evidence. For example:**

    - *This is one idea in "Stonehenge" by Marjori Frank explained how it could not have been true. In 2000, a group of Welsh + English volenteers participated in a reenactment of the proccess of moving the bluestone from 250 miles away, to the Stonehenge. . . . At some point along the way the ropes snapped and the stone sank.*

    The student does not adequately establish the relationship between the evidence presented and the opinion.

- **The response contains a limited concluding statement:**

    - *That's why I think that Jonh Hudson Tiner's story best uses reason and evidence to support the mysteries of Stonehenge.*

    The last sentence does not serve as a relevant conclusion. The response does not discuss the "*mysteries of Stonehenge*."

Focus & Organization Anchor: Response #5

I think the Aruther Marjorie Frank wrote the best story. I think she wrote the best story because she explaind things, like when she said something she would tell you about it. The other auther would not do that. For example, she told how long ago Stonehenge was built. However I still think that Jhon Hudson tiner did a very good job on the story just not as much as Marjorie Frank. By the Way Marjorie Frank also wrote more of an instresting Story, because it gave you way more details then the other Story. Here is an example in both story's they talk about the heel stone and the sun rises over it, Here is what Jhon Hudson Tiner said about it the sun rose directly over it as seen from the altar, here is what marjorie frank said about it a special stone called the Heel Stone stands at some distance from the main structure. Imagine standing at the center of the structure and looking toward it. If it were the morning of the summer or winter solstice you would see it directley over you. You see the difference she explains things way more then Jhon Hudson Tiner. I am going to tell you one more example then I will let you go. Marjorie Frank tells about how much it weighs. It weighs 40 tons. But Jhon Hudson tiner does not talk about that, he just does short little words to make a story. Even though it was a good story I think he was in a rush doing this story.

SCORE POINT: 2

Focus & Organization Anchor: Response #5

Annotations
SCORE POINT: 2

In response to the task and stimuli:

- **The response contains a limited introduction:**
  - *I think the Aruther Marjorie Frank wrote the best story.*

  The introduction provided is very general and remains limited.

- **The response states and maintains a clear opinion. For example:**
  - *I think the Aruther Marjorie Frank wrote the best story.*
  - *. . . Jhon Hudson tiner did a very good job on the story just not as much as Marjorie Frank.*

  The student maintains the opinion throughout the response.

- **The response demonstrates an attempt to use organizational strategies to order some reasons and information. The student attempts to organize by comparing and contrasting the two texts. However, the student provides little evidence for most of the comparisons, making ideas sometimes hard to follow.**

- **The response establishes some relationships among opinions, reasons, and evidence. For example:**
  - *I think she wrote the best story because she explaind things, like when she said something she would tell you about it. The other auther would not do that. For example, she told how long ago Stonehenge was built.*

  The student does not adequately establish the relationship between the evidence and the opinion.

- **The response contains no concluding statement or section.**

Focus & Organization Anchor: Response #6

I think John Hudson Tiner is the better author. He gave a lot of information and evidence. His story was easy to follow. Marjorie did not give as much information or answers.

First of all, he used dates and brought up things that happened in order, like a timeline. He started by talking about theories scholars had in the 1500's and ended by talking about a theory Gerald Hawkins had in 1964. Marjorie Frank did not discuss information in order.

John gave a lot of information about Sun and Moon eclipses. Marjorie did not. She only talked about solar eclipses. The only thing she said was "the placement of the stones predicted solar eclipses." He told us about the 56 Aubrey Holes. They could be used to compute when eclipses would happen because eclipses repeat in cycles that last 56 years. You can see John gave more information.

Marjorie didn't give any real answers. However, John gave more information. He told us that there is a gigantic altar in Stonehedge. Marjorie did not talk about the Altar table or many other facts that John discussed.

Marjorie told theories and questions. Although, Marjorie gave some good theories, she didn't have many answers. She didn't really give much information. She admited that there was really only two answers she knew with certainty… The sun will rise over the Heel Stone to mark the next solstice, and that our understanding of Stonehedge will remain incomplete. Marjorie admits she does not have many answers. Yet, John gave more information than Marjorie.

John told us how everyone got more and more information over the centuries. Although he gives theories too, Marjorie gave mostly theories. We will get more answers from John.

Marjorie's story was not as good as John's. It had less information and answers. John Hudson Tiner is the better authoer because he gave more reasons, evidence, and information.

SCORE POINT: 3

Focus & Organization Anchor: Response #6

Annotations
SCORE POINT: 3

In response to the task and stimuli:

- **The response contains a relevant introduction:**
  - *I think John Hudson Tiner is the better author. He gave a lot of information and evidence. His story was easy to follow. Marjorie did not give as much information or answers.*

  The student writes a general preview to the response.

- **The response states and maintains a clear opinion. For example:**
  - *I think John Hudson Tiner is the better author.*
  - *. . . John gave more information.*
  - *We will get more answers from John.*

  The student maintains the opinion throughout the response.

- **The response utilizes adequate organizational strategies to logically order reasons and information. The student uses paragraphs to group related information. Within paragraphs, the student organizes by comparing and contrasting the two texts. The student uses transitions to aid in organization.**

Continued on the next page . . .

Focus & Organization Anchor: Response #6

- **The response adequately establishes most relationships among opinions, reasons, and evidence. For example:**

    - *John gave a lot of information about Sun and Moon eclipses. Marjorie did not. She only talked about solar eclipses. The only thing she said was "the placement of the stones predicted solar eclipses." He told us about the 56 Aubrey Holes. They could be used to compute when eclipses would happen because eclipses repeat in cycles that last 56 years. You can see John gave more information.*

  The student adequately establishes the relationship between the opinion that John gave more information and the evidence from both texts.

- **The response contains a relevant concluding section:**

    - *Marjorie's story was not as good as John's. It has less information and answers. John Hudson Tiner is the better authoer because he gave more reasons, evidence, and information.*

  The conclusion reiterates the introduction and sums up ideas from the response.

Focus & Organization Anchor: Response #7

I just finished reading two articles about Stonehenge. They were both titled Stonehenge, but one was by Marjorie Frank and the other was by John Hudson Tiner. In my opinion, I think the article that John wrote was better than Marjorie's. His article was more interesting because it talked about some things that Marjorie's did not, and went into more details about some of the things that both articles talked about.

One thing that made Tiner's article interesting was how he talked about the different theories people have had over the years about who built Stonehenge. To start with, he talks about how, in 1620, Inigo Jones concluded that the romans had built Stonehenge. Next, he talks about how John Aubrey, in 1650, discovered a trench around Stonehenge and based on this discovery, Aubrey thought that the Druids had built stonehenge. Later that thoery was disproved when tools such as sandstone axes and hammers that were much older than the Druids were discovered at Stonehenge. Marjorie doesn't write about the different theories people had in the past about who built Stonehenge. She just states that "Stonehenge was built in phases from about 3100 B.C. to 1600 B.C." and that "Stone Age" people built it. Those are some interesting old theories that she left out!

Both articles talked about Stonehenge being used as an astronomical calender but Tiner went into much more detail. For instance, Tiner writes "Eclipses of the sun and moon repeat in a cycle that lasts 56 years. By moving stones around the Aubrey holes, the ancient people could have computed the dates of solar and lunar eclipses." All Frank says about eclipses is that "the placement of the stones predicted solar eclipses." As you can see, Tiner was much more specific.

Overall, John Hudson Tiner's article was more interesting.

SCORE POINT: 3

Focus & Organization Anchor: Response #7

Annotations
SCORE POINT: 3

In response to the task and stimuli:

- **The response contains a relevant introduction:**
  - *I just finished reading two articles about Stonehenge. They were both titled Stonehenge, but one was by Marjorie Frank and the other was by John Hudson Tiner. In my opinion, I think the article that John wrote was better than Marjorie's. His article was more interesting because it talked about some things that Marjorie's did not, and went into more detail about some of the things that both articles talked about.*

  The student gives a general preview to the response.

- **The response states and maintains a clear opinion. For example:**
  - *In my opinion, I think the article that John wrote was better than Marjorie's.*
  - *. . . Tiner went into much more detail.*
  - *. . . Tiner was much more specific.*

  The student maintains the opinion throughout the response.

- **The response utilizes adequate organizational strategies to logically order reasons and information. The student uses paragraphs to group related information. Within paragraphs, the student organizes by comparing and contrasting the two texts. The student consistently uses transitions to aid in organization.**

Continued on the next page . . .

Focus & Organization Anchor: Response #7

- **The response adequately establishes most relationships among opinions, reasons, and evidence. For example:**
    - *Both articles talked about Stonehenge being used as an astronomical calender but Tiner went into much more detail. For instance, Tiner writes "Eclipses of the sun and moon repeat in a cycle that lasts 56 years. By moving stones around the Aubrey holes, the ancient people could have computed the dates of solar and lunar eclipses." All Frank says about eclipses is that "the placement of the stones predicted solar eclipses." As you can see, Tiner was much more specific.*

  The student clearly establishes the relationship between the opinion and the evidence from both texts.

- **The response contains a limited concluding statement:**
    - *Overall, John Hudson Tiner's article was more interesting.*

  The student provides a very general and abrupt conclusion.

Focus & Organization Anchor: Response #8

The two articles about Stonehenge are both fascinating. Marjorie Frank's article, "Stonehenge" focuses on the different theories of how and why Stonehenge was created. The article by John Tiner, also entitled "Stonehenge, also raised theories, but had a better approach. I think Tiner's article is more compelling because it is more like a timeline and contains more details.

Marjorie Frank's article talked what we know about Stonehenge, such as the age, the stones themselves, and the placement, and then floated different theories about why Stonehenge exists. Tiner 's article was more comprehensive. He discusses the background of the stones and even brings ideas not discussed by Frank such as the Alter which "convinced scholars of the 1500s that the monument served as a temple." Tiner also brings in that "In 1620, Inigo Jones made the first accurate drawings of the monument." This was pivotal because he was a builder and he knew the concept was too old to have been created by the people in Britain. He thought that it was the "ruins of a Roman temple, put in place about A.D. 100." That seemed like a good idea, but Stonehenge was older than that so the idea of Roman construction was out too. Then in 1650 a man named John Aubrey found a trench build around the ruins and concluded the Druids had "used Stonehenge as a temple." It wasn't until 1880 that a geology professor name William Gowland "found flint and sandstone axes and hammers that had been used in its construction. The ancient tools came from a time before the Druids. Stonehenge had to be more than a thousand years old when the Druids came on the scene." So, Stonehenge has been confusing researchers all along, but Archaeologists believe "ancient people began construction about 3500 B.C." I think that kind of timeline is more concise than Frank's article. She never even mentions the possibilities of the Romans and the Druids, and Tiner's article is easier to follow because it lets you know what was happening at each point in history.

And he doesn't stop there. Tiner goes on to say that weather and tourists took a toll. In 1958, Britain raised the fallen stones and tried to set it back the way it was during the time of the Roman invasion. So why did the ancient people build this site? Marjorie Frank discusses this in a vague section called "What We Imagine." She says it could be an "astronomical calendar . . . the stones predicted solar eclipses and marked the summer

Continued on the next page . . .

Focus & Organization Anchor: Response #8

and winter solstices." But Tiner digs deeper and reveals that astronomer Norman Lockyer was able to show that the sun always rose over a certain stone on the first day of summer. Other scientists figured out the 56 Aubrey holes could be used to predict eclipses. "Eclipses of the sun and moon repeat in a cycle that lasts 56 years. By moving stones around the Aubrey holes, the ancient people could have computed the dates of solar and lunar eclipses." By 1964, Gerald Hawkins believed that two stones would have been all you needed to mark the solstice, but "the Stonehenge builders carved hundreds of stones that weighed thousands of tons and placed them in position." They did this for a specific reason. "Hawkins took detailed measurements from aerial photographs" and put that information into a computer showing that Stonehenge was "an elaborate astronomical observatory."

Although both articles discuss theories about Stonehenge, John Tiner's is easier to follow and more detailed. In the end, Marjorie Frank's article only arrives at more speculation, instead of the detailed historical overview and analysis that we get from Tiner. In my opinion, John Tiner wrote the best article.

SCORE POINT: 4

Focus & Organization Anchor: Response #8

Annotations
SCORE POINT: 4

In response to the task and stimuli:

- **The response contains an effective and relevant introduction:**
    - *The two articles about Stonehenge are both fascinating. Marjorie Frank's article "Stonehenge" focuses on the different theories of how and why Stonehenge was created. The article by John Tiner, also entitled "Stonehenge, also raised theories, but had a better approach. I think Tiner's article is more compelling because it is more like a timeline and contains more details.*

  The student mentions both texts and previews the response.

- **The response states and maintains a clear and sophisticated opinion. For example:**
    - *I think Tiner's article is more compelling because it is more like a timeline and contains more details.*
    - *Tiner 's article was more comprehensive.*
    - *. . . Tiner's article is easier to follow because it lets you know what was happening at each point in history.*

  The student displays some sophisticated insight into the differences between the two texts. The student maintains the opinion throughout the response.

- **The response utilizes effective organizational strategies to logically order reasons and information. The student uses paragraphs to group related information. Within paragraphs, the student organizes by comparing and contrasting the two texts. The student effectively uses transitions to aid in comprehension.**

Continued on the next page . . .

Focus & Organization Anchor: Response #8

- **The response effectively establishes relationships among opinions, reasons, and evidence. For example:**

    - *So why did the ancient people build this site? Marjorie Frank discusses this in a vague section called "What We Imagine." She says it could be an "astronomical calendar...the stones predicted solar eclipses and marked the summer and winter solstices." But Tiner digs deeper and reveals that astronomer Norman Lockyer was able to show that the sun always rose over a certain stone on the first day of summer. Other scientists figured out the 56 Aubrey holes could be used to predict eclipses.*

  The student effectively establishes the relationship between the opinion and the evidence from both texts.

- **The response contains an effective and relevant concluding section. For example:**

    - *Although both articles discuss theories about Stonehenge, John Tiner's is easier to follow and more detailed. In the end, Marjorie Frank's article only arrives at more speculation, instead of the detailed historical overview and analysis that we get from Tiner. In my opinion, John Tiner wrote the best article.*

  The conclusion effectively summarizes the response.

GRADES 4–5
ITEM 2
DEVELOPMENT
ANCHOR

Copyright © 2013 by the University of Pittsburgh and published under contract with Tennessee State Department of Education by Measurement Incorporated, 423 Morris Street, Durham, North Carolina, 27701. Testing items licensed to the Tennessee State Department of Education. All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of Tennessee Department of Education and the University of Pittsburgh.

Score:	Development
4	In response to the task and the stimuli, the writing: • utilizes well-chosen, relevant, and sufficient evidence[1] from the stimuli to insightfully support the writer's opinion. • thoroughly and accurately explains and elaborates on the evidence provided, connecting the evidence to the writer's opinion and demonstrating a clear understanding of the topic and the stimuli.
3	In response to the task and the stimuli, the writing: • utilizes relevant and sufficient evidence[1] from the stimuli to adequately support the writer's opinion. • adequately and accurately explains and elaborates on the evidence provided, connecting the evidence to the writer's opinion and demonstrating a sufficient understanding of the topic and the stimuli.
2	In response to the task and the stimuli, the writing: • utilizes mostly relevant but insufficient evidence[1] from the stimuli to partially support the writer's opinion. Some evidence may be inaccurate or repetitive. • explains some of the evidence provided, connecting some of the evidence to the writer's opinion and demonstrating only a partial understanding of the topic and the stimuli. There may be some level of inaccuracy in the explanation.
1	In response to the task and the stimuli, the writing: • utilizes mostly irrelevant or no evidence[1] from the stimuli, or mostly/only personal knowledge to inadequately support the writer's opinion. Evidence is inaccurate or repetitive. • inadequately or inaccurately explains the evidence provided; evidence and the writer's opinion appear disconnected, demonstrating little understanding of the topic and the stimuli.

[1] Evidence includes facts, concrete details, or other information as appropriate to the task and the stimuli.

EXPLANATION OF DEVELOPMENT RUBRIC TERMS

"In response to the task and stimuli"

- **As you assess development in a student's response, remember that you are scoring based upon how the student develops in response to the task and the stimuli. If a response does not address the task, any information and ideas presented would be considered irrelevant.**

"…insightfully support the writer's opinion"

- **In order to insightfully support his or her opinion, the student must move beyond simply stating an opinion with supporting evidence. Text-based evidence should be well-chosen and explanations of evidence should demonstrate advanced understanding of the task and the stimuli. Note that personal information outside of the text cannot in and of itself demonstrate insightful support.**

"evidence"

- **Evidence refers to facts, extended definitions, concrete details, quotations and other information that the student uses from the text.**

"inaccurate/inaccuracy"

- **Inaccuracy may be exhibited through the use of erroneous evidence, through the misinterpretation of evidence from the text, or through erroneous explanation of accurate evidence from the text. Inaccuracy is a quality of an inadequately developed response. However, it does not prevent a student from showing partial development. The level and amount of inaccuracy will determine how detrimental it is to the score.**

"personal knowledge"

- **The Phase 1 Writing Task is a text-based assessment. The bulk of the student's writing should be focused on the given task and text, including the evidence used in development. Students may make a personal connection with the topic and the stimuli; however, this should not replace the use of text-based evidence or overshadow text-based development. Doing so would weaken the student's response in relation to the task.**

"the topic and the stimuli"

- **With regards to the rubric, the term "topic" refers to the task directives, while the "stimuli" refers to the associated text(s). The topic for the Analysis essay is how the authors use and refine the meaning of intelligence over the course of the text.**

You will now review 8 individual anchor responses, scored only in Development, along with annotations to help you internalize the use of the rubric for this trait.

Development Anchor: Response #1

After reading both stories i deciced the First story was more informable because the second story mainly talked about the pourpose of the struture. The First one told me how it was probley Built, it also told us what it ment to. From my point of veiw it looks more reasonable to chose author #1

SCORE POINT: 1

Development Anchor: Response #1

Annotations
SCORE POINT: 1

In response to the task and stimuli:

- **The student utilizes almost no evidence from the stimuli. For example:**
  - *The First one told me how it was probley Built, it also told us what it ment to.*

  While there is some relevant text evidence, it inadequately supports the student's opinion.

- **The student inadequately explains the evidence provided, demonstrating little understanding of the topic and stimuli. There is no explanation for the evidence provided in this brief response.**

Development Anchor: Response #2

I think the first text was better than the second one because, to me the first one had more facts about what and how people tried to findout about stonehenge. In the first story people were always trying to figure out why stonehenge was built and what it represents. A Detail that shows that is this, "Is it mere coincidence that the sun rises and sets over the Heel Stone on the summer and winter solstice, or was the placement of the stone chosen for that very purpose?" In the story they were always also wondering how they transported the ginourmous rocks from the mountains over to the Middle of an area. Another Detail that could represent this is. "Acorrding to these specialists the stones were dragged over land and perhaps towed along the shoreline to there destination." There are also many other facts about these two subjects in the story, but this why I injoyed this selection better than the second one.

SCORE POINT: 1

Development Anchor: Response #2

Annotations
SCORE POINT: 1

In response to the task and stimuli:

- **The response utilizes mostly irrelevant evidence from the stimuli to inadequately support the student's opinion. For example:**
    - *In the first story people were always trying to figure out why stonehenge was built and what it represents. A Detail that shows that is this, "Is it mere coincidence that the sun rises and sets over the Heel Stone on the summer and winter solstice, or was the placement of the stone chosen for that very purpose?"*

  The student only partially addresses the task. Although the response references the second text in the first and last sentences, all the evidence comes from the first text. The evidence provided inadequately supports the student's opinion.

- **The student inadequately or inaccurately explains the evidence provided, demonstrating little understanding of the topic and the stimuli. The response fails to provide any explanation of the evidence and does not connect the evidence to the student's opinion.**

Development Anchor: Response #3

My opinion is Stonehenge by John Hudson Tiner is better. I think this because he provides more facts about Stonehenge. For example, he says John Aubrey explored the site. He talks about who looked at it, and what they thought about it.

The one by Marjorie Frank, is good, but it dosent provide as much details. For example, she asks the reader numerous questions in the beggining. Then compared to his story, she dosen't have a lot of details. She talks about what she knows and he talks about what other people know.

These are some of the reasons I think the other one is better (the one by John Hudson Tiner). I mean he puts forth more detail about Stonehenge. He says what it acually probably was. Which is what it probably was. Who would go to an alter to get healed? That's my reasoning.

SCORE POINT: 1

Development Anchor: Response #3

Annotations
SCORE POINT: 1

In response to the task and stimuli:

- **The response utilizes mostly irrelevant evidence from the stimuli to inadequately support the student's opinion. For example:**
    - *. . . he says John Aubrey explored the site. He talks about who looked at it, and what they thought about it.*
    - *. . . she asks the reader numerous questions in the beggining.*

  The student presents evidence that is very general and repetitive. The evidence inadequately supports the student's opinion that "Stonehenge by John Hudson Tiner is better."

- **The student inadequately explains the evidence provided. For example:**
    - *Then compared to his story, she dosen't have a lot of details. She talks about what she knows and he talks about what other people know.*

  The student attempts to explain the evidence provided by comparing the two texts, but this mainly consists of statements such as "Frank . . . dosent provide as much details." The limited amount of evidence leaves little to be explained. The connections between the evidence and the student's opinion demonstrate little understanding of the topic and stimuli.

Development Anchor: Response #4

I think that John Hudson Tiner's is more illuminating because he explains theories thar authentic scientists said. By contrast, Marjorie Frank's doesn't use anything that real scientists said. John Hudson Tiner used what Inigo Jones, John Aubrey, William Gowland, and Norman Lockyer said and did so you could get some better facts. Another difference is that John made us aware of what was already known about Stonehedge, while Marjorie told us mainly what isn't known. If you read John's instead of Marjorie's, you would get more facts. John talked about what hapened to the stones when they were there. Also, he talked more about the solstice, and how it amazingly comes up behind a certain stone. John Hudson Tiner's essay may be alot shorter, but I think that it's more factual than Marjorie Frank's.

SCORE POINT: 2

Development Anchor: Response #4

Annotations
SCORE POINT: 2

In response to the task and stimuli:

- **The response utilizes mostly relevant but insufficient evidence from the stimuli to partially support the student's opinion. For example:**
    - *John Hudson Tiner used what Inigo Jones, John Aubrey, William Gowland, and Norman Lockyer said and did so you could get some better facts.*
    - *Also, he talked more about the solstice, and how it amazingly comes up behind a certain stone.*

  The response partially supports the writer's opinion that Tiner's text is "*more illuminating*" with evidence from the text.

- **The response explains some of the evidence provided, connecting some of the evidence to the student's opinion by comparing and contrasting the two texts. The response contains some inaccuracies in the explanations. For example:**
    - *By contrast, Marjorie Frank's doesn't use anything that real scientists said.*
    - *If you read John's instead of Marjorie's, you would get more facts.*

  Frank does utilize information from scientists, though she is less specific with her sources. Without more explanation, the assertion that John's text has more facts than Marjorie's is also inaccurate. The student demonstrates only a partial understanding of the topic and the stimuli.

Development Anchor: Response #5

I think the Aruther Marjorie Frank wrote the best story. I think she wrote the best story because she explaind things, like when she said something she would tell you about it. The other auther would not do that. For example, she told how long ago Stonehenge was built. However I still think that Jhon Hudson tiner did a very good job on the story just not as much as Marjorie Frank. By the Way Marjorie Frank also wrote more of an instresting Story, because it gave you way more details then the other Story. Here is an example in both story's they talk about the heel stone and the sun rises over it, Here is what Jhon Hudson Tiner said about it the sun rose directly over it as seen from the altar, here is what marjorie frank said about it a special stone called the Heel Stone stands at some distance from the main structure. Imagine standing at the center of the structure and looking toward it. If it were the morning of the summer or winter solstice you would see it directley over you. You see the difference she explains things way more then Jhon Hudson Tiner. I am going to tell you one more example then I will let you go. Marjorie Frank tells about how much it weighs. It weighs 40 tons. But Jhon Hudson tiner does not talk about that, he just does short little words to make a story. Even though it was a good story I think he was in a rush doing this story.

SCORE POINT: 2

Development Anchor: Response #5

Annotations
SCORE POINT: 2

In response to the task and stimuli:

- **The response utilizes mostly relevant but insufficient evidence from the stimuli to partially support the student's opinion. For example:**
  - *It weighs 40 tons.*
  - *. . . she told how long ago Stonehenge was built.*

  The response contains some general and some specific evidence from the text. The evidence partially supports the student's opinion that "Marjorie Frank wrote the best story."

- **The response explains some of the evidence provided, connecting some of the evidence to the student's opinion by comparing and contrasting the two texts. For example:**
  - *Here is an example in both story's they talk about the heel stone and the sun rises over it, Here is what Jhon Hudson Tiner said about it the sun rose directly over it as seen from the altar, here is what marjorie frank said about it a special stone called the Heel Stone stands at some distance from the main structure. Imagine standing at the center of the structure and looking toward it. If it were the morning of the summer or winter solstice you would see it directley over you. You see the difference she explains things way more then Jhon Hudson Tiner.*

  Although the student makes one specific comparison that is clearly explained, the other explanations mainly consist of statements such as "*The other auther would not do that*." Overall, the student demonstrates only a partial understanding of the topic and stimuli.

Development Anchor: Response #6

I think John Hudson Tiner is the better author. He gave a lot of information and evidence. His story was easy to follow. Marjorie did not give as much information or answers.

First of all, he used dates and brought up things that happened in order, like a timeline. He started by talking about theories scholars had in the 1500's and ended by talking about a theory Gerald Hawkins had in 1964. Marjorie Frank did not discuss information in order.

John gave a lot of information about Sun and Moon eclipses. Marjorie did not. She only talked about solar eclipses. The only thing she said was "the placement of the stones predicted solar eclipses." He told us about the 56 Aubrey Holes. They could be used to compute when eclipses would happen because eclipses repeat in cycles that last 56 years. You can see John gave more information.

Marjorie didn't give any real answers. However, John gave more information. He told us that there is a gigantic altar in Stonehedge. Marjorie did not talk about the Altar table or many other facts that John discussed.

Marjorie told theories and questions. Although, Marjorie gave some good theories, she didn't have many answers. She didn't really give much information. She admited that there was really only two answers she knew with certainty . . . The sun will rise over the Heel Stone to mark the next solstice, and that our understanding of Stonehedge will remain incomplete. Marjorie admits she does not have many answers. Yet, John gave more information than Marjorie.

John told us how everyone got more and more information over the centuries. Although he gives theories too, Marjorie gave mostly theories. We will get more answers from John.

Marjorie's story was not as good as John's. It had less information and answers. John Hudson Tiner is the better authoer because he gave more reasons, evidence, and information.

SCORE POINT: 3

Development Anchor: Response #6

Annotations
SCORE POINT: 3

In response to the task and stimuli:

- **The response utilizes relevant and sufficient evidence from the stimuli to adequately support the student's opinion. For example:**
    - *John gave a lot of information about Sun and Moon eclipses. Marjorie did not. She only talked about solar eclipses. The only thing she said was "the placement of the stones predicted solar eclipses." He told us about the 56 Aubrey Holes. They could be used to compute when eclipses would happen because eclipses repeat in cycles that last 56 years.*

  The student specifically chooses evidence from both texts to support the opinion that "*John Hudson Tiner is the better author*."

- **The response adequately and accurately explains and elaborates on the evidence provided, connecting the evidence to the student's opinion by comparing and contrasting the two texts. For example:**
    - *She admited that there was really only two answers she knew with certainty . . . The sun will rise over the Heel Stone to mark the next solstice, and that our understanding of Stonehedge will remain incomplete. Marjorie admits she does not have many answers. Yet, John gave more information than Marjorie.*

  The response connects the evidence to the student's opinion by explaining that "*Marjorie admits she does not have many answers.*" The student demonstrates a sufficient understanding of the topic and the stimuli.

Development Anchor: Response #7

I just finished reading two articles about Stonehenge. They were both titled Stonehenge, but one was by Marjorie Frank and the other was by John Hudson Tiner. In my opinion, I think the article that John wrote was better than Marjorie's. His article was more interesting because it talked about some things that Marjorie's did not, and went into more details about some of the things that both articles talked about.

One thing that made Tiner's article interesting was how he talked about the different theories people have had over the years about who built Stonehenge. To start with, he talks about how, in 1620, Inigo Jones concluded that the romans had built Stonehenge. Next, he talks about how John Aubrey, in 1650, discovered a trench around Stonehenge and based on this discovery, Aubrey thought that the Druids had built stonehenge. Later that thoery was disproved when tools such as sandstone axes and hammers that were much older than the Druids were discovered at Stonehenge. Marjorie doesn't write about the different theories people had in the past about who built Stonehenge. She just states that "Stonehenge was built in phases from about 3100 B.C. to 1600 B.C." and that "Stone Age" people built it. Those are some interesting old theories that she left out!

Both articles talked about Stonehenge being used as an astronomical calender but Tiner went into much more detail. For instance, Tiner writes "Eclipses of the sun and moon repeat in a cycle that lasts 56 years. By moving stones around the Aubrey holes, the ancient people could have computed the dates of solar and lunar eclipses." All Frank says about eclipses is that "the placement of the stones predicted solar eclipses." As you can see, Tiner was much more specific.

Overall, John Hudson Tiner's article was more interesting.

