STEPPING UP FOR SUCCESS ON THE MATH SOL:

TAKING THE NEXT STEPS TOWARD AUTHENTIC ASSESSMENT

Note to our CLN network:

This booklet is a **WORK**BOOK designed to be an interactive document. An electronic copy is available at flexiblecreativity.com. Thank you…the management!

6 - EOC EDITION

"We can, whenever and wherever we choose, successfully teach all children whose schooling is of interest to us. We already know more than we need to do that. Whether or not we do it must finally depend on how we feel about the fact that we haven't so far."

~Ron Edmonds

PREPARED FOR THE COLLABORATIVE LEARNING NETWORK OF THE

VIRGINIA TIERED SYSTEM OF SUPPORTS

BY DAN MULLIGAN, FLEXIBLECREATIVITY.COM

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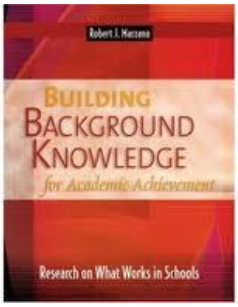
THE IMPORTANCE OF 'I' STATEMENTS AND EXPERIENCES

The research study identifies "Six Principles for Building an Indirect Approach" to building background knowledge.

1. The first principle is that students store background knowledge in "bimodal packets" and that these packets or "memory records" are based on eight "propositions" related to an "I" event, one in which the student is directly involved:
   - *what* "I" did,
   - *how* I felt,
   - *what* I did to something,
   - *where* I did something,
   - *what* I did for or gave to someone,
   - *what* happened to me during the event,
   - *what* someone else did for me, and
   - *how* I felt at the end of the event.

   The specific details of the experience are "translated" into generalizations that the student then has available in his/her fluid intelligence. Further, the bimodal nature of the memory packet allows the student to connect the linguistic part of the memory [words] to nonlinguistic interpretation such as visual or mental images, sounds, smells, sensations of touch, and even emotions.

2. The second principle is that helping students store their experiences in permanent memory can be enhanced. Students need minimally four exposures to new content, no more than two days apart, but the four exposures cannot be mere repetition; the four exposures must provide a variety of elaborations of the new content without requiring students to access another knowledge set.

3. The third principle acknowledges that while the target for instruction must be content-specific information, a student's background knowledge outside the target content area can be a valuable tool as the student personalizes the new information.

4. The fourth principle emphasizes the need to increase opportunities for students to build academic knowledge through multiple exposures to the surface-level or basic terminology or concepts for a content area; teachers cannot build "more" background knowledge until their students have acquired the basic information.

5. The fifth principle promotes building background knowledge through vocabulary acquisition. Words are the labels students store in their memory packets, not just for single objects but rather for groups or families of objects. For example, when a child hears the word "store," that child will pull all background knowledge that

connects “store” to grocery store, convenience store, department store, etc., only if the student has a memory packet that allows him/her to explore different kinds of stores.

6. The sixth principle discusses using virtual experiences to enhance background knowledge. A student’s ability to read is obviously important for virtual experiences; however, equally important is the use of spoken language for virtual experience. Conversation, then, is an important instructional tool that should be used in the required multiple exposures for building students’ background information.

SOMETHING SOUNDS FAMILIAR HERE…

Additionally, students need to be provided sustained, uninterrupted silent reading time, allowed to identify topics of interest to them, and required to write about what they read. Through “academic” notebooks (aka, interactive notebooks), students reveal thoughts, ideas, reservations, etc. The connection between what is read and what is written helps establish and support the acquisition of background knowledge. While “expressive journals” are important after reading literature, academic notebooks may ask students to respond to questions like “How would you use this information?” or “What do you find interesting about this information?” These notebooks may ask students to represent what they read with a graphic or a picture. Having students share their notebooks with others is another way to support the building process for background information through conversation and a reinforcement of the students’ understanding or reaction.

FOCUS ON VOCABULARY

Research supports the positive results of direct vocabulary instruction, and this instruction typically involves ten to twelve words a week from high-frequency word lists that are grade and content-appropriate. However, problems exist, in part, because most “high frequency” word lists do not address the difficulty, appropriateness, or relevance of a word to a concept.

The eight characteristics of effective vocabulary instruction begins with the most important: Dictionary definitions should not be the first exposure for students to new words. Two of the other characteristics are, perhaps, more obvious:
Students must have multiple exposures to words and word meanings, and teaching word parts supports student learning. Another important characteristic is that students are provided the opportunity to discuss the words they are learning. Research confirms that content-specific terms are most helpful in building academic vocabulary and credits the standards movement with helping shape national recommendations for these terms

