Differentiation & Agile Mind
Asynchronous Professional Learning Module

Module Outcomes

This module will provide an overview of Agile Mind's differentiation design principles and how they connect to research and best practice in this area. Participants will study a topic in their course through the lens of differentiation by identifying embedded differentiation tools and opportunities to include additional differentiation strategies that will be shared during the module. Module outcomes include:

- Develop a common understanding of differentiation grounded in enduring research
- Connect this research to the design of Agile Mind course programs
- Build on the program design by applying additional research-based strategies in the context of an Agile Mind block or lesson

Agenda

Activities
Grounding Differentiation Conversations in Research ● Independent Study 1 ○ Read & Annotate Differentiation Excerpt ○ Connect Differentiation tenets to Agile Mind's design
Focused Topic Exploration: Looking for Differentiated Design ● Independent Study 2 ○ Review a Focus Topic in a course you teach through the tenets of differentiation
Whole-Class Differentiation Strategies ● Independent Study 3: ○ Introduction to: Opening Questions & Parallel Tasks ● Independent Study 4: ○ Practice application of whole-class differentiation strategies
Closing & Survey ● Module Reflection ● Feedback Survey ● Next Steps

Differentiation and Agile Mind Design

Independent Study 1: Building Common Understanding of the tenets of Differentiation

Directions:

1. Read introduction to chapter 4, "Differentiating Instruction"
2. Make notes:
    a. Highlight places where there are direct connections to tools and resources you have seen in Agile Mind
    b. **Comment** the direct connection (e.g. components of Course Contents, Professional Support, Assessment)

Differentiation & Agile Mind

Excerpt from: Teaching Student-Centered Mathematics: Developmentally Appropriate Instruction for Grades 6-8 (Ch. 4) de Walle, John A. Van; Bay-Williams, Jennifer M.; Lovin, Lou Ann H.; Karp, Karen S.

All seventh graders do not learn the same thing in the same way and at the same rate. In fact, every classroom at every grade level contains a range of students with varying abilities and backgrounds. Perhaps the most important work of teachers today is to be able to plan (and teach) lessons that support and challenge all students to learn important mathematics.

Differentiation and Teaching Mathematics through Problem Solving

Teachers have for some time embraced the notion that students vary in reading ability, but the idea that students can and do vary in mathematical development may be new. Mathematics education research reveals a great deal of evidence demonstrating that students vary in their understanding of specific mathematical ideas. Attending to these differences in students' mathematical development is key to differentiating mathematics instruction for your students. Interestingly, the problem-based approach to teaching is the best way to teach mathematics while attending to the range of students in your classroom. In a traditional, highly directed lesson, it is often assumed that all students will understand and use the same approach and the same ideas as determined by the teacher. Students not ready to understand the ideas presented by the teacher must focus their attention on following rules or directions without developing a conceptual or relational understanding (Skemp, 1978). This, of course, leads to endless difficulties and can leave students with misunderstandings or in need of significant remediation. In contrast, in a problem-based classroom, students are expected to approach problems in a variety of ways that make sense to them, bringing to each problem the skills and ideas that they own. So, with a problem-based approach to teaching mathematics, differentiation is already built in to some degree.

(*Example of problem-based approach omitted from this excerpt*)

This expectation and the recognition that different students will approach and solve the same problem in various ways honors students' varying mathematical development and sets the stage for differentiated mathematics instruction. In addition, by listening to how different students approached the task, the teacher has acquired important information that can be used to plan subsequent instruction that meets a variety of students' needs.

The Nuts and Bolts of Differentiating Instruction

Differentiation is an instructional approach that requires a shift from focusing on the "middle-of-the-road" student to attending to all students. As overwhelming as this may sound, differentiation does not require a teacher to create individualized lessons for each and every student in the classroom.