SCORE POINT: 3

Development Anchor: Response #7

Annotations
SCORE POINT: 3

In response to the task and stimuli:

- **The response utilizes relevant and sufficient evidence from the stimuli to adequately support the student's opinion. For example:**
    - *To start with, he talks about how, in 1620, Inigo Jones concluded that the romans had built Stonehenge. Next, he talks about how John Aubrey, in 1650, discovered a trench around Stonehenge and based on this discovery, Aubrey thought that the Druids had built stonehenge. Later that thoery was disproved when tools such as sandstone axes and hammers that were much older than the Druids were discovered at Stonehenge.*
    - *She just states that "Stonehenge was built in phases from about 3100 B.C. to 1600 B.C." and that "Stone Age" people built it.*

  The student specifically chooses evidence from both texts to support the student's opinion that "the article that John wrote was better than Marjorie's."

- **The response adequately and accurately explains and elaborates on the evidence provided, connecting the evidence to the student's opinion by comparing and contrasting the two texts. For example:**
    - *Both articles talked about Stonehenge being used as an astronomical calender but Tiner went into much more detail. For instance, Tiner writes "Eclipses of the sun and moon repeat in a cycle that last 56 years. By moving stones around the Aubrey holes, the ancient people could have computed the dates of solar and lunar eclipses." All Frank says about eclipses is that "the placement of the stones predicted solar eclipses." As you can see, Tiner was much more specific.*

  The student explains how the evidence supports the student's opinion. The response demonstrates a sufficient understanding of the topic and the stimuli.

Development Anchor: Response #8

The two articles about Stonehenge are both fascinating. Marjorie Frank's article, "Stonehenge" focuses on the different theories of how and why Stonehenge was created. The article by John Tiner, also entitled "Stonehenge, also raised theories, but had a better approach. I think Tiner's article is more compelling because it is more like a timeline and contains more details.

Marjorie Frank's article talked what we know about Stonehenge, such as the age, the stones themselves, and the placement, and then floated different theories about why Stonehenge exists. Tiner 's article was more comprehensive. He discusses the background of the stones and even brings ideas not discussed by Frank such as the Alter which "convinced scholars of the 1500s that the monument served as a temple." Tiner also brings in that "In 1620, Inigo Jones made the first accurate drawings of the monument." This was pivotal because he was a builder and he knew the concept was too old to have been created by the people in Britain. He thought that it was the "ruins of a Roman temple, put in place about A.D. 100." That seemed like a good idea, but Stonehenge was older than that so the idea of Roman construction was out too. Then in 1650 a man named John Aubrey found a trench build around the ruins and concluded the Druids had "used Stonehenge as a temple." It wasn't until 1880 that a geology professor name William Gowland "found flint and sandstone axes and hammers that had been used in its construction. The ancient tools came from a time before the Druids. Stonehenge had to be more than a thousand years old when the Druids came on the scene." So, Stonehenge has been confusing researchers all along, but Archaeologists believe "ancient people began construction about 3500 B.C." I think that kind of timeline is more concise than Frank's article. She never even mentions the possibilities of the Romans and the Druids, and Tiner's article is easier to follow because it lets you know what was happening at each point in history.

And he doesn't stop there. Tiner goes on to say that weather and tourists took a toll. In 1958, Britain raised the fallen stones and tried to set it back the way it was during the time of the Roman invasion. So why did the ancient people build this site? Marjorie Frank discusses this in a vague section called "What We Imagine." She says it could be an

Continued on the next page . . .

Development Anchor: Response #8

"astronomical calendar . . . the stones predicted solar eclipses and marked the summer and winter solstices." But Tiner digs deeper and reveals that astronomer Norman Lockyer was able to show that the sun always rose over a certain stone on the first day of summer. Other scientists figured out the 56 Aubrey holes could be used to predict eclipses. "Eclipses of the sun and moon repeat in a cycle that lasts 56 years. By moving stones around the Aubrey holes, the ancient people could have computed the dates of solar and lunar eclipses." By 1964, Gerald Hawkins believed that two stones would have been all you needed to mark the solstice, but "the Stonehenge builders carved hundreds of stones that weighed thousands of tons and placed them in position." They did this for a specific reason. "Hawkins took detailed measurements from aerial photographs" and put that information into a computer showing that Stonehenge was "an elaborate astronomical observatory."

Although both articles discuss theories about Stonehenge, John Tiner's is easier to follow and more detailed. In the end, Marjorie Frank's article only arrives at more speculation, instead of the detailed historical overview and analysis that we get from Tiner. In my opinion, John Tiner wrote the best article.

SCORE POINT: 4

Development Anchor: Response #8

Annotations
SCORE POINT: 4

In response to the task and stimuli:

- **The response utilizes well-chosen, relevant, and sufficient evidence from the stimuli to insightfully support the student's opinion. For example:**
    - *"In 1620, Inigo Jones made the first accurate drawings of the monument . . ." He thought it was the "ruins of a roman temple, put in place about A.D. 100."*
    - *Then in 1650 a man named John Aubrey found a trench build around the ruins and concluded the Druids had "used Stonehenge as a temple."*
    - *It wasn't until 1880 that a geology professor name William Gowland "found flint and sandstone axes and hammers that had been used in its construction. The ancient tools came from a time before the Druids."*

  The response uses significant amounts of well-chosen text to support the student's opinion that "*Tiner's article is more compelling because it is more like a timeline and contains more details*."

Continued on the next page . . .

Development Anchor: Response #8

- **The response thoroughly and accurately explains and elaborates on the evidence provided, connecting the evidence to the student's opinion by comparing and contrasting the two texts. For example:**
    - *She says it could be an "astronomical calendar . . . the stones predicted solar eclipses and marked the summer and winter solstices." But Tiner digs deeper and reveals that astronomer Norman Lockyer was able to show that the sun always rose over a certain stone on the first day of summer. Other scientists figured out the 56 Aubrey holes could be used to predict eclipses. "Eclipses of the sun and moon repeat in a cycle that lasts 56 years. By moving stones around the Aubrey holes, the ancient people could have computed the dates of solar and lunar eclipses."*

  The response connects the evidence to the student's opinion by clearly demonstrating that Tiner's article contains more details and more thorough explanations of Stonehenge. The response demonstrates a clear understanding of the topic and the stimuli.

Sample Student Thesis

Elementary School

Sample Thesis 1:
I think Tiner's article is more compelling because it is more like a timeline and contains more details.

Analysis: While this thesis is simplistic, it does successfully convey the author's opinion ("I think Tiner's article is more compelling") and gives a *specific* reason why.

Sample Thesis 2:
Although Marjorie Frank's article contains factual information regarding Stonehenge, John Tiner's article did a better job of explaining the mystery that surrounds Stonehenge and includes more details about certain aspects of Stonehenge, especially its use as an astronomical calendar. [. . .] In my opinion, Tiner wrote the better article.

Analysis: This thesis is actually drawn from two different sentences in the introduction. Note that in the first sentence the author explains in detail the reasons why one article is a stronger argument. In the second sentence the author sums up her argument with a confident claim. While it is usually a good idea to keep a thesis to one sentence in a short essay (it is also easier to teach students to do it that way), there are no hard and fast rules. This student successfully uses a second sentence as a rhetorical punctuation of her thesis.

Peer Review Exercise: Evaluating Thesis Statements (Elementary School)

A good thesis does two things:

1) It answers the prompt.
2) It has three qualities (DDS):
   - **D**ebatable: A classmate could disagree. Otherwise, the thesis is just a fact (for example, "No one knows for sure why or how Stonehenge was built.") and there is nothing to prove!
   - **D**efensible: There is enough textual evidence to prove the thesis is true.
   - **S**pecific: The thesis makes a clear, specific point instead of a general one.

Now that you know the characteristics of a good thesis, evaluate your partner's thesis by completing the following steps.

a) What questions does this thesis need to answer? Turn the prompt into one or two **questions** and write them below:

b) Write your partner's **thesis** below:

c) Does your partner's thesis **answer the questions** from the prompt? If so, how do you know? If not, what could your partner do to better answer the questions?

d) Is your partner's thesis **debatable**? Imagine that you take the opposite point of view. How might you disagree with your partner's thesis? (If you can't come up with any ideas, chances are the thesis isn't really debatable.)

e) Is your partner's thesis **defensible**? Find two pieces of evidence from each text that might prove this thesis. If you can't find two, chances are the thesis is not strongly defensible.

Text 1 evidence:
Text 2 evidence:

f) Is your partner's thesis **specific**? In your partner's thesis in part b), **underline** words or ideas that are specific. **Circle** words or ideas that are general or vague.

g) Once this sheet is complete, exchange it with your partner. Your partner should **revise** his or her original thesis based upon your feedback.

Quotes on the Writing Process

Revision, Editing, and Proofreading

"In general *revision* is best thought of as re-vision, re-looking, re-working of a piece of writing. This may include changing significant portions of the writing, such as rearranging sections, deleting sections, rewriting openings and closings, or even refocusing the entire piece. Revision can transform a piece of writing.

Editing, on the other hand, is a look at a revised piece of writing to review and change word order and sentence structure and to check usage issues. At this stage the major changes in the writing have been established; the changes made in editing are less intrusive and far less significant to the meaning of a final piece of writing.

Proofreading is a last look at a revised, edited piece, and it includes verification that all minor details of usage are addressed (such as capitalization, indentation of paragraphs, and sufficient spaces between title and body). It is a final polishing."

Source: Gere, Ann Ruggles, Leila Christenbury, and Kelly Sassi. *Writing on Demand: Best Practices and Strategies for Success*. Portsmouth, NH: Heinemann, 2005.

What is revision?

"Revision takes you from self to society, from the writer's concerns to the readers' concerns"

Source: Bishop, Wendy. "Introduction." *Acts of Revision: A Guide for Writers*. Ed. Wendy Bishop. Portsmouth, NH: Boynton/Cook (Heinemann), 2004. v-x.

"Generally, revision has been understood not as a step in which the author corrects errors, but as a process of discovering what one has to say and adapting the text to maximize the clarity of the message."

Source: Pritchard, Ruie J. and Ronald Honeycutt. "The Process Approach to Writing Instruction: Examining its Effectiveness." Handbook of Writing Research. Edited by Charles A. MacArthur, Steve Graham, and Jill Fitzgerald. New York: Guilford, 2005.

Providing Feedback on Writing
(Guidelines for Quality Feedback)

Guideline	Poor practice/Example(s)	Best practice/Example(s)
1) Align comments to the expectations of the rubric.	• Feedback touches on aspects of writing not addressed in the task or rubric.	• Feedback matches aspect of writing or expectation addressed in the task or rubric.
2) Feedback should be grade appropriate.	• Telling an elementary student to maintain parallel structure (not addressed in CCSS until high school).	• Helping an elementary student form grammatically correct sentences.
3) Be specific.	• "Good job."	• "I like how you used precise words like 'illogical' and 'repetitive' to refute your opponent's argument."
	• "Awkward."	• "The construction of this sentence makes your point unclear – think about your verb placement."
	• "Need more explanation."	• "Your point about the author's tone in paragraph three is undeveloped."
4) Emphasize content.	• Comments focus predominantly on conventions (grammar, usage, formatting).	• Comments focus on the quality of the student's ideas and his/her ability to develop, organize, and effectively communicate those ideas.
5) Balance feedback between positive reinforcement and suggestions for improvement.	• Provide exclusively negative comments for a bad paper or exclusively positive comments for a great paper.	• A seed of promise can be found in the worst essay; even the best writers have room to improve.
6) Don't give it all away.	• "You need a semicolon here because this sentence has two independent clauses."	• "What would be a more appropriate punctuation mark for this type of sentence?"

Accountable Talk® Features and Indicators

Accountability to the Learning Community

- Active participation in classroom talk
- Listen attentively
- Elaborate and build on each other's ideas
- Work to clarify or expand a proposition

Accountability to Knowledge

- Specific and accurate knowledge
- Appropriate evidence for claims and arguments
- Commitment to getting it right

Accountability to Rigorous Thinking

- Synthesize several sources of information
- Construct explanations and test understanding of concepts
- Formulate conjectures and hypotheses
- Employ generally accepted standards of reasoning
- Challenge the quality of evidence and reasoning

Accountable Talk® Moves

Talk Move	Function	Example
To Ensure Purposeful, Coherent, and Productive Group Discussion		
Marking	Direct attention to the value and importance of a student's contribution.	That's an important point.
Challenging	Redirect a question back to the students or use students' contributions as a source for further challenge or query.	Let me challenge you: Is that always true?
Revoicing	Align a student's explanation with content or connect two or more contributions with the goal of advancing the discussion of the content.	S: 4 + 4 + 4. You said three groups of four.
Recapping	Make public in a concise, coherent form, the group's achievement at creating a shared understanding of the phenomenon under discussion.	Let me put these ideas all together. What have we discovered?

institute for learning

TNCore

Resource

Accountable Talk® Moves and Functions

Teacher Move	Function	An Example
To ensure purposeful, coherent, and productive group discussion		
1. Marking	Direct attention to the value and importance of a student's contribution.	"I hear you saying _____. Let's keep this idea in mind."
2. Challenging students	Redirect a question back to the students or use student's contributions as a source for a further challenge or inquiry.	"What do YOU think?" "What surprised you about what you just heard about the text's _____?"
3. Modeling	Make one's thinking public and demonstrate a total performance in order to help learners understand the essence of the activity and to develop a mental picture of what the real thing looks like.	"Here's what good readers do…"
To support accountability to accurate knowledge		
4. Pressing for accuracy	Hold students accountable for the accuracy, credibility, and clarity of their contributions.	"Where can we find that…?" "What is your basis for that conclusion?" "Who said that?"
5. Building on prior knowledge	Tie a current contribution back to knowledge accumulated by the class at a previous time.	"How does this connect…?" How do we define _____ in this context?" "What else comes to mind given our discussion about _____?"
To support accountability to rigorous thinking		
6. Pressing for reasoning	Elicit evidence and establish what contribution a student's utterance is intended to make within the group's larger enterprise.	"Why do you think that…?" What evidence from the text supports your claim? How does this idea contrast with _____?"
7. Expanding reasoning	Open up extra time and space in the conversation for student reasoning.	"Take your time… say more." "Given what we just read and discussed, what would you now say about _____?"
8. Recapping	Make public in a concise, coherent way, the group's developed, shared understanding of the content or text under discussion.	"What have we discovered?" So far, we have discussed the following …What else do we need to address?"
To support accountability to the learning community		
9. Keeping the channels open	Ensure that students can hear each other, and remind them that they must hear what others have said.	"Please say back what _____ just said."
10. Keeping everyone together	Ensure that everyone not only heard, but also understood what a speaker said.	"Do you agree or disagree with what _____ just said? Explain your thinking."
11. Linking contributions	Make explicit the relationship between a new contribution and what has gone before.	"Who wants to add on to …? "What do you notice is missing?"
12. Verifying and clarifying	Revoice a student's contribution, thereby helping both speakers and listeners to engage more profitably in the conversation.	"So, are you saying…?"

© 2013 UNIVERSITY OF PITTSBURGH

Peer Review Sample Exercise

Name of reviewer: _____

Author's name: _____

Instructions:

1) Read your partner's paper, writing in marginal comments and questions and making proofreading marks if you wish

2) At the end of your partner's paper, write your partner a brief letter explaining what you liked about the paper and what you think is the main area for improvement

3) Fill out the peer review form below. As you make comments on specific words or sentences, highlight those parts in the paper so the author can refer back to the places he/she needs to work on the most.

I. Thesis

- Is it Debatable?
- Is it Defensible?
- Is it Specific?
- Does it present an original, compelling, and sophisticated understanding of the text?

II. Introduction/Conclusion

- Does the introduction provide a compelling lead-in to the essay?
- Does the conclusion provide satisfying closure and answer the question "so what"?

III. Body structure and organization:

- Does each body paragraph have or suggest a strong topic sentence?

- Does each topic sentence match the focus of the thesis?
- Is there a body paragraph to correlate with each aspect of thesis?

III. Evidence

- Does the author provide sufficient evidence to back up the thesis?
- Is the evidence provided relevant and accurate?
- Are individual paragraphs built around multiple pieces of evidence?

IV. Analysis:

- Is the evidence analyzed or elaborated upon sufficiently?
- Is the analysis grounded *closely* in the language and details of the text?
- Does the analysis match the focus of the thesis and topic sentence?

VI. Miscellaneous:

- Does the author transition smoothly between paragraphs?
- Are there any points in the essay where the meaning is unclear?
- Do mechanical errors obstruct meaning in any way?

Writing Survey Questions

1. How often is the following statement true for you? I like to write.
A. Almost always
B. More than half the time
C. About half the time
D. Less than half the time
E. Rarely or never

2. What kinds of grades do you typically receive on writing assignments for your class?
A. Mostly A's
B. Mostly B's
C. Mostly C's
D. Mostly D's or below

3. How often do you write in subjects other than Language Arts or English?
A. Almost every day
B. Once or twice per week
C. Once or twice per month
D. Rarely
E. Never

4. How often do you work in pairs or small groups to discuss each others' writing?
A. Almost every day
B. Once or twice per week
C. Once or twice per month
D. Rarely or never

5. How frequently do you make notes or an outline before you begin writing a paper?
A. Almost always
B. More than half the time
C. About half the time
D. Less than half the time
E. Rarely or never

6. How often do you use a computer to aid in your writing assignments?
A. Weekly
B. Monthly
C. Rarely
D. Never

7. How often do you use the computer (at school) to write in a log or journal?
A. Almost every day
B. Once or twice per week
C. Once or twice per month
D. Never or hardly ever

8. How often do you use the computer (at school) to develop a story or report?
A. Almost every day
B. Once or twice per week
C. Once or twice per month
D. Never or hardly ever

9. How often do you use a computer to make changes to the paper or report (for example, spell-check, or cut and paste)?
A. Almost always
B. Sometimes
C. Never or hardly ever

10. If you could choose, how would you take the TCAP Writing Test?
A. Write your paper with a pen or pencil
B. Type your paper at a computer

State-level Writing Practices

To better understand writing instruction in Tennessee, we examined student responses to survey questions administered with the 2013 Writing Assessment. The questions asked about writing practices and practice using computers for writing. We also looked at 2012-13 school-level technology survey data to determine computer resources available to educators and students.

Students responded to 10 questions about their writing instruction and writing practice. The survey questions included in this research are listed below:

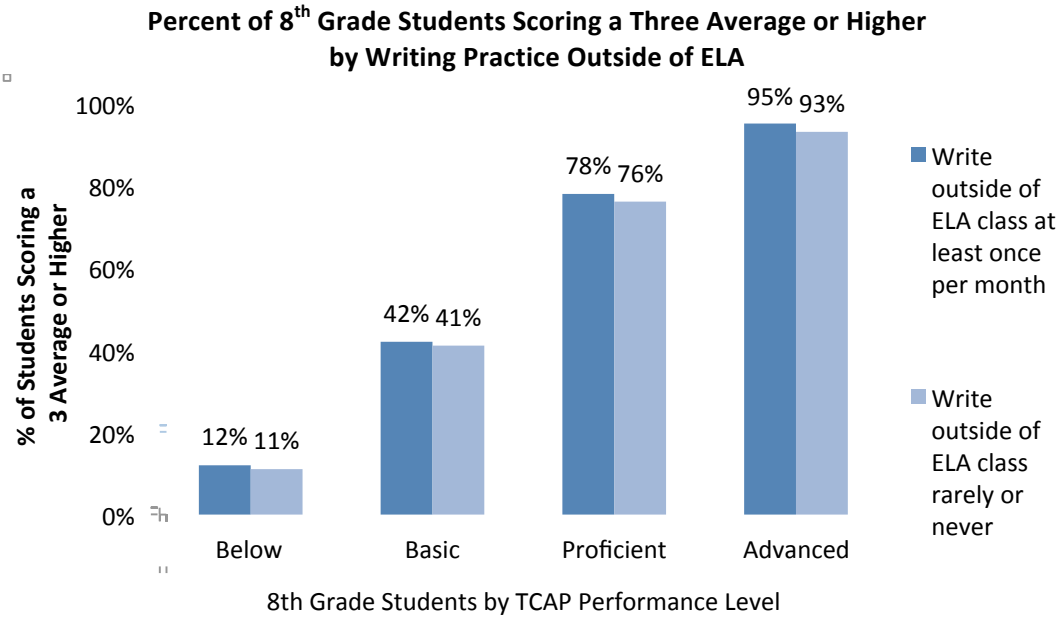
1. How often do you write in subjects other than Language Arts or English?
2. How often do you work in pairs or small groups to discuss each other's writing?
3. How frequently do you make notes or an outline before you begin writing a paper?
4. How often do you use a computer to aid in your writing assignments?

The first three questions were selected based on research that identifies writing across content, discussing writing with peers, and making notes or an outline before writing as key writing practices. The fourth question was included given the importance of computer literacy for college and career readiness and the move to online testing. For the 2013 Writing Assessment, 88 percent of eleventh graders, 86 percent of eighth graders, and 12 percent of fifth graders took the test online.

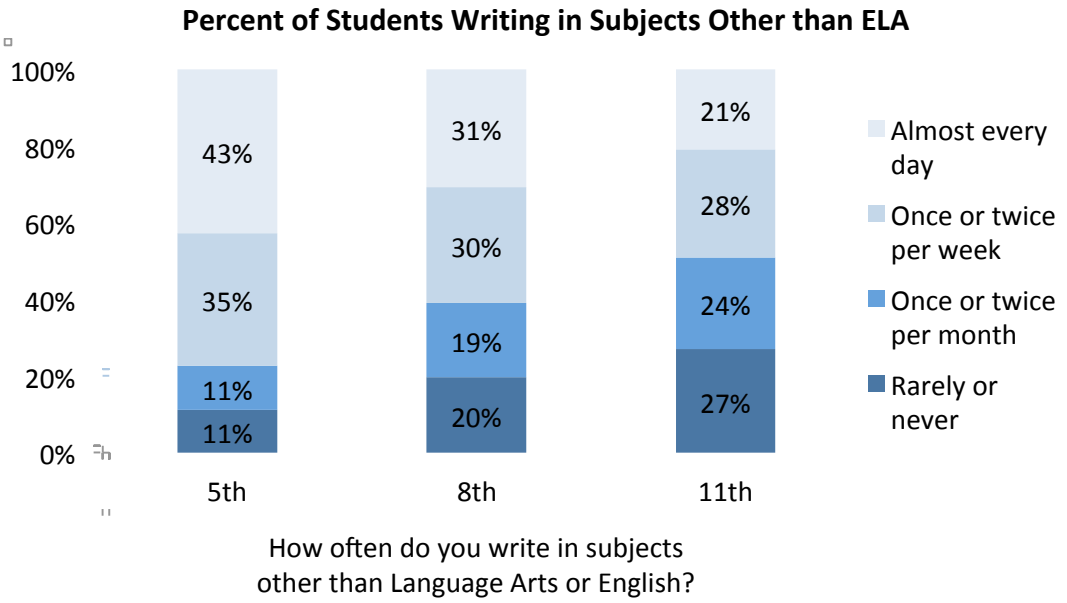
State-level findings show that students who reported more frequently (a) writing in non-ELA courses, (b) working with peers to discuss writing, and (c) making notes or an outline before writing had higher Writing Assessment scores. The survey data also reveal that while some students in Tennessee are engaging in these practices, many others are not. Findings also show economically disadvantaged students reported significantly less practice using computers for writing, although they have slightly more computers per student in their schools.

Writing Practice Outside of English/Language Arts Classes

- Students who reported more frequent writing practice outside of their English/Language Arts classes received higher scores on the 2013 Writing Assessment compared to their peers with similar TCAP scores. The graph below includes 8th grade students, but the same trend was seen for students in grades 5 and 11 (see Appendix).



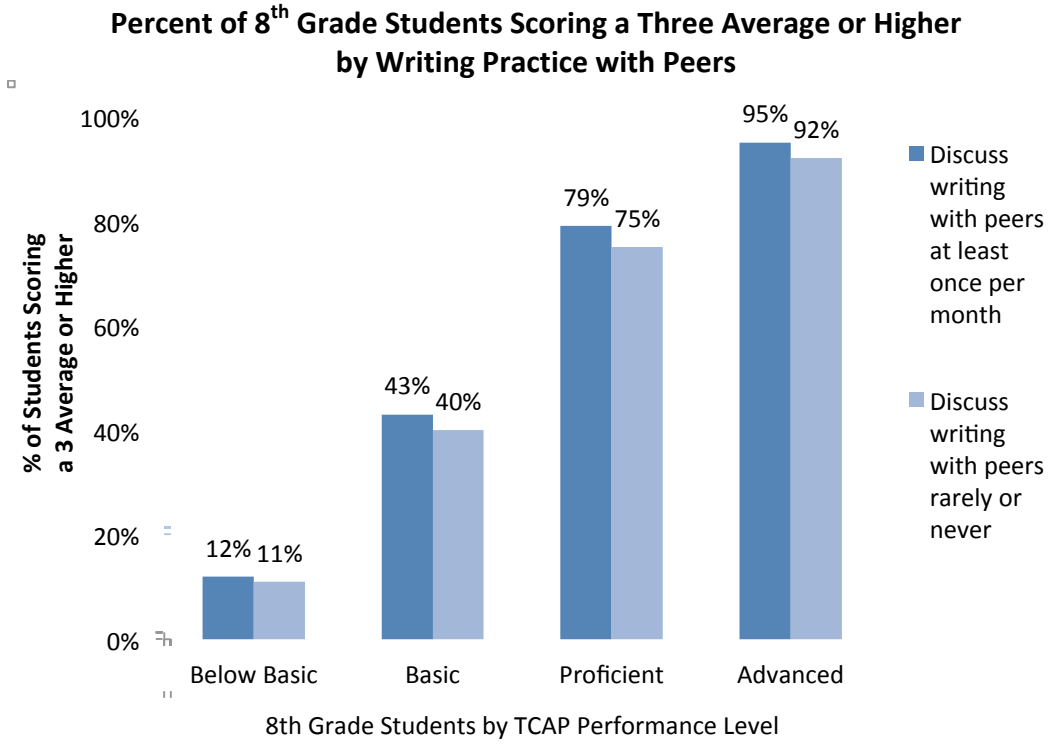
- About half or more of the students in each grade reported writing in subjects other than ELA at least once or twice per week. About one-third of 11th graders reported rarely or never writing in subjects other than ELA.



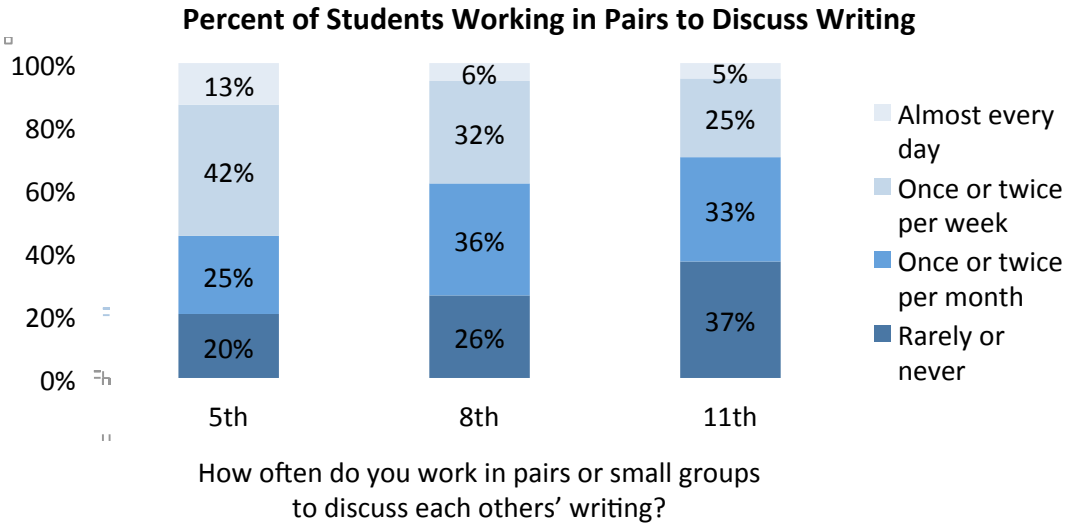
TNCore

Writing Practice with Peers

- Students who reported more frequently working with peers to discuss their writing received higher scores on the 2013 Writing Assessment compared to their peers with similar TCAP scores. The graph below includes 8th grade students, but the same trend was seen for students in grades 5 and 11.