MEASURING YOUR PRACTICE

SELF-ASSESSMENT OF BACKGROUND KNOWLEDGE STRATEGIES

How do I foster background knowledge across the					
	5	**4**	**3**	**2**	**1**
Knowledge of Misconceptions Common to the Topic	My units include topic-specific misconceptions that are directly assessed. Explicit teaching is designed to interrupt misconceptions.	My units include topic-specific misconceptions. These are assessed, but are not directly assessed in teaching.	Misconceptions are sometimes included in my units and may or may not be assessed or directly addressed in my teaching.	I have an awareness of some topic-specific misconceptions. These are integrated into some aspects of my assessing and teaching.	Honestly, I am unfamiliar with topic-specific misconceptions that should be anticipated from my students.
Assessing Background Knowledge	Common formative assessments in my grade focus on core background knowledge, not incidental knowledge.	Formative assessment focuses mostly on core background knowledge. These assessment results are used to plan instruction and re-teaching, but are based within single classrooms.	Formative assessment is used, but core and incidental background knowledge is not differentiated. Results are used for some instructional planning, but not routinely. Results are not discussed with colleagues.	Assessment is used as a pretest, but is rarely analyzed for planning instruction and re-teaching. Results are not discussed with colleagues.	Assessment is summative and is used primarily for grading purposes. Results are not used for the purposes of improving future instruction.
Activating Background Knowledge	Both unit and lesson purposes are established at the onset of every one of my lessons. Varied oral and written language tools are used throughout the lesson to cause activation.	Unit and lesson purposes re established during most of my lessons. . Varied oral and written language tools are used to activate background knowledge, but primarily at the start of the lesson.	Unit and lesson purposes are posted but are not discussed within the lesson. Oral and written language tools are occasionally used in some lessons.	Purpose of the lesson is posted but is not linked to larger unit purposes. Oral or written language tools are used as icebreakers or warm-ups.	Purposes are behavioral in nature and are not linked to larger unit concepts. Students have few opportunities to reflect on what they know about a topic or concept.
Building Background Knowledge	Indirect and direct methods for building background knowledge are used daily, including teacher modeling, wide reading, and experiential learning outside of class.	Indirect and direct methods for building background knowledge are used daily, including teacher modeling and wide reading. These methods are confined to in-class learning.	Indirect methods, such as wide reading and experiential learning are used, but teacher modeling occurs only occasionally.	Methods for building background knowledge are used occasionally, primarily when students demonstrate a gap.	Lessons are designed to present content. Any gaps in background knowledge are assumed to be the responsibility of students.
Using Technological Literacy to Build Background Knowledge	Students search for, evaluate, and create information daily using relevant technological tools and literacy processes that are integrated into classroom learning.	Students search for, evaluate, and create information regularly and in the company of peers in and out of the classroom. Their own technology tools are off-limits.	Students regularly use technology to gather and evaluate information, but rarely to create new digital products.	Some technology is sanctioned for classroom learning, but only to gather information.	Technology is seen as a separate and limited function, with an emphasis on tools. Students must go to another area of the school to use these tools.

Operation Space Creature Classification (OSC^2)

Creatures on the planet Nelle have been studied at length by anthropologists and determined to fall into two categories – ENITS and ENOTS. Pictures of sixteen space creatures have been provided below by scientists at NASA. Your task is to classify each creature as an ENIT or an ENOT based on the following rules:

1. Any creature with a smile, a hat, and no ears is an ENIT.
2. Any creature with no smile, no hat, but two ears is also an ENIT.
3. Any creature with a smile or a hat, but not both, is an ENIT if it has a bowtie.
4. Any creature not identified as an ENIT is an ENOT.

Determine which creatures are ENITS and which are ENOTS.

1 

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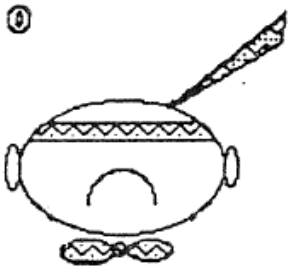
10 

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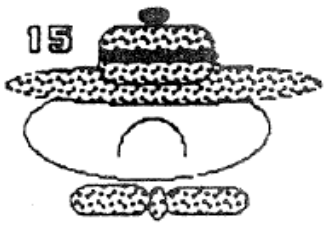
15 

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What I KNOW about _____!

I think _____ is:

One question I have about _____ is:

Here is a picture to show what _____ is:

Focus Strategy: ALPHA BLOCKS SORT

Topic: _____

ABC	DEF	GHI
JKL	MN	OPQ
RST	UVW	XYZ

On the back of the sheet, write a summary of the topic. In the summary, use the most important words from the list of words that appear in the above blocks.

These are _____

These are NOT _____

Which of these are _____**?**

Explain how to recognize _____**?**

My examples of _____ **are…**

WHERE DO I BELONG?

Main Idea	Main Idea
Detail	Detail
Detail	Detail
Detail	Detail
Detail	Detail

Chatter Drawing

Goal: To activate and evaluate student knowledge of a topic.

Description: In this activity, students will activate prior knowledge by creating a graphic representation of a topic before the lesson. After engaging in learning about that topic, students will re-evaluate their prior knowledge by drawing a second depiction of their topic. They will then summarize what the different drawing *say* to them about what they learned.

Procedure:

1. Ask students to close their eyes and think about topic X. Using the Chatter Drawing worksheet, have students draw a picture what they saw while they were thinking about topic X.
2. Teach cognitive portion of your lesson.
3. At the end of the lesson, ask students to elaborate upon their initial drawing by creating a new drawing that incorporates what they learned about topic X during the lesson.
4. Have students share their ideas before and after drawings with a partner. Students should discuss the differences between the two depictions of topic X.
5. Finally, have students respond in writing at the bottom of their Chatter Drawing worksheet. What do the two drawings tell them about what they learned during the lesson?

My notes/variations on this structure:

Chatter Drawing

1. **Close your eyes and think about _____ . Now, open your eyes and draw what you saw.**

2. **Now that you have learned more about _____ , draw a second picture to show what you learned.**

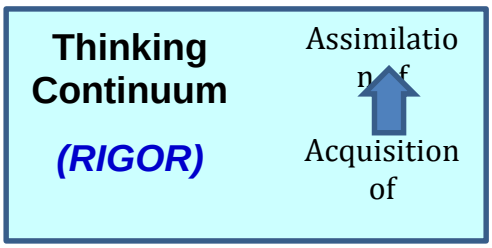
3. **In the space below, tell what you have changed about your before and after pictures. Explain why you made those changes.**

Rigor/Relevance Framework

The framework is a tool established by the *International Center for Leadership in Education* to assist educators in examining curriculum, instruction, and assessment.

The Rigor/Relevance Framework is based on two dimensions of higher standards and authentic student engagement.

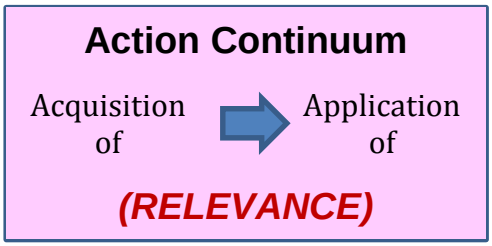
1. **Higher Standards** – First, there is the knowledge continuum that describes the increasingly complex ways in which we think. The Knowledge Taxonomy is based on the six levels of Bloom's Revised Taxonomy.