Rather, it requires emphasizing three basic ideas (Sousa & Tomlinson, 2011):
- Planning lessons around meaningful content, grounded in authenticity
- Recognizing each student's readiness, interest, and approach to learning
- Connecting content and learners by modifying content, process, product, and the learning environment

Planning Meaningful Content, Grounded in Authenticity

Before you begin to think about differentiation, you first need to know where you want students to "be" at the end of the learning experience. You must be explicitly aware of the content that students should know, understand, and be able to do after engaging in a given lesson or sequence of lessons. This awareness enables you to effectively guide students' learning by varying or differentiating instruction. If you do not have a clear idea about the specific learning outcomes, identifying how and when to differentiate can be difficult. In fact, Tomlinson (1999) claims that "If the 'stuff' [content] is ill conceived, the 'how' [differentiation] is doomed" (p. 16).

Note that the content must be authentic and grounded in important mathematics that emphasizes the big ideas in ways that require students to develop relational understanding. Authentic content engages students in the heart of mathematics by requiring them to be problem solvers and creators of knowledge. Through this kind of engagement, students also develop a productive disposition toward mathematics and see it as sensible, useful, and worthwhile.

(Recognizing Students as Learners section omitted from this excerpt)

Content: What You Want Each Student to Learn

Generally, what is learned (the big ideas) should be relatively the same for all students. However, content can still be differentiated in terms of depth (level of complexity) and breadth (connecting across different topics) (Murray & Jorgensen, 2007; Small, 2009). Students' readiness typically informs the level of complexity or depth at which the content is initially presented for different groups of students. Interest and learning profiles tend to inform differentiation geared toward breadth. An example of a depth adaptation for developing understanding and skill with organizing, representing, and interpreting data is a mini-lesson in which all students organize and represent data and answer questions based on the data. However, some students may have a smaller set of data to deal with, or they may be asked to answer given questions about the data, while others, who are ready for more sophisticated content, are asked to generate their own questions about the data. An example of a breadth adaptation for the same objective is to allow students a choice in terms of the kind of data with which to work. For example, based on their interests, students might choose to work with data pertaining to sports, books, science, gaming, or pets. By working with data from various contexts, students not only learn something about those contexts, but also can begin to see the broader applications of organizing, representing, and interpreting data.

Process: How Students Engage in Thinking about Content

Although the big ideas of a learning experience remain relatively stable when differentiating, how students engage with and make sense of the content—the process—changes. Tomlinson (1999) described the process as students "taking different roads to the same destination" (p. 12). You can use different strategies or encourage students to take different "roads" to increase access to the essential information, ideas, and skills embedded in a lesson (Cassone, 2009; Tomlinson, 2003). For example, the use of manipulatives, games, and relevant and interesting contextual problems provides different ways for students to process their ideas while engaging with content.

The process standards in the *Principles and Standards for School Mathematics* (NCTM, 2000), which served as a basis for the Standards for Mathematical Practice in the Common Core State Standards (CCSSO, 2010), lend themselves well to differentiating how students engage with and make sense of content. In particular, the process standard of representation emphasizes the need to think about and use different ways to represent mathematical ideas, which can help students make connections between concepts and skills. With the process standard of communication, students can use verbal or written communication as they share their reasoning, depending on their strengths. In addition, the process standard of problem solving allows for differentiation because of the myriad of strategies that students can use— from drawing a diagram or using manipulatives to solving a simpler problem and looking for patterns.

Because of different levels of readiness, it is imperative that students be allowed to use a variety of strategies and representations that are grounded in their own ideas to solve problems. You can facilitate students' engagement in thinking about the content through a variety of methods. For example, teachers may

- Use visuals or graphic organizers to help students connect ideas and build a structure for the information in the lesson.
- Provide manipulatives to support students' development of a concept.
- Provide manipulatives other than those previously used for the same content.
- Use an appropriate context that helps students build meaning for the concept and that employs purposeful constraints that can highlight the significant mathematical ideas.
- Share examples and nonexamples to help students develop a better understanding of a concept.
- Gather a small group of students to develop foundational knowledge for a new concept.
- Provide text or supplementary material in a student's native language to aid understanding of materials written or delivered in English.
- Set up learning centers or a tiered lesson (a lesson that offer learners different pathways to reach a specific learning goal).

