STEMscopes TEXAS MATH
POWERED BY ACCELERATE LEARNING

Algebra I

Lesson Sample

Content Review

Built for Texas Math

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A Math Program for Texas Educators

GUIDED LESSON TOUR

Welcome to Your Lesson Sample

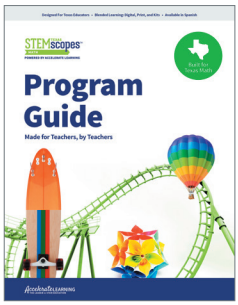
The following pages feature resources that mirror what teachers and students can access digitally. Each section includes clear navigation steps that seamlessly guide you through the content online, ensuring quick and easy access. Look for red circle callouts in the top left corner, which correspond directly to the titles of online documents.

Our lessons are also referred to as Scopes online. Scopes are built on a solid foundation of proven educational strategies, featuring a wealth of resources and materials fully aligned to the TEKS.

From our online platform, you can:

- Personalize your experience by bookmarking your favorite elements, crafting lesson plans, and effortlessly managing your students and classes.
- Access detailed preparation instructions, facilitation prompts, discussion questions, and sample student answers, providing everything you need for successful hands-on learning.
- Preview assignments from the student's view.
- Assign activities and assignments to students digitally, grade submissions, and provide feedback seamlessly within our user-friendly interface.
- Download and print files for added flexibility!

Explore the STEMscopes Texas Math Program Guide for a deeper dive into our lesson design and comprehensive program details.



Log In and Review!

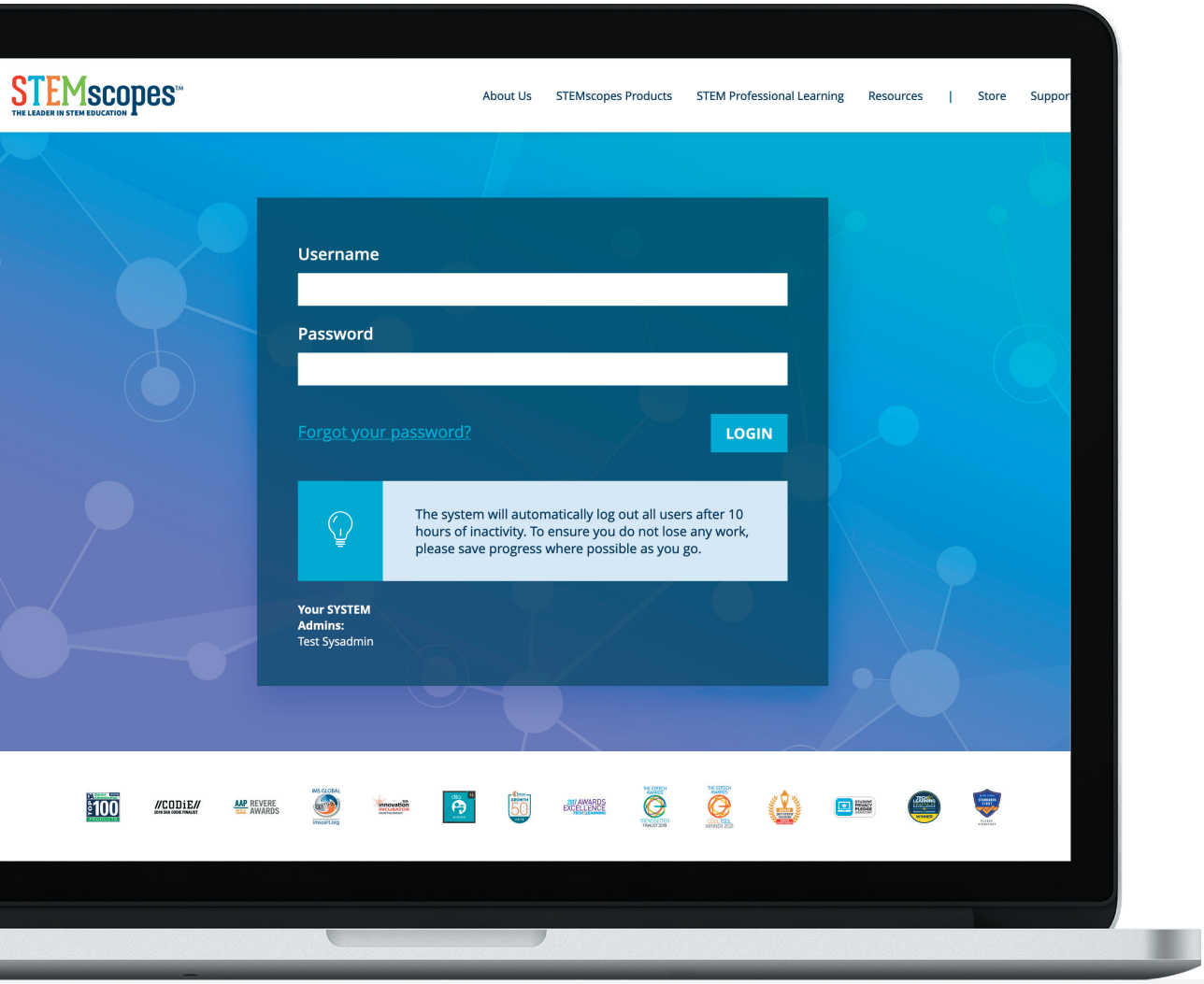
The entire STEMscopes Texas Math curriculum is online.

Use the **navigation steps** to follow along online and explore all that STEMscopes Texas Math offers educators and students.

