Just In Time Quick Check

Standard of Learning (SOL) 6.12a

Strand: Patterns, Functions and Algebra

Standard of Learning (SOL) 6.12a

The student will represent a proportional relationship between two quantities, including those arising from practical situations.

Grade Level Skills:

- Make a table of equivalent ratios to represent a proportional relationship between two quantities, when given a ratio.
- Make a table of equivalent ratios to represent a proportional relationship between two quantities, when given a practical situation.

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Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - 6.12ab – Ratio Tables and Unit Rates (Word) / PDF
- VDOE Algebra Readiness Formative Assessments
  - SOL 6.12a (Word) / PDF
- VDOE Algebra Readiness Remediation Plans
  - Ratio Tables and Unit Rates (Word) / PDF
- VDOE Word Wall Cards: Grade 6 (Word) | PDF
  - Ratio Table
  - Proportional Relationship
  - Connecting Representations
- Desmos Activity
  - Marcellus the Giant

Supporting and Prerequisite SOL: 6.1, 5.2a, 4.2b

SOL 6.12a - Just in Time Quick Check

1. The ratio of *y* to *x* is represented by the relationship 2 to 1.5. Make a ratio table to represent this proportional relationship.

2. Explain what it means for the ratio of *a* to *b* to have a proportional relationship of 5 to 6. Create a ratio table to support your answer.

3. Complete the following ratio table to show the proportional relationship of *x*:*y* as 1:2.

x	***y***
1	2
2	
4	
	16
10	

4. Complete the ratio table using the proportional relationship.

Cups of Sugar		$\frac{3}{4}$		3
Cookies	10	20	40	

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Common Errors/Misconceptions and their Possible Indications

1. The ratio of *y* to *x* is represented by the relationship 2 to 1.5. Make a ratio table to represent this proportional relationship.
   A common misconception is reversing the order of the relationship as a student creates the table for a proportion. Here, the student might list the variable y *as being represented by the part of the relationship of the ratio noted as 1.5 instead of 2. An example of this error is shown in the table.*

In this INCORRECT table, the variables *x* and *y* are reversed for the proportional relationship.

x	***y***
2	*1.5*
4	*3*
8	*6*
16	*12*

Encourage students who make this error to reflect on the meaning behind the numbers connected to the ratio. Ask questions like, how does your table show the ratio? Why does it make sense that these would be your x values? What is happening to x as you move down the table? Why?

In addition, some students may need use a contextual problem in conjunction with manipulatives to model the relationships in the ratio. In this example, replacing the variables x and y with "Number of Pizzas Eaten" and "People," may make the ratio easier to understand. Students could use a manipulative such as fraction circles to model the proportional relationship and explain how this is shown in the table. Once students have that understanding, replacing context with variables embeds the abstract mathematical thinking. How are x and y the same as pizza and people? Is it okay to use variables instead of words? Why? It is important for students to see that the relationship still exists in the abstract form.

2. Explain what it means for the ratio of *a* to *b* to have a proportional relationship of 5 to 6. Create a ratio table to support your answer.

This open-ended problem allows the teacher to see the strategies a student may use in creating the ratio table. Do students use doubles and halves? Do they find a unit rate? Do they try to count forward starting from 5 then going to 6, 7, 8, etc. for the value represented by b?

A common misconception in proportional reasoning is using an additive relationship instead of a multiplicative relationship. For example, in completing a table for this problem, students might incorrectly do the following:

a	***b***
5	*6*
6	*7*
7	*8*

Because the difference between 5 and 6 is one, students may apply additive reasoning in considering the other values in the table, also making them have a difference of one. To help students move to multiplicative reasoning, provide them opportunities to explore both types of relationships by comparing an additive situation with a multiplicative situation. This should also be embedded in the work of 6.12c as students are determining whether a relationship is proportional. Additionally, allowing students to use context and manipulatives to model the proportional relationship can help support them in understanding the multiplicative relationship. For example, using the same relationship what is the value of a when b is 10? Teachers may want to provide context to the values of a and b, such as, chocolate donuts and glazed donuts.

3. Complete the following ratio table to show the proportional relationship of *x*:*y* as 1:2.

x	***y***
1	2
2	4
4	
	16
10	
100	

A common error some students may have is to struggle with the inconsistent increase of the values in the x *column. Students may try to continue the pattern counting by twos (2, 4, and 6). Students may feel they need to write out more numbers in between the values listed instead of using the values and the unit rate listed in the table. To help students make sense of the relationships in a ratio table, engage them in real-world contexts and tasks that allow them to make the connections more concrete. For example, if each can of food costs 2 dollars, what would be the cost 10 cans of food? 100 cans of food? What other values can added to the table based on the number of cans of food? Can the ratio of 2 cans of food for a cost of 4 dollars help us find the cost of 100 cans of food? How do you know? Asking questions embedded in real world contexts will assist students to understand proportional relationships and use them efficiently.*

4. Complete the ratio table using the proportional relationship.

Cups of Sugar		$\frac{3}{4}$		3
Cookies	10	20	40	

A common misconception some students may have is recognizing how to use a fraction in a proportional relationship, such as $\frac{3}{4}$: 20, in order to determine how much sugar is needed for 10 cookies and 40 cookies. This may indicate that some students may not think that a fractional relationship is possible and that this is not a ratio table. Engage students in questions that help connect the ratio table to the proportional relationship. If we know that 20 cookies need ¾ cup of sugar, how can you figure out the amount of sugar needed for 10 cookies and 40 cookies? What do you notice about the relationship between the values? What values can we determine starting with 10 cookies? What do all of the relationships have in common?

Use of models allows students to apply a concrete relationship for understanding. One model for conceptual understanding is a double number line. Double number line diagrams can be used to represent proportional relationships and create collections of pairs of equivalent ratios. These types of diagrams provide a visual representation to move from a concrete application to a conceptual understanding of the proportional relationship.