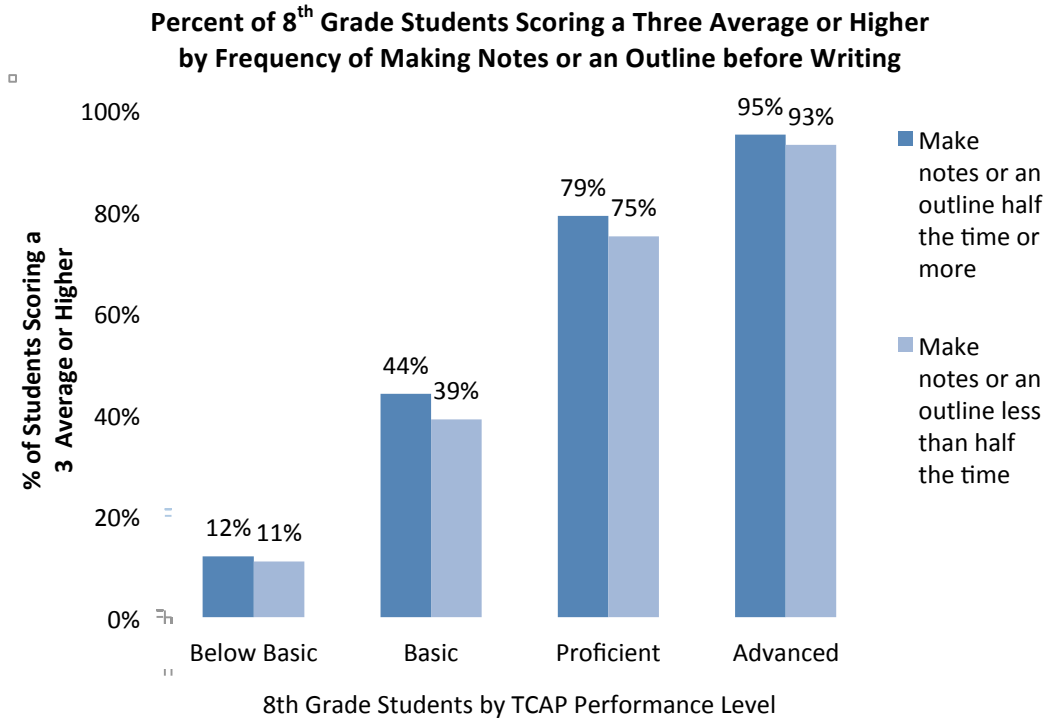
- Over half of the students in grade 5 and about one-third of students in grades 8 and 11 reported working in pairs to discuss writing at least once or twice per week. Twenty percent or more of students in each grade reported rarely or never doing so.



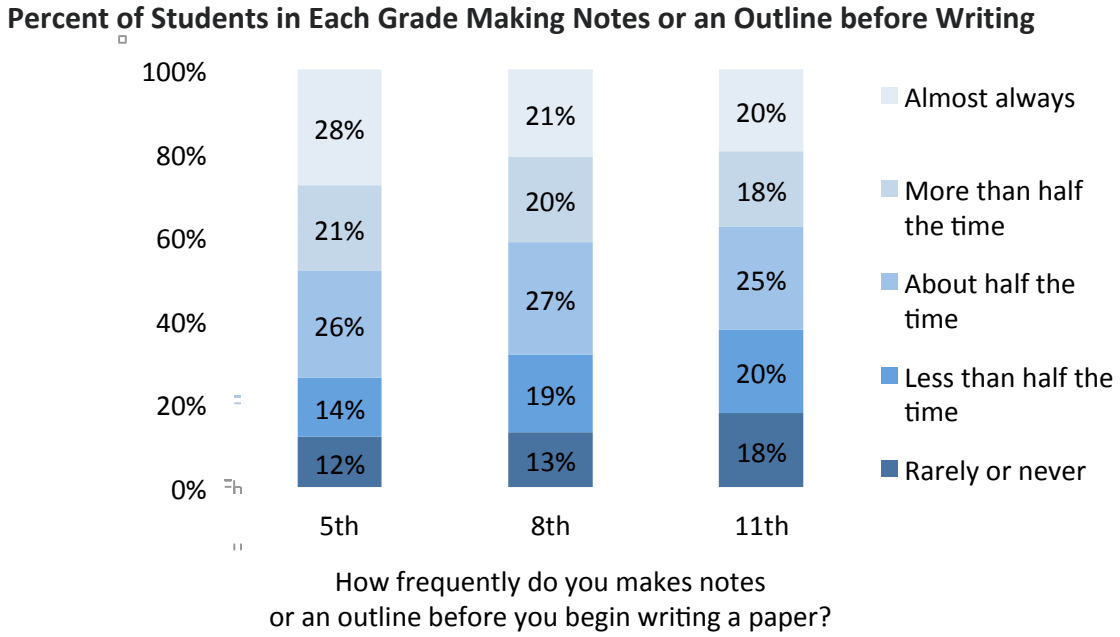
TNCore

Making Notes or an Outline before Writing

- Students who reported more frequently making notes or an outline before writing received higher scores on the 2013 Writing Assessment compared to their peers with similar TCAP scores. The graph below includes 8th grade students, but the same trend was seen for students in grades 5 and 11.



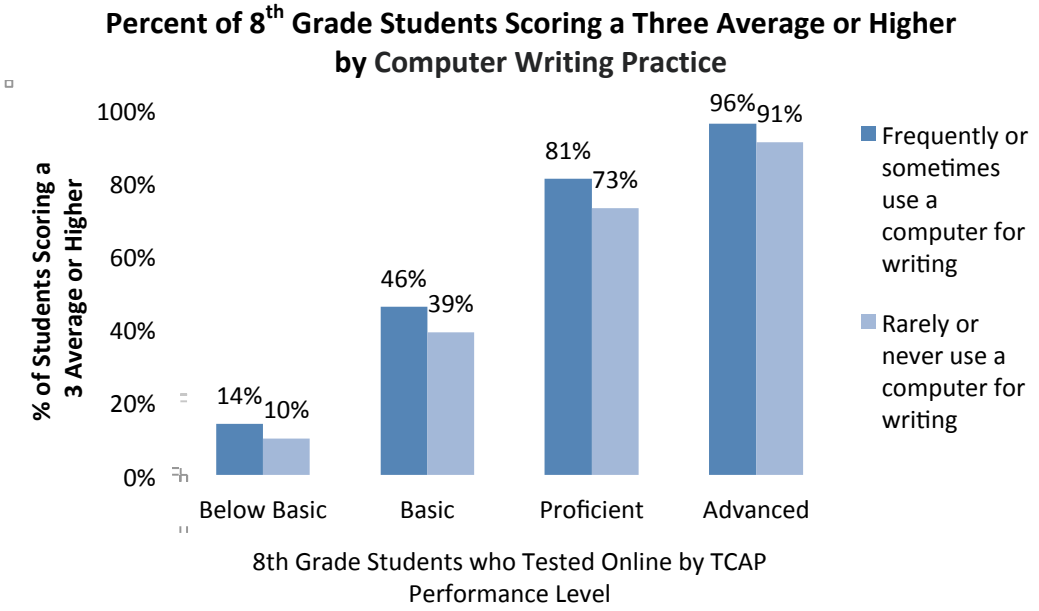
- Less than one-third of students from each grade level reported almost always making notes or an outline before writing.



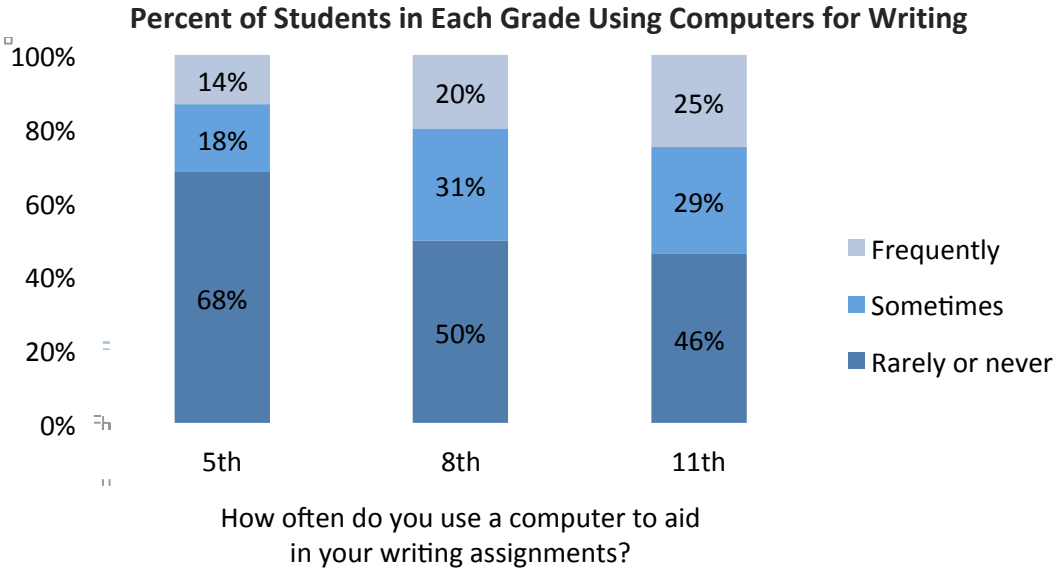
TNCore

Computer Writing Practice

- When taking the 2013 Writing Assessment online, students who reported frequently or sometimes using computers for writing assignments received higher scores compared to their peers with similar TCAP scores. The graph below includes 8th grade students, but the same trend was seen for students in grades 5 and 11.



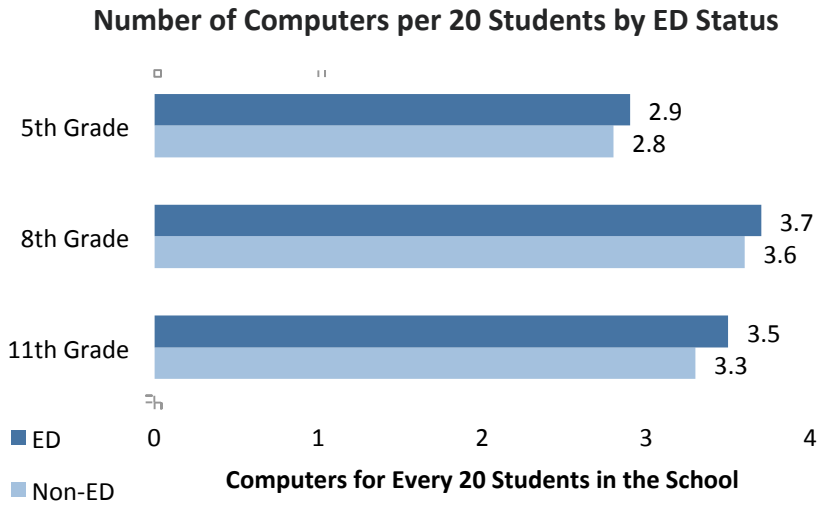
- About half of students or more in grades 5, 8, and 11 reported rarely or never using computers for writing assignments. Older students reported more frequent use of computers for writing assignments. The survey question did not specify whether this computer use was occurring at home or school; therefore, it is difficult to determine where this practice is occurring.



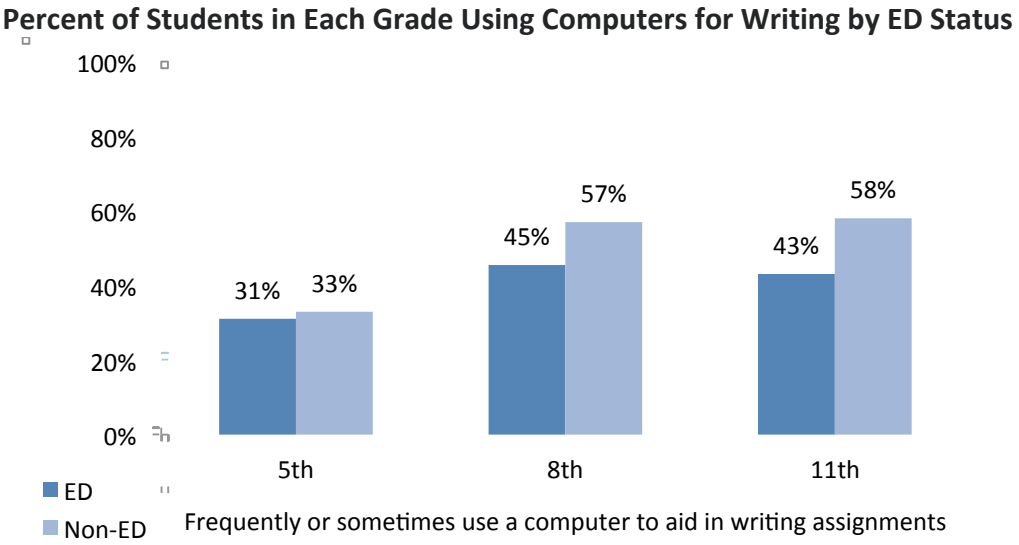
TNCore

Differences in Technology Resources and Computer Writing Practice by Economically Disadvantaged (ED) Status

- On average, ED students had slightly more computers per student in their schools than non-ED students.



- However, ED students reported significantly less practice using computers for writing.

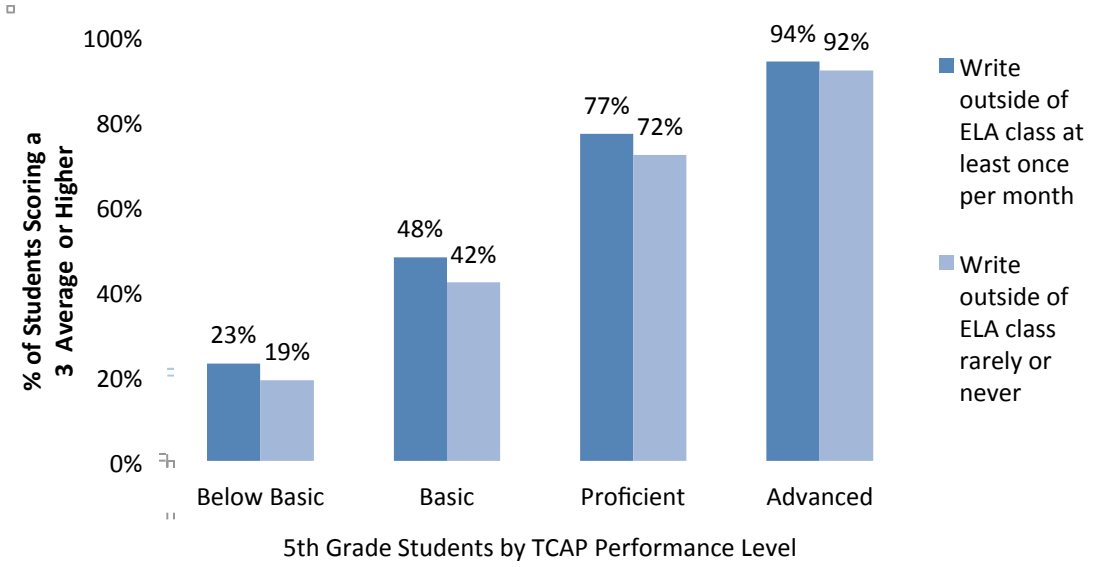


- ED and non-ED students gave similar responses regarding frequency of writing practice outside of ELA classes, writing practice with peers, and making notes or an outline before writing (not shown).

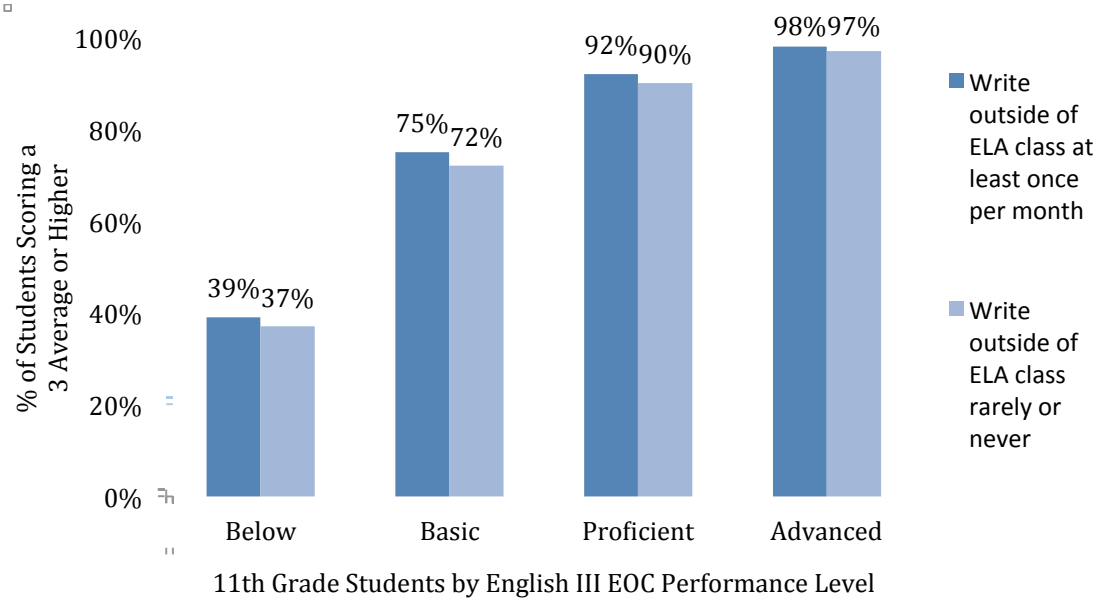
Writing Practice Outside of English/Language Arts Classes

Percent of 5th Grade Students Scoring a Three Average or Higher

by Writing Practice Outside of ELA

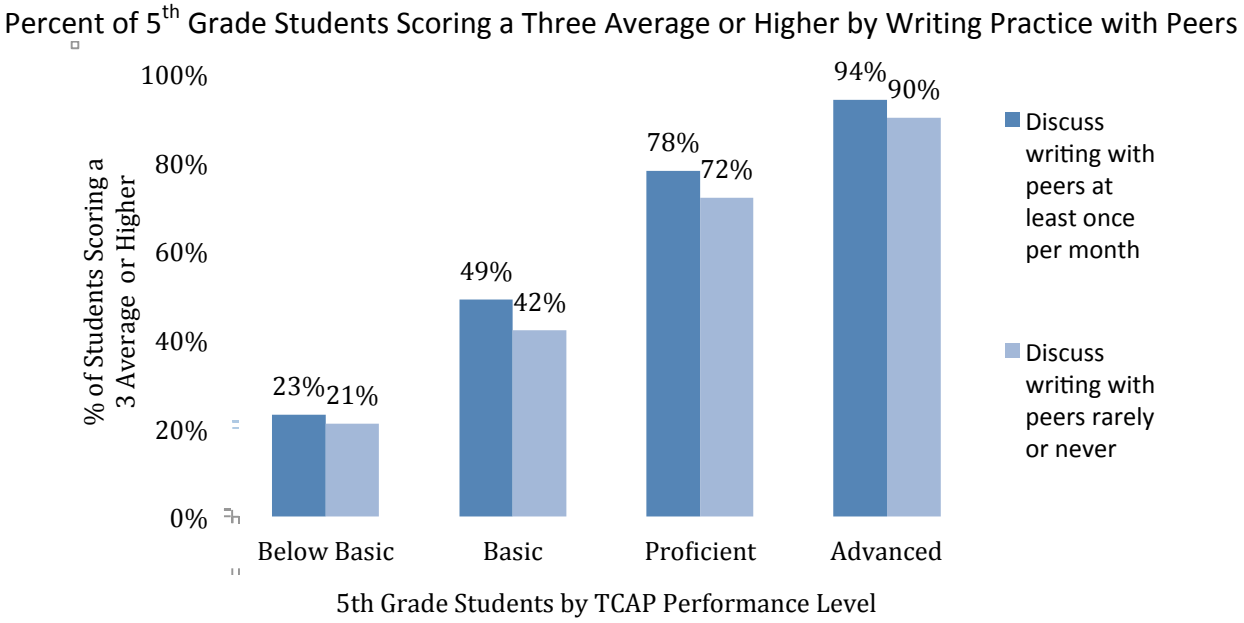


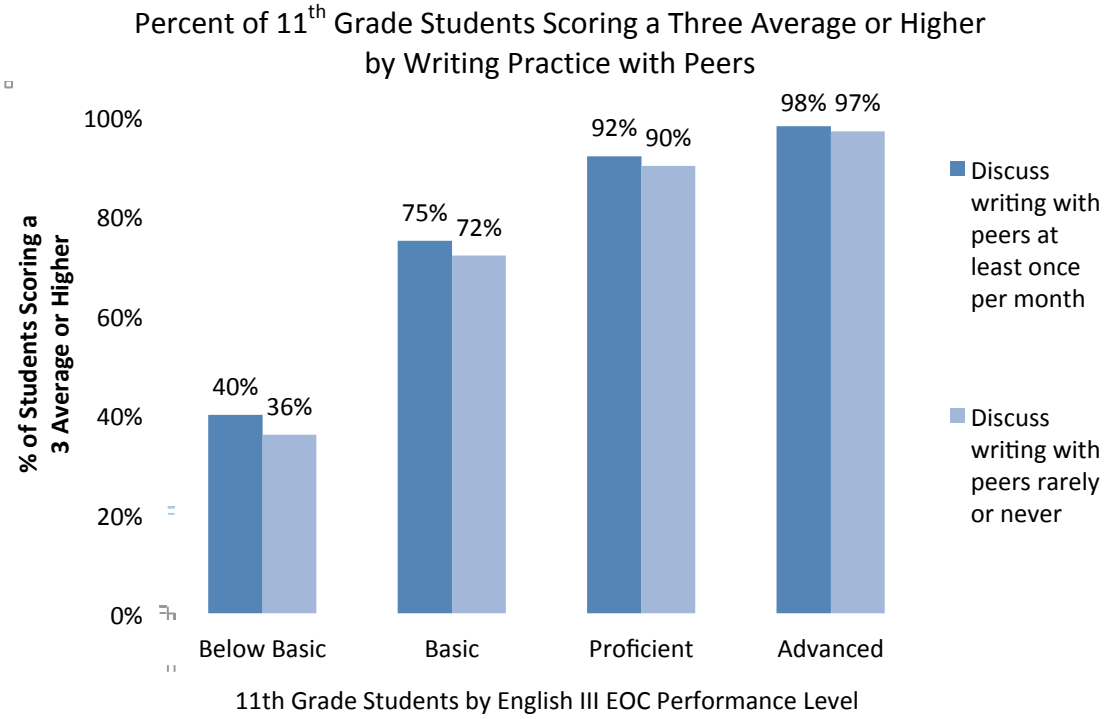
Percent of 11th Grade Students Scoring a Three Average or Higher by Writing Practice Outside of ELA



TNCore

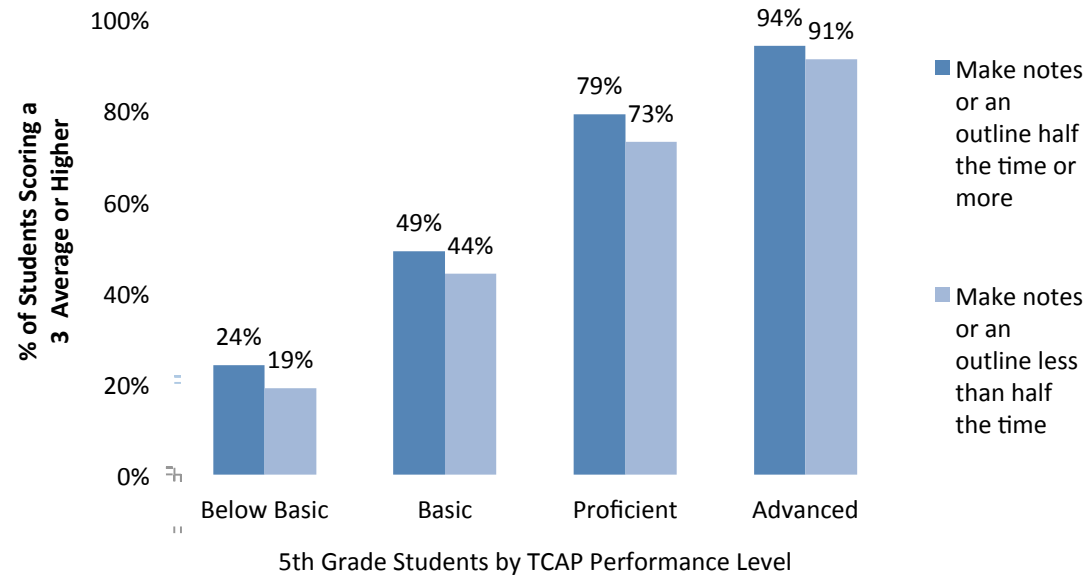
Writing Practice with Peers



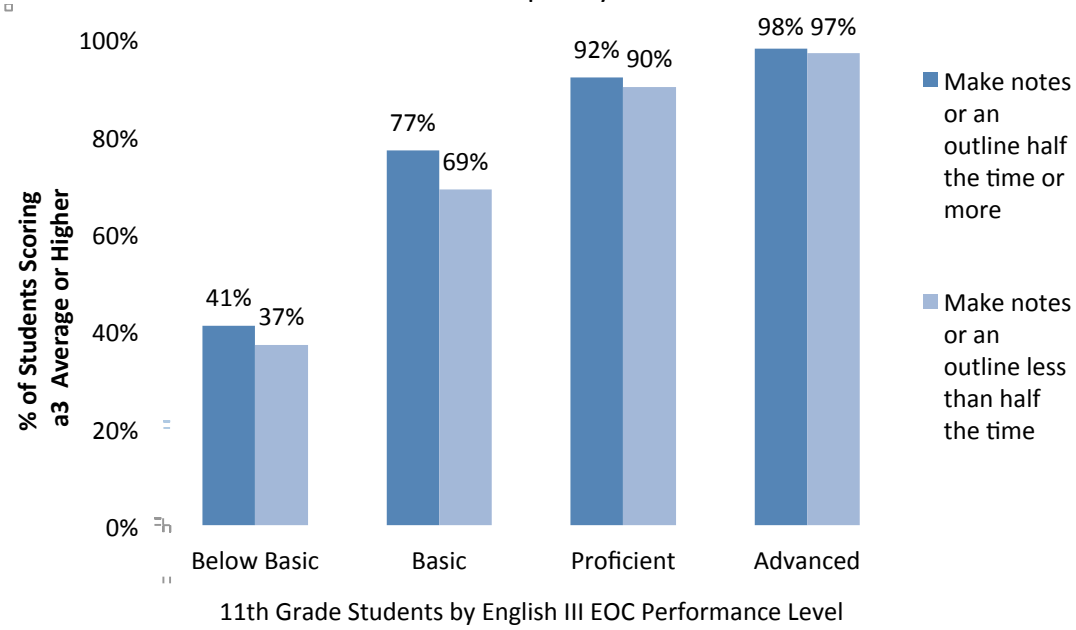


Making Notes or an Outline before Writing

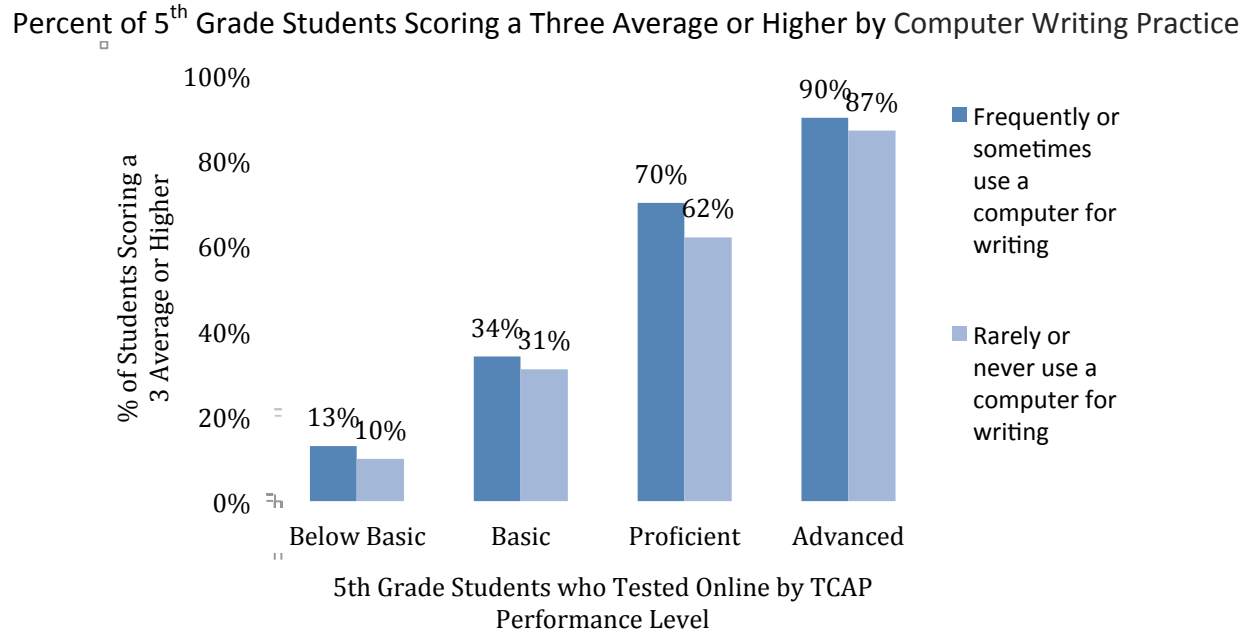
Percent of 5th Grade Students Scoring a Three Average or Higher by Making Notes/Outline Frequency

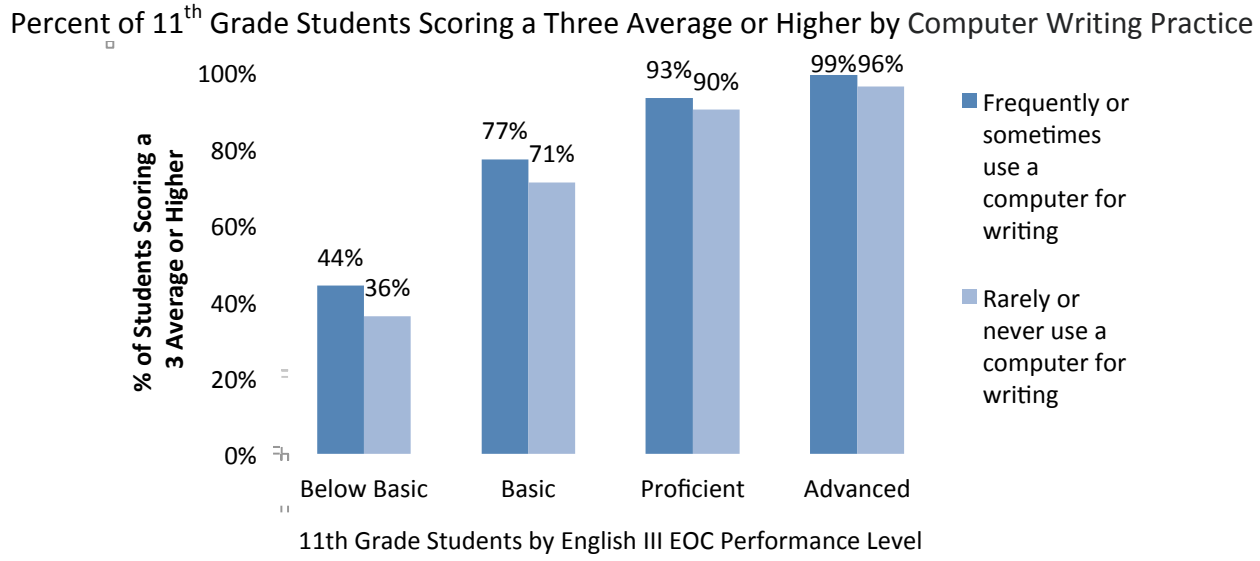


Percent of 11th Grade Students Scoring a Three Average or Higher by Making Notes/Outline Frequency



Computer Writing Practice





TNCore

Curriculum Coverage Guidance in English Language Arts for the 2013-14 School Year

As we move toward full implementation of the Common Core State Standards for English Language Arts, many educators and districts have sought guidance on what content to teach during the 2013-14 school year and how to best prepare students for PARCC while balancing current TCAP accountability.