Product: How Students Demonstrate What They Know, Understand, and Are Able to Do after the Lesson Is Over

The term *product* can refer to what a student produces as a result of completing a single task or to a major assessment after an extended learning experience. The products related to a single task would be consistent with the ways students share their ideas in the After portion of a lesson (described in Chapter 2), which could include explaining their ideas with manipulatives, through a drawing, in writing, or verbally. The products related to an extended experience can take the form of a project, portfolio, test, write-up of solutions to several problem-based inquiries, and so on. An important feature of any product is that it allows a variety of ways for students to demonstrate their understanding of essential content.

(Learning Environment section omitted from this excerpt)

Independent Study 2: Exploring a Topic

- Directions:
    - Explore the designated topic in the table by reviewing the online content pages and making notes where you see connection in this topic to the Research-based principles and Agile Mind Design Look-fors.
        - Depth differentiation: if you are familiar with this topic, please include the Student Activity Sheets and Advice for Instruction in your exploration
        - Breadth differentiation: explore a different topic than the recommended one.

    - Use the train site and choose a course for this exploration
        - URL: https://train116.agilemind.com
        - Username: teacher10
        - Password: rectangle

Course	Topic to Review
Math 6	2. Introducing Ratios
Math 7	8. Equations and Inequalities
Math 8	8. Understanding Slope and y-Intercept
Algebra I	8. Solving Linear Equations and Inequalities
Intensified Math	4. Representing mathematical relationships in multiple ways.
Algebra II	3. Transforming Functions
Geometry	3. Transformations and Coordinate Geometry
Precalculus	1. Polynomial Functions
Calculus	18. Optimization
Statistics	4. Measures of relative position

Research-based principles	Agile Mind Design Look-fors	Connections to Topic

Teaching Mathematics through problem-solving	• Opportunities for students to approach problems in different ways that make sense to them	
Planning Meaningful Content, Grounded in Authenticity	• Explicit awareness of what students should know, understand, and be able to do • Emphasizes key ideas in ways that require students to develop relational understanding	
Content: What You Want Each Student to Learn	• Key ideas relatively the same for all students • Depth differentiation informed by readiness • Breadth differentiation informed by interests	
Process: How Students Engage in Thinking about Content	• Process/Practice standards inform differentiation strategies, especially representation, communication/reasoning when grounded in student's own ideas	
Product: How students demonstrate what they know	• Result of completing single task or after extended learning experience • allows a variety of ways for students to demonstrate understanding of essential content	

Whole-Class Differentiated Tasks

Independent Study 3: Learning about whole-group differentiated task strategies

- Directions:
  - Read about Parallel Task and Open Questions
  - Reflect: Where have you seen these strategies in Agile Mind?

Reflection	Where have you seen these types of differentiated task opportunities in Agile Mind?

Parallel Task	•
Open Questions	•

Independent Study 4: Applying whole-group differentiated task strategies

- Directions:
  - Review the tasks below and choose **ONE** to focus on.
  - Determine which differentiation strategy would be most appropriate for this task.
  - Modify the task ensuring that the same learning outcomes would be met for all students. Consider and note responses to the framing questions below:
    - Why did you choose the modification you chose?
    - How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task?
    - What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification?
    - Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Whole-class Task Modification Considerations

Parallel Tasks	Open Questions
• same big idea, different levels of difficulty • assigned based on readiness (depth), or student choice	• Students can choose their solution strategies, or a variety of answers • Students asked to compare similarities and differences
Specific Strategies for Task Modification	

• Identify big idea
• Consider different ways students might reason
• Modify task by:
  ○ size of numbers
  ○ operations used
  ○ insert sets of numbers
	• Give answer, ask for the problem
	• Replace a number in given problem with a blank or a question mark
	• Offer 2 situations or examples and ask for similarities and differences
	• Create a question in which students have to make choices

Bringing Tasks Together through Whole-Class Discussion	
• Modifications work towards same big ideas, so all students can contribute meaningfully to whole class discussion after working on task.	

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Math 6

Original Task Option 1: Math 6, Topic 2, SAS Block 7, Reinforce #6 Add modifications to this task in another color!	Framing Question Notes
1. **Reinforce** Lara mixes lime soda and lemon soda in a ratio of 4	1. Why did you choose the modification you chose?

parts lime for every 3 parts lemon. Complete the table to show different amounts of the mixture. Hint: Look for how each ratio is related to other ratios you already know.

