Grade 8 Unit 3: Linear Relations
Lessons 1–4: Proportional Relationships

Explore, Play, and Discuss

- I can graph a proportional relationship from a story.
- I can use the constant of proportionality to compare the pace of different animals.

Activity Suggestions:

- ➢ Activity 1.1: Students notice and wonder in an online discussion board, an online or paper journal, communicate with a classmate, or share their reasoning with someone at home.
- ➢ Students notice and wonder about the two graphs using a discussion board or some platform where they can see each others' reasoning.
- ➢ Activity 2.2: This is a Card Sort that students could complete independently and check their answers.

Assessment Suggestions:

- ➢ Check Your Readiness assessment: items 1–4: Administer all 4 items within the first day or two of this section. Use the guidance provided with each problem to adjust instruction so that students can access the math in the unit.

Deep Dive

- I can graph a proportional relationship from an equation.
- I can tell when two graphs are of the same proportional relationship even if the scales are different.
- I can scale and label a coordinate axes in order to graph a proportional relationship.

Activity Suggestions:

- ➢ Activity 1.2: Sync discussion. This ladybug and ant context is important to drive the rest of the lesson.
- ➢ Activity 1.3: Sync discussion. This is the extension of Activity 1.2.
- ➢ Activity 2.3: Sync discussion focusing on choosing the scales that make the most sense given the context.
- ➢ Activity 3.2: This activity involves students making their own graphs. The creation of the graphs may happen independently, but it is critical that there is an opportunity for students to create and explain their work given other activities involve interpreting existing graphs.

Assessment Suggestions:

- ➢ Lesson 2 cool-down
- ➢ Lesson 3 cool-down This cool-down involves graph creation as well.

Synthesize and Apply

- I can compare proportional relationships in different ways.

Activity Suggestions:

- ➢ Activity 4.1: Have students generate their situation to match the equation using a discussion board. If possible given technology, have them share their tables and graphs with one another and the teacher as well.
- ➢ Activity 4.2 This activity has many parts and synthesizes the work of the prior three lessons. It can be broken into independent activities or used as an assessment.
- ➢ Teach and encourage students to study the lesson summaries (at the end of every lesson) and refer back to them.

Assessment Suggestions:

- ➢ Activity 4.2 This activity has many parts and synthesizes the work of the prior three lessons. It can be broken into independent activities or assessment.
- ➢ Revisions to previous assessment prompts
- ➢ Students use learning targets to decide what additional practice they need.

Ongoing Practice

- Assign one or more of the distributed practice problem sets from lessons 1–4 to be completed over the time period that the section is being worked on.
- These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit.
- Specify which problems students should submit, or let them choose.

Anytime Resources

- Grade 7 Unit 2 Lesson 10: Activities 1 and 2 can be completed digitally. This lesson launches the introduction to graphing proportional relationships.
- Grade 7 Unit 2 Lesson 11 Activity 3: This activity can be completed digitally. This is essential prior knowledge for this unit.
- The Family Support Materials from this unit provide high level guidance on the content of this unit and sample problems with answers.

Lessons 5–8: Representing Linear Relationships

Explore, Play, and Discuss

- I can find the rate of change of a linear relationship by figuring out the slope of the line representing the relationship
- I can use patterns to write a linear equation to represent a situation.

Activity Suggestions:

- ➢ warm-up Lesson 6 Students respond to questions in an online discussion board, an online or paper journal, communicate with a classmate, or talk them over with someone at home.
- ➢ Activity 6.2 This activity is a card sort. It can be done virtually or students can use their books or online platform to see the cards. Students can try on their own and self-check.
- ➢ warm-up Lesson 8 This activity asks students to look at several lines on the same coordinate grid and figure out which ones are translations. This activity should be accessible with knowledge or transformations from Unit 1.

Assessment Suggestions:

- ➢ Lesson 6 cool-down
- ➢ Have students create a visual pattern that shows a linear equation (for example: the number of tiles = $3x + 4$, where x represents the term of the pattern.)

Dive Deep

- I can write an equation for the relationship between the total volume in a graduated cylinder and the number of objects added to the graduated cylinder.
- I can interpret the vertical intercept of a graph of a real-world situation.
- I can match graphs to the real-world situations they represent by identifying the slope and the vertical intercept.

