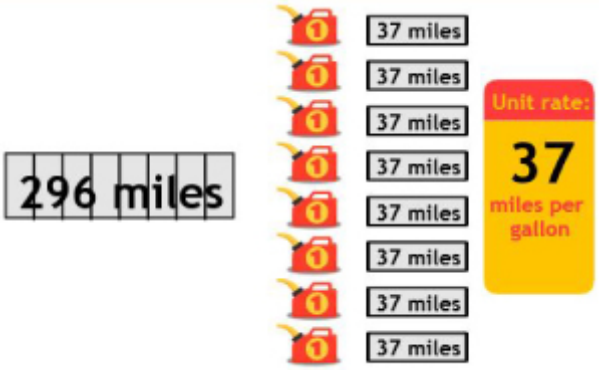
Prepare instruction

Goals and objectives Topic at a glance Prerequisite skills Resources Language support

Goals and objectives

After finishing the topic **Patterns in proportional relationships**, students will be able to

- decide whether two quantities are in a proportional relationship by looking at a table or graph;
- identify the constant of proportionality, or unit rate, in tables and graphs;
- represent proportional and non-proportional relationships with equations;
- explain what a point (x,y) on the graph of a proportional relationship means;
- solve word problems leading to equations of the form $px + q = r$.



Topic at a glance

This topic, **Patterns in proportional relationships**, is designed to build on students' prior knowledge involving ratios, rates, and proportional reasoning developed in previous topics. Students will learn how to analyze relationships using tables and graphs, and develop algebraic equations that describe the relationships. Students will also explore various patterns, developing skills to predict future iterations of a pattern by developing equations. The ability to analyze relationships will be valuable in future topics as students continue to explore relationships using multiple representations.

This topic is designed to support ten 45-minute blocks of instruction and formative assessment. You may need more or less, depending on your students' familiarity with proportionality, function analysis, and pattern recognition.

This topic provides multiple opportunities for students to engage in literacy tasks. Throughout the topic are opportunities for extended written responses that support a culminating literacy task in Blocks 8 and 9.

Description	Resources	Suggested assignment
Block 1 introduces the graphing of proportional ratios using a paint mixing scenario that students have encountered in a previous topic. Students will compare the graphs of different paint mixture relationships.	*Overview* Block 1 SAS	Block 1 SAS Q2a-c and 3a-c
Block 2 introduces building a table, graph, and equation for proportional relationships.	*Exploring* "Proportional and non-proportional relationships" p1-4 Block 2 SAS	*Guided practice* p1-2 *More practice* p1-2 Block 2 SAS Q6a-c
Block 3 guides students in analyzing the differences between proportional and non-proportional relationships in table and graph form.	*Exploring* "Proportional and non-proportional relationships"	*Guided practice* p3-4

	p5-9 Block 3 SAS	*More practice* p3-5
Block 4 helps students recognize the constant of proportionality, or unit rate, in tables and graphs of proportional relationships.	*Exploring* "Proportional and non-proportional relationships" p10-12 Block 4 SAS	*Guided practice* p5-6 *More practice* p6 Block 4 SAS Q3a-d, 4a-c, and 5a-c
Block 5 gives students an opportunity to describe a relationship using an expression. The emphasis is on the idea that multiple expressions can be used to represent the same pattern.	*Exploring* "Identifying proportional relationships" p1-4 Block 5 SAS	*Guided practice* p7-8 *More practice* p7-9
Block 6 allows student to practice creating generalized algebraic rules from expressions they have developed to describe a specific iteration of a pattern.	*Exploring* "Identifying proportional relationships" p5-8 Block 6 SAS	*Guided practice* p9-10 *More practice* p10 Block 6 SAS Q5a-c and 6a-b
Block 7 gives students time to practice the skills they have developed in Blocks 5 and 6 through applicable reinforcement activities.	Block 7 SAS *Summary* Literacy Task	Literacy Task Block 7 SAS Q1a-g, 2a-f, 3a-c, and 4a-g
Block 8 allows students to use their experiences with completing a table and creating an algebraic rule for a pattern to explore an extended task. This block introduces the culminating literacy task for this topic.	*Mars Task: Tiling squares* Literacy Task Literacy Task Rubric	*Guided practice* p11-15 See *Deliver instruction* Block 8
Block 9 provides time for students to continue the development and revision of their written essay.	Literacy Task Literacy Task Rubric	See *Deliver instruction* Block 9
Block 10 provides time for a topic level assessment.	*Automatically scored* *Constructed response*	None

Prerequisite skills

To be successful with the material in this topic, students should already be able to:

- Explain what makes a relationship proportional
- Describe a relationship using ratios and rates
- Simplify a ratio
- Identify a unit rate
- Map a coordinate pair on a coordinate grid

Resources

LESSON RESOURCES

- Computer with projection device
- Color tiles (Block 5)

- Colored pencils (Block 5)
- Graph paper (Block 5)

RELATED RESOURCES

- Agile Mind **Glossary**

Language support

All students should become proficient in using the core vocabulary of ***factor***, ***constant***, ***variable***, ***coefficient***, ***scale factor***, ***ratio***, ***proportional reasoning***, ***rate***, ***unit rate***, ***constant of proportionality***, ***coordinate pair***, ***proportional linear relationship***, and ***non-proportional linear relationship***.