The Common Core State Standards for ELA provide a framework of expectations; curriculum and instruction will continue to be under the discretion of schools and districts. This document offers guidance to all districts in transitioning to the CCSS. Some districts have chosen to transition fully to the CCSS for ELA, while others combine the CCSS and SPI's. The TDOE encourages districts to make thoughtful decisions around what a successful transition to the CCSS should look like for their respective districts, keeping in mind that a focus on the CCSS will support success on the TCAP as well.

There are three key instructional shifts required to implement the Common Core State Standards for ELA:

1. Building knowledge through content-rich nonfiction
2. Reading, writing, and speaking grounded in evidence from text, both literary and informational
3. Regular practice with complex text and its academic language

Implementing the instructional shifts and focusing on the **following three priorities** will provide students with the best preparation for PARCC assessments in 2014-15 and the TCAP Writing Assessment in 2013-14**:**

- Stop teaching the dropped SPI's
- Prioritize readings of rich, complex text multiple times and for varying purposes
- Give students sequenced, text-dependent questions and writing tasks that require them to cite evidence, simultaneously developing students' reading, writing, speaking, listening, and thinking skills

On the next page, you can find a table offering more specific recommendations/guidance for ELA. Please note that these recommendations provide **minimal** expectations and do not intend to cover the entirety of a CCSS for ELA-aligned curriculum. Fore more information on the concepts and terms mentioned in the tables, see the PARCC Model Content Frameworks**.**

TNCore

ELA K-12

	K-3	4-5	6-8	9-12
Instructional Priorities	• Use PARCC Model Content Frameworks to guide planning • At least[1]: ○ Daily: ▪ Read complex text as defined by the CCSS grade bands ▪ Discuss text/evidence-based questions, with a focus on academic (Tier II) vocabulary ○ Several times per week: routine/on-demand informal writing in response to text-based questions ○ Twice a month: Analytical formal writing with teacher feedback in response to text-based prompt ○ Four times per course (may vary depending on type of schedule): Conduct research project; present findings in a variety of written, oral, and multimedia formats			
Reading Foundations	• Explicit, systematic instruction of foundational reading skills based on learning needs		N/A	
Text Types[2]	Balance: • 50% informational • 50% literary Emphasis on content-rich nonfiction that coherently and systematically builds student knowledge across grades		Balance: • 55% informational • 45% literary Emphasis on literary nonfiction	Balance: • 60-70% informational • 30-40% literary Emphasis on literary nonfiction (6-12), foundational/seminal US documents (11-12)
Writing	Balance across modes: • 30% opinion • 35% informative/explanatory • 35% narrative		Balance across modes: • 35-40% argumentative • 35-40% informative/explanatory • 20-30% narrative[3]	
	• Emphasis across all modes on using and/or analyzing text/sources • Focus on effective writing that achieves author's purpose and/or fulfills request of prompt (Anchor Standard for Writing #4: "produce clear and coherent writing" that is "appropriate to task, purpose, and audience") rather than writing to fulfill generic conventions of modes			
Response to Instruction and Intervention (RTI[2])	• Within the RTI[2] framework, Tier I is the core curriculum; **all** students receive research-based, high quality, general education instruction using the Common Core State Standards • Use Response to Instruction and Intervention (RTI[2]) Initiative to guide time allocation and tiered interventions.			

[1] These activities apply to *all* students, regardless of ability level, disability, or English proficiency. While leveled reading may still occur to build reading engagement, confidence, and stamina, all students must be regularly exposed to complex text. Struggling readers can grapple productively with complex text with increased teacher scaffolding, especially in the area of academic vocabulary.
[2] The percentages on this table reflect the **sum** of student reading across **all courses**, not just reading in ELA classrooms. The numbers are rough guidelines and should not be treated as literal mandates.
[3] The balance of narrative should taper off toward 20% as students approach 12th grade.

ELA/Literacy Model Content Framework Chart for Grade 3

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year.[1] As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (but not replace engaging with the standards themselves).

Modules	Reading Complex Texts RL/RI.3.10		Writing to Texts W.3.1–6, 10, RL/RI.3.1–10			Research Project W.3.1, 2, 4–9, RL/RI.3.1–10
	1 Extended Text	5–9 Short Texts	Routine Writing	2 Analyses	1–2 Narratives	1 Research Project
A	Literature	Myths/fables: 3–5 Science: 1–2 Social studies or arts: 1–2	Develop & convey understanding	Focus on opinions	Convey experiences, events and/or procedures	Integrate knowledge from sources when composing
B	Informational	Literature: 3–5 Science: 1–2 Social studies or arts: 1–2	Develop & convey understanding	Focus on informing & explaining	Convey experiences, events and/or procedures	Integrate knowledge from sources when composing
C	Literature	Literature: 3–5 Science: 1–2 Social studies or arts: 1–2	Develop & convey understanding	Focus on informing & explaining	Convey experiences, events and/or procedures	Integrate knowledge from sources when composing
D	Informational	Literature: 3–5 Science: 1–2 Social studies or arts: 1–2	Develop & convey understanding	Focus on opinions	Convey experiences, events and/or procedures	Integrate knowledge from sources when composing

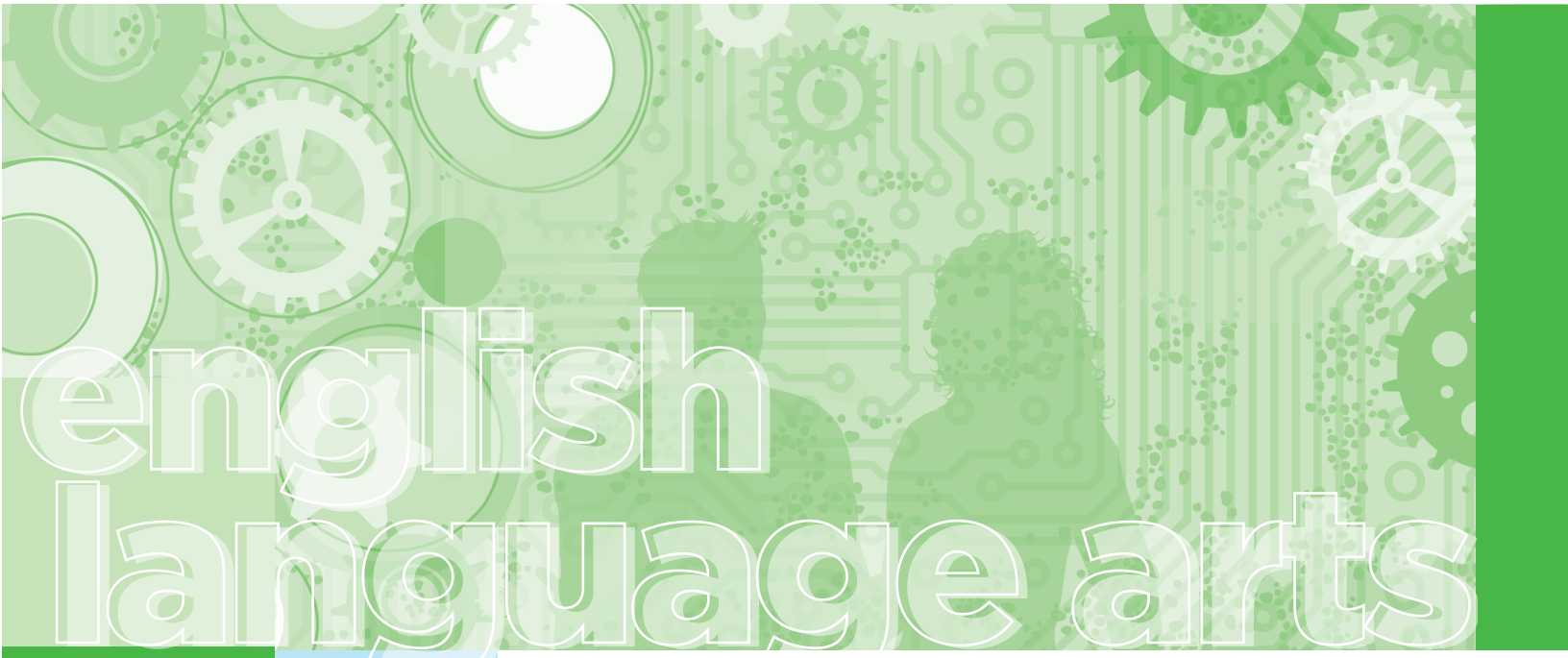
For Reading and Writing in Each Module*

Cite evidence RL/RI.3.1	Analyze content RL/RI.3.2–9, SL.3.2–3	Study & apply grammar L.3.1–3, SL.3.6	Study & apply vocabulary L.3.4–6	Conduct discussions SL.3.1	Report findings SL.3.4–6

*After selecting the standards targeted for instruction, texts and writing tasks with clear opportunities for teaching these selected standards should be chosen.

Reading: Foundational Skills

Phonics & word recognition RF.3.3	Fluency RF.3.4



Grade 5

Introduction

Opinions on Space Exploration: Reading and Writing Informational Texts

Overview

What is this unit about?

This unit asks students to consider the big question of the costs and benefits of space exploration as a current and historical issue. As part of this inquiry, students develop a criteria-meeting opinion piece. Writing this opinion piece is keyed to the Grade 5 Common Core State Standards (CCSS). Over the course of this four-to-six-week unit, students are supported to read six complex expository texts and to view a comprehensive video to understand more about the topic of space exploration and informational texts with opinions.

While it is essential for students to read nonfiction texts and write an opinion piece on a meaningful topic, such as the costs and/or benefits of space exploration, this unit is not intended to take the place of rigorous science content instruction. It is related to, but does not replace, the teaching of important concepts in science.

What content will students learn?

Students will expand their knowledge base about:

- what various authors have to say about the costs and benefits of space exploration.
- categories of knowledge such as historical events of space exploration, types of space exploration, scientific and economic problems of space exploration and the solutions to those problems, and those who are for and opposed to space exploration.
- features of an opinion piece such as stated opinions, textual support, introductions, and conclusions.
- how writers choose and use methods such as quotations, linking words and phrases, and sequencing of information in order to communicate an informed opinion about a topic.
- text structures of expository text such as chronology, comparison, cause/effect, problem/solution, and description.
- the comparison and contrast of information about space exploration, text structures, and authors' methods.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

How will students develop their skills and habits of reading, writing, and speaking?

The unit provides instructional resources and questions that guide an inquiry-based approach to teaching; students engage as problem solvers and sense-makers as they read, write, talk, and think about the texts they are reading. Each task includes an inquiry for the students to answer and/or pursue. Students are supported to develop skills and habits such as how to:

- comprehend complex expository texts with assistance and independently.
- figure things out and construct answers to big questions and open-ended, text-based questions.
- use categories to access information and to organize information in their own writing.
- analyze texts for evidence of their stated or implied opinion, reasons, facts, details, and examples.
- read and take notes from multiple sources on a topic.
- study and use models of a genre.
- participate in routines such as maintaining a Reader/Writer Notebook, completing Quick Writes, pair/trio sharing of textual evidence, using charts, and whole group discussions on a text's ideas to assist the application of knowledge.
- construct understandings from textual information.
- link reasons with facts and/or examples with key words and phrases.
- use criteria to guide their writing.
- recognize classmates as resources for reading and writing assistance.
- value effort as a way to get smarter about reading, writing, listening, speaking, and research.

What is the unit outline?

On the next page, you'll find the unit outline. This unit outline provides a one-page snapshot of the major work that students will engage in over the course of this unit. The outline shows what students will do, while the pages that follow the unit outline show how students will engage in that work.

The unit outline lists the unit's overarching questions, texts, tasks, and culminating assignment. The unit outline is meant to be read horizontally and vertically. The horizontal work represents the work that students do across texts. For example, the overarching questions reach across all the texts in the unit and students are asked to engage with work that will deepen their understanding of these questions with all the texts in the unit.

The vertical work shows the tasks or questions that students will engage in with a single text or across two texts. As you read, notice how the tasks in the vertical rows are designed to build on each other and engage students in evolving, challenging work. Notice too how the tasks are designed to give students multiple opportunities with each text to engage in key tasks aligned to the CCSS.

At the bottom of the page, you'll find the unit's culminating assignment. Students are supported to complete the major task throughout the unit while using the knowledge, habits, and skills they gained over the course of the unit and apply them to the writing assignment. Notice how the tasks within and across texts are designed to prepare students for the culminating assignment.

Each unit task on the unit outline is represented by a question or set of questions preceded by two numbers. The first number references a unit text and the second number references the task number for that text. For instance, Task 2.2 uses Text 2, "Not in Our Lifetime" and is the second task for this text.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

Unit Outline

Overarching Questions

- What are the benefits and costs of space exploration according to these authors?
- What methods do writers use to build and support their opinions?

INTRODUCTION	TEXT 1 "Space Exploration Is Worth the Cost" *by the Institute for Learning* TEXT 2 "Not in Our Lifetime" *by the Institute for Learning*	TEXT 3 "A Brief History of Space Exploration" *by The Aerospace Corporation (AERO)* TEXT 4 "Timeline of Space Exploration Events" TEXT 5 "Our Future in Space: Space Exploration and Travel" *by Peter W. Waller*
0.1 Access Prior Knowledge On what topics have you written opinion pieces? What kinds of topics warrant opinion writing? 0.2 Access Prior Knowledge What are features of effective opinion pieces? What methods do writers use to build and support their opinions?	1.1. Access Prior Knowledge What do you already know about space exploration? What are technical words and phrases about space exploration? What can you learn about texts from their titles? 1.2 Comprehension In "Space Exploration Is Worth the Cost," what is the author's opinion about space exploration? What reasons does the author give for her opinion? What evidence supports reasons for her opinion? 1.3 Vocabulary What words and phrases does the author of "Space Exploration Is Worth the Cost" use to discuss space exploration? How can we use context clues to figure out what these words and phrases mean? 2.1 Comprehension In "Not in Our Lifetime," what is the author's opinion about space exploration? What reasons does the author give for his opinion? What evidence (facts and details) supports reasons for his opinion? 2.2 Vocabulary What academic words and phrases does the author of "Not in Our Lifetime" use to discuss space exploration? What do the words mean? 2.3 Authors' Methods: Quotations What is each author's purpose in using quotations? 2.4 Analysis of Authors' Methods Across Texts How do the authors organize information? How does each author provide logically organized reasons to support his/her opinion? What else did you learn about characteristics of effective opinion pieces by analyzing these two texts? 2.5 Analysis of Linking Language Across Texts What specific words, phrases, and clauses do the authors use to link their opinions with reasons and to support their reasons with evidence (facts/details)?	3.1 Access Prior Knowledge What kinds of facts should people know in order to have an informed opinion about space exploration? 3.2 Comprehension In "A Brief History of Space Exploration," what main ideas does AERO want us to understand about space exploration? What facts and details support the author's main ideas? How do the facts and details support the main ideas? 4.1 Comprehension Across Texts How does the "Timeline of Space Exploration Events" add to your understanding of the text "A Brief History of Space Exploration"? 4.2 Significant Events From your reading, what are three significant events in the history of space exploration? 5.1 Comprehension In "Our Future in Space: Space Exploration and Travel," what main ideas does Waller want us to understand about space exploration? What facts and details support Waller's main ideas? How do the facts and details support the main ideas? 5.2 Research Across Texts Based on information from these two texts, what are the benefits and costs of aspects of space exploration? 5.3 Analysis of Text Structures What are the text structures of each text? How do these text structures support readers? How can we use these text structures to communicate effectively when writing?

Culminating Assignment

See next page.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

TEXT 6 "Benefits of Space Exploration" *by Tega Jessa* TEXT 7 Video: "SpaceX Boldly Looks to Blast 'Millions of People to Mars'" *from PBS NewsHour*	TEXT 8 "A One-Way Ticket to Mars" *by Lawrence M. Krauss*	CULMINATING ASSIGNMENT
6.1 Assessment 1 Read "Benefits of Space Exploration" by Jessa and determine at least two main ideas, find facts and details that support each main idea, and explain how the facts and details support each main idea. **6.2 Analysis of Text Structure** What is the dominant text structure of the Jessa text? How does the text structure support the development of Jessa's opinion? How can we use text structures to communicate effectively when writing? **7.1 Comprehension: Media** How can you use a media source to add to your knowledge of an issue? What additional information about space exploration do you learn from this video? **Optional Follow-up Task** Confirming and Contradicting Information in a Media Source.	**8.1 Comprehension** In "A One-Way Ticket to Mars," what is Krauss' opinion on space exploration? How do you know? What reasons does Krauss give for his opinion? What facts and details support the reasons for Krauss' opinion? **8.2 Vocabulary** What does the word "cost" mean in the Krauss article? What does the word "cost" mean when used in the phrase "benefit and cost of space exploration"? **8.3 Analysis of Content Across Texts** What information is the same or additional in the Jessa and Krauss texts? What information is conflicting or different? **8.4 Research Across Texts** How does new information from the Jessa and Krauss texts confirm or change your thoughts about the benefits and costs of space exploration? **8.5 Analysis of Authors' Methods** How do Jessa and Krauss begin their texts and each paragraph? How do these texts end? How are the introductions and conclusions effective and appealing to readers? **8.6 Analysis of Language to Link Ideas** What specific words, phrases, and clauses do the authors use to link their opinions to reasons and to support their reasons with facts and details? **8.7 Assessment 2** Using information from two of the unit texts, write two paragraphs, one supporting an opinion on the costs of space exploration and one supporting an opinion on the benefits of space exploration.	(See Culminating Assignment at bottom of page.) **9.1 Analysis and Discovery Writing** How can you write your opinion in the most effective way? To begin your culminating assignment, what is your point of view and opinion about an aspect of space exploration? **9.2 Planning Reasons with Evidence** What is your informed opinion about the costs and benefits of an aspect of space exploration? What are reasons with evidence for your opinion? Where and how will you cite sources? What do you know and what do you need to research? **9.3 Developing the Paper** What sequence of reasons will make the most sense to readers? How will you make an engaging beginning? How will you write a strong concluding statement or section? **9.4 Revision and Peer Review** How does your paper meet the criteria for effective opinion pieces? How will you provide and use feedback from another writer? **9.5 Publication and Reflection** From engaging in this unit, what did you learn about space exploration? How will you read informational text differently after engaging in this unit? What did you learn about methods writers use to build and support their opinions?

Culminating Assignment

Write an opinion piece in which you analyze the costs and benefits of an aspect of space exploration based on information from at least three of the unit sources (texts and video). Develop your point of view by stating your opinion on whether the costs outweigh the benefits or the benefits outweigh the costs. Develop your opinion piece with reasons that you support with evidence (facts and details) and cite your sources. Group and sequence your reasons with facts and details logically to support your purpose. Use words and phrases that link your opinion to the reasons for your opinion and provide a concluding statement or section that relates to your opinion.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

Common Core State Standards[1] (CCSS)

College And Career Readiness Anchor Standards For:

Reading informational (p. 10)

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.
7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
10. Read and comprehend complex literary and informational texts independently and proficiently.

Writing (p. 18)

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

[1] Council of Chief State School Officers (CCSSO) & National Governors Association Center for Best Practices (NGA Center). (2012). *Common core state standards for English language arts & literacy in history/social studies, science and technical subjects.* (pp. 10, 18, 22, 25). Retrieved from http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

Speaking and listening (p. 22)

1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Language (p. 25)

1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Notes

- The grade-level standards that are addressed are provided at the end of each task.
- For standards where there is partial alignment, the underlined words and phrases indicate the part of the standard to which the task is aligned.
- Standards that are aligned only to the differentiated options are indicated in the callout boxes for each option.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

TASK 5.2

Research Across Texts

"A Brief History of Space Exploration" by The Aerospace Corporation
"Our Future in Space: Space Exploration and Travel" by Peter W. Waller

- *Based on information from these two texts, what are the costs and benefits of aspects of space exploration?*

Texts and Materials

- "A Brief History of Space Exploration" by The Aerospace Corporation
- "Our Future in Space: Space Exploration and Travel" by Peter W. Waller
- Chart: Categories of Space Exploration
- Reader/Writer Notebook
- Chart paper and markers

Teaching Approach

Whole Group

Explain to students that at the end of this unit, they will be writing an opinion piece about the costs and benefits of space exploration. To help them gather more information on this topic, ask students to reread "A Brief History of Space Exploration" to individually identify and write about at least one aspect of costs and benefits of space exploration.

Model Charting

As shown in the example of a table below, have students make a two-column note chart in their Reader/Writer Notebooks to record the information they select. Before students begin, model how you used the "Categories of Space Exploration" chart to research into the article to find an example of an aspect of space exploration. For instance, the example could be the costs and benefits of a particular space vehicle, a historical event such as the Challenger accident, or an aspect of human survival such as dealing with microgravity. Students will then briefly explain how they thought about the aspect of space exploration in terms of its costs and benefits and note the page(s) and paragraph(s) where they gathered textual evidence. Students should consider how they will phrase the explanation so that the model assists students' understanding of the task.

Text:_____ One Aspect of Space Exploration from My Reading: _____	
Explanation of its costs (human, monetary, political) with page and paragraph in article where I found the textual evidence	Explanation of its benefits with page and paragraph in article where I found the textual evidence

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

Teacher Model:

Text: "A Brief History of Space Exploration" One Aspect of Space Exploration from My Reading: Shuttle Columbia	
Explanation of its costs (human, monetary, political) with page and paragraph in article where I found the textual evidence	Explanation of its benefits with page and paragraph in article where I found the textual evidence
The Shuttle Columbia did not have a good launch system, and one like it, the Shuttle Challenger, blew up and its crew of seven was killed. Its use came at a big human cost (Page 1, Paragraph 10).	*The Shuttle Columbia was reusable over many flights, which meant scientists could learn more about space travel from the same vehicle. Trips could also be cheaper and rely on the track record of earlier successful trips than if a new space vehicle had to be used with each trip to space (Page 1, Paragraph 10).*

Quick Write
Ask students to reread "A Brief History of Space Exploration" to individually identify at least one example of the costs and benefits of space exploration. They should write their explanation as shown in the teacher model.

Pair/Trio Share
Ask students to take a few minutes to share their completed note chart with a partner. As students are sharing, circulate around the room and identify two-three students whose work it would benefit the class to see. Ask those students if they would display their two-column chart and share their work and thinking with the class.

Whole Group
Invite students to share their examples and explanations with the whole group before asking the students you identified in the previous activity to display their work. Encourage students to notice the textual evidence in the text and how students explained in writing the textual evidence in light of its costs and benefits.

Pair/Trio
Ask students to work through the same process with the text "Our Future in Space: Space Exploration and Travel," as they did with the Aerospace Corporation text. Monitor and adjust based on students' written understanding of the textual evidence that they find related to costs and benefits of one aspect of space exploration.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

TASK 5.2

Focus Standards (CCSS, 2012, p. 14, 21, 24)

Reading Informational Text

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

Writing

W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

W.5.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening

SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

TASK 6.1

Name:_____

Space Exploration
Assessment 1
Grade 5

Comprehension

Please read "Benefits of Space Exploration" by Tega Jessa. From your reading, fill in the chart below by completing what you are asked to do in each column of the table.

State two main ideas that the author wants us to understand about space exploration.	List two key details (facts, examples, etc.) that the author uses to support your selected main idea.	Write a short, two to three sentence explanation about how the details (facts, examples, etc.) work to support the author's main idea.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

Planning Reasons with Evidence

TASK 9.2

- *What is your informed opinion about the costs and benefits of an aspect of space exploration?*
- *What are reasons with evidence for your opinion?*
- *Where and how will you cite sources?*
- *What do you know and what do you need to research?*

Texts and Materials

- Chart: What I know; What I need to Learn and Research
- Handout: Reason Planning for Opinion Papers
- Handout: Citing Sources and Creating a List of Sources
- Enlarged copy of "Reason Planning for Opinion Papers"
- Reader/Writer Notebook
- Chart paper and markers

Teaching Approach

Whole Group

Model

Explain to students that they are going to plan reasons for their opinion pieces by completing a "Reason Planning" organizer.

Model how to complete each half sheet with your teacher model of a reason you will use to develop your own opinion on the costs and benefits of an aspect of space exploration.

1. Start by rereading the discovery writing you did in Task 9.2. Explain that you are evaluating the thinking you've already done for ideas that you can use in your opinion piece.
2. Then begin completing the sheet by writing your opinion.
3. Then move on to writing a reason to develop your opinion and how that reason develops your opinion. As you complete the sheet, refer to how your purpose is informing the choices you are making.
4. When you get to facts and details, demonstrate using two kinds of evidence: (a) from your own observations and experiences; and (b) evidence [facts and details] that comes from the unit texts. Since this is a thinking and planning tool, you might write something like, "will describe the ," or "will talk about the time when ," or "need to find statistics in the unit text on ," for information that you know you need but do not yet have. Then articulate how the facts and details support your reasons and how the reason develops your opinion.
5. Circle any of your reasons or evidence that will need a citation and say why you circled it.

Charting

After you finish, ask students what they noticed you wrote and said. Chart what they say if their insights have not been previously charted.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

TASK 9.2

Write About

Give students time to think and complete at least three half sheets, one for each reason with related evidence. Circulate around the room to assess students' learning and progress. Talk with students individually who need help. Discuss the correctness of the citations they circled on their reason planning half sheets. Encourage students to confer with you or their peers if they need assistance or someone to bounce ideas off of.

Allow students about 30 minutes to work on this task and turn in at least three "Reason Planning Sheets" for your review.

Quick Write

Have students create a two-column chart. On the left side, students write what they know about the costs and benefits of the aspect of space exploration they chose to write about, and on the right side what they need to learn and research in unit texts in order to write their opinion piece. Show students a model you did on what you know and still have to learn and research.

What I know	What I need to learn and research in unit texts

Focus Standards (CCSS, 2012, p. 20, 21, 24)

Reading Informational Text

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

Writing

W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

W.5.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening

SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

TASK 9.2

Reason Planning for Opinion Paper

Write your opinion—your point of view—on the costs or benefits of an aspect of space exploration.

_____

_____

Write a reason to develop your opinion and evidence (facts and details) you might use to support your reason. List kinds of evidence that come from you (observations, descriptions, etc.) and/or kinds of evidence you have read in the unit texts.

Reason: _____

How does the reason develop your opinion? _____

_____

Evidence (facts and details): _____

_____

_____

How does the evidence support your reason? _____

_____

_____

How does the evidence support your opinion? _____

_____

_____

Reason Planning for Opinion Paper

Write your opinion—your point of view—on the costs or benefits of an aspect of space exploration.

_____

_____

Write a reason to develop your opinion and evidence (facts and details) you might use to support your reason. List kinds of evidence that come from you (observations, descriptions, etc.) and/or kinds of evidence you have read in the unit texts.

Reason: _____

How does the reason develop your opinion? _____

_____

Evidence (facts and details): _____

_____

_____

How does the evidence support your reason? _____

_____

_____

How does the evidence support your opinion? _____

_____

_____

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

TASK 9.1

Space Exploration

Culminating Assignment
Grade 5

Opinion Piece on Space Exploration

As part of this unit, you have learned about the issue of space exploration by reading, viewing, and discussing ideas about exploring space from different text and media. A few of the sources you read and viewed provided information on the history and kinds of space exploration. Other sources gave the author's point of view and opinion about aspects of space exploration. You also learned more about the methods authors use to craft effective opinion pieces. This culminating assignment asks you to use what you learned in the unit to state your point of view and opinion about the issue of space exploration.