Lime soda	Lemon soda
4	3
8	a.
b.	12
24	c.
56	d.
e.	39
60	f.

a.

2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task?
   a.
3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification?
   a.
4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?
   a.

Original Task Option 2: Math 6, Topic 2, Constructed Response, #1
Add modifications to this task in another color!

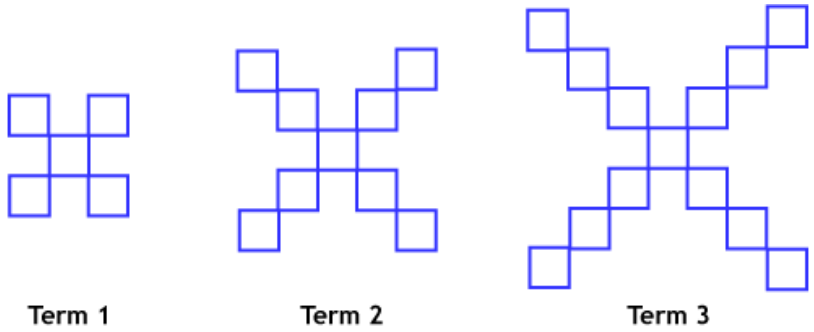
1. Cindy has bought a box of birthday candles. It is 6 ounces and

Framing Question Notes

1. Why did you choose the modification you chose?
   a.
2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task?
   a.
3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification?
   a.
4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

contains 96 candles. The candles are sold in other sizes of boxes. The smallest is a 2-ounce box. How many candles would you expect in a 2-ounce box? Use a double number line diagram to show how you got your answer. 2. The store also sells a 15-ounce grand size. How many candles would you expect in that box? Explain how you determined your solution. 3. The grand size box sells for $5. The ratio of the dollars to ounces is 5 to 15. How much does a 2-ounce box cost? Show your solution with a double number line or table of equivalent ratios.	

Math 7

Original Task Option 1: Math 7, Topic 8, Constructed Response #2 Add modifications to this task in another color!	Framing Question Notes
 Here are the first three terms in a pattern. 1. How many squares are in the next term? A square must have lines around all sides! 2. Make a table to represent the pattern. Include a process	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate? a.

column. 3. Write a rule that describes the pattern. 4. Which term number in the pattern is a figure that contains exactly 45 squares? Write an equation to model the situation. Then solve your equation to answer the question.	
Original Task Option 2: Math 7, Topic 8, Constructed Response #3 Add modifications to this task in another color!	Framing Question Notes
Two friends, Gina and Ray, go to a go-kart track together. The price of a ticket is $5 per hour plus a $25 fee. Since they can share a go-kart, Gina and Ray will split the cost. a. Write a rule that represents the amount that Gina and Ray pay together for riding x hours. b. Gina and Ray pool their money and have $50. What is the greatest number of hours they can ride? Write an inequality and solve. c. Ray decides he does not want to ride after all. Gina wants to ride 1 ½ hours, but she only has $33. Write an equation that represents how many hours Gina can ride with $33. Can she meet her goal of riding 1 ½ hours?	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Math 8

Original Task Option 1: Math 8, Topic 8, Constructed Response #4 Add modifications to this task in another color!	Framing Question Notes
1. The CTW Pizza Company is planning to produce small square pizzas. It will cost them $2.00 to make each pizza, and the company will sell them for $5.00 each. Express the profit earned as a function of the number of pizzas sold. 2. Graph the function rule that you developed for the pizza profits, and describe the relationship between the two variables. 3. What is the slope of the graph, and what does it mean in the context of the situation? 4. CTW finds a less expensive supplier for its ingredients, and now it spends $0.50 less on making each pizza. Describe how this will change the function rule and the graph. Explain how you know.	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate? a.
Original Task Option 2: Math 8, Topic 8, SAS Block 8, Reinforce #14 Add modifications to this task in another color!	Framing Question Notes

<table>
<tr>
<td>Elisabeth bought a new type of dry food for her large dog. The side of the bag contained this table. If you graph the information in the table, what will be the value of the slope of the graph? What will the slope represent in this situation?