The low end of this continuum involves acquiring knowledge and being able to recall or locate that knowledge in a simple manner. The high end of the Knowledge Taxonomy is evident when the learners takes several pieces of information and combine them in both logical and creative ways. Students can solve multistep problems and create unique work and solutions.

Remembering Understanding Applying Analyzing Evaluating Creating

2. **Application Model** – The second continuum describes putting knowledge to use.. The five levels of this action continuum are:



a) Knowledge in one discipline
b) Apply in one discipline
c) Apply across disciplines
d) Apply to real-world predictable situations
e) Apply to real-world unpredictable situations

The Application Model describes putting knowledge to use. While low end is knowledge acquired for its own sake, the high end signifies action – use of the knowledge to solve complex real-world problems and to create projects, designs, and other works for use in real-world situations.

Rigor –

Rigor refers to academic rigor — learning in which students demonstrate a thorough, in-depth mastery of challenging tasks to develop cognitive skills through reflective thought, analysis, problem-solving, evaluation, or creativity. ***(think Bloom's)***

Rigor should be thought of as how often we require our students to solve complex problems, apply what they have learned, and critically analyze the results. The focus of rigor should be on helping the students develop a deeper understanding of the subject matter that goes beyond memorizing, reciting and restating. The development of critical thinking skills is paramount to "rigor". Teachers shouldn't take pride in the fact that a student has to do two hours of homework per night and study three days for tests in order to pass their class. In fact, absent the true "rigor" of higher-order thinking skills, this could be considered poor teaching practice.

Relevance –

Relevance refers to learning in which students apply core knowledge, concepts, or skills to solve real-world problems. Relevant learning is interdisciplinary and contextual. Student work can range from routine to complex at any school grade and in any subject. Relevant learning is created, for example, through authentic problems or tasks, simulation, service learning, connecting concepts to current issues, and teaching others. ***(think student interest)***

All educators have heard the phrase, *"Why do I have to learn this? I'll never use it again."* If students have to ask this question, then "relevance" is missing in the classroom. Relevance refers to how the subject matter relates to the student's interests and needs. Real relevance cannot be developed unless students are allowed to utilize their learning in real-life situations and contexts. When this is considered, it is easy to see how "rigor" and "relevance" begin to overlap. When students are allowed to apply their learning to real-world situations (relevance), they are required to use higher-order thinking skills (rigor). Therefore, true rigor is very difficult to attain in the absence of relevance, and vice versa.

Relationships –

Relationships involve teaching a rigorous and relevant curriculum while understanding each student's needs and barriers to learning ***(think differentiation)*** Core Values – Myself, as your teacher, taking the time to understand when you don't.

Although "rigor" and "relevance" are keys to meaningful student learning, this learning cannot occur in the absence of "relationships" in the school. Kids cannot learn if their social and emotional needs have not been satisfied. We can have the most rigorous and relevant classrooms in the country, but if our kids' affective needs are not being met, we will not be successful. In a school focused on relationships, there is a caring, student-centered environment where students feel a sense of connection to their school. Many schools have realized the importance of this variable, and have tried to account for it through the development of the *"school within a school"* concept. In this structure, interdisciplinary teams are developed and groups of students are assigned to each team. Others have adopted an *"advisory"* structure, where each teacher is assigned a small group of students.

Results – Results refer to accountability to each student to do all in our power to assist them reach their true potential. The focus on the results of student learning using multiple indicators is non-negotiable, so our teachers can adjust their practices and schools can offer personalized support to students. **(*think college and career ready)***

Rigor/Relevance Framework

Creating: *"putting together"* 6 • Use old ideas to create new ones • Relate knowledge from several areas • Reorganize parts to create new original things, ideas, concepts • Use innovation to make something new • Generalize from given facts • Predict or draw conclusion	**C** **Assimilation** Students extend and refine their knowledge so that they can use it automatically and routinely to analyze and solve problems and create solutions. **Student Thinking** ***(Relationships Important)***	**D** **Adaptation** Students have the competence that, when confronted with perplexing unknowns, they are able to use their extensive knowledge base and skills to create unique solutions and take action that further develop their skills. **Students Thinks and Works** ***(Relationships Critical)***
Evaluating: *"judge the outcome"* 5 • Compare and discriminate between ideas • Assess values of theories, presentations • Make choices on reasoned arguments • Verify value of evidence/ Recognize subjectivity • Make judgments/choices based on criteria, standards, and/or conditions		
Analyzing: *"taking apart"* 4 • See patterns/relationships • Recognize hidden parts • Take ideas/learning apart • Find unique characteristics • Organize parts • Identify components • Separate into component parts		
Applying: *"making use of knowledge"* 3 • Use the information • Use methods, concepts, theories in new situations • Solve problems using required skills and/or knowledge • Make use of learning in new or concrete manner, or to solve problems	**A** **Acquisition** Students gather and store bits of knowledge and information and are expected to remember or understand this acquired knowledge. **Teacher Works** ***(Relationships of Little Importance)***	**B** **Application** Students use acquired knowledge to solve problems, design solutions, and complete work. The highest level of application is to apply knowledge to new and unpredictable situations. **Student Work** ***(Relationships Important)***
Understanding: *"confirming"* 2 • Understand information • Translate knowledge into new context • Grasp meaning of materials learned, communicate learnings, and interpret learnings • Order, group, infer causes • Interpret facts, compare/contrast • Predict consequences		
Remembering: *"information gathering"* • Observation and recall of information • Knowledge of dates, events, places • Mastery of subject matter • Gain specific facts, ideas, vocabulary, etc.		