Task: Write an opinion piece of at least four paragraphs in which you analyze the costs and benefits of space exploration based on information from at least three of the unit sources (texts and video text). Your opinion piece should include at least three reasons with supporting facts and details and be written in standard English including your best work for capitalization, punctuation, and spelling.

The texts/sources you may use:

- "A Brief History of Space Exploration" by The Aerospace Corporation
- "Our Future in Space" by Peter W. Waller
- "Timeline of Space Exploration Events"
- "Benefits of Space Exploration" by Tega Jessa
- "A One-Way Ticket to Mars" by Lawrence M. Krauss
- "Space Exploration Is Worth the Cost" by the Institute for Learning
- "Not in Our Lifetime" by the Institute for Learning
- Your Reader/Writer Notebook
- Your notes from the media video text, "SpaceX Boldly Looks to Blast 'Millions of People to Mars'" from PBS NewsHour.

Getting started:

- Review your notes for information on the costs and benefits of an aspect of space exploration.
- Begin to build your point of view on the costs and/or benefits of an aspect of space exploration and form an opinion that can be backed up with reasons.
- Plan how you will select and group your reasons with facts, details, or examples into a logical organizational structure that will best support your opinion.
- As you write, you can refer to the class chart "Criteria of Effective Opinion Pieces."

Your opinion piece should feature:

- An introduction of the topic as an issue and a statement of your opinion.
- An organizational structure in which you order your reasons logically and support your reasons with facts and details from at least three of the unit's texts (print and video).
- Words and phrases that link your opinion and the reasons for your opinion.
- A concluding statement or section that relates to the opinion you presented

© 2013 University of Pittsburgh – English Language Arts Unit, Grade 5: Opinions on Space Exploration

3 - Math

Instruction that Deepens Mathematical Understanding

Tennessee Department of Education
Common Core Leadership Course 202

TNCore

Math Table of Contents

Course Goals	113
Bridge to Practice #2 Task	114
Multiple Representations	115
Mathematical Practices	116
Bridge to Practice #1 Student Work	117
Bridge to Practice #2 Student Work	118
Supporting Understanding of a Lesson	119
Structures and Routines of a Lesson	120
Mathematics Grade 4: Task Arcs	121
Table of Contents	124
Overview	126
Identified CCSSM and Essential Understandings	127
Tasks' CCSSM Alignment	131
Lesson Progression Chart	133
Task	136
Lesson Guide	137
The Launch Phase	148
The Explore Phase	149
Private Think Time	149
Small Group	150
Share, Discuss, Analyze Phase	151
Accountable Talk	152

Course Goals/Objectives

1) Further develop our understanding of the expectations of the standards and PARCC in math. Examine student work for strengths and areas for growth.

2) Unpack components of a lesson that support rigorous mathematical thinking

3) Develop a plan of action to help all students meet expectation by class 3.

4) Step back and consider the implications of our work thus far on local planning for the coming year. Understand the available resources to support instructional planning in the coming year.

Elementary Math Task #2

How Many More? Task

Sam has 3 boxes of donuts. He has 9 donuts in each box.

Anne has 5 boxes of donuts. She has 9 donuts in each box.

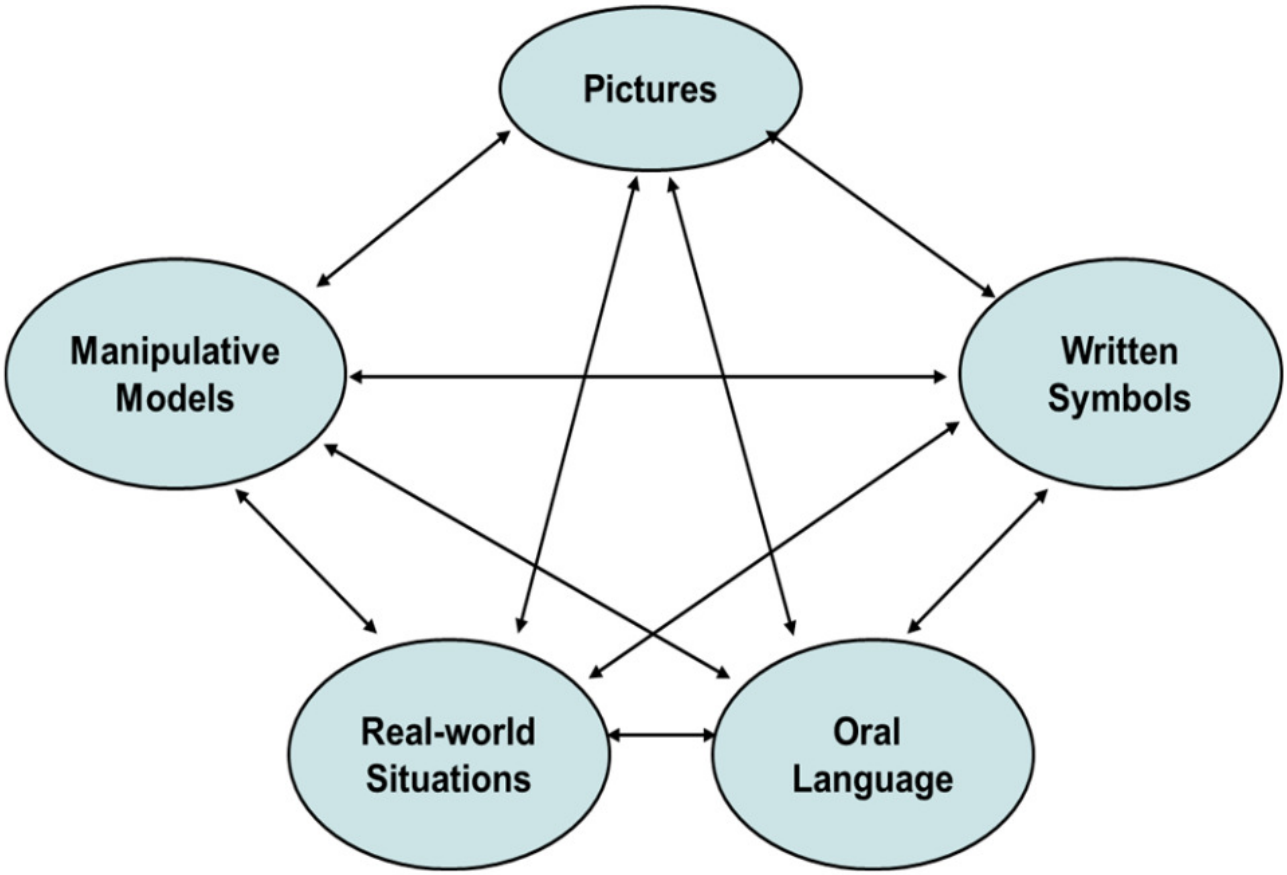
Anne has more donuts than Sam does.

She claims that she can figure out her amount of donuts by using what she knows about Sam's 3 boxes of donuts with 9 donuts in each box.

Draw a picture and write a multiplication equation to show how Anne can use Sam's situation to find the number of donuts that she has in 5 boxes.

Source: 2012-2013 CRA

Multiple Representations



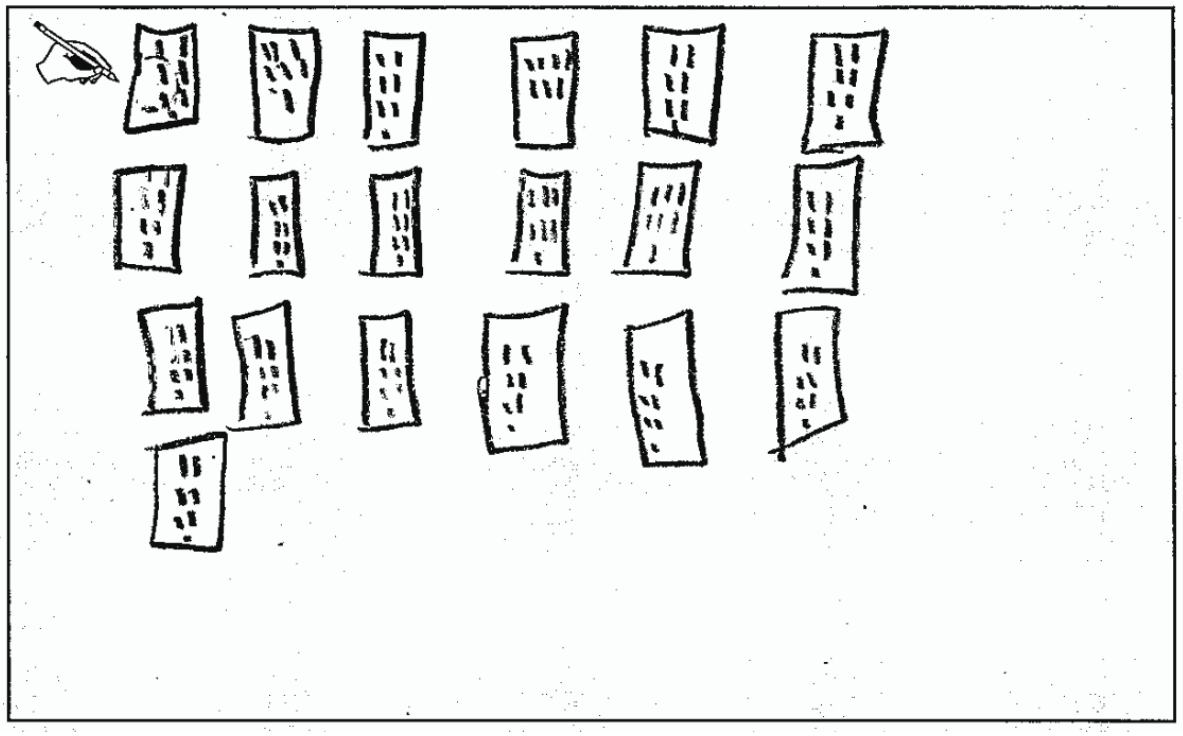
Adapted from Lesh, Post, & Behr, 1987

Mathematical Practices

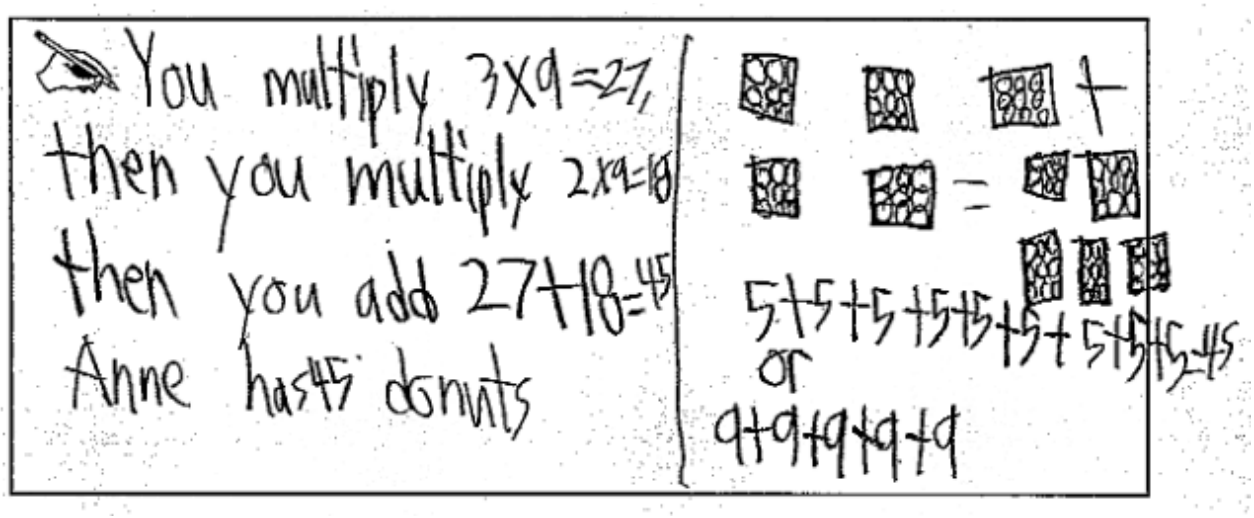
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Bridge to Practice #1: Multiplication Task

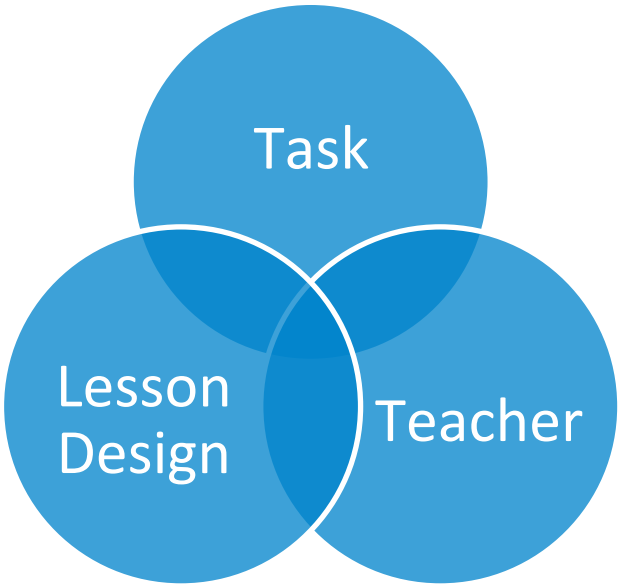
c. Use Dylan's method to solve the multiplication problem 7 × 19. Use a diagram or equation to show the relationship between your new expression and 7 × 19.



Bridge to Practice #2: How Many More? Task



Supporting Understanding of a Lesson



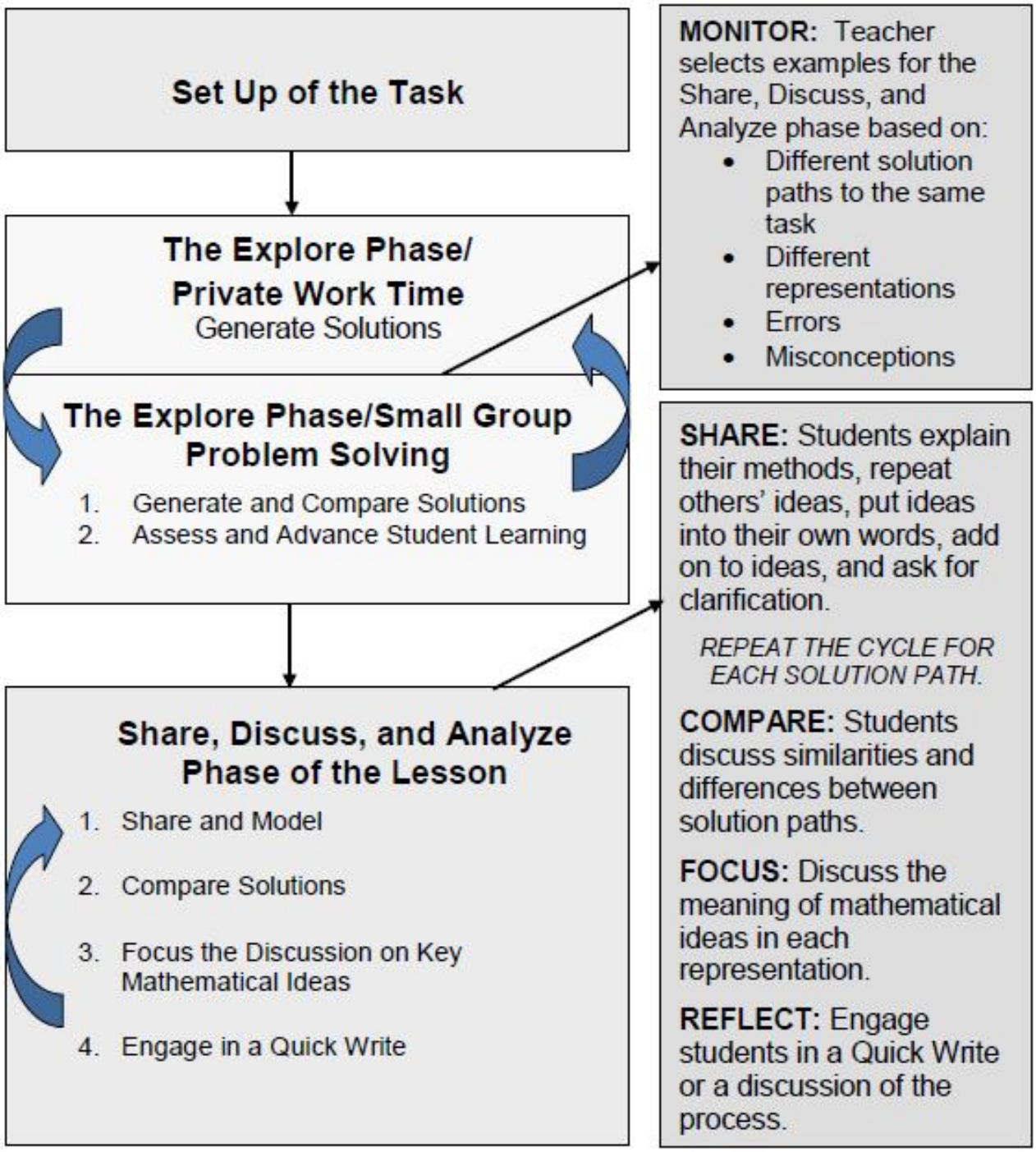
Notes:

The Task:

The Lesson Design:

The Teacher:

Structures and Routines of a Lesson



Institute for Learning

TNCore

Mathematics Task Arcs

Overview of Mathematics Task Arcs:

A task arc is a set of related lessons which consists of eight tasks and their associated lesson guides. The lessons are focused on a small number of standards within a domain of the Common Core State Standards for Mathematics. In some cases, a small number of related standards from more than one domain may be addressed.

A unique aspect of the task arc is the identification of essential understandings of mathematics. An essential understanding is the underlying mathematical truth in the lesson. The essential understandings are critical later in the lesson guides, because of the solution paths and the discussion questions outlined in the share, discuss, and analyze phase of the lesson are driven by the essential understandings.

The Lesson Progression Chart found in each task arc outlines the growing focus of content to be studied and the strategies and representations students may use. The lessons are sequenced in deliberate and intentional ways and are designed to be implemented in their entirety. It is possible for students to develop a deep understanding of concepts because a small number of standards are targeted. Lesson concepts remain the same as the lessons progress; however the context or representations change.

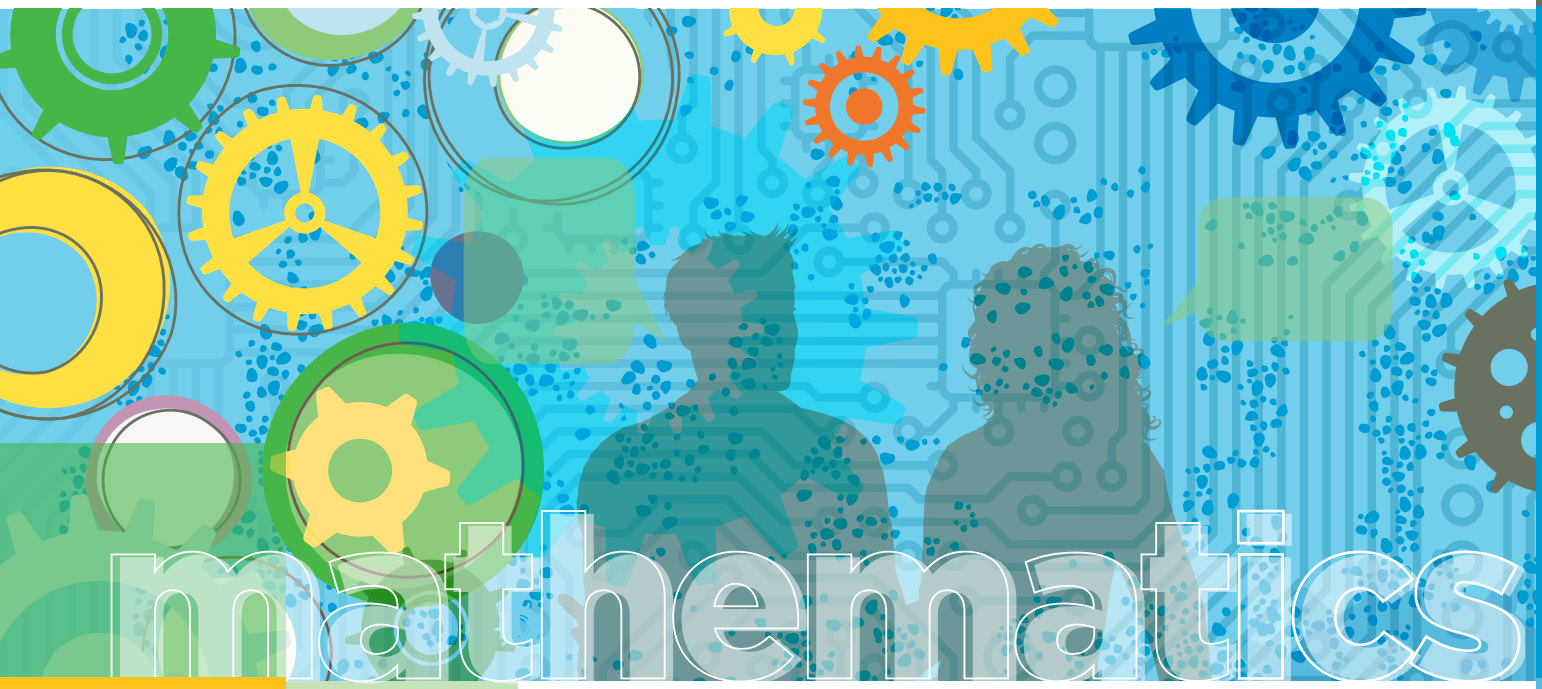
Bias and sensitivity:

These math task arcs are peer-reviewed and have been vetted for content by experts. However, it is the responsibility of local school districts to review these units for social, ethnic, racial, and gender bias before use in local schools.

Copyright:

These task arcs have been purchased and licensed indefinitely for the exclusive use of Tennessee educators.

institute for learning



Grade 4

Building Non-Unit Fractions

A SET OF RELATED LESSONS

UNIVERSITY OF PITTSBURGH

Unit Licensing

We have chosen to make these materials easily available and reproducible for the benefit of teachers and their students. In exchange, we ask you honor the hard work that goes into developing them. Please read the following licensing agreement carefully.

By printing, copying, or using any of the files or components composed in this unit you or the entity you represent (collectively "You") agree that this Agreement is enforceable like any written contract signed by You.

If You do not agree to the forgoing, IFL does not authorize You to print, copy, or use the materials.

Title, ownership rights, and intellectual property rights of the IFL MATERIALS shall remain with the University of Pittsburgh (UNIVERSITY).

The IFL grants You a non-exclusive license to:

- Make copies of the IFL MATERIALS for each teacher, educator, or school in your school district, provided that you have paid for those materials to use for the sole purpose of teacher professional development and/or course implementation.

You may not:

- Redistribute, post, or otherwise enable or permit other individuals to access or use the IFL MATERIALS except under the terms listed herein;
- Modify, translate, or create derivative works based on the IFL MATERIALS;
- Copy the IFL MATERIALS other than as specified above;
- Rent, lease, grant a security interest in, or otherwise transfer rights to the IFL MATERIALS; or
- Remove any proprietary notices or labels on the IFL MATERIALS.

DISCLAIMER OF WARRANTY: The IFL MATERIALS are provided "as is." The UNIVERSITY does not warrant the IFL MATERIALS will meet Your requirements, operate without interruption, or be error free. UNIVERSITY makes no representations and extends no warranties of any kind, expressed or implied, including but not limited to warranties of merchantability, fitness for a particular purpose, and non-infringement.

INDEMNIFICATION: The entire risk as to the use and performance of the IFL MATERIALS is assumed by You. You shall defend, indemnify and hold harmless UNIVERSITY, its trustees, officers, employees and agents, for and against any and all claims, demands, damages, losses, and expenses of any kind (including but not limited to attorneys' fees), relating to or arising from any use or disposition by LICENSEE of the IFL MATERIALS.

MAINTENANCE: UNIVERSITY is not obligated to provide maintenance or updates for the IFL MATERIALS. However, any maintenance or updates provided by UNIVERSITY shall be covered by this Agreement and may, at UNIVERSITY's discretion, require payment of an additional license fee.

TERMINATION: This Agreement and the license granted herein shall remain effective until terminated. You may terminate this Agreement and the license at any time by destroying all IFL MATERIALS in Your possession or control. The Agreement will terminate automatically if You fail to comply with the limitations described herein. On termination, You must destroy all copies of the IFL MATERIALS.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Table of Contents

Introduction

Overview 9

Identified CCSSM and Essential Understandings 10

Tasks' CCSSM Alignment 14

Lesson Progression Chart 16

Tasks and Lesson Guides

TASK 1: Pizza for the Family 21
Lesson Guide 22

TASK 2: Drinking Juice 27
Lesson Guide 28

TASK 3: Birthday Money 33
Lesson Guide 34

TASK 4: Thirds and Sixths 40
Lesson Guide 41

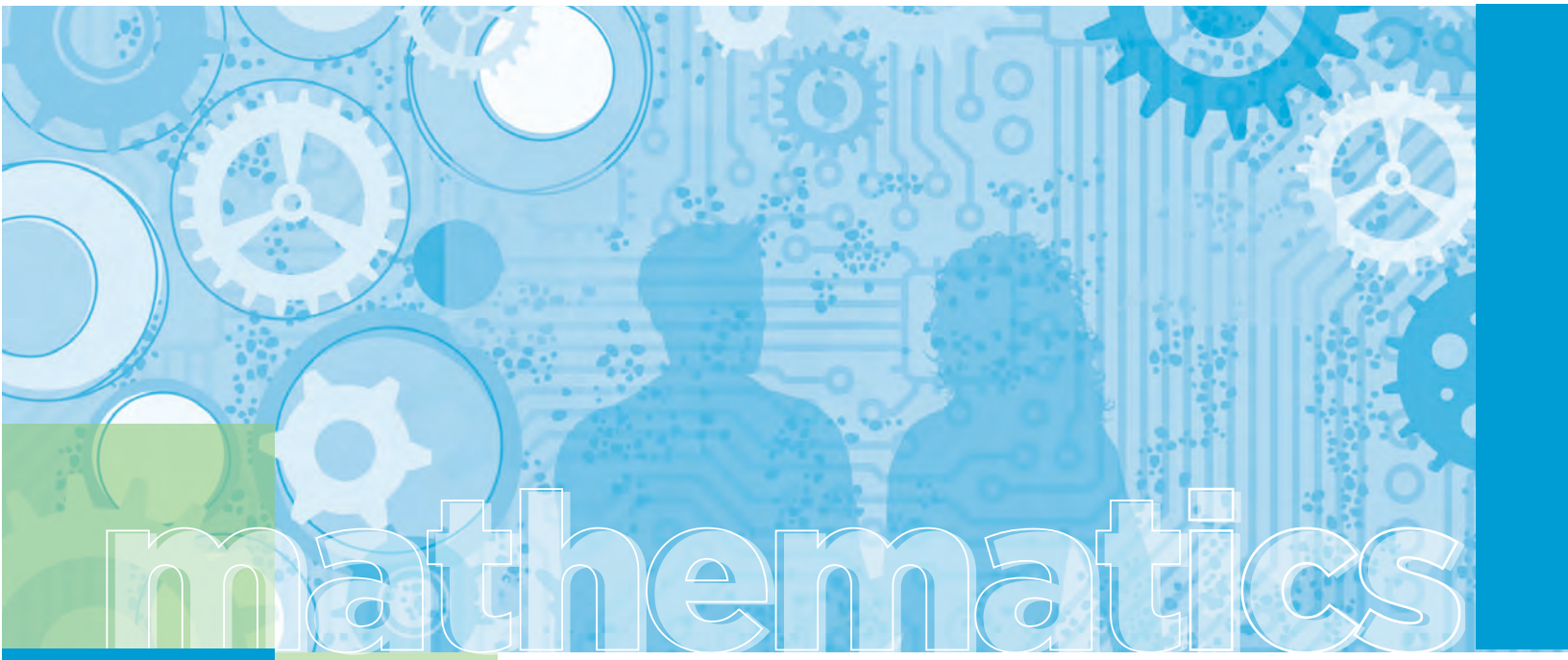
TASK 5: Fractional Number Lines 47
Lesson Guide 48

TASK 6: Watching TV 53
Lesson Guide 54

TASK 7: Eating Apples 59
Lesson Guide 60

TASK 8: The End Product 66
Lesson Guide 67

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions



Grade 4

Introduction

Building Non-Unit Fractions

A SET OF RELATED LESSONS

Overview

This set of related lessons provides an introduction to addition and subtraction with like denominators in the same whole, as well as the connection between repeated addition of a unit fraction to multiplication of that unit fraction by a whole number. Students will use representations (pictorial and symbolic) and mathematical reasoning. The standards addressed by this set of related tasks are 4.NF.B.3, 4.NF.B.3a, 4.NF.B.3b, 4.NF.B.3d, and 4.NF.B.4, 4.NF.B.4a, 4.NF.B.4b, and 4.NF.B.4c. Standard 4.NF.A.2 is addressed but may not be solidified over the course of these eight tasks.

Tasks 1 and 2 explore the concept of adding or subtracting unit fractions within the same whole. The students are asked to link diagrams to equations. Task 3 goes one step further by requiring students to determine amounts by comparing them to benchmark fractions.