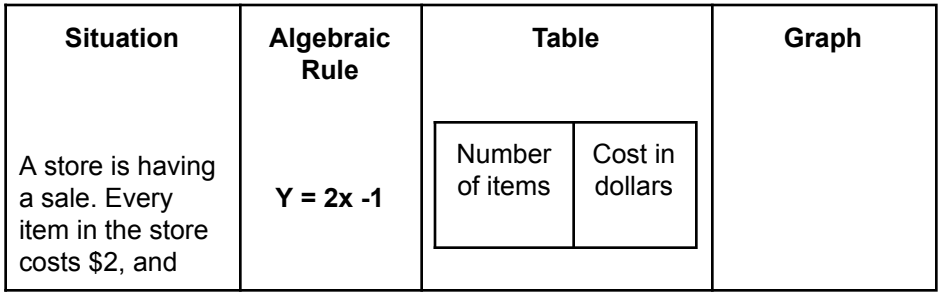
<table>
<tr><td>Weight of dog (in pounds)
Amount of food (in cups)</td><td>Weight of dog (in pounds) Amount of food (in cups)</td></tr>
<tr><td>50</td><td>2</td></tr>
<tr><td>100</td><td>3</td></tr>
<tr><td>150</td><td>4</td></tr>
</table>
</td>
<td>1. Why did you choose the modification you chose?
a.
2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task?
a.
3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification?
a.
4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?</td>
</tr>
</table>

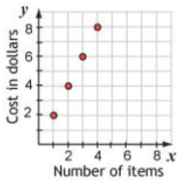
Algebra I

Original Task Option 1: Algebra I, Topic 8, SAS 3, Reinforce #13 Add modifications to this task in another color!	Framing Question Notes
Solve **5x - 7 = 5 - x** using algebraic operations. Check your solution using a table and explain how you used the table to check your solution. Alternative: Provide a visual drawing of balance scale to solve the equation. Connect your drawing to algebraic operations.	1. Why did you choose the modification you chose? 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Original Task Option 2: Algebra I, Topic 8, Constructed Response #2 Add modifications to this task in another color!	Framing Question Notes
You want to see if there's a way to spend less money on dune buggy rentals. Recall that your current rental car company, Go-Beach-Go, charges $29.95 plus 16 cents per mile. Nearby are two other companies, Sunnyside Buggies, which charges $72.00 per day with unlimited free mileage, and Playa Buggies, which has no daily fee and charges 45 cents per mile. 1. Some days you drive many miles, and some days you drive fewer miles. So, determine the range of daily mileage for which each company is the least expensive choice.	1. Why did you choose the modification you chose? 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Intensified Algebra

Original Task Option 1: Intensified Algebra I, Lesson 4, Homework #1 Add modifications to this task in another color!	Framing Question Notes
 	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification?

you get to subtract $1 from your total bill.		<table><tr><th>*x*</th><th>*y*</th></tr><tr><td>1</td><td>1</td></tr><tr><td>2</td><td>3</td></tr><tr><td>6</td><td>11</td></tr></table>	

1. Some, but not all, of the representations in each set model the situation described. Answer the questions for each problem.

   Does the algebraic rule match the situation? YES / NO Explanation:

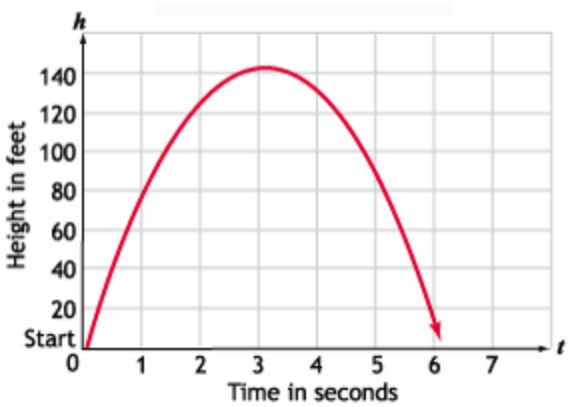
   Does the table match the situation? YES / NO Explanation:

   Does the graph match the situation? YES / NO Explanation:

a.