Activity Suggestions:

- ➢ Activity 7.2: This task has a digital simulation and applets that allow students to easily engage virtually with technology or pencil and paper. The context makes it a great launch for discussion. Emphasize new terms in this unit such as “rate of change,” “linear relationship,” and “vertical intercept.”
- ➢ Activity 7.3 This task asks students to generalize a method for finding slope—it should be facilitated by a

Assessment Suggestions:

- ➢ Lesson 8 Cool Down This Cool Down asks students to describe how the graphs of $y = 2x$ and $y = 2x - 7$ are different. The answer can be typed in, but does not require additional technology.

	teacher in a live synchronous session if possible.	

Synthesize and Apply

- I can explain where to find the slope and vertical intercept in both an equation and its graph.
- I can write equations of lines using $y = mx + b$.

Activity Suggestions:

- ➢ Activity 8.2 This task has a digital applet. This activity could be used for asynchronous work as assessment or an activity.
- ➢ Activity 8.3 This first part of this task can be completed independently with the aid of the digital applet. The card sort can be done independently and students can check their work when finished.
- ➢ Teach and encourage students to study the lesson summaries (at the end of every lesson) and refer back to them.

Assessment Suggestions:

- ➢ Revisions to previous assessment prompts
- ➢ Students use learning targets to decide what additional practice they need.

Ongoing Practice

- Assign one or more of the distributed practice problem sets from lessons 1–8 to be completed over the time period that the section is being worked on.
- These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit.
- Specify which problems students should submit, or let them choose.

Anytime Resources

- Lesson 3 warm-up This warm-up helps students make sense of the different placement of negative signs in fractions which is particularly helpful for reviewing negative slopes.
- The Family Support Materials from this unit provide high level guidance on the content of this unit and sample problems with answers.

Lessons 9–14: Finding Slopes and Linear Equations

Explore, Play, and Discuss

- I can give an example of a situation that would have a negative slope when graphed.
- I can look at a graph and tell if the slope is positive or negative and explain how I know.

Activity Suggestions:

- ➢ Lesson 9 warm-up This Which One Doesn't Belong asks students to generate ideas about different lines on the same coordinate grid. Students could complete this on a discussion board as a lead in to their work on non-positive slopes.
- ➢ Lesson 11 warm-up Students could complete this on a discussion board as a lead in to their work on non-positive slopes.
- ➢ Activity 11.2 Students are asked to plot many points on a digital graph with the same *x* or *y* coordinate and to generate an equation based on what they notice.

Assessment Suggestions:

- ➢ Lesson 9 practice problems Practice problem 1 asks students to describe whether the rate of change is positive, negative or 0 in different scenarios.
- ➢ Ask students to generate their own scenarios where slope is positive, negative or 0.
- ➢ Ask students to find a graph in the media with a negative slope and explain why the slope of the line is negative in that context.

Dive Deep

- I can calculate positive and negative slopes given two points on the line.
- I can write equations of lines that have a positive or a negative slope.
- I know that the graph of an equation is a visual representation of all the solutions to the equation.
- I understand what the solution to an equation in two variables is.

Activity Suggestions:

- ➢ Activity 9.2 This introduction to negative slopes has a rich real world context that will help students make meaning of negative slopes.
- ➢ Activity 12.2 This activity uses apples and oranges as a context to launch the idea of solutions to equations in two variables.
- ➢ Activity 12.3 This activity builds directly on 12.2. It uses the same equation without the context which allows the graph to truly show the infinite solutions. Leverage the graph and

Assessment Suggestions:

- ➢ Lesson 9 cool-down

	decontextualized equations to help students see that the graph of an equation is the visual representation of all the solutions.	

Synthesize and Apply	• I can find solutions (*x*, *y)* to linear equations given either the *x*- or the *y*-value to start from.	
	Activity Suggestions: ➢ Activity 12.3 ➢ Activity 13.2 ➢ Teach and encourage students to study the lesson summaries (at the end of every lesson) and refer back to them.	**Assessment Suggestions:** ➢ Revisions to previous assessment prompts ➢ Students use learning targets to decide what additional practice they need.

Ongoing Practice	• Assign one or more of the distributed practice problem sets from lessons 1–13 to be completed over the time period that the section is being worked on. • These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit. • Specify which problems students should submit, or let them choose.

Anytime Resources	• The Family Support Materials from this unit provide high level guidance on the content of this unit and sample problems with answers. • Lesson 10 • Lesson 14