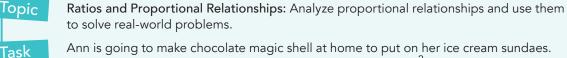# Grade 7
rich tasks
mathematics

Instructional mathematics tasks are accessible to all learners because they invite students to wrestle with a problem. Students share their ideas, ask questions of one another, use and apply multiple representations, and collaborate to develop various solution pathways. Then, teachers use students' solutions to make the math visible, connect prior learning, and forecast new mathematical learning.

Directions: Launch the tasks in a whole group to provide opportunities for students to discuss their understanding of the task and suggest strategies to solve. Organize the students in pairs or groups of four to encourage participation. Provide manipulatives, chart paper, and markers.

1

Topic

Ratios and Proportional Relationships: Analyze proportional relationships and use them to solve real-world problems.

Task

Ann is going to make chocolate magic shell at home to put on her ice cream sundaes. The recipe she is using calls for 2 cups of chocolate chips and $\frac{2}{3}$ cup of coconut oil. Ann only has a 1-cup measuring cup. Tell Ann how many cups of chocolate chips and how many cups of coconut oil she will need to use to make a batch of magic shell that is proportional to the original recipe.

Facilitate

Encourage students to discuss the scenario. Prompt students to describe different strategies for modeling proportional relationships. Make available multiple representation organizers for students to create ratio tables, tape diagrams, double number line diagrams, or other models.

Make the Math Visible

Select students to share their solutions and thinking. Make connections between different strategies. Discuss the concept of proportionality and how it relates to the context of the recipe.

Notes

CORWIN
A SAGE Publishing Company

2

Topic — **The Number System:** Solve real-world problems involving the four operations with rational numbers.

Task — Sandy works at an apple orchard. She picked $2\frac{2}{5}$ bushels of apples, but unfortunately, overnight the rabbits ate $\frac{1}{4}$ of what Sandy had picked. If there are about 125 medium apples in a bushel and Sandy earns $0.35 for every apple she delivers to her boss, how much money did Sandy make?

Facilitate — Prompt students to describe how they can determine how many of the apples were eaten by the rabbits and how many are left. Encourage students to discuss which rational number operations will help them arrive at a solution. Highlight the importance of attending to precision with their calculations.

Make the Math Visible — Select students to share their solutions and strategies. Sequence the sharing to highlight different approaches and address student misconceptions. Ask students how they modeled the situation. Prompt students to reflect on the reasonableness of their answers.

3

Topic — **Expressions and Equations:** Use variables to represent quantities and solve real-life problems.

Task — Estela is raising money for her school's walk-a-thon fund-raiser. Her dad agrees to sponsor her for $25. Estela then asks her neighbors to each donate $10 toward her fund-raising goal. How many neighbors does Estela need as sponsors in order to reach her goal of $100? Explain your reasoning.

Facilitate — Reveal the first portion of the problem, and ask students if they have ever set a goal for raising/saving money. Elicit from students how they tracked their savings. Prompt students to describe how they can model this scenario. Make available tables, graphs, and other organizers. Provide flexibility for students who choose to model this with an equation rather than an inequality.

Make the Math Visible — Select and sequence students to share their solutions. Begin with visual and table representations and progress toward a formal inequality. Highlight the connections between the different representations. Prompt students to discuss constraints on the solution and why the answer must be a whole number.

4

Topic — Geometry: Solve problems involving scale drawings of geometric figures.

Task — An interior designer is developing plans for her client's living room. She is using the scale that 1 inch represents 4 feet. She wants a rug that covers 48 square feet. What could be the dimensions of the rug on the plans?

Facilitate — Encourage students to make a drawing of the scenario, much like an interior designer would do. Ensure that students understand the scale and how that translates to the measurements in the plans and those of the actual rug. Prompt students to make connections to factor pairs and explore multiple solutions.

Make the Math Visible — Ask students to share solutions and support them with pictures or other models. List all of the possible dimensions for the rug. Prompt the class to look for a relationship between the different solutions. After examining dimensions of the rug on the plans, encourage students to discuss what the dimensions of the actual rug could be.

5

Topic — Statistics and Probability: Understand that generalizations about a population from a sample are valid only if the sample is representative of that population.

Task — Zahir wants to know what models of cars are most popular with teenagers. He decides to go out to his high school's parking lot at lunch one day and record the different models of cars he sees. Do you believe this will provide Zahir with a random sample that is representative of all teenagers? Explain your thinking.

Facilitate — Encourage students to discuss what makes a sample random. Ensure that students consider the importance of a sample being representative of a larger population.

Make the Math Visible — Prompt students to take a stance on whether or not Zahir will collect a random sample.

Consider dividing the class based on their conclusions. Allow time for students to share their thinking and reasoning. Facilitate a class debate that requires students to construct a viable argument and critique the reasoning of others.

Adapt-a-Mathematical TASK Tool

Do you have a task that is not quite right? Use this guide to adapt the task to meet your needs!

How does the task meet your STUDENTS' needs?

ACCESS and EQUITY: Ensure that the task is "responsive to students' backgrounds, experiences, cultural perspectives, traditions, and knowledge" (NCTM, 2014, para. 1, https://www.nctm.org/uploadedFiles/Standards_and_Positions/Position_Statements/Access_and_Equity.pdf). Consider students' language readiness, including access to mathematical vocabulary.

- How can you differentiate the context of the task to support the students' backgrounds, experiences, and cultural needs?
- How can you group students to engage the students' socio-emotional and developmental needs?
- How can you "open up" the task to encourage access to the task for all learners?
- How can you connect the task to the mathematics the students have learned and students' interests?

Notes

How do you PLAN for students to learn from the task?

MATHEMATICAL GOAL: The task should provide students opportunities to access new mathematical knowledge and to solidify, consolidate, or extend knowledge. Tasks can be changed to highlight multiple learning needs and content standards. Ensure that you strategically connect the learning goal to the task.

- What do your students know how to do right now?
- What do you expect your students to understand as a result of this task?
- What do you anticipate students will do? What changes might you make as a result of your anticipation?

FACILITATE: Task facilitation is critical to student success. Consider how you will organize students and **design** purposeful questions to help them discover and connect mathematics concepts and procedures.

- What **questions** are you going to ask? What tools will you provide? How will students be grouped?
- How and when will you provide opportunities for student **discourse**?

Notes

How do you move learning FORWARD?

FORMATIVE ASSESSMENT: Collecting information about student understanding will help you adjust instruction as you conduct the task.

- How will you listen, observe, and identify students' strategies?
- How will you respond to students' understanding?
- How will you provide feedback to students?
- How will you provide opportunities for students to provide feedback to one another?
- How will you provide opportunities for students to persevere and productively struggle through problems?
- How will you make the mathematics visible for your students?

Notes