Task 4 links repeated addition of unit fractions to the operation of multiplication. Students have to identify equal groups and the number in each group in order to determine why multiplication works. Tasks 5 and 6 provide opportunities to deepen students' understanding of fractional multiplication, applying strategies to different representations each time.

Task 7 introduces students to products greater than one whole. Teachers may find that additional lessons are needed to support student learning. Task 8 requires that students employ all of the standards addressed by this set.

The prior knowledge that is required for this set is that students have mastered the third grade fractional standards related to understanding the meaning of a fraction, as well as the ability to visually represent fractions (area model and number lines)–3.NF.A.1 and 3.NF.A.2. An early knowledge of equivalent fractions (3.NF.A.3) may help students complete the tasks more efficiently.

Through engaging in the lessons in this set of related tasks, students will:

- understand non-unit fractions as a sum or product of unit fractions;
- represent non-unit fractions; and
- prove equivalency of multiplicative expressions involving one fractional factor.

By the end of these tasks, students will be able to answer the following overarching questions:

- How does one add and subtract fractional amounts (with like denominators) within the same whole?
- What is the link between repeated addition of a unit fraction and multiplying that unit fraction by a whole number?

The questions provided in the guide will make it possible for students to work in ways consistent with the Standards for Mathematical Practice. It is not the Institute for Learning's expectation that students will name the Standards for Mathematical Practice. Instead, the teacher can mark agreement and disagreement of mathematical reasoning or identify characteristics of a good explanation (MP3). The teacher can note and mark times when students independently provide an equation and then re-contextualize the equation in the context of the situational problem (MP2). The teacher might also ask students to reflect on the benefit of using repeated reasoning, as this may help them understand the value of this mathematical practice in helping them see patterns and relationships (MP8). In study groups, topics such as these should be discussed regularly because the lesson guides have been designed with these ideas in mind. You and your colleagues may consider labeling the questions in the guide with the Standards for Mathematical Practice.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Identified CCSSM and Essential Understandings[1]

CCSS for Mathematical Content: Number and Operations—Fractions		**Essential Understandings**
Extend understanding of fraction equivalence and ordering.		
4.NF.A.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Fractions with the same size pieces, or common denominators, within the same size whole can be compared with each other because the size of the pieces is the same. Comparison to known benchmark quantities can help determine the relative size of a fractional piece because the benchmark quantity can be seen as greater, less than, or the same as the piece. A product can be written as two or more different but equivalent expressions as long as the total number of items in each set is the same (e.g., $2 \times \frac{1}{4} = 4 \times \frac{1}{8}$).

1 Council of Chief State School Officers (CCSSO) & National Governors Association Center for Best Practices (NGA Center). (2010). Mathematics. *Common core state standards for mathematics*. Retrieved from http://www.corestandards.org/Math

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

CCSS for Mathematical Content: Number and Operations—Fractions		**Essential Understandings**
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.		
4.NF.B.3	Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*.	When decomposing a fraction into iterations of the unit fraction, the number of iterations is the same as the value of the numerator. Iterating a unit fraction is an interpretation of a fraction that illustrates the equal parts that the fraction is composed of ($\frac{3}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$ or revoicing of the iterations as 3 x $\frac{1}{5}$ [exposure level]). A fraction in which the total number of pieces in the whole is the same as the total number of the pieces is called one whole because all of the pieces of the whole are accounted for (e.g., $\frac{4}{4}, \frac{5}{5}, \frac{6}{6}$). Fractions with the same size pieces, or common denominators, within the same size whole can be added or subtracted because the size of the pieces is the same.
4.NF.B.3a	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole	
4.NF.B.3b	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*	
4.NF.B.3c	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. *Greyed-out portions not addressed in task or lesson.	
4.NF.B.3d	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

CCSS for Mathematical Content: Number and Operations—Fractions		**Essential Understandings**
4.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.	One factor in a multiplication problem tells you the number of groups and one tells you the number of items in the group, OR one factor can tell you the number of rows/groups and the items in the row or the number of columns/groups and the items in the columns. If there is a whole number of groups, repeated addition can be used because the amount in each group can be added repeatedly (e.g., 7 groups of $\frac{1}{4}$). When multiplying with at least one factor greater than one, the product will be greater than at least one of the factors because more than one group of the other factor is being utilized. A product can be written as two or more different but equivalent expressions as long as the total number of items in each set is the same (e.g., $2 \times \frac{1}{4} = 4 \times \frac{1}{8}$).
4.NF.B.4a	Understand a fraction *a/b* as a multiple of 1/*b*. For example, use *a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*	
4.NF.B.4b	Understand a multiple of *a/b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*	
4.NF.B.4c	Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

The CCSS for Mathematical Practice[2]

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

2 Council of Chief State School Officers (CCSSO) & National Governors Association Center for Best Practices (NGA Center). (2010). Mathematics. *Common core state standards for mathematics*. Retrieved from http://www.corestandards.org/Math

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Tasks' CCSSM Alignment

Task	4.NF.A.2	4.NF.B.3	4.NF.B.3a	4.NF.B.3b	4.NF.B.3d	4.NF.B.4	4.NF.B.4a	4.NF.B.4b	4.NF.B.4c
Task 1 Pizza for the Family Developing Understanding	✓	✓	✓		✓				
Task 2 Drinking Juice Developing Understanding	✓	✓	✓		✓				
Task 3 Birthday Money Solidifying Understanding	✓	✓	✓		✓				
Task 4 Thirds and Sixths Developing Understanding		✓		✓		✓	✓	✓	
Task 5 Fractional Number Lines Developing Understanding						✓	✓	✓	
Task 6 Watching TV Developing Understanding						✓	✓	✓	✓
Task 7 Eating Apples Developing Understanding						✓	✓	✓	✓
Task 8 The End Product Solidifying Understanding		✓		✓		✓	✓	✓	

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Task	MP 1	MP 2	MP 3	MP 4	MP 5	MP 6	MP 7	MP 8
Task 1 Pizza for the Family Developing Understanding	✓	✓	✓	✓	✓	✓	✓	
Task 2 Drinking Juice Developing Understanding	✓	✓	✓	✓		✓	✓	
Task 3 Birthday Money Solidifying Understanding	✓	✓	✓	✓		✓	✓	✓
Task 4 Thirds and Sixths Developing Understanding	✓		✓	✓		✓	✓	
Task 5 Fractional Number Lines Developing Understanding	✓	✓	✓	✓		✓	✓	
Task 6 Watching TV Developing Understanding	✓	✓		✓			✓	✓
Task 7 Eating Apples Developing Understanding	✓	✓		✓		✓	✓	✓
Task 8 The End Product Solidifying Understanding	✓			✓		✓	✓	✓

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Lesson Progression Chart

Overarching Questions

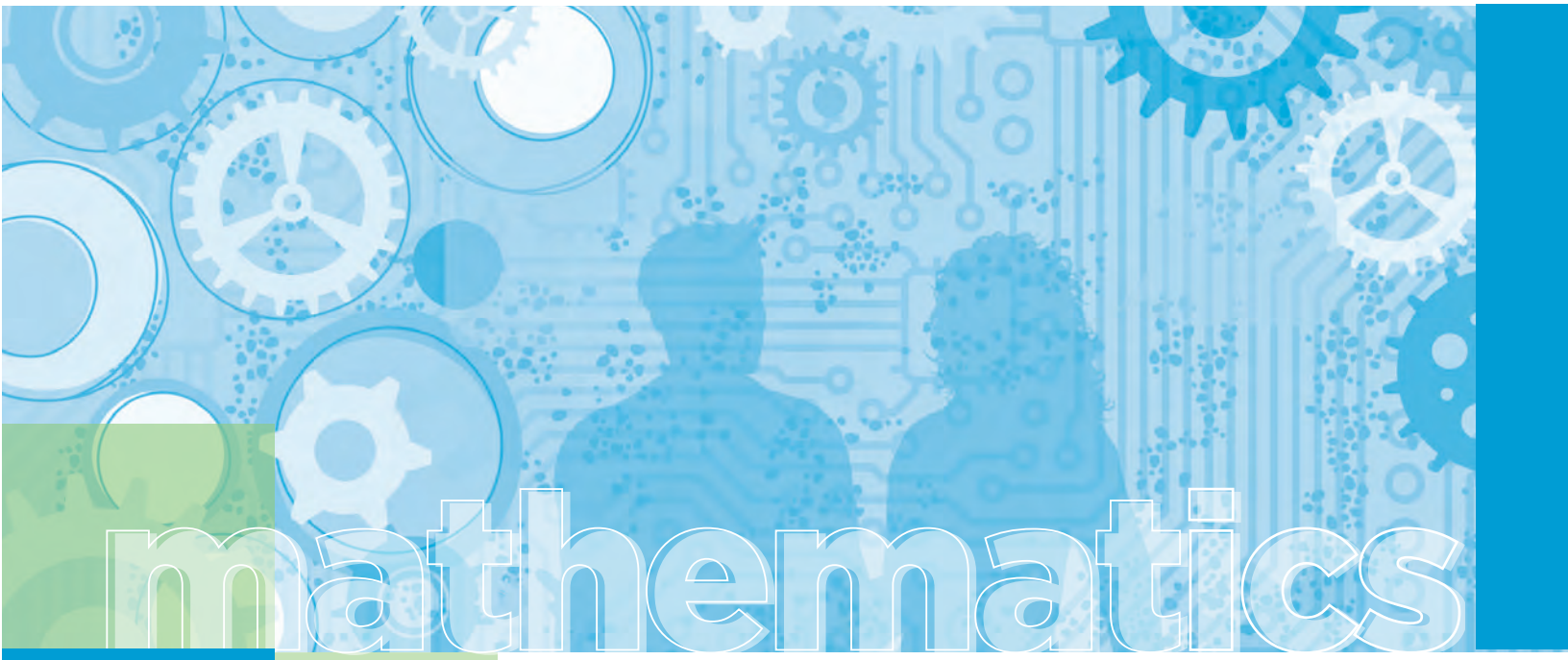
- How does one add and subtract fractional amounts (with like denominators) within the same whole?
- What is the link between repeated addition of a unit fraction and multiplying that unit fraction by a whole number?

	Task 1 **Pizza for the Family** *Developing Understanding*	**Task 2** **Drinking Juice** *Developing Understanding*	**Task 3** **Birthday Money** *Solidifying Understanding*	**Task 4** **Thirds and Sixths** *Developing Understanding*
Content	Explore use of either adding or subtracting fractional amounts from the whole of 1. Students compare the remaining $\frac{2}{6}$ to the benchmark of $\frac{1}{2}$.	Deepen understanding of addition and subtraction of fractions with like denominators within the same whole. Students compare amounts to benchmark fractions.	Solidify understanding of addition and subtraction within the same whole. Students use repeated applications of the same process. Students continue making comparisons to benchmark fractions.	Link repeated addition of unit fractions to multiplication of a whole number by the unit fraction.
Strategy	Makes use of manipulatives or drawings, and equations to represent fractions of a whole.	Makes use of both addition and subtraction; students employ reasoning about magnitude to compare to benchmarks.	Relies on the use of what students know about repeated addition or subtraction of unit and non-unit fractions.	Relies on the use of what students know about repeated addition of fractions to write addition and multiplication equations.
Representations	Provides a contextualized situation and an area model matching most closely to the context.	Provides a contextualized situation that requires students to provide an argument; expressions/ equations and diagrams are encouraged to support the argument.	Provides contextualized situation and students model each situation with diagrams and/or numbers.	Provides a visual area model and requires repeated addition and multiplication equations.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

	Task 5 **Fractional Number Lines** *Developing Understanding*	**Task 6** **Watching TV** *Developing Understanding*	**Task 7** **Eating Apples** *Developing Understanding*	**Task 8** **The End Product** *Solidifying Understanding*
Content	Compare visual models of multiplication/ repeated addition to determine equivalence. Introduction of multiplication of non-unit fractions.	Build understanding of multiplication by proving equivalence of provided expressions. Identification of meaning of the factors is a focus.	Apply what has been explored about multiplication of unit and non-unit fractions to situations in which the product is greater than 1.	Students solidify understanding of repeated addition and multiplication of unit and non-unit fractions through repeated application.
Strategy	Makes use of number lines and equations to argue equivalence. (Repeated addition may still be used.)	Makes use of drawings and reasoning to connect numbers with equations. (Repeated addition may be an applicable strategy. Simplification is required.)	Makes use of either repeated addition or multiplication combined with visual models to explore products greater than 1.	Makes use of what students know about repeated addition and multiplication of fractions.
Representations	Provides number lines and requires equations and mathematical reasoning around the meaning of the factors.	Provides contextualized situation and equations and requires the use of visual models or other reasonable representations to prove equivalence.	Provides contextualized situation and requires equations and visual representations to support strategies and defend answers.	Provides expressions and a number line and requires additional expressions or other models.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions



Grade 4

Tasks and Lesson Guides

Building Non-Unit Fractions

A SET OF RELATED LESSONS

Name_____

TASK 1

Pizza for the Family

1. Todd orders a pizza. He eats $\frac{1}{6}$ of it for lunch. Then he eats $\frac{1}{6}$ of it for a snack in the afternoon. He has another $\frac{1}{6}$ for dinner. How much pizza did he eat? Use diagrams and equations.

2. Todd's sister eats $\frac{1}{6}$ of the pizza. Todd's brother is hungry and wants to eat $\frac{1}{2}$ of the pizza. Is there enough left for him to eat $\frac{1}{2}$ of the pizza? Use a diagram to support your answer.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 1

Pizza for the Family

Rationale for Lesson: Introduce students to adding and subtracting from the same whole. Students also compare the portion unused to a benchmark fraction.

Task 1: Pizza for the Family

1. Todd orders a pizza. He eats $\frac{1}{6}$ of it for lunch. Then he eats $\frac{1}{6}$ of it for a snack in the afternoon. He has another $\frac{1}{6}$ for dinner. How much pizza did he eat? Use diagrams and equations.
2. Todd's sister eats $\frac{1}{6}$ of the pizza. Todd's brother is hungry and wants to eat $\frac{1}{2}$ of the pizza. Is there enough left for him to eat $\frac{1}{2}$ of the pizza? Use a diagram to support your answer.

Common Core Content Standards	4.NF.A.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
	4.NF.B.3	Understand a fraction *a/b* with *a* > 1 as a sum of fractions 1/b.
	4.NF.B.3a	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
	4.NF.B.3d	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
Standards for Mathematical Practice	MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure.	

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 1

Essential Understandings	• Comparison to known benchmark quantities can help determine the relative size of a fractional piece because the benchmark quantity can be seen as greater, less than, or the same as the piece. • Iterating a unit fraction is an interpretation of a fraction that illustrates the equal parts that the fraction is composed of. • A fraction in which the total number of pieces in the whole is the same as the total number of the pieces is called one whole because all of the pieces of the whole are accounted for. • Fractions with the same size pieces, or common denominators, within the same size whole can be added or subtracted because the size of the pieces is the same.
Materials Needed	• Student reproducible task sheet • Fraction circles, fraction bars, or other fraction manipulatives

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 1

SET-UP PHASE

Someone please read the task aloud. What materials would help you represent the problem? How many times did Todd get pizza? Work on the problem by yourself for five minutes before working with your partner.

EXPLORE PHASE (SMALL GROUP TIME, APPROXIMATELY 10 MINUTES)

Possible Student Pathways	Assessing Questions	Advancing Questions
Group can't get started.	How can you represent the pizza? How many pieces should be in the pizza? How do you know?	How can you represent the amount of pizza that Todd ate?
Writes equations using repeated addition. Todd ate: $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{3}{6}$ Todd and his sister together ate $\frac{3}{6}+\frac{1}{6}=\frac{4}{6}$.	What about the situation involving pizza made you choose to add?	How can you use subtraction to describe the amount of pizza that Todd ate?
Writes equations using subtraction. $1-\frac{1}{6}-\frac{1}{6}-\frac{1}{6}=\frac{3}{6}$ (left after Todd ate). $\frac{3}{6}-\frac{1}{6}=\frac{2}{6}$ left after his sister ate.	How does subtraction describe the pizza?	What addition problem could be used to describe the amount of pizza that Todd and his sister ate?

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 1

SHARE, DISCUSS, AND ANALYZE PHASE

EU: A fraction in which the total number of pieces in the whole is the same as the total number of the pieces is called one whole because all of the pieces of the whole are accounted for.

- I would like the group who drew an area model to come up and explain their diagram. Others listen with the goal of being able to put their method into your own words.
- Who can say in their own words what the group just explained? *(They drew a circle/square to represent the pizza and cut it into 6 equal pieces.)*
- Why did the group choose to make 6 pieces? *(Because the denominator said 6.)*
- So the group cut the "pizza" into 6 equal pieces because the denominator tells you how many pieces are in the whole. **(Revoicing)**
- How did knowing that the denominator was the number of pieces in the pizza help you represent this problem? *(Because then we could add or subtract the pieces and not have to worry anymore about how big they were; the problem was only about sixths so once we had a picture of sixths, we could manipulate it.)*
- If we had another problem that was not about sixths, how would you know how to visually represent the problem? **(Challenging)** *(We cut it up based on the denominator because that tells us how many pieces in the whole.)*

EU: Iterating a unit fraction is an interpretation of a fraction that illustrates the equal parts that the fraction is composed of.

- How many pieces did Todd eat? I would like the group that used a visual model to show us where they see the total pizza eaten by Todd. *(We took the $\frac{1}{6}$ from lunch, the $\frac{1}{6}$ from the snack, and the $\frac{1}{6}$ from dinner and colored them in. That made $\frac{3}{6}$.)*
- Who agrees with them? Say back how you know that Todd ate $\frac{3}{6}$. *(I agree and there were $\frac{3}{6}$ because he ate $\frac{1}{6}$ three times.)*
- I heard you say that 3 groups of $\frac{1}{6}$ gave you $\frac{3}{6}$. **(Marking)** Is that what you are saying?
- How else can we represent the $\frac{3}{6}$? I saw a group that wrote an equation. Come show us your work. *(We wrote an equation: $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{3}{6}$.)*
- Do you agree or disagree and say why? *(I agree because the story says Todd ate $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}$. I agree because there are three pieces.)*
- Where do we see this group's equation in the visual representation from the other group? **(Challenging)** *(We see three $\frac{1}{6}$'s in the equation and three $\frac{1}{6}$'s in the diagram.)*
- Where did the 3 in $\frac{3}{6}$ come from? Why didn't the 6 change when adding $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}$? *(The 3 came from the 1 + 1 + 1. And the 6 are the sixths.)*
- What is he saying when he says the 1 + 1 + 1? I want you to try to use math vocabulary to explain your thinking. *(The numerator says we have 1 piece and 1 piece and 1 piece, so we have $\frac{3}{6}$.)*
- Why didn't the sixth change? *(The sixth is the kind of piece. It is the 6 pieces and it doesn't change. We don't add the sixth; we only add the number in the numerator.)*
- So this $\frac{1}{6}$ (point to the equation) is represented here (point to the diagram); the next $\frac{1}{6}$ (point to the equation) is represented here (point to the diagram); and the last $\frac{1}{6}$ (point to the equation) is represented here (point to the diagram). He had one unit at each time. $\frac{1}{6}$ is a unit fraction. He had 3 unit fractions of pizza. **(Recapping)**

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 1

EU: Fractions with the same size pieces, or common denominators, within the same size whole can be added or subtracted because the size of the pieces is the same.

- In the room we had people both add and subtract for this problem. The group that used addition, please show us what you did. *(We added $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}$ for Todd and another $\frac{1}{6}$ for his sister.) (Record $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=$ ____)* Everyone stop and jot. What is the sum?
- Someone come explain how this group figured out the amount of pizza eaten. *(They added the $\frac{3}{6}$ that Todd ate to the $\frac{1}{6}$ that his sister ate and that is $\frac{4}{6}$.)*
- So you are saying that the total, the sum of the pizza eaten, was $\frac{4}{6}$. **(Revoicing)** I did not hear the group that explained the addition mention $\frac{4}{6}$. Do other groups agree with $\frac{4}{6}$ being eaten?
- How is addition shown in the diagrams? *(We added the parts that we colored in: $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{4}{6}$ eaten.)*
- Other groups subtracted. Will the group that subtracted please come show us your equation? *(We knew that the pizza was $\frac{6}{6}$. Then we subtracted $\frac{1}{6}$ and $\frac{1}{6}$ and $\frac{1}{6}$ for what Todd ate. Then we took another $\frac{1}{6}$ for what his sister ate. That was subtracting $\frac{4}{6}$.)*
- So if we added we found that $\frac{4}{6}$ was eaten. And if we subtracted we found that $\frac{4}{6}$ was eaten. **(Marking)**
- Who can show us in the same diagram how subtraction was used? *(We had the whole and took away the three parts for Todd and the one part for his sister.)*
- How would the addition and subtraction look on a number line for this problem? Will they look the same or different? **(Challenging)**

EU: Comparison to known benchmark quantities can help determine the relative size of a fractional piece because the benchmark quantity can be seen as greater, less than, or the same as the piece.

- So did Todd's brother have $\frac{1}{2}$ of the pizza available to him? *(No.)*
- How do you know? *($\frac{4}{6}$ is more than $\frac{1}{2}$.)*
- How do you know that $\frac{4}{6}$ is more than $\frac{1}{2}$? *($\frac{3}{6}$ is the same as $\frac{1}{2}$ so $\frac{4}{6}$ is more than $\frac{1}{2}$.)*
- Does everyone agree? Who can say it another way or show us on a diagram? *(On the diagram, we see that $\frac{3}{6}$ is equal to $\frac{1}{2}$ and then $\frac{1}{6}$ more is $\frac{4}{6}$ so that is more than $\frac{1}{2}$.)*
- So $\frac{3}{6}$ is equal to $\frac{1}{2}$. **(Marking)** And $\frac{4}{6}$ is $\frac{1}{6}$ more than $\frac{1}{2}$. **(Revoicing)**
- If you know that $\frac{4}{6}$ is more than $\frac{1}{2}$, how does that help you answer the question? *(If more than $\frac{1}{2}$ of the pizza is eaten by Todd and his sister, his brother has less than $\frac{1}{2}$ a pizza to eat.)*

Application	If Todd ate $\frac{3}{8}$ of a pizza and his sister ate $\frac{2}{8}$ of a pizza, how much was left for Todd's brother?
Summary	Let's put all of our ideas together about today's lesson. What did we discover about how both addition and subtraction work in this situation?
Quick Write	Why could we use both addition and subtraction to solve today's problem?

Support for students who are English learners (EL):

1. Ask a student to physically come to the board/overhead/chart paper when sharing strategies in order to point to the meaning of each number so all students can follow the line of thinking being explained.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Name_____

TASK 2

Drinking Juice

1. Gabrielle drinks $\frac{1}{10}$ of a container of juice each day. How many days does it take her to drink the whole container?

2. Deborah says Gabrielle can use addition to figure out the answer to this problem. Charlie says Gabrielle can use subtraction to figure out the answer to this problem. Show why they are both correct.

Extension: How many days will it take for $\frac{3}{4}$ of the juice to be gone?

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 2

Drinking Juice

Rationale for Lesson: In this lesson, the context changes as well as the amounts, but students continue to deepen their understanding of addition and subtraction of unit fractions within the same whole. Students again compare non-unit fractions to benchmark fractions.

Task 2: Drinking Juice

1. Gabrielle drinks $\frac{1}{10}$ of a container of juice each day. How many days does it take her to drink the whole container?
2. Deborah says Gabrielle can use addition to figure out the answer to this problem. Charlie says Gabrielle can use subtraction to figure out the answer to this problem. Show why they are both correct.

Extension: How many days will it take for $\frac{3}{4}$ of the juice to be gone?

Common Core Content Standards	4.NF.A.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
	4.NF.B.3	Understand a fraction *a/b* with *a* > 1 as a sum of fractions 1/b.
	4.NF.B.3a	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
	4.NF.B.3d	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
Standards for Mathematical Practice	MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Create viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP6 Attend to precision. MP7 Look for and make use of structure.	

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 2

Essential Understandings	• Comparison to known benchmark quantities can help determine the relative size of a fractional piece because the benchmark quantity can be seen as greater, less than, or the same as the piece. • Iterating a unit fraction is an interpretation of a fraction that illustrates the equal parts that the fraction is composed of. • A fraction in which the total number of pieces in the whole is the same as the total number of the pieces is called one whole because all of the pieces of the whole are accounted for. • Fractions with the same size pieces, or common denominators, within the same size whole can be added or subtracted because the size of the pieces is the same.
Materials Needed	• Student reproducible task sheet • Fraction circles, fraction bars, or other fraction manipulatives

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 2

SET-UP PHASE

Someone please read the task aloud. As you work, remember some of the strategies used in the Pizza for the Family task; these strategies may help with your thinking. Work on the problem by yourself for five minutes before working with your partner.

EXPLORE PHASE (SMALL GROUP TIME, APPROXIMATELY 15 MINUTES)

Possible Student Pathways	Assessing Questions	Advancing Questions
The students cannot get started.	How can we represent the container of juice? What part of the container does Gabrielle drink each day?	How much does Gabrielle drink in two days? How can you show this in a diagram?
Draws a diagram that shows tenths. Shades/ labels one tenth per day.	What does your diagram represent? How do you know how much Gabrielle drank in three days?	What equation would represent the amount of juice that Gabrielle drank? What does each number in the equation tell about the juice that Gabrielle drank?
Adds tenths to get to one whole.	How many days does it take for Gabrielle to finish the container?	What if Gabrielle drank $\frac{2}{10}$ per day? Then how many days would it take her to drink the juice in the container?

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 2

SHARE, DISCUSS, AND ANALYZE PHASE

EU: A fraction in which the total number of pieces in the whole is the same as the total number of the pieces is called one whole because all of the pieces of the whole are accounted for.

- This group used a diagram to represent the problem. Please come up and show us how you decided how to draw the container. *(We broke the whole container into 10 equal parts because Gabrielle drinks $\frac{1}{10}$ each day.)*
- Who understood their thinking? Come explain their diagram again.
- So the group decided to break the whole into 10 equal parts. **(Marking)** Where did they find the information that told them to break it into 10 parts? Why not 6 parts like the pizza task we talked about yesterday? *(Because the denominator said 10, not 6.)*
- The denominator determines how many parts are in the whole or the size of the pieces. **(Revoicing and Marking)**

EU: Iterating a unit fraction is an interpretation of a fraction that illustrates the equal parts that the fraction is composed of.

- How much did Gabrielle drink each day? *($\frac{1}{10}$ of the container.)*
- How much did she drink in two days? Three? ($\frac{2}{10}$, $\frac{3}{10}$.)
- How can the amount that she drank each day for the four days be represented in an equation? *(Well, we can add $\frac{1}{10}$ as many times as we need to in order to represent the days.)*
- Show me an equation that would represent how much Gabrielle drank by the fourth day. Stop and jot. Everyone write an equation. **(Challenging)** ($\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} = \frac{4}{10}$)

EU: Fractions with the same size pieces, or common denominators, within the same size whole can be added or subtracted because the size of the pieces is the same.

- This group represented the problem with an addition equation. Explain your thinking. *(We added $\frac{1}{10}$ until we got to one whole and it took 10 times.)*
- Someone else explain back the equation that was used to show how many days it took Gabrielle to finish the juice container. *(The group added $\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$ because it took 10 tenths to get to one whole container.)*
- Now there was a group that used subtraction for this problem. Please come explain your thinking. *(We took one whole and subtracted $\frac{1}{10}$ until we finished the whole.)*
- Explain in your own words the difference between the two strategies. *(One group added one-tenths until they got to one whole. The other group subtracted one-tenths from one whole until they reached zero.)*
- So you could use addition or subtraction to solve this problem. **(Marking)**
- It seems like most of the groups that have explained their thinking only added or subtracted the numerators. Is that true? *(Yes, they almost ignored the tenth part; yes, the denominator stayed the same so it is like they only worked with the numerators.)*
- So when the denominators are common, we can add or subtract the numerators. **(Revoicing)** Why do we add only the numerators? **(Challenging)** *(Because the pieces are the same size we can do what we need to with the numerators. But if the denominators are different we need to look at both the numerator and denominator.)*

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

LESSON GUIDE 2

EU: Comparison to known benchmark quantities can help determine the relative size of a fractional piece because the benchmark quantity can be seen as greater, less than, or the same as the piece.

- How many days did it take Gabrielle to finish half of the container? *(Five.)* How do you know? *(We split the container into 10 equal pieces and then colored in half of them. That was five pieces, or $\frac{5}{10}$, so that was five days.)*
- Can someone else explain what that group did?
- Come show us the diagram that shows the five days. Who can tell us where they see five days in this diagram? *(Each tenth is one day and if there are five tenths in one half, that is five days.)*
- I saw an equation that someone wrote to show their thinking. Come show us that equation. *(Student puts on the board/chart/overhead: $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=\frac{5}{10}=\frac{1}{2}$)*
- How did this equation help you solve the problem? *(I knew that five tenths and one half are the same things, so I counted how many tenths are in five tenths and it is five, so five days is half of the container.)*
- Does anyone disagree?
- How did we figure out how many days it took to drink $\frac{3}{4}$ of the container? *(That one was hard!)*
- Why was this harder? *(We drew a picture of the container and colored in $\frac{3}{4}$ and then we compared that to our container that had tenths drawn. The lines did not match up.)*
- Who can show us what the group means by "the lines did not match up"?
- So the line at the $\frac{3}{4}$ was in between two of the lines showing tenths of the container, which means that $\frac{3}{4}$ does not have a nice equivalence in tenths like the $\frac{1}{2}$ equaling $\frac{5}{10}$. **(Revoicing)**
- What did the question ask? *(What about more than $\frac{3}{4}$ gone?)*
  So when is the container MORE than $\frac{3}{4}$ gone? *(On the eighth day.)*
- Then I hear you saying that $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}$ is more than $\frac{3}{4}$.
  (Revoicing and Marking)

Application	What would happen if Gabrielle drank $\frac{1}{8}$ of a container of juice per day? How many days would it take her to finish a container? How do you know?
Summary	How does the denominator impact the diagram or equation for a problem?
Quick Write	In a situation like today's task, how does labeling the diagram help clarify the mathematics?