Access our full curriculum online in two easy ways:

1. Log in using your district's unique review URL and credentials.
2. Sign up at ***acceleratelearning.com/math/tx***.

All student digital and print resources are available in English and Spanish.



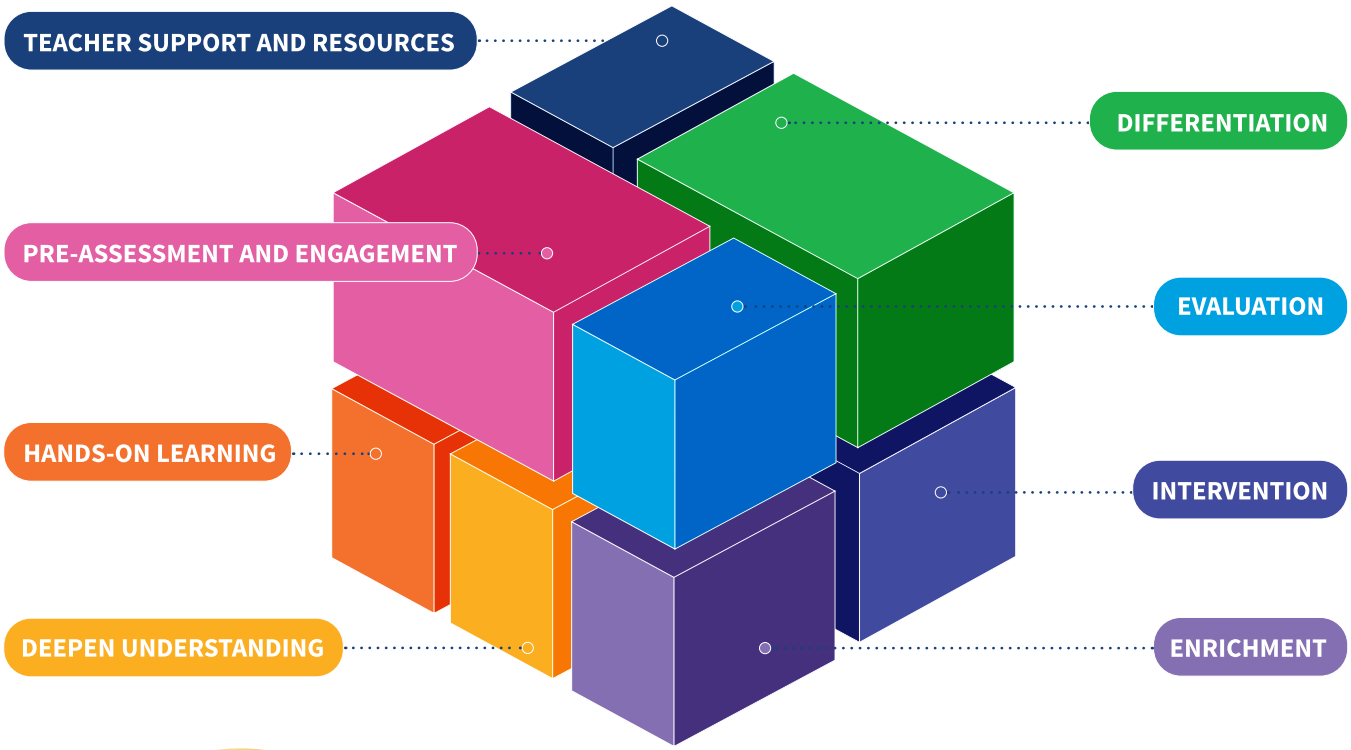
AccelerateLEARNING
THE LEADER in STEM EDUCATION

Lesson Design

A Comprehensive Math Solution

Each lesson is intentionally designed to provide teachers and students with everything they need for engaging and meaningful math instruction and learning.

Everything You Need, All In One Place



Algebra I Lessons

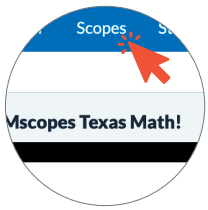
LESSON	TEKS
Properties of Functions	A.2A, A.12A, A.12B
Solve Equations	A.2D, A.5A, A.12E
Slope and Rate of Change	**4.3A, 4.3B**
Linear Functions and Models	A.2A, A.2C, A.3C, A.3E, A.4A, A.4B, A.4C
Parallel and Perpendicular Lines	A.2B, A.2C, A.2E, A.2F, A.2G, A.3A
Arithmetic and Geometric Sequences	A.12C, A.12D
Systems of Equations	A.2I, A.3F, A.3G, A.5C
Inequalities and Systems of Inequalities	A.2H, A.3D, A.3H, A.5B
Properties of Exponents and Radicals	A.11A, A.11B
Exponential Functions and Models	A.9A, A.9B, A.9C, A.9D, A.9E
Polynomial Operations	A.10A, A.10B, A.10C, A.10D
Factors of Polynomials	A.10A, A.10E, A.10F
Graphs of Quadratic Functions	A.6A, A.6B, A.6C, A.7A, A.7B
Quadratic Extensions	A.7C, A.8B
Solve Quadratics	A.8A

Algebra I,
Slope and Rate of Change

NAVIGATION STEPS

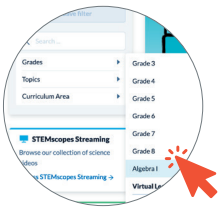
Log In

Use Your Credentials



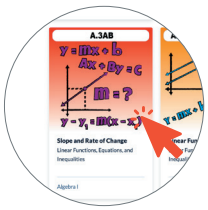
Click Scopes

Click on Scopes in the Blue Navigation Bar