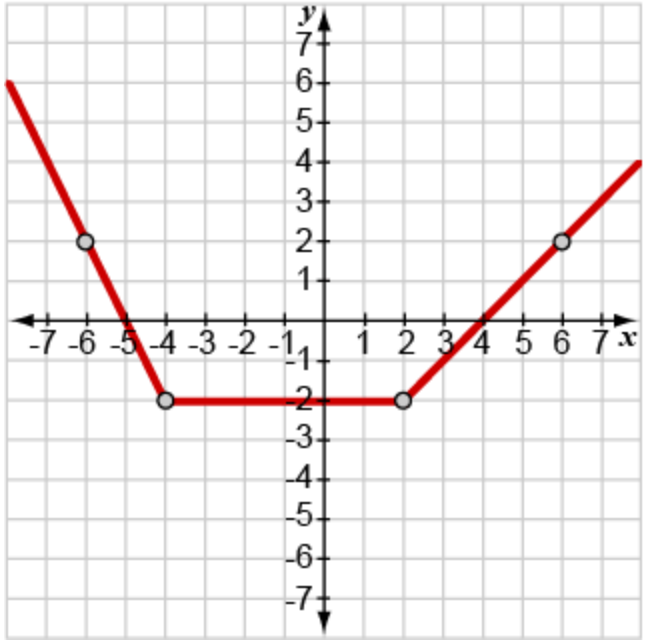
4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Original Task Option 2: Intensified Algebra I, Lesson 4, More Practice #4 Add modifications to this task in another color!	Framing Question Notes

 This graph represents the height of a kicked ball at a given time. Which is the best conclusion about the position of the ball? 1. At 4 1/2 seconds, the ball is about 110 feet from the ground. 2. The ball returns to the ground in 3 seconds. 3. The ball travels 140 feet total. 4. The ball lands about 6 feet away from where it is kicked.	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Algebra II

Original Task Option 1: Algebra II, Topic 3, Constructed Response #1 Add modifications to this task in another color!	Framing Question Notes



The graph of the function $y=f(x)$ is given above.

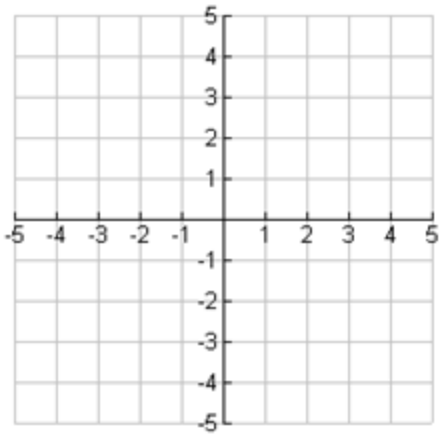
Consider the function

$g(x)=3f(x-2)+1.$

a. Sketch a graph of g.
b. Describe the effect of the transformation on the parent function, f.
c. Compare the domains and ranges of f and g.

1. Why did you choose the modification you chose?
   a.
2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task?
   a.
3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification?
   a.
4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Original Task Option 2: Algebra II, Topic 3, SAS 2, Reinforce #16 Add modifications to this task in another color!	Framing Question Notes
1. Graph the function $f(x) = (x - 3)^2$. How does this graph compare to the graph of the parent function $y = x^2$?	1. Why did you choose the modification you chose? a.

	2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

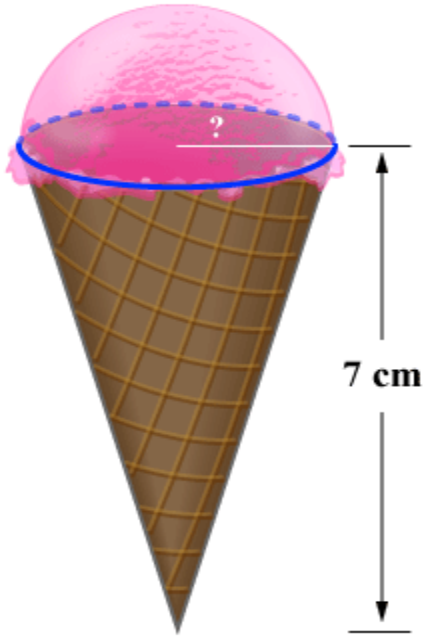
Geometry

Original Task Option 1: Geometry, Topic 3, SAS 2, Reinforce #9 Add modifications to this task in another color!	Framing Question Notes
Quadrilateral CDEF has the following vertices: C(1,2), D(5,3), E(5,1), and F(3,-2). a. Plot quadrilateral CDEF on the grid. b. Reflect quadrilateral CDEF across the x-axis. What are the coordinates of the image? c. Reflect quadrilateral CDEF across the y-axis. What are the coordinates of the image? d. Reflect quadrilateral CDEF across the line y = x. What are the coordinates of the image?	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?
Original Task Option 2: Geometry, Topic 3, SAS 4, #4 Add modifications to this task in another color!	Framing Question Notes