Support for students who are English learners (EL):

1. Ask students to describe and point to the diagrams, indicating what each group of one-tenth represents.
2. Publically list the strategies identified by students for figuring out how to solve a problem. Ask students who are English learners to set a goal to use one or more of the strategies listed.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

The Launch Phase

Someone please read the task aloud. What materials would help you represent the problem? How many times did Todd get pizza? Work on the problem by yourself for five minutes before working with your partner.

Video Clip

Reflection Questions:

1. What actions is the teacher doing? What is her goal?

2. What preparation does the teacher need to do in order to make this phase successful?

3. How are students responding to the teacher?

Explore Phase

Private Think Time

Video Clip

Reflection Questions:

1. How is the teacher ensuring continued success during this time?

2. What are the different student outputs' that you are seeing?

Small Group

(Small Group Time, Approximately 10 Minutes)

Possible Student Pathways	Assessing Questions	Advancing Questions
Group can't get started.	How can you represent the pizza? How many pieces should be in the pizza? How do you know?	How can you represent the amount of pizza that Todd ate?
Writes equations using repeated addition. Todd ate: $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{3}{6}$ Todd and his sister together ate: $\frac{3}{6}+\frac{1}{6}=\frac{4}{6}$	What about the situation involving pizza made you chose to add?	How can you use subtraction to describe the amount of pizza that Todd ate?
Writes equations using subtraction. $1-\frac{1}{6}-\frac{1}{6}-\frac{1}{6}=\frac{3}{6}$ (left after Todd ate.) $\frac{3}{6}-\frac{1}{6}=\frac{2}{6}$ left after his sister ate.	How does subtraction describe the pizza?	What addition problem could be used to describe the amount of pizza that Todd and his sister ate?

Video Clip

Reflection Questions:

1. How does the teacher connect to various levels of student understanding?

2. What are students asked to do during this part of the lesson?

Share, Discuss, Analyze Phase, Continued

Video Clip

Reflection Questions:

1. How do you see ways in which the teacher prepared for this part of the lesson?

2. What are the students demonstrating for the teacher and how is the teacher helping the students do that?

3. Which Accountable Talk© moves did you see in the clip?

4. How does the teacher make connections between the student work and the mathematical goal?

Accountable Talk© Chart

Talk Moves	Function	Example
	To Ensure Purposeful, Coherent, and Productive Group Discussion	
Marketing	Direct **attention** to the value and importance of s student's contribution.	It is important t say describe to compare the size of the pieces and then to look at how many pieces if that size.
Challenging	Redirect a question back to the students or use students' contributions as a source for further challenge or query.	Let me challenge you: Is that always true?
Revoicing	Align a student's explanation with content or connect two or more contributions with the goal of advancing the discussion of the content.	You said 3, yes there are three columns and each column is 1/3 of the whole.
Recapping	Make public in a concise, coherent form, the group's achievement at creating a shared understanding of the phenomenon under discussion.	Let me put these ideas all together. What have we discovered?
	To Support Accountability to Community	
Keeping the Channels Open	Ensure that students can hear each other, and remind them that they must hear what others have said.	Say that again and louder. Can someone repeat what was just said?
Keeping Everyone Together	Ensure that everyone not only heard, but also understood, what a speaker said.	Can someone add on to what was said? Did everyone hear that?
Linking Contributions	Make explicit the relationship between a new contribution and what has gone before.	Does anyone have a similar idea? Do you agree or disagree with what was said? Your idea sounds similar to his idea.
Verifying and Clarifying	Revoice a student's contribution, thereby helping both speakers and listeners to engage more profitability in the conversation.	So are you saying..? Can you say more? Who understood what was said?
	To Support Accountability to Knowledge	
Pressing for Accuracy	Hold students accountable for the accuracy, credibility, and clarity of their contribution.	Why does that happen? Someone give me the term for that.
Building on Prior Knowledge	Tie a current contribution back to knowledge accumulated by the class at a previous time.	What have we learned in the past that links with this?
	To Support Accountability to Rigorous Thinking	
Pressing for Reasoning	Elicit evidence to establish what contribution a student's utterance is intended to make within the group's larger enterprise.	Say why this works. What does this mean? Who can make a claim and then tell us what their claim means?
Expanding Reasoning	Open up extra time and space in the conversation for student reasoning.	Does the idea work if I change the context? Use bigger numbers?

©2013 UNIVERSITY OF PITTSBURGH
Accountable Talk© is a registered trademark of the University of Pittsburgh

TNCore

Appendix

Tennessee Department of Education
Common Core Leadership Course 202

Appendix Table of Contents

Writing Rubric	157
Phase Writing	158
Text 1	160
Text 2	166
Training Set	170
The Structure and Routines of a Lesson	179
Accountable Talk Moves	181
Linking to Research/Literature: Connections between Representations	183
The Mathematical Task Analysis Guide	185
Thanksgiving Pie Activity	187
Task Arc: Building Non-Unit Fractions (8 Tasks)	189
Contact Information	199
Notes Pages	200

Revised: April 2013

Score	Development	Focus & Organization	Language	Conventions
4	In response to the task and the stimuli, the writing: • utilizes well-chosen, relevant, and sufficient evidence[1] from the stimuli to insightfully support the writer's opinion. • thoroughly and accurately explains and elaborates on the evidence provided, connecting the evidence to the writer's opinion and demonstrating a clear understanding of the topic and the stimuli.	In response to the task and the stimuli, the writing: • contains an effective and relevant introduction. • states and maintains a clear and sophisticated opinion or point of view. • utilizes effective organizational strategies to logically order reasons and information. • effectively establishes relationships among opinions, reasons, and evidence. • contains an effective and relevant concluding statement or section.	The writing: • illustrates consistent and sophisticated command of precise language and domain-specific vocabulary appropriate to the task. • illustrates sophisticated command of syntactic variety for meaning, reader interest, and style. • utilizes sophisticated and varied transitional words and phrases.	The writing: • demonstrates consistent and sophisticated command of grade-level conventions of standard written English.[2] • may contain a few minor errors that do not interfere with meaning.
3	In response to the task and the stimuli, the writing: • utilizes relevant and sufficient evidence[1] from the stimuli to adequately support the writer's opinion. • adequately and accurately explains and elaborates on the evidence provided, connecting the evidence to the writer's opinion and demonstrating a sufficient understanding of the topic and the stimuli.	In response to the task and the stimuli, the writing: • contains a relevant introduction. • states and maintains a clear opinion or point of view. • utilizes adequate organizational strategies to logically order reasons and information. • adequately establishes most relationships among opinions, reasons, and evidence. • contains a relevant concluding statement or section.	The writing: • illustrates consistent command of precise language and domain-specific vocabulary appropriate to the task. • illustrates consistent command of syntactic variety for meaning, reader interest, and style. • utilizes appropriate and varied transitional words and phrases.	The writing: • demonstrates consistent command of grade-level conventions of standard written English.[2] • contains some minor and/or major errors, but the errors do not significantly interfere with meaning.
2	In response to the task and the stimuli, the writing: • utilizes mostly relevant but insufficient evidence[1] from the stimuli to partially support the writer's opinion. Some evidence may be inaccurate or repetitive. • explains some of the evidence provided, connecting some of the evidence to the writer's opinion and demonstrating only a partial understanding of the topic and the stimuli. There may be some level of inaccuracy in the explanation.	In response to the task and the stimuli, the writing: • contains a limited introduction. • states a weak opinion or point of view. • demonstrates an attempt to use organizational strategies to order some reasons and information, but ideas may be hard to follow at times. • establishes some relationships among opinions, reasons, and evidence, but there are lapses in focus. • contains a limited concluding statement or section.	The writing: • illustrates inconsistent command of precise language and domain-specific vocabulary. • illustrates inconsistent command of syntactic variety. • utilizes basic or repetitive transitional words and phrases.	The writing: • demonstrates inconsistent command of grade-level conventions of standard written English.[2] • contains many errors that may significantly interfere with meaning.
1	In response to the task and the stimuli, the writing: • utilizes mostly irrelevant or no evidence[1] from the stimuli, or mostly/only personal knowledge to inadequately support the writer's opinion. Evidence is inaccurate or repetitive. • inadequately or inaccurately explains the evidence provided; evidence and the writer's opinion appear disconnected, demonstrating little understanding of the topic and the stimuli.	In response to the task and the stimuli, the writing: • contains no or an irrelevant introduction. • states an unclear opinion or point of view. • demonstrates an unclear organizational structure; ideas are hard to follow most of the time. • fails to establish relationships among opinions, reasons, and evidence; concepts are unclear and/or there is a lack of focus. • contains no or an irrelevant concluding statement or section.	The writing: • illustrates little to no use of precise language and domain-specific vocabulary. • illustrates little to no syntactic variety. • utilizes no or few transitional words and phrases.	The writing: • demonstrates limited command of grade-level conventions of standard written English.[2] • contains numerous and repeated errors that seriously impede meaning.

[1] Evidence includes facts, concrete details, or other information as appropriate to the task and the stimuli.
[2] Conventions of standard written English include sentence structure, grammar, usage, spelling, capitalization, and punctuation.

MI MEASUREMENT INCORPORATED
institute for learning

ELA Phase I Writing Task Introduction

Stonehenge is an ancient, circular setting of stones located in Wiltshire, Great Britain. There are photos of Stonehenge on the next few pages. Who built Stonehenge? Why did they build it? How did they build it? These are questions that people have tried to solve for years, and some answers remain a mystery today.

ELA Phase I Writing Task Texts

Two texts will be used with this set of writing tasks. The print texts are included in the accompanying text packet:

- “Stonehenge” by Marjorie Frank
- “Stonehenge” by John Hudson Tiner

ELA Phase I Writing Tasks

Two writing tasks have been provided:

- Analytic Summary of Text 1
- Analysis of Texts 1 and 2

© 2013 UNIVERSITY OF PITTSBURGH

2. Analysis

Please read "Stonehenge" by John Hudson Tiner.[2]

You have now read two texts about Stonehenge. Write an opinion essay about which of the two authors best uses reasons and evidence to support ideas about the mystery of Stonehenge. Be sure to develop your point of view with reasons that are supported by facts and details from both texts. Follow the conventions of standard written English. Write your essay in the space provided on the next pages.

You may use this area for notes ONLY. Use the lined pages to write your essay.

[2] Tiner, J.H. (2003, December). "Stonehenge." *Nature Friend, 18-20.* Retrieved SIRS Discoverer. Web. 30 Mar 2013. Used by permission.

© 2013 UNIVERSITY OF PITTSBURGH

Stonehenge

Marjorie Frank

Frank, Marjorie. (2012). KIDS DISCOVER spotlights: Stonehenge. *Kids Discover*. Used by permission. Retrieved from http://www.kidsdiscover.com/blog/spotlight/stonehenge-for-kids/

Copyright laws may prohibit photocopying this document without express permission.

Stonehenge

By Marjorie Frank

Suppose you came upon a statue in the woods. “What is this?” you might ask. Why is it here? Who brought it? Why? How did they get it here? What does it mean? These are reasonable questions. With a little research and some effort, you could probably find the answers and satisfy your curiosity.

Now, imagine coming upon something for which there are no answers—whose origins and reason for existence you could never know, no matter how much research you did.

Imagine Stonehenge, forever to be one of the world’s greatest mysteries.

What We Do Know

The Age

Stonehenge was built in phases from about 3100 B.C. to 1600 B.C. Yes, more than 5,000 years ago—during the Stone Age, long before the wheel was invented! We know this because scientists have used carbon dating[1] to analyze the age of animal bones buried at the site.

The Stones

The monument consists of enormous stones laid out in concentric circles[2]. The outermost circle is about 32 yards in diameter. The stones of the outer circle are sandstone columns connected by lintels[3] about ten feet long. The lintels are shaped to the curve of the circle.

Even larger blocks of sandstone and lintels form an inner semicircle. The largest of these stones weighs about as much as a fully loaded cement truck—40 tons. Today, sandstone similar to the kind at Stonehenge is found about 19 miles north, but no closer.

---

[1] **carbon dating**: a way of calculating the age of a very old object by the amount of radioactive carbon

[2] **concentric circles:** circles of different sizes with the same middle point

[3] **lintels:** horizontal beams used for support

Frank, Marjorie. (2012). KIDS DISCOVER spotlights: Stonehenge. *Kids Discover*. Used by permission. Retrieved from http://www.kidsdiscover.com/blog/spotlight/stonehenge-for-kids/

Grade 4-5/Text 1

This material is copyrighted and therefore must be securely destroyed immediately after use. DO NOT provide a copy of this material to anyone (teacher, student, or otherwise) who is not directly involved with this test administration.

Within the inner circle of pillars and lintels are smaller stones, called bluestones. Also arranged in a circle, some are still standing as they have been for thousands of years. Others are leaning or lying on the ground. These four-ton stones are from mountains nearly 250 miles away!

The Placement

A special stone called the Heel Stone stands at some distance from the main structure. Imagine standing at the center of the structure and looking toward the Heel Stone. If it were the morning of the summer or winter solstice[4], you would see the sun rise directly over the Heel Stone.

That's what we know about the structure. Here's some of what we don't know. . . .

How were the stones transported?

How were they stood on end?

How were the lintels put in place?

Is it mere[5] coincidence that the sun rises and sets over the Heel Stone on the summer and winter solstice, or was the placement of the stone chosen for that very purpose?

Answers to these questions represent a combination of theory and imagination.

---

[4] **solstice:** the longest (summer) or shortest (winter) day of the year
[5] **mere:** no more than

Frank, Marjorie. (2012). KIDS DISCOVER spotlights: Stonehenge. *Kids Discover*. Used by permission. Retrieved from http://www.kidsdiscover.com/blog/spotlight/stonehenge-for-kids/

Grade 4-5/Text 1

This material is copyrighted and therefore must be securely destroyed immediately after use. DO NOT provide a copy of this material to anyone (teacher, student, or otherwise) who is not directly involved with this test administration.

What We Think

Transportation

Most archaeologists maintain that people transported the stones, even the bluestones that came from so far away. According to these specialists, the stones were dragged over land and perhaps towed along the shoreline to their destination.

In 2000, a group of Welsh and English volunteers participated in a reenactment of the process by moving a three-ton bluestone from the Preseli Mountains in Wales to Stonehenge. The volunteers used methods and boats they thought might have been available 5,000 years ago.

To travel along the coast, the stone was towed by two boats lashed together. At a point along the way, one of the ropes snapped, and the stone sank. It took many divers and a lot of muscle power to hoist[6] the stone back into position.

Imagine what it might have taken to house, clothe, and feed all the people needed to transport these stones! Would it have been possible? No one knows for sure.

Many geologists contend that ancient glaciers deposited the massive boulders across the plains of southern England. These would have been gathered by the Stone Age monument-makers and transported to the site. It would have been a big job but not as big as transporting the stones nearly 250 miles.

Today, the immediate area around the monument is free of large boulders. However, supporters of this view point to the many glacial remnants[7] within a 60-mile radius to suggest that glaciers were no strangers to the area. Perhaps farmers had already removed most of the large stones.

---

[6] **hoist:** raise or lift up
[7] **remnant:** a small part of something that remains after most is gone

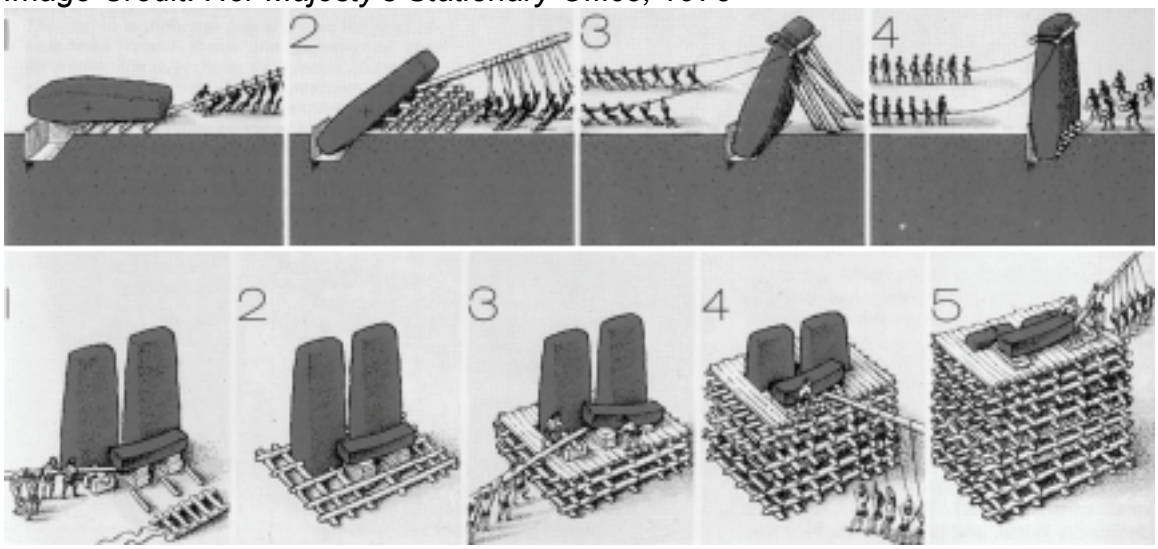
Frank, Marjorie. (2012). KIDS DISCOVER spotlights: Stonehenge. *Kids Discover*. Used by permission. Retrieved from http://www.kidsdiscover.com/blog/spotlight/stonehenge-for-kids/

This material is copyrighted and therefore must be securely destroyed immediately after use. DO NOT provide a copy of this material to anyone (teacher, student, or otherwise) who is not directly involved with this test administration.

Construction

What happened once the stones were at the site? How were they raised upright? And how were the lentils jacked[8] into position? Barbara J. Becker, a historian of science, proposes the following:

Image Credit: Her Majesty's Stationary Office, 1978



However, like almost everything else about Stonehenge, we have no way of knowing for sure that this is what happened.

What We Imagine

Whatever your view about how Stonehenge was built, a single question remains: Why? Like much else about this mysterious monument, theories abound[9].

Some believe the monument was an astronomical calendar. According to this group, the placement of the stones predicted solar eclipses and marked the summer and winter solstices. But would Stone Age people have had the knowledge to erect[10] such a monument?

---

[8] **to jack:** to raise a heavy object a short distance using a mechanical device
[9] **abound:** be present in large numbers
[10] **erect:** construct

Frank, Marjorie. (2012). KIDS DISCOVER spotlights: Stonehenge. *Kids Discover*. Used by permission. Retrieved from http://www.kidsdiscover.com/blog/spotlight/stonehenge-for-kids/

This material is copyrighted and therefore must be securely destroyed immediately after use. DO NOT provide a copy of this material to anyone (teacher, student, or otherwise) who is not directly involved with this test administration.

Others contend that Stonehenge was a place of healing, a place where some type of primitive[11] surgery was performed. As evidence, people of this view cite the nearby discovery of skeletons with crude gashes. . . . But the gashes could have had many origins.

Still others feel that Stonehenge was a burial ground and site for ancestor worship. Skeletal remains dating from 3000 B.C. to 2500 B.C. are offered as evidence for this theory. But why here?

Research scientists and others continue to explore Stonehenge and its many mysteries. For now, only two things are certain:

The sun will rise over the Heel Stone to mark the next solstice.

Our understanding of Stonehenge will remain incomplete.

What do *you* think?

---

[11] **primitive:** simple, in the early stages of development

Frank, Marjorie. (2012). KIDS DISCOVER spotlights: Stonehenge. *Kids Discover*. Used by permission. Retrieved from http://www.kidsdiscover.com/blog/spotlight/stonehenge-for-kids/

This material is copyrighted and therefore must be securely destroyed immediately after use. DO NOT provide a copy of this material to anyone (teacher, student, or otherwise) who is not directly involved with this test administration.

Stonehenge

John Hudson Tiner

Tiner, J.H. (2003, December). “Stonehenge.” *Nature Friend*, 18-20. Retrieved SIRS Discoverer. Web. 30 Mar 2013. Used by permission.

Copyright laws may prohibit photocopying this document without express permission.

Stonehenge

by John Hudson Tiner

The Stonehenge people possessed an incredible blending of organization, intelligence,and building skill.

On the Salisbury Plain in England stands Stonehenge, a magnificent circle of stone arches. During the past four hundred years, visitors have tried to reason out its purpose.

Stonehenge at first looks like a confusing series of nested stone circles. Gigantic standing stones circle two horseshoe-shaped sets of blocks eighteen feet high. In the center is a massive sandstone table called the Altar. Despite the name, no one knows the actual use of the Altar. Beyond it is a large tapering[1] stone known as the Heelstone.

The flat Altar stone convinced scholars of the 1500s that the monument served as a temple. . . . They imagined that people gathered around it and prepared to go to war. Scholars had a few real facts about the site. They did know that on the first day of summer, the sun rose directly over the Heelstone as seen from the Altar. Most scientists thought this to be only a coincidence.

In 1620, Inigo Jones made the first accurate drawings of the monument. He was an experienced building designer, and he decided it couldn't be the work of ancient Britons. “These savage and barbarous[2] people could not possibly erect such a stately structure,” he said. He concluded it was the ruins of a Roman temple, put in place about A.D. 100.

The Romans invaded England about A.D. 43. They built many permanent structures that still stand. However, Stonehenge was ancient even then. The Romans had not built it.

In1650, John Aubrey explored the site. He visited interesting places and described them in books that he wrote. Aubrey discovered the remains of a circular trench[3] 320 feet in diameter and five feet deep around Stonehenge. Just inside the trench, Aubrey found 56 evenly spaced pits filled with white chalk. He declared that the Druids, a mysterious group of Britons who lived about 200 B.C.,

---

[1] **taper:** gradually become narrower at one end
[2] **barbarous:** uncivilized
[3] **trench:** a long, deep hole in the ground with steep sides

Tiner, J.H. (2003, December). “Stonehenge.” *Nature Friend*, 18-20. Retrieved SIRS Discoverer. Web. 30 Mar 2013. Used by permission.

Grade 4-5/Text 2

This material is copyrighted and therefore must be securely destroyed immediately after use. DO NOT provide a copy of this material to anyone (teacher, student, or otherwise) who is not directly involved with this test administration.

used Stonehenge as a temple. For two hundred years, people accepted Aubrey's explanation.

In 1880, Professor William Gowland, a geology professor, dug around one of the towering stones of the larger circle. He found flint[4] and sandstone axes and hammers that had been used in its construction. The ancient tools came from a time before the Druids. Stonehenge had to be more than a thousand years old when the Druids came on the scene.

Archaeologists today believe ancient people began construction about 3500 B.C. The first version consisted of the circle of 56 holes that Aubrey discovered. About 2300 B.C., ancient people transported gigantic stone blocks to the site. They completed the last improvement about 1000 B.C. After that, it fell into ruins.

A thousand years passed. The Romans invaded England. They carted away some of the stones for building material. The Romans left in A.D. 410. Wind and rain wore away at the stone for the next thousand years. Visitors hammered off chips for souvenirs.

In 1958, England had the fallen stones raised. They restored Stonehenge to how it appeared in Roman times. Later, they rerouted[5] modern highways away from the site and built an underground visitors' center. Despite the years of neglect, it remains an awe-inspiring accomplishment.

Why did the ancient people of England invest so much time and effort in the monument? Archaeologists have made many attempts to provide an answer. They found evidence that could mark celestial events[6] during the course of a year.

Early in the 1900s, the English astronomer Norman Lockyer showed that the sun rose over a particular stone on the first day of summer. Other astronomers were impressed with the 56 Aubrey holes. Eclipses[7] of the sun and moon repeat in a cycle that lasts 56 years. By moving stones around the Aubrey holes, the ancient people could have computed the dates of solar and lunar[8] eclipses.

---

[4] **flint:** a hard quartz rock used for tools in prehistoric times
[5] **reroute:** send in a different direction
[6] **celestial event:** anything of interest that happens in outer space involving planets, stars, etc.
[7] **eclipse:** the hiding of an object in space, like the sun or moon, by another object that crosses in front of it
[8] **lunar:** having to do with the moon

Tiner, J.H. (2003, December). "Stonehenge." *Nature Friend*, 18-20. Retrieved SIRS Discoverer. Web. 30 Mar 2013. Used by permission.

Grade 4-5/Text 2

This material is copyrighted and therefore must be securely destroyed immediately after use. DO NOT provide a copy of this material to anyone (teacher, student, or otherwise) who is not directly involved with this test administration.

Because of the importance of the sun in daily life, an eclipse of the sun could be a frightening event. Being able to predict an eclipse took away some of the fear.

In 1964, Gerald H. Hawkins of Boston University became convinced the arrangement of stones was not a coincidence. If the people had wished to mark only summer sunrise, they needed only two stones: one stone to mark where they should stand and another one farther away to show on the horizon where the sun would come up. Yet, the Stonehenge builders carved hundreds of stones that weighed thousands of tons and placed them in position.

Hawkins took detailed measurements from aerial photographs of the stones. He fed the information into a computer. Hawkins concluded that Stonehenge was an elaborate astronomical observatory. The Stonehenge builders could calculate solstices (first day of summer and winter), equinoxes (first day of spring and autumn), and eclipses.

At first, scientists dismissed such an idea. Ancient people, they believed, simply would be too primitive to make such precise calculations. Hawkins convinced many skeptics with his discovery that an eclipse of the sun or moon always occurred when the winter moon rose over the Heelstone.

Other archaeologists believe that Gerald Hawkins overstated the purpose of Stonehenge. They believe its true purpose has yet to be fully revealed. The Stonehenge people, like many others of the remote past, showed remarkable skill. They possessed an incredible blending of organization, intelligence, and building skill. Stonehenge builders searched for truth and knowledge. To what extent they achieved their goals we do not know. But they saw a design in creation that modern people often ignore.

Tiner, J.H. (2003, December). “Stonehenge.” *Nature Friend*, 18-20. Retrieved SIRS Discoverer. Web. 30 Mar 2013. Used by permission.

Grade 4-5/Text 2

This material is copyrighted and therefore must be securely destroyed immediately after use. DO NOT provide a copy of this material to anyone (teacher, student, or otherwise) who is not directly involved with this test administration.

GRADES 4–5
TRAINING SET
ITEM 2

Copyright © 2013 by the University of Pittsburgh and published under contract with Tennessee State Department of Education by Measurement Incorporated, 423 Morris Street, Durham, North Carolina, 27701. Testing items licensed to the Tennessee State Department of Education. All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of Tennessee Department of Education and the University of Pittsburgh.

TRAINING SET DIRECTIONS

After you have read and reviewed the texts, anchor responses and annotations for this item, you may complete this training set.

This item-specific training set was developed to help you practice scoring responses before you begin to score your students' work. Unlike the individual trait anchors, you will review these responses for all four traits. Responses within the training set have also been placed in random order, unlike anchor responses.

There are five responses in the training set. After reading each response, write down your score for all four traits (Development, Focus & Organization, Language, and Conventions). There is space available after each response for you to provide a score. Once you have finished scoring, you may go on to the next response and repeat this process.

You are highly encouraged to use the anchor responses and appropriate rubrics for this item as you move through the training set and score responses. Keep in mind that your copies of the texts may also help in assessing these training responses.

An answer key has been provided on the last page of this training set. Once you have finished scoring the training set, you may compare your score with the true score for each response.

Training Set: Response #1

In my opinion, I think John Hudson Tiner used the best evidence and reason that Stonehenge is still a mystery.

John Hudson Tiner wrote that Inigo Jones, John Aubrey, Proffesor Williams Gowald, Norman Lockyer, and Gerald H. Hawkins all try to reveal all the mysteries of the Stonehenge. In the passage, "Inigo Jones made the first accurate drawings of the monument." For John Aubrey, "Aubrey discovered the remains of a circular trench 320 ft in diameter and five feet deep around the Stonehenge." For Proffesor Williams Gowald, "A geology proffesor, dug around one of the towering stones of the large circle. He found flint and sandstone axes and hamers used in contruction."

So after every discovery, John Hudson Tiner put the proffesor's name and some details that the proffesor discovered about Stonehenge.

In Majorie Frank's story, it only tells the facts with no explanation at how, when, or what reason they digged the flint. For example, "The outermost circle is about 32 yards in diameter." It tells that fact, but there were no details in how they found it or what reason they found it.

Anoter reason I didn't choose Majore Frank's theary is, because they really haven't suggest when or what cooperated in the construction.

In the theory of John Hudson Tiner, it said it was probably in 3500 B.C. In the paragraph He said, "About 2800 B.C., ancient people transported gigantic stones blocks to the site. They completed the last improvement about 1000 B.C."