Student

RIGOR

Teacher

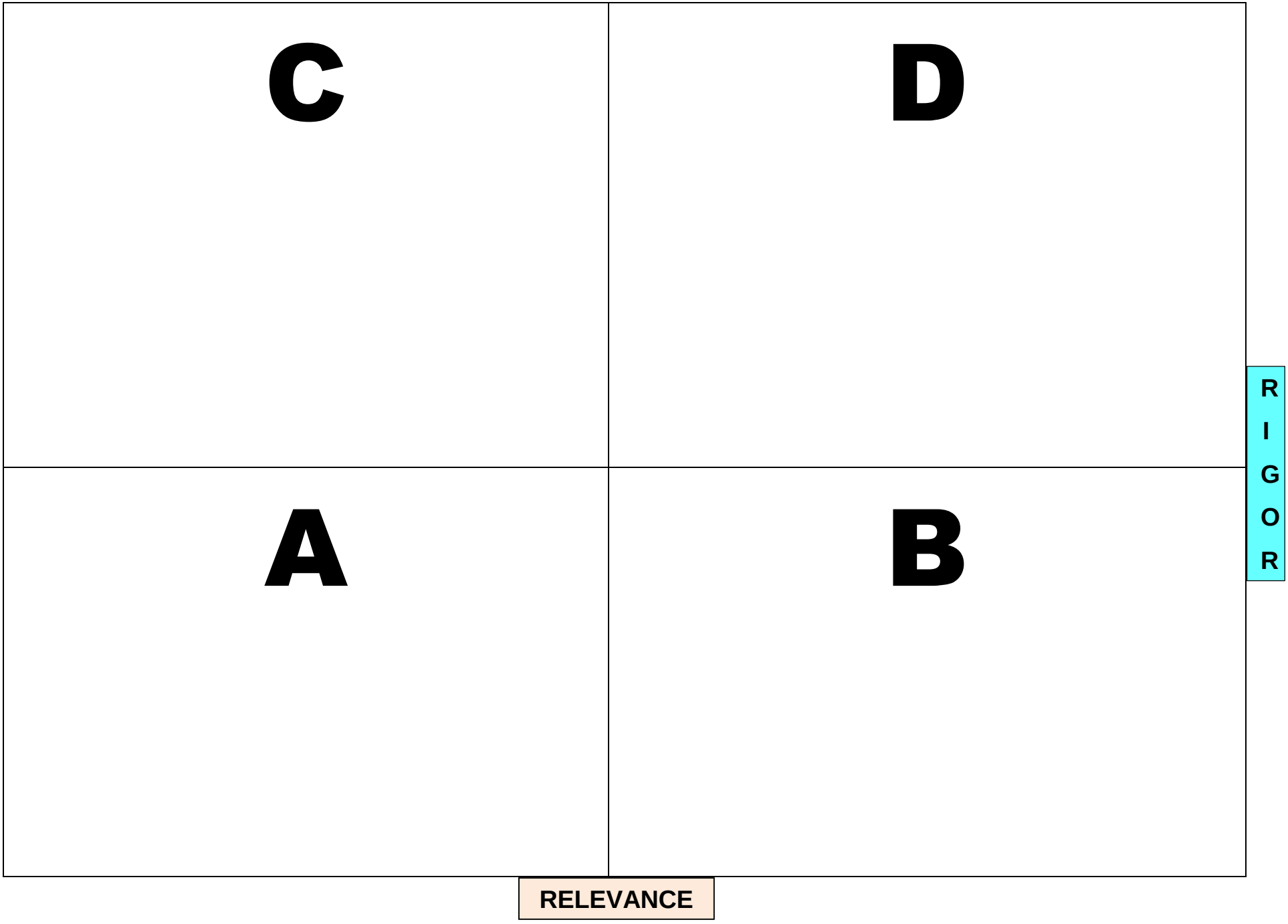
Formula for Success:
Rigor x Relevance x Relationships = Meaningful Learning

(Note: if any one of these are missing, the equation equals

Classroo → RELEVANCE → Real

Rigor and Relevance Model Adaptation

RELEVANCE


C
D
A
B
RIGOR
RELEVANCE

T E A M

Think and Turn

2 1	4
3	

Verbs and Products by Quadrant (DOK) of the Learning Framework

C (DOK 3) Student Thinks

VERBS	PRODUCTS
Analyze	Essay
Compare	Abstract
Examine	Blueprint
Contrast	Inventory
Differentiate	Report
Explain	Plan
Dissect	Chart
Categorize	Investigation
Classify	Questionnaire
Diagram	Classification
Discriminate	

D (DOK 4) Student Thinks and Works

VERBS	PRODUCTS
Evaluate	Evaluation
Formulate	Newspaper
Justify	Estimation
Rate	Trial
Recommend	Editorial
Infer	Radio Program
Prioritize	Play
Revise	Collage
Predict	Machine
Argue	Adaptation
Conclude	Poem
	Debate
	New Game
	Invention

A (DOK 1) Teacher Works

VERBS	PRODUCTS
Name	Definition
Label	Worksheet
Define	List
Select	Quiz
Identify	Test
List	Workbook
Recite	True-False
Locate	Reproduction
Record	Recitation
Memorize	

B (DOK 2) Student Works

VERBS	PRODUCTS
Apply	Scrapbook
Sequence	Summary
Demonstrate	Interpretation
Interview	Collection
Construct	Annotation
Solve	Explanation
Calculate	Solution
Dramatize	Demonstration
Interpret	Outline
Illustrate	

VERBS AND PRODUCTS BY QUADRANT (DOK)

Ask questions to summarize, analyze, organize, or evaluate:

- How are these similar/different?
- How is this like___?
- What's another way we could say/explain/express that?
- What do you think are some reasons/causes that ___?
- Why did ___ changes occur?
- How can you distinguish between ___?
- What is a better solution to ___?
- How would you defend your position about ___?
- What changes to ___ would you recommend?
- What evidence can you offer?
- How do you know?
- Which ones do you think belong together?
- What things/events lead up to ___?
- What is the author's purpose?

C

Ask questions to predict, design, or create:

- How would you design a ___ to ___?
- How would you compose a song about ___?
- How would you rewrite the ending to the story?
- What would be different today, if that event occurred as ___?
- Can you see a possible solution to ___?
- How could you teach that to others?
- If you had access to all the resources, how would you deal with ___?
- How would you devise your own to deal with ___?
- What new and unusual uses would you create for ___?
- Can you develop a proposal that would ___?
- How would you have handled ___?
- How would you do it differently?

D

A

Ask questions to recall facts, make observations, or demonstrate understanding:

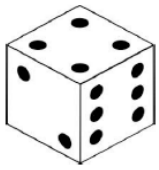
- What is/are ___?
- How many ___?
- How do/does ___?
- What did you observe ___?
- What else can you tell me about ___?
- What does it mean ___?
- What can you recall ___?
- Where did you find that ___?
- Who is/was ___?
- In what ways ___?
- How would you define that in your own terms?
- What do/did you notice about this ___?
- What do/did you feel/see/hear/smell ___?
- What do/did you remember about ___?
- What did you find out about ___?

B

Ask questions to apply or relate:

- How would you do that?
- Where will you use that knowledge?
- How does that relate to your experience?
- How can you demonstrate that?
- What observations relate to ___?
- Where would you locate that information?
- Calculate that for ___?
- How would you illustrate that?
- How would you interpret that?
- Who could you interview?
- How could you collect the data?
- How do you know it works?
- Can you show me?
- Can you apply what you know to this real-world problem?
- How do you make sure it is done correctly?

CUBE IT!



TEAM NAME: _____ TOPIC:_____

1. DESCRIBE IT:

2. EXPLAIN IT:

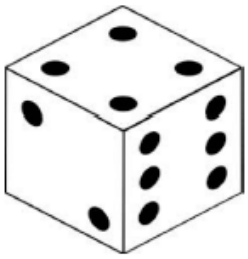
3. APPLY IT:

4. ANALYZE IT:

5. JUDGE IT:

6. CREATE WITH IT:

LET'S CUBE IT!



TEAM NAME: _____

TOPIC: _____

1. **DESCRIBE IT:** *What is it?*

WORDS…	IMAGE…

2. **EXPLAIN IT:** *HOW WOULD YOU MAKE IT CLEARER FOR SOMEONE TO UNDERSTAND IT?*

WORDS…	IMAGES…

3. **APPLY IT:** *WHAT DOES IT MAKE YOU THINK OF? WHAT CAN YOU DO WITH IT?*

WORDS…	IMAGES…

4. **ANALYZE IT:** *WHAT ARE ITS ESSENTIAL PARTS? HOW IS IT MADE? WHAT IS IT COMPOSED OF?*

WORDS…	IMAGES…

5. **JUDGE IT:** *ARGUE FOR OR AGAINST IT. SUPPORT YOUR THINKING.*

WORDS…	IMAGES…

6. **CREATE WITH IT:** *WHAT IS SOMETHING YOU CAN DO WITH IT?*

WORDS…	IMAGES…

_____ Unit

Role - Audience - Format - Topic

Your RAFT must show that you understand the following concepts:

Choose one of the following RAFT options:

Role	Audience	Format	Topic

Other Ideas?

Submit a proposal below:

Individual Learning Contract

Project #: ____

To demonstrate what I have learned about:

_____

I want to:

_____

____ **Author** a report	____ **Produce** a movie (podcast)
____ **Conduct** a demonstration	____ **Generate** graphic organizer
____ **Design** an experiment	____ **Build** a model
____ **Create** a multimedia presentation	____ **Construct** a model
____ **Invent** a mural	____ **Other:** _____

This is a valid way to demonstrate understanding of this concept because:

To do this task, I will need:

My action plan is:

The criteria/rubric which will be used to assess my final product is:

My project will be completed by this date: _____

Student signature: _____ Date: ___/___/____

Teacher signature: _____ Date: ___/___/____

Think Pad

Partner A thinks…	Partner B thinks
We think:	

Think Pad

Partner A thinks…	Partner B thinks
We think:	

CELEBRATE THE STRUGGLE! – THE MATHEMATICS EDITION

RIGOR = TYPE OF THINKING +DEPTH OF THINKING

Depth + Type of Thinking	Level 1 Recall & Reproduction	Level 2 Basic Skills & Concepts	Level 3 Strategic Thinking & Reasoning	Level 4 Extended Thinking
Remember A	Recall facts, terms, formulas, conversions			
Understand B	Solve a one-step problem	Use models/diagrams to explain concepts	Use concepts to solve non-routine problems	Develop generalizations of the strategies used and apply to new situations
Apply C	Apply algorithm or formula	Select a procedure and perform it	Use reasoning, planning, and evidence	Design and conduct a project that specifies a problem, identifies solution paths, solves the problems, and reports results
Analyze D	Identify a pattern and trend	Organize and display data	Generalize a pattern	Analyze multiple sources of evidence or data sets
Evaluate E			Compare/contrast solution methods	Apply understanding in a novel way, provide justification for the new application
Create F	Brainstorm ideas related to a topic	Generate conjectures based on observations or prior knowledge	Develop an alternative solution	Design a model to solve a practical or abstract situation

Depth + Type of Thinking	Level 1 Recall & Reproduction	Level 2 Basic Skills & Concepts	Level 3 Strategic Thinking & Reasoning	Level 4 Extended Thinking
Remember A				
Understand B				
Apply C				
Analyze D				
Evaluate E				
Create F				

Using the Cognitive Rigor Matrix to Align Items to Required Student Thinking

Grade 6

1. A ship must average 22 miles per hour to make its ten-hour run on time. During the first four hours, bad weather caused it to reduce speed to 16 miles per hour. What should its speed be for the rest of the trip to keep the ship to its schedule?

Grade 3

2. Put the circles below into eight equally sized groups and write an equation to represent the picture.

o o o o o o o o o o o o o o o o o o o o o o o o o o

Grade 7

3. During an experiment, three coins were tossed once.

   Part A: Give the sample space to show all possible outcomes for tossing three coins one time, using the letter H when a coin faces "heads" up, and the letter T when it faces "tails" up.

   Part B: Based on your answer to part A, how many outcomes consist of 3 heads or 3 tails?

   Part C: During a math class, each of 24 students tossed three coins once. Based on your answer to part B, how many students would you expect to get a result of 3 heads or 3 tails?

Grade 1

4. How long is the pencil in terms of paper clips?

Grade 1

5. How long is the pencil in terms of paper clips? Explain to your teacher how you will measure the pencil. Why do you think your plan will work?

Geometry

6. Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. A correct numerical answer with no work shown will receive only 1 credit. The answer should be written in pen, except for graphs and drawings, which should be done in pencil.

   The vertices of quadrilateral JKLM have coordinates *J*(-3,1), *K*(1,–5), *L*(7,-2), and *M*(3,4).

   a. Prove that *JKLM* is a parallelogram.
   b. Prove that *JKLM* is not a rhombus.

   [The use of the set of axes below is optional.] *Graph not included saving space.*

Grade 5

7. A line of symmetry can be drawn on only two of the figures below.

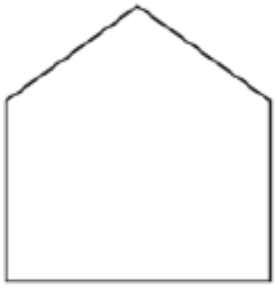


Figure A

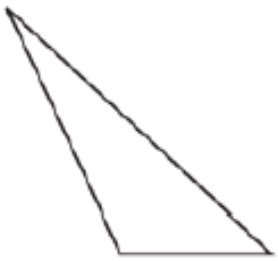


Figure B

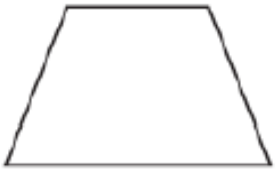


Figure C

Figure D

   a. Draw a line of symmetry on the two figures.
   b. On the lines below, explain how you determined your answer.

Lines not included saving space.

Grade 4 (Virginia DOE released)

8. Click on (circle) each measurement you want to select. You must select each correct measurement.

Identify each measure that is equivalent to 12 feet.

120 inches	**4 yards**
36 yards	**144 inches**

Kindergarten

9. How many **hearts** are there? Show and explain how you know. Is there another way you can do this?

Algebra I

10. If $A = 3x^2 + 5x - 6$ and $B = -2x^2 - 6x + 7$, then A - B equals

(1) $-5x^2 - 11x + 13$

(2) $5x^2 + 11x - 13$

(3) $-5x^2 - x + 1$

(4) $5x^2 - x + 1$

Grade 5

11. a. Find the next three terms in the pattern.
    b. Determine the rule for finding the next number in the pattern.
    c. Make or find a model for the pattern. Explain your model.

1, 1, 2, 3, 5, 8, 13, 21, 34

Item Investigation Work Zone:

It's All About the Second Question

What if…?	Is ____ the reason for ___?
I wonder why ____?	Can…?
If…?	Would you rather…?
What is it that…?	What would it take to…?
When is it…?	Why is it that…?
Who could…?	Would ____ be possible if…?
How is ____ like ____?	Is it possible to…?
When is…?	Could…?
What could happen if…?	How can…?
If it were possible…?	What is your opinion about…?
Are there…?	Is it right to…?
Why is…?	I wonder when…?
How…?	I'm wondering if…?
Where did…?	How could it…?
Do you…?	Why are…?
Does it matter if…?	If it ___, could ____?
When is it…?	What can…?

The impact of a first question can be enriched by following with:

"How do you know?"

"What makes you say that?"

AUTHENTIC ASSESSMENT

According to the Virginia Department of Education, authentic assessment refers to assessment by performance, task, product, or project. Authentic assessment asks students to apply what they have learned in such a way that it provides evidence of in-depth understanding, rather than of superficial or naive understanding. In authentic assessment, teachers ask students to provide evidence that they have "gotten it" by actually doing something real. Often, such assessments include an authentic audience—real stakeholders to whom the students present information or with whom they otherwise engage.

The DOE goes on to explain, “As students construct meaning from their inquiries, not all students, no matter how hard teachers work with them, will arrive at the proper scientific conceptions. The fact that some students have failed to grasp the principles of scientific inquiry is often hidden when conventional, multiple-choice tests are used. What this means for assessment and evaluation is that assessment must be process-oriented. In assessing, teachers may want to consider questions such as the following:

- What are the contributions of the students?
- Are the claims viable in terms of the data collected (including claims made by students who enter and pursue blind alleys in their research)?
- How creative are the research questions?
- Are the findings consistent with currently held views?
- What skills did the students use, and how well were they used in the process of finding answers to questions”

The design and content of an authentic assessment may depend upon how the students' project has evolved. But in any case, if scientific inquiry is an important factor in the project, the assessment should compel students to show clear evidence of understanding the "big picture" of scientific inquiry (from organizing and supporting questions, through research and data collection, to hypothesis testing and action).

Once the "big picture" or central learning of a unit has been identified, criteria for judging student learning should be developed. Checklists are a useful way of displaying criteria. Teachers can assign points to a checklist against a standard, although assigning points is not necessarily straightforward. **Students should have access to the checklists as they perform**. These tools can also make a judgment

about the quality of their work, and this can be used as the basis for a discussion with them about their progress throughout the project.

What is the best design to the new elementary school in Hickman Mills?

Superintendent Carpenter has requested you and your team to serve as the design committee for the new Skinner Elementary School. Using your patterns blocks design the layout for the new school. Transfer your design to paper and label each section of the school (e.g., library, gym, classroom pods, etc.). The cost of materials of each hexagon section used in construction is $120,000.

Dr. Carpenter has tasked your committee to submit to him:

a. A sketch of the building (with each section of the building labeled)
b. The fractional part of the entire building that is represented by each section.
c. The cost of construction each section.
d. The total cost of materials for Skinner Elementary School.
e. Write a persuasive letter or a presentation to justifying your design of the new school to Dr. Carpenter.

Task 1: Grocery Shopper Challenge

The table below shows the prices of different items at Super Fresh Market.

Item	Price
1 pound of ham	$7
1 gallon of milk	$4
1 pumpkin pie	$5
24 ounce box of cereal	$6
1 bag of cookies	$4

Part A: Mr. Martin buys 3 bags of cookies and 3 pounds of ham.

A1. Write two equivalent expressions to represent the total amount Mr. Martin will pay for the items he buys.

Expression #1	
Expression #2	

A2. Explain how Mr. Martin can use the distributive property to calculate the total amount he has to pay.

Part B: Mr. Martin has $60 to spend at the grocery store.

B1. Without considering tax, create 3 different ways, using at least 4 different items in each cart, that Mr. Martin can fill his shopping cart without going over $60.

Shopping Cart A	Shopping Cart B	Shopping Cart C

Task 1: Grocery Shopper Challenge

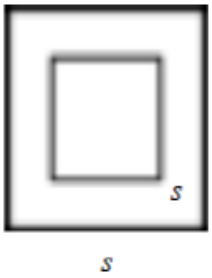
Scoring Rubric

Score	Description
4	**Exceeds Expected Proficiency** I have answered completely and correctly all aspects of the question. My responses effectively communicate my mathematical understanding. My strategies and ability to carry out my strategies meet the content demands of all parts of the task.
3	**Proficient** I have answered some aspects of the question completely and correctly. My responses demonstrate adequate evidence and understanding necessary to complete the task with minor errors in execution. I demonstrate some mathematical understanding and will be able to revise my work with discussion and/or feedback from my peers or teacher. My errors may include: • Incomplete justifications for written responses • Explaining the wrong number property to justify the correct equivalent expressions • Minor numerical error in representing equivalent expressions
2	**Not Yet Proficient** Many of my answers do not provide complete and correct responses. I demonstrated effort to complete the task; however, there are many conceptual errors throughout the task. My work will require significant revisions. My errors may include: • Incomplete justifications for written responses • Incorrect solutions with incomplete work • Many calculation errors or mathematical misconceptions • Equivalent representations, but not in the form of two expressions; the incorrect number property is explained
1	**Limited Proficiency** I attempted to complete the task, but do not understand the concepts or the directions of the task. I demonstrated some effort, and made some connections to the content. After discussing the task with my peers or the teacher, I will need to re-attempt the task.
0	**No Proficiency** I did not attempt the task. I do not understand the concepts or the directions of the task.

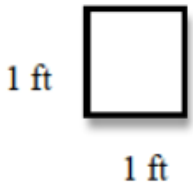
Comments:	
(Student Notes)	(Teacher Notes)

Task 2: The Quilt Quandary

Mrs. Smith is making a quilt in the shape of a square for her younger sister. The border of the quilt is made of 1-foot by 1-foot patches. She asks one of her students, Maria, to use the picture of the quilt, shown below, to write an expression to illustrate the number of patches needed to border the square quilt with side length s.



The square quilt has side length, s. (not drawn to scale)



Border patch (not drawn to scale)

Part A: Maria writes this expression:

$$(s + s + s + s) + (1 + 1 + 1 + 1)$$

A1. Is Maria's expression correct? Explain your reasoning.

Part B: Mrs. Smith asks four students, LaTonya, Jerry, Nadia, and Joseph, to generate expressions that are equivalent to Maria's expression. Their expressions are shown below:

- LaTonya's expression: $4s + 4$
- Jerry's expression: $4(s + 1)$
- Nadia's expression: $4s + 1$
- Joseph's expression: $2s + 2(s + 2)$

B1. How many of the students wrote a correct expression? Justify your answer with a detailed explanation.

Task 2: The Quilt Quandary

Scoring Rubric

Score	Description
4	**Exceeds Expected Proficiency** I have answered completely and correctly all aspects of the question. My responses effectively communicate my mathematical understanding. My strategies and ability to carry out my strategies meet the content demands of all parts of the task.
3	**Proficient** I have answered some aspects of the question completely and correctly. My responses demonstrate adequate evidence and understanding necessary to complete the task with minor errors in execution. I demonstrate some mathematical understanding and will be able to revise my work with discussion and/or feedback from my peers or teacher. My errors may include: • Incomplete justifications for written responses • Incorrectly identifying 1 or 2 expressions in Part B • Minor numerical error in either Part A or Part B
2	**Not Yet Proficient** Many of my answers do not provide complete and correct responses. I demonstrated effort to complete the task; however, there are many conceptual errors throughout the task. My work will require significant revisions. My errors may include: • Incomplete justifications for written responses • Incorrect solutions with incomplete work • Many calculation errors or mathematical misconceptions • Only Part A or Part B shows limited understanding
1	**Limited Proficiency** I attempted to complete the task, but do not understand the concepts or the directions of the task. I demonstrated some effort, and made some connections to the content. After discussing the task with my peers or the teacher, I will need to re-attempt the task.
0	**No Proficiency** I did not attempt the task. I do not understand the concepts or the directions of the task.

Comments:	
(Student Notes)	(Teacher Notes)

Task 3: Beach Bike Rentals

The advertisement below shows the cost of renting a bike at the beach.

Part A: Al rents a bike for 3 hours and Gil rents a bike for twice as long as Al.

A1. Create an expression to represent the bike rental fee for each boy.

Expression for Al's Rental	
Expression for Gil's Rental	

A2. What is Gil's total beach bike rental fee? Explain how you found your answer.

Part B: Kate wants to rent a bike for 5 hours. At Ocean Bike Rentals, she can rent a bike for 5 hours for $42.

B1. If Kate wants to choose the best value, which bike rental company, Beachside Bikes or Ocean Bike Rentals, should she choose? Explain your answer.

Task 3: Beach Bike Rentals

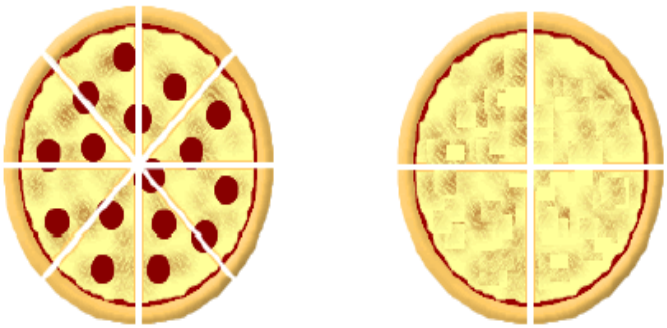
Scoring Rubric

Score	Description
4	**Exceeds Expected Proficiency** I have answered completely and correctly all aspects of the question. My responses effectively communicate my mathematical understanding. My strategies and ability to carry out my strategies meet the content demands of all parts of the task.
3	**Proficient** I have answered some aspects of the question completely and correctly. My responses demonstrate adequate evidence and understanding necessary to complete the task with minor errors in execution. I demonstrate some mathematical understanding and will be able to revise my work with discussion and/or feedback from my peers or teacher. My errors may include: • Incomplete justifications for written responses • Minor numerical errors
2	**Not Yet Proficient** Many of my answers do not provide complete and correct responses. I demonstrated effort to complete the task; however, there are many conceptual errors throughout the task. My work will require significant revisions. My errors may include: • Incomplete justifications for written responses • Incorrect solutions with incomplete work • Many calculation errors or mathematical misconceptions • Expressions are written incorrectly
1	**Limited Proficiency** I attempted to complete the task, but do not understand the concepts or the directions of the task. I demonstrated some effort, and made some connections to the content. After discussing the task with my peers or the teacher, I will need to re-attempt the task.
0	**No Proficiency** I did not attempt the task. I do not understand the concepts or the directions of the task.

Comments:	
(Student Notes)	(Teacher Notes)

Task 4: Pizza Party

Tiffany bought 4 pepperoni pizzas and 7 cheese pizzas for a party. Each pepperoni pizza was cut into 8 pieces and each cheese pizza was cut into 4 pieces. At the end of the party there were 9 pieces of pizza left.



Part A: Tiffany uses the expression (4 x 8) + (7 x 4) – 9 to show the number of pieces of pizza eaten.

A1. What is described by the part of Tiffany's expression "**the product of 7 and 4**"?

A2. How could Tiffany's expression be written using the distributive property?

Pizza Party Expression Using Distributive Property	

Part B: Chen surveyed the number of pieces of pizza eaten by the boys at the party. He determined that the boys ate 29 pieces of pizza.

B1. How many pieces of pizza did the girls eat at the pizza party?

Task 4: Pizza Party

Scoring Rubric

Score	Description
4	**Exceeds Expected Proficiency** I have answered completely and correctly all aspects of the question. My responses effectively communicate my mathematical understanding. My strategies and ability to carry out my strategies meet the content demands of all parts of the task.
3	**Proficient** I have answered some aspects of the question completely and correctly. My responses demonstrate adequate evidence and understanding necessary to complete the task with minor errors in execution. I demonstrate some mathematical understanding and will be able to revise my work with discussion and/or feedback from my peers or teacher. My errors may include: • Incomplete justifications for written responses • Incorrectly creating expression in Part A • Minor numerical error in Part B
2	**Not Yet Proficient** Many of my answers do not provide complete and correct responses. I demonstrated effort to complete the task; however, there are many conceptual errors throughout the task. My work will require significant revisions. My errors may include: • Incomplete justifications for written responses • Incorrect solutions with incomplete work • Many calculation errors or mathematical misconceptions • Only Part A or Part B shows limited understanding
1	**Limited Proficiency** I attempted to complete the task, but do not understand the concepts or the directions of the task. I demonstrated some effort, and made some connections to the content. After discussing the task with my peers or the teacher, I will need to re-attempt the task.
0	**No Proficiency** I did not attempt the task. I do not understand the concepts or the directions of the task.

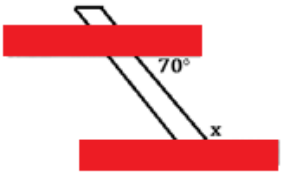
Comments:	
(Student Notes)	(Teacher Notes)

TASK 1: PARALLEL SHELVES

Carpenters work in many areas within the construction industry. Their jobs consist of cutting, sizing, and constructing wood or other substances for building residences, businesses, roads, factories, water vessels, piers, bridges, and many other constructions.

Andy is very interested in working in carpentry when he graduates from high school. He is currently in the building trades program at his school and is apprenticing with a local carpenter for half of the school day.

Part A: For Andy's first independent job he is asked to fasten two shelves to the wall using a metal bracket. The bottom shelf will be floating (no visible support) and must be parallel to the top shelf. The directions that Andy has only include the measure of the top shelf to the bracket.



A1. Before the carpenter will allow Andy to hang the shelves he asks Andy to identify and explain two strategies that he could use to ensure that the bottom shelf is parallel when he is hanging them.

Strategy 1:

Strategy 2:

Part B: After Andy hangs the shelves the carpenter asks him to verify that the shelves are parallel.

B1. How could Andy use the angles of the shelves to check that the two shelves are parallel?

Task 1: Parallel Shelves
Scoring Rubric

Score	Description
4	**Exceeds Expected Proficiency** I have answered completely and correctly all aspects of the question. My responses effectively communicate my mathematical understanding. My strategies and ability to carry out my strategies meet the content demands of all parts of the task.
3	**Proficient** I have answered some aspects of the question completely and correctly. My responses demonstrate adequate evidence and understanding necessary to complete the task with minor errors in execution. I demonstrate some mathematical understanding and will be able to revise my work with discussion and/or feedback from my peers or teacher. My errors may include: • Minor errors in calculating angles
2	**Not Yet Proficient** Many of my answers do not provide complete and correct responses. I demonstrated effort to complete the task; however, there are many conceptual errors throughout the task. My work will require significant revisions. My errors may include: • Errors in calculating angles • Incomplete written explanations
1	**Limited Proficiency** I attempted to complete the task, but do not understand the concepts or the directions of the task. I demonstrated some effort, and made some connections to the content. After discussing the task with my peers or the teacher, I will need to re-attempt the task.
0	**No Proficiency** I did not attempt the task. I do not understand the concepts or the directions of the task.

Comments:	
(Student Notes)	(Teacher Notes)