 How could you model a glider in the air circling a point on the ground? In this example, the glider is circling clockwise about the point on the ground. Suppose the glider is placed in the coordinate plane with the point on the ground set at the origin. What transformation would make the glider follow the exact path shown?	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Pre-Calculus

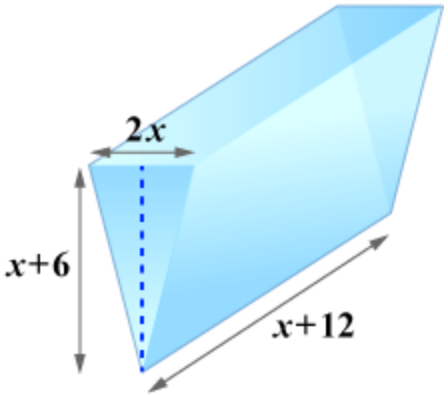
Original Task Option 1: Pre-calculus, Topic 1, Constructed Response #1 Add modifications to this task in another color!	Framing Question Notes



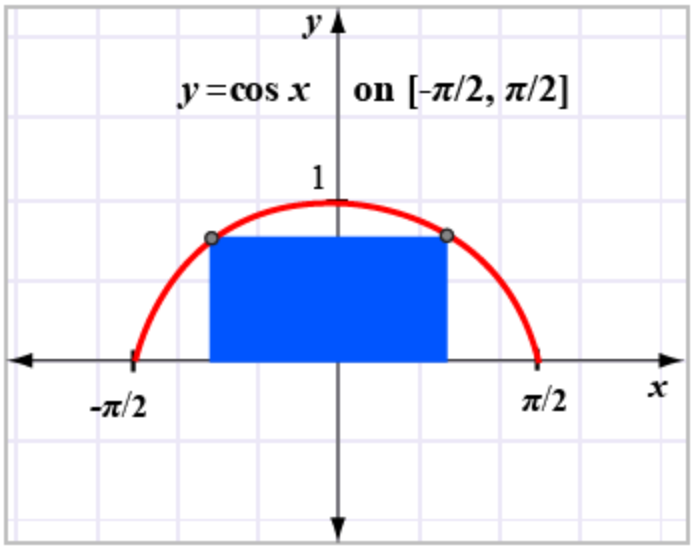
An ice cream company is planning to sell frozen mini ice cream cones in boxes for grocery retail. The ice cream cones are in the shape of a cone and a hemisphere, as shown. Ice cream fills the cone completely. The designer of the packaging would like the height of the cone portion to be 7 cm.

1. Write a function for volume of ice cream in terms of the radius and π.
2. The nutritionist for the company would like the calories for an ice cream cone to be less or equal to 250 calories, which is about 4π in^3 of ice cream. Write and solve an equation to find the radius of the cone that would provide the maximum amount of ice cream calories. Explain your solution method. (For the purposes of this problem, you can ignore the thickness of the cone.)
3. Draw a sketch of a feasible ice cream that would meet the package designer and the nutritionist's constraints.

1. Why did you choose the modification you chose?
    a.
2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task?
    a.
3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification?
    a.
4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Original Task Option 2: Pre-calculus, Topic 1, Constructed Response #2 Add modifications to this task in another color!	Framing Question Notes
A sheet metal company builds metal troughs for various purposes. They sell triangular prisms as containers for plants as well as for animal feed. For efficiency, they keep the dimensions of the troughs proportional. The diagram shows the dimensions of a trough with isosceles triangles as the bases.  1. Write a function that represents the volume of the triangular prism. 2. A client orders a triangular trough with a volume of 935 cubic inches to use as a flower bed. Find the dimensions of the trough. 3. Suppose a rectangular trough has the same dimensions as the triangular prism in the diagram. How would the volume of the rectangular trough relate to the volume of the triangular trough? Explain your reasoning.	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Calculus

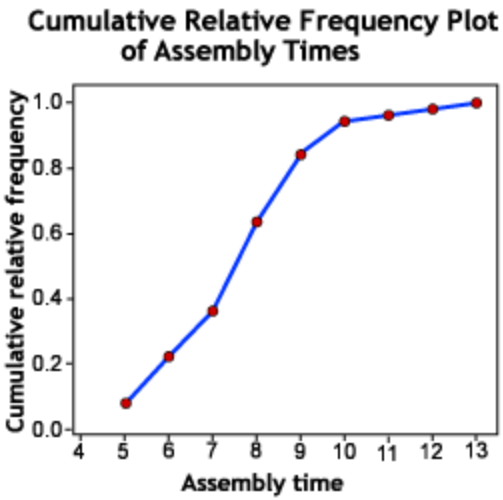
Original Task Option 1: Calculus AB: Topic 18, Free Response #1 Add modifications to this task in another color!	Framing Question Notes
 Use calculus in answering the following questions. a. Find a function for the area of the shaded rectangle in the figure above. b. Find the area of the largest rectangle (shaded) that is bounded by $f(x)=\cos x$ and the x-axis, as pictured. c. Find the area of the largest rectangle that is bounded by $g(x)=k(\cos x)$, for any positive constant k. Justify your answer.	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Original Task Option 2: Calculus AB: Topic 18: Exploring Shepherd Seth Add modifications to this task in another color!	Framing Question Notes
 Seth the shepherd has a tough decision to make. How many sheep should he keep on his 10-acre mini-ranch? Every sheep he keeps on the ranch up to 500 sheep yields an average annual wool output of 25 pounds per sheep. However, for every sheep over 500, the average wool output per sheep decreases by 0.01 pounds. This decrease occurs because of health reasons such as grass scarcity, overcrowded sleeping arrangements, and low sheep morale. So how many sheep should he keep?	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?

Statistics

Original Task Option 1: Statistics: Topic 4, Free Response #1	Framing Question Notes

Add modifications to this task in another color!	
Scores on a midterm exam for a Statistics class have a mound-shaped histogram and a mean of 78. Jolene got a score of 84 on the exam. She computed her z-score as -1.8 and determined that she scored at the 84th percentile. 1. Explain why Jolene's computed z-score could not be correct. 2. Briefly explain why a z-score of -1.8 could not correspond to the 84th percentile. 3. If the standard deviation of exam scores was 6, what is the correct z-score for Jolene's exam score of 84? 4. What is the approximate percentile for Jolene's exam score of 84?	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?
Original Task Option 2: Statistics Topic 4: Free Response #2 Add modifications to this task in another color!	Framing Question Notes
Fifty students participated in a contest that required each of them to assemble a small bookcase as quickly as possible. The graph shown here is a cumulative relative frequency plot that was constructed from the resulting data on time (in minutes) to assemble the bookcase.	1. Why did you choose the modification you chose? a. 2. How does this differentiation strategy provide more entry points for students working towards the same learning outcomes for this particular task? a. 3. What formative assessment evidence might inform modifications to this task? What specific scaffolds are you working to provide through this modification? a. 4. Which groups of students would benefit from the modifications you made? What flexible grouping do you anticipate?



1. Approximately what percent of the students were able to assemble the bookcase in 6 minutes or less?
2. What is the approximate value of the median assembly time?
3. What is the approximate value of the interquartile range?
4. One student required 12 minutes to assemble the bookcase. If this student had actually taken 22 minutes rather than 12, would the value of the interquartile range change? Explain.

Module Certificate of Completion (optional)

Directions:

1. Complete the Module Participant Activity Sheet
2. Submit "Earn a Certificate of Completion" form on Module Site
    a. Enter Information
    b. Respond to Reflection Questions
    c. Upload completed Participant Activity Sheet
3. An Agile Minder will review your submission and we will send you a Certificate of Completion