Those are some of the reasons why I choosed John Hudson Tiner instead of Marjore Frank. I think having more professors involved in the story will probably reveal more reasons why they built or how they built Stonehenge.

<u>SCORES</u>
Development:
Focus & Organization:
Language:
Conventions:

Training Set: Response #2

I think that Jhon hudson tiner did better by giving good evidence about the passage and better detailed it, also taks much more about it and it stays on topic like talking about salsbary plain, wich is very much so, staying on topic, but the other one dosen't stay on topic. I also like how it talks about the romans invaded england, it goes back all the way to the 16'20's when inigo Jones made the first acurate drawings of the monument served as a temple, then monument was served as a temple and roman temples were their too, back then in the old day.

SCORES
Development:
Focus & Organization:
Language:
Conventions:

Training Set: Response #3

Writers John Hudson Tiner and Marjorie Frank both wrote papers with the title "Stonehenge". Although their subject matter was the same their content varied greatly. Based on these two articles, I believe John Hudson Tiner wrote a more informative article.

Frank's paper is intresting but Tiner's provides the reader with more information. Tiner gives a more complete description of the layout of stonehedge. He talks about the history of our knowledge about the structure, as well as the people who proposed some of the popular theories about its origin and purpose. For example, He explained how Inigo Jones made the first acurate drawings of Stonehenge and thought that the romans had built Stonehenge. Frank does not mention the early theory about the romans. She only says that Stone Age people built the structure.

He also provides more details about Stonehedges astranomical significance. Frank does mention the Heelstone and its alinment to the rising sun on the summer solstice but she leaves out information about the Aubrey holes and their conection to lunar and solar eclipses. Tiner gives a lot of information about the Aubrey holes. He explains how, by moving stones around the 56 Aubrey holes, you can predict eclipses because eclipses of the sun and moon repeat in a cycle that lasts 56 years.

Although both writers have clearly studied the structure of Stonehenge, John Hudson Tiner provides more complete information. In my opinion Tiner's article was better.

<u>SCORES</u>
Development:
Focus & Organization:
Language:
Conventions:

Training Set: Response #4

I think John Tiner's Stonehenge was better than Marjorie Frank's. John Tiner explained more on the stones, as Marjorie Frank just touched on it. Marjorie Frank explained just a bit about everything. She asked more questions, as Tiner answered them. I think Marjorie Frank explained more about how and less about the actual stones. Tiner explained several of the theories about the stones, as Marjorie explained only one. In a concluson, my personal opinion is that John Tiner's "Stonehenge" was more in depth, and better than Marjorie Frank's.

SCORES
Development:
Focus & Organization:
Language:
Conventions:

Training Set: Response #5

There were two very interesting articles written about Stonehenge. One was by Marjorie Frank and the other was by John Hudson Tiner. Although Marjorie Frank's article contains factual information regarding Stonehenge, John Tiner's article did a better job of explaining the mystery that surrounds Stonehenge and includes more details about certain aspects of Stonehenge, especially its use as an astronomical calendar. After reading Tiner's article, the reader not only knows details about Stonehenge, but understands the different theories about Stonehenge's creation and how it is still a mystery to this day. In my opinion, Tiner wrote the better article.

One of the biggest differences in the two articles is how Tiner takes the reader through the history of theories that have tried to explain Stonehenge. To begin with, Tiner describes how Inigo Jones made the first accurate drawings of Stonehenge. Jones determined that the structure couldn't possibly be the work of ancient britons because it was to impressive of an accomplishment to be built by a "savage and barbarous" people. Jones surmised that the Romans must have built Stonehenge. That theory was proven incorrect because Stonehenge was old even at the time of the Romans. Later, in 1620, John Aubrey puts forth the theory that the Druids, a mysterious group of ancient Britons, erected Stonehenge. His theory was accepted for two hundred years until Professor Willaim Gowland came along. Once again, a theory about who built Stonehenge was about to be undone. Professor Gowland discovered tools that had been used in the construction of Stonehenge and they were from a time well before the Druids. As you can see, Tiner does an excellent job showing how theories about Stonehenge have come and gone over the years. This reinforces the idea that the truth about Stonehenge is still a mystery. Marjorie Frank does not discuss the historical progression of theories about Stonehenge at all. She simply states that Stone Age people built it.

Another topic that Tiner addresses better than Frank is Stonehenges use as an astronomical calendar. Although Frank does state that the sun rises over the Heelstone on the summer and winter solstices, and that Stonehenge might have been used to predict solar eclipses, Tiner goes into much more detail. For instance, Tiner discusses the 56 Aubrey Holes, which frank does not mention. Tiner tells us that the Aubrey holes could be used to predict eclipses because sun and moon eclipses repeat in a cycle that lasts 56 years. By moving stones around the Aubrey holes, ancient people could have computed the dates of solar and lunar eclipses. By giving more detail about how

Continued on the next page . . .

Training Set: Response #5

Stonehenge could have been used to predict astronomical events, Tiner heightens the mystery about who these ancient but intelligent people might have been.

Although both articles contain interesting details about Stonehenge, John Tiner wrote the better article. Marjorie Frank and John Tiner both give many facts, but Tiner gives more details about its use as an astronomical calendar and discusses different theories that have come and gone over the years. Tiner gives the reader an understanding of the long, winding road of history that always seems to lead to more mystery about Stonehenge.

SCORES
Development:
Focus & Organization:
Language:
Conventions:

- **Training Set: Response #1:**
  - **Development:** 2
  - **Focus and Organization:** 2
  - **Language:** 3
  - **Conventions:** 2

- **Training Set: Response #2:**
  - **Development:** 1
  - **Focus and Organization:** 1
  - **Language:** 1
  - **Conventions:** 1

- **Training Set: Response #3:**
  - **Development:** 3
  - **Focus and Organization:** 3
  - **Language:** 3
  - **Conventions:** 3

- **Training Set: Response #4:**
  - **Development:** 1
  - **Focus and Organization:** 2
  - **Language:** 2
  - **Conventions:** 3

- **Training Set: Response #5:**
  - **Development:** 4
  - **Focus and Organization:** 4
  - **Language:** 4
  - **Conventions:** 4

The Structure and Routines of a Lesson

Set Up of the Task

The Explore Phase/ Private Work Time
Generate Solutions

The Explore Phase/Small Group Problem Solving

1. Generate and Compare Solutions
2. Assess and Advance Student Learning

Share, Discuss, and Analyze Phase of the Lesson

1. Share and Model
2. Compare Solutions
3. Focus the Discussion on Key Mathematical Ideas
4. Engage in a Quick Write

MONITOR: Teacher selects examples for the Share, Discuss, and Analyze phase based on:

- Different solution paths to the same task
- Different representations
- Errors
- Misconceptions

SHARE: Students explain their methods, repeat others' ideas, put ideas into their own words, add on to ideas, and ask for clarification.

REPEAT THE CYCLE FOR EACH SOLUTION PATH.

COMPARE: Students discuss similarities and differences between solution paths.

FOCUS: Discuss the meaning of mathematical ideas in each representation.

REFLECT: Engage students in a Quick Write or a discussion of the process.

© 2013 UNIVERSITY OF PITTSBURGH

institute for learning

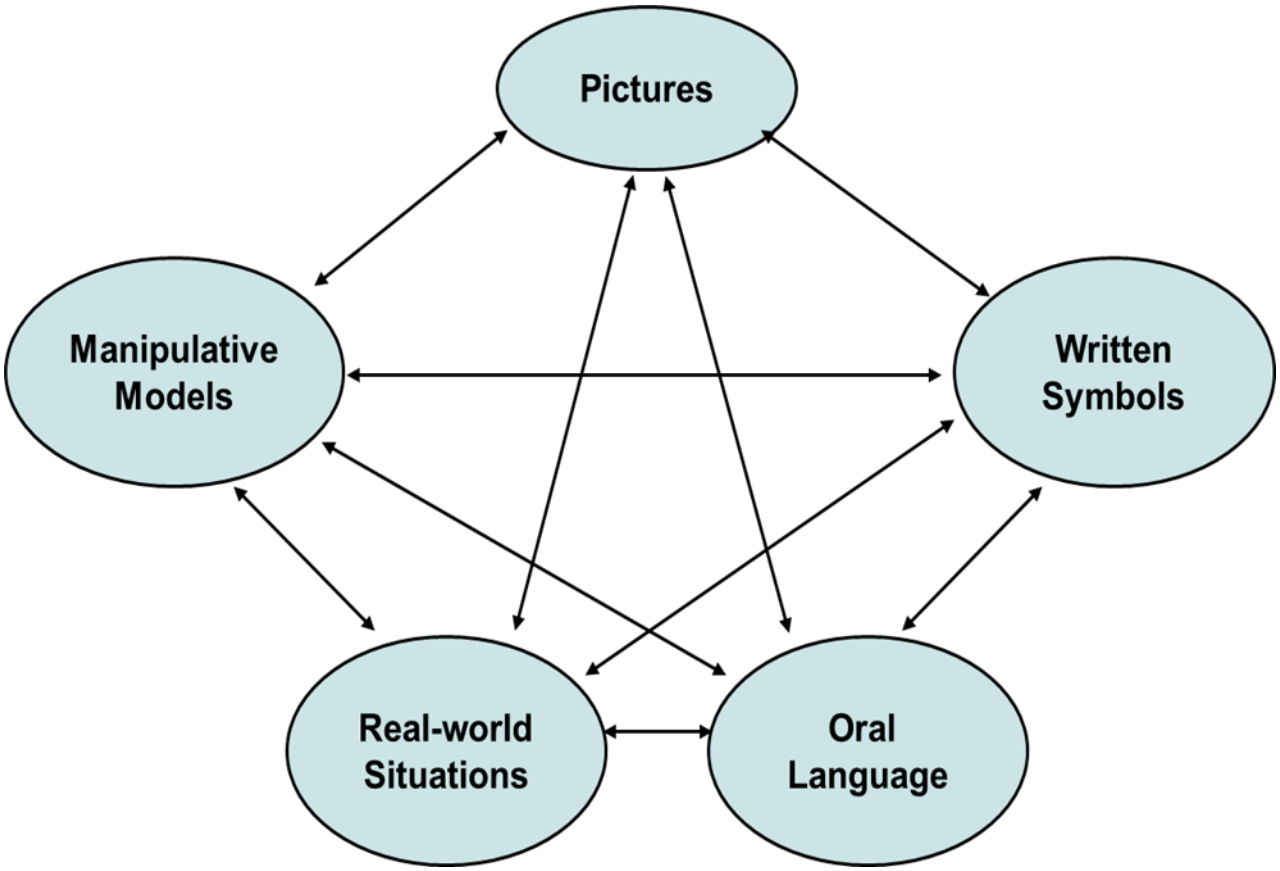
TNCore

Accountable Talk® Moves

Talk Move	Function	Example
	To Ensure Purposeful, Coherent, and Productive Group Discussion	
Marking	Direct **attention** to the value and importance of a student's contribution.	It is important to say describe to compare the size of the pieces and then to look at how many pieces of that size.
Challenging	Redirect a question back to the students or use students' contributions as a source for further challenge or query.	Let me challenge you: Is that always true?
Revoicing	Align a student's explanation with content or connect two or more contributions with the goal of advancing the discussion of the content.	You said 3, yes there are three columns and each column is 1/3 of the whole
Recapping	Make public in a concise, coherent form, the group's achievement at creating a shared understanding of the phenomenon under discussion.	Let me put these ideas all together. What have we discovered?
	To Support Accountability to Community	
Keeping the Channels Open	Ensure that students can hear each other, and remind them that they must hear what others have said.	Say that again and louder. Can someone repeat what was just said?
Keeping Everyone Together	Ensure that everyone not only heard, but also understood, what a speaker said.	Can someone add on to what was said? Did everyone hear that?
Linking Contributions	Make explicit the relationship between a new contribution and what has gone before.	Does anyone have a similar idea? Do you agree or disagree with what was said? Your idea sounds similar to his idea.
Verifying and Clarifying	Revoice a student's contribution, thereby helping both speakers and listeners to engage more profitably in the conversation.	So are you saying..? Can you say more? Who understood what was said?
	To Support Accountability to Knowledge	
Pressing for Accuracy	Hold students accountable for the accuracy, credibility, and clarity of their contributions.	Why does that happen? Someone give me the term for that.
Building on Prior Knowledge	Tie a current contribution back to knowledge accumulated by the class at a previous time.	What have we learned in the past that links with this?
	To Support Accountability to Rigorous Thinking	
Pressing for Reasoning	Elicit evidence to establish what contribution a student's utterance is intended to make within the group's larger enterprise.	Say why this works. What does this mean? Who can make a claim and then tell us what their claim means?
Expanding Reasoning	Open up extra time and space in the conversation for student reasoning.	Does the idea work if I change the context? Use bigger numbers?

©2013 UNIVERSITY OF PITTSBURGH
Accountable Talk® is a registered trademark of the University of Pittsburgh

Linking to Research/Literature Connections between Representations



Adapted from Lesh, Post, & Behr, 1987

The Mathematical Task Analysis Guide

Lower-Level Demands	*Higher-Level Demands*
Memorization Tasks • Involves either producing previously learned facts, rules, formulae, or definitions OR committing facts, rules, formulae, or definitions to memory. • Cannot be solved using procedures because a procedure does not exist or because the time frame in which the task is being completed is too short to use a procedure. • Are not ambiguous – such tasks involve exact reproduction of previously seen material and what is to be reproduced is clearly and directly stated. • Have no connection to the concepts or meaning that underlie the facts, rules, formulae, or definitions being learned or reproduced.	Procedures With Connections Tasks • Focus students' attention on the use of procedures for the purpose of developing deeper levels of understanding of mathematical concepts and ideas. • Suggest pathways to follow (explicitly or implicitly) that are broad general procedures that have close connections to underlying conceptual ideas as opposed to narrow algorithms that are opaque with respect to underlying concepts. • Usually are represented in multiple ways (e.g., visual diagrams, manipulatives, symbols, problem situations). Making connections among multiple representations helps to develop meaning. • Require some degree of cognitive effort. Although general procedures may be followed, they cannot be followed mindlessly. Students need to engage with the conceptual ideas that underlie the procedures in order to successfully complete the task and develop understanding.
Procedures Without Connections Tasks • Are algorithmic. Use of the procedure is either specifically called for or its use is evident based on prior instruction, experience, or placement of the task. • Require limited cognitive demand for successful completion. There is little ambiguity about what needs to be done and how to do it. • Have no connection to the concepts or meaning that underlie the procedure being used. • Are focused on producing correct answers rather than developing mathematical understanding. • Require no explanations, or explanations that focus solely on describing the procedure that was used.	Doing Mathematics Tasks • Requires complex and non-algorithmic thinking (i.e., there is not a predictable, well-rehearsed approach or pathway explicitly suggested by the task, task instructions, or a worked-out example). • Requires students to explore and to understand the nature of mathematical concepts, processes, or relationships. • Demands self-monitoring or self-regulation of one's own cognitive processes. • Requires students to access relevant knowledge and experiences and make appropriate use of them in working through the task. • Requires students to analyze the task and actively examine task constraints that may limit possible solution strategies and solutions. • Requires considerable cognitive effort and may involve some level of anxiety for the student due to the unpredictable nature of the solution process required.

Mathematics Teaching in the Middle School. Also in: Stein, Smith, Henningsen, & Silver (2000). Implementing standards-based mathematics instruction: A casebook for professional development, p. 16. New York: Teachers College Press.

Thanksgiving Pie

On Thanksgiving Day, four families each ate a part of an equal size pie. Each pie was split into different pieces.

- The Ray's family strawberry pie was cut into 4 equal pieces. They ate 3 pieces.
- The Love's chocolate pie was cute into 8 equal pieces. They ate 4 pieces.
- The Wolf's pumpkin pie was cut into 3 equal pieces. They ate 1 piece.
- The Cosby's cherry pie was cut into 6 equal pieces. They ate 3 pieces.

A) Use a number line and include diagrams to illustrate:

1. Which family at the most pie?

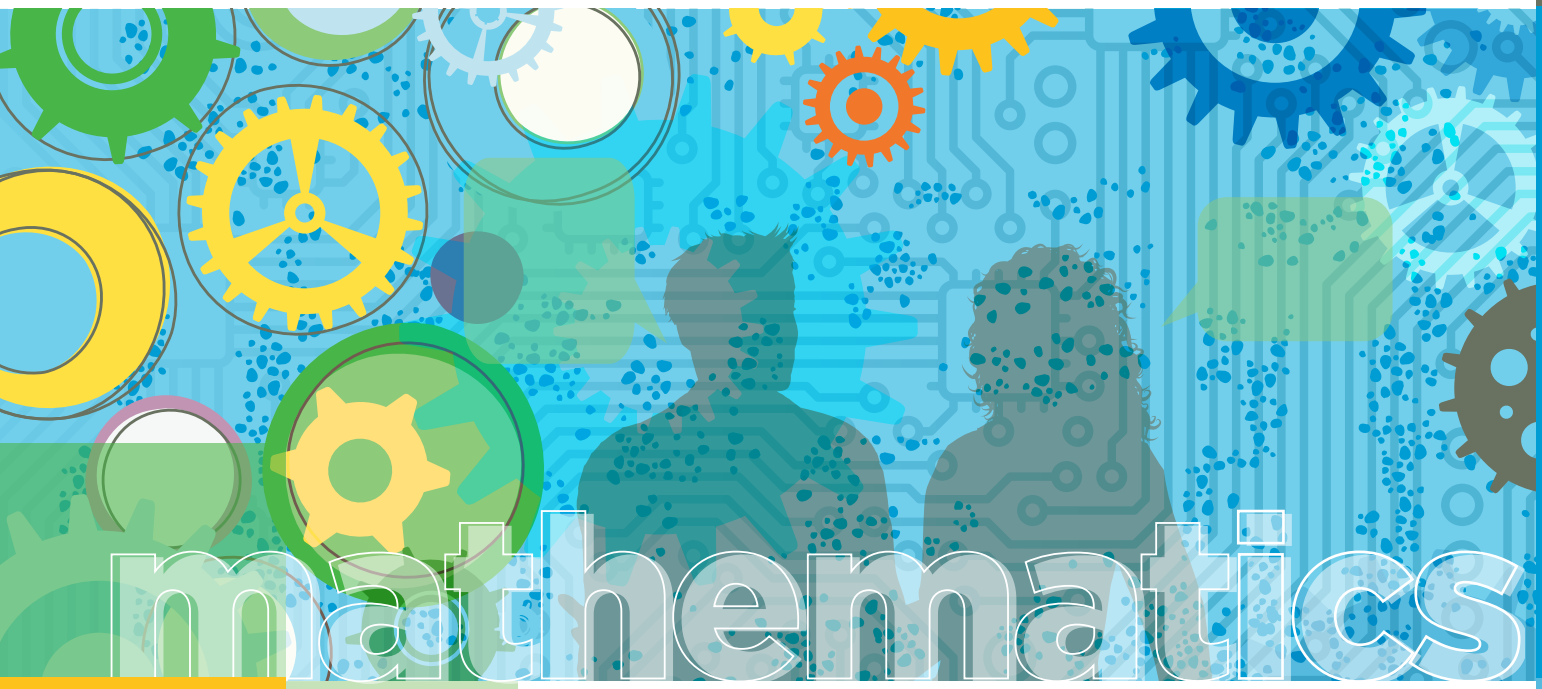
2. Which family ate the least amount of pie?

B) Who ate the same amount of pie? How do you know?

C) How much more pie would the Love family need to eat in order to have eaten the same amount of pie as the Ray family?

TNCore

institute for learning



Grade 4

Building Non-Unit Fractions

A SET OF RELATED LESSONS

UNIVERSITY OF PITTSBURGH

Table of Contents

Introduction

Overview 9

Identified CCSSM and Essential Understandings 10

Tasks' CCSSM Alignment 14

Lesson Progression Chart 16

Tasks and Lesson Guides

TASK 1: Pizza for the Family 21
Lesson Guide 22

TASK 2: Drinking Juice 27
Lesson Guide 28

TASK 3: Birthday Money 33
Lesson Guide 34

TASK 4: Thirds and Sixths 40
Lesson Guide 41

TASK 5: Fractional Number Lines 47
Lesson Guide 48

TASK 6: Watching TV 53
Lesson Guide 54

TASK 7: Eating Apples 59
Lesson Guide 60

TASK 8: The End Product 66
Lesson Guide 67

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Name_____

TASK 1

Pizza for the Family

1. Todd orders a pizza. He eats $\frac{1}{6}$ of it for lunch. Then he eats $\frac{1}{6}$ of it for a snack in the afternoon. He has another $\frac{1}{6}$ for dinner. How much pizza did he eat? Use diagrams and equations.

2. Todd's sister eats $\frac{1}{6}$ of the pizza. Todd's brother is hungry and wants to eat $\frac{1}{2}$ of the pizza. Is there enough left for him to eat $\frac{1}{2}$ of the pizza? Use a diagram to support your answer.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Name_____

TASK 2

Drinking Juice

1. Gabrielle drinks $\frac{1}{10}$ of a container of juice each day. How many days does it take her to drink the whole container?

2. Deborah says Gabrielle can use addition to figure out the answer to this problem. Charlie says Gabrielle can use subtraction to figure out the answer to this problem. Show why they are both correct.

Extension: How many days will it take for $\frac{3}{4}$ of the juice to be gone?

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Name_____

TASK 3

Birthday Money

Delonte saves money to buy a birthday gift for his mom. He is figuring out how much of his money he wants to spend. Use equations or diagrams to show how you determined your answers.

a. If he spends $\frac{1}{3}$ of his money on the gift, what fraction will he have left for himself?

b. If he spends $\frac{1}{6}$ of his money on the gift, what fraction will he have left for himself?

c. If he spends $\frac{2}{6}$ of his money on the gift, what fraction will he have left for himself?

d. If he spends $\frac{3}{4}$ of his money on the gift, what fraction will he have left for himself?

e. Delonte knows he also wants to buy a gift for his dad's birthday soon. Which fractions above allow him to keep at least $\frac{1}{2}$ of his money? Explain how you know.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

TASK 4

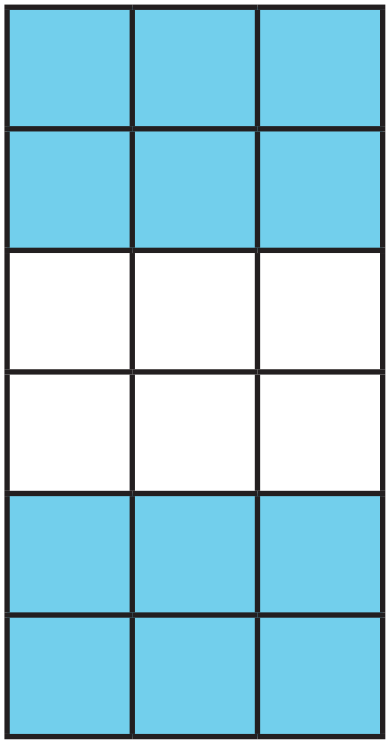
Name_____

Thirds and Sixths

Joel looks at the picture below and says, "I see $\frac{2}{3}$ of the picture is shaded."

Sammy says, "No, $\frac{4}{6}$ of the picture is shaded."

Who is correct? Write addition and multiplication equations to prove your answer.



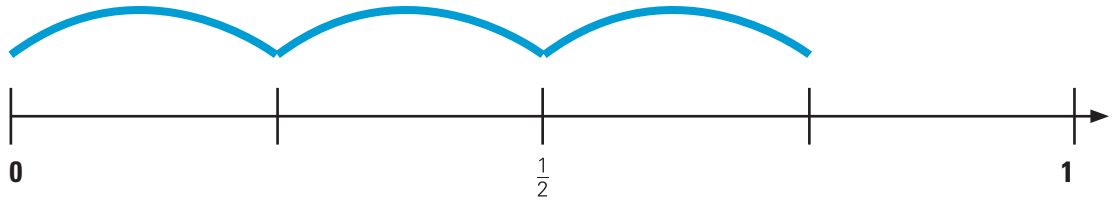
© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

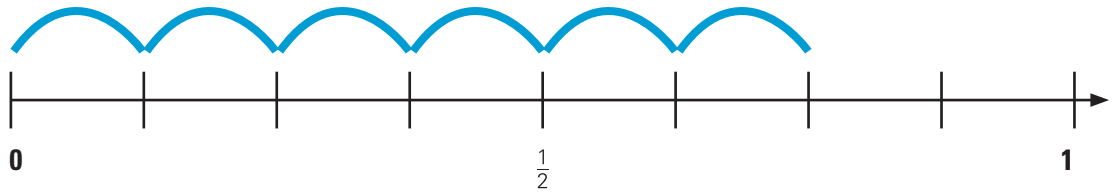
Name_____

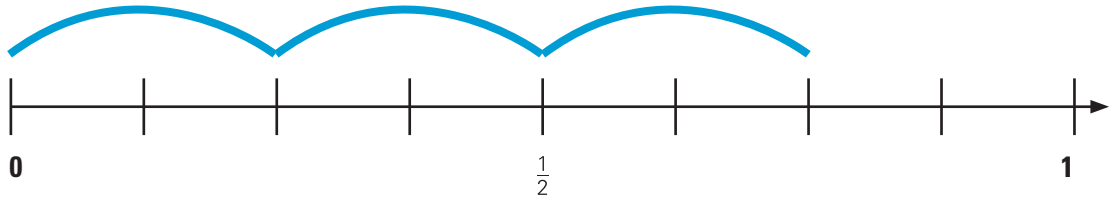
TASK 5

Fractional Number Lines

Sarina and Trevor are arguing about the three number lines below.







Sarina says that these three number lines represent the same thing mathematically.

Trevor says that he would use three different multiplication equations to represent what is happening on the number lines.

Explain how each of the students is correct.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Name_____

TASK 6

Watching TV

Kayla's parents only allow her to watch a certain amount of television per week.

- *Watching a comedy show uses up $\frac{1}{8}$ of Kayla's television time.*
- *Watching a movie uses up $\frac{1}{2}$ of Kayla's television time.*
- *Watching a drama show uses up $\frac{1}{4}$ of Kayla's television time.*

Kayla is trying to figure out all of her options. She writes the expressions below to represent how she can use all of her TV time for the week. Explain what each expression shows about Kayla's television time.

a. $8 \times \frac{1}{8}$

b. $1 \times \frac{1}{2} + 2 \times \frac{1}{4}$

c. $4 \times \frac{1}{4}$

d. $\frac{1}{8} + \frac{1}{8} + \frac{1}{4} + \frac{1}{2}$

Kayla starts thinking about what other combinations she can make during the week. She writes some equations to help her. For each equation, prove it is true with a diagram or number line and identify what the equation means in terms of the time she can watch TV.

e. $4 \times \frac{1}{8} = 2 \times \frac{1}{4}$

f. $4 \times \frac{1}{4} = 8 \times \frac{1}{8}$

g. $2 \times \frac{1}{8} = \frac{1}{4}$

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Name_____

TASK 7

Eating Apples

Josiah and Shamar's parents keep apple slices in the refrigerator.

- *Josiah likes his apples cut into thirds.*
- *Shamar likes his apples cut into fourths.*

a. If they each eat one slice per day, how many days will it take for each brother to finish an apple?

After five days, how much have they each eaten?

After seven days, how much have they each eaten?

b. If they each eat two slices per day, how many days will it take for each brother to finish an apple?

After seven days, how much have they each eaten?

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

TASK 8

Name_____

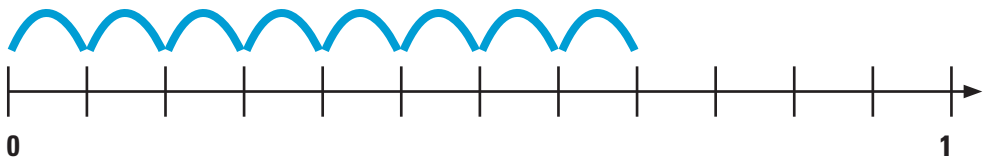
The End Product

Which of the following models represents $\frac{8}{12}$ and which represents $\frac{3}{2}$? Write the fraction that A–J represents on the line in front of the model. (Note that not all of the models may be used.)

_____ a. $\frac{1}{12}+\frac{1}{12}+\frac{1}{12}+\frac{1}{12}+\frac{1}{12}+\frac{1}{12}+\frac{1}{12}+\frac{1}{12}$

_____ b. 12 x $\frac{1}{8}$

_____ c.



_____ d. 3 x $\frac{1}{2}$

_____ e. 2 x $\frac{1}{8}$

_____ f. $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}$

_____ g. 8 x $\frac{1}{12}$

_____ h. 4 x $\frac{1}{6}$

_____ i. $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$

_____ j. 3 x $\frac{1}{6}$

Create one more model for each fraction. Story problems are one way to model the fraction as well.

© 2013 University of Pittsburgh – Fourth Grade Set of Related Lessons: Building Non-Unit Fractions

Tennessee Department of Education

Common Core Leadership Course 202

Contact Information:

With questions, please contact:

- TNcore.questions@tn.gov or
- Your facilitators

Your facilitators today are:

Name: _____ Email: _____

Name: _____ Email: _____

Notes:

Tennessee Department of Education

Common Core Leadership Course 202

Notes:

Tennessee Department of Education

Common Core Leadership Course 202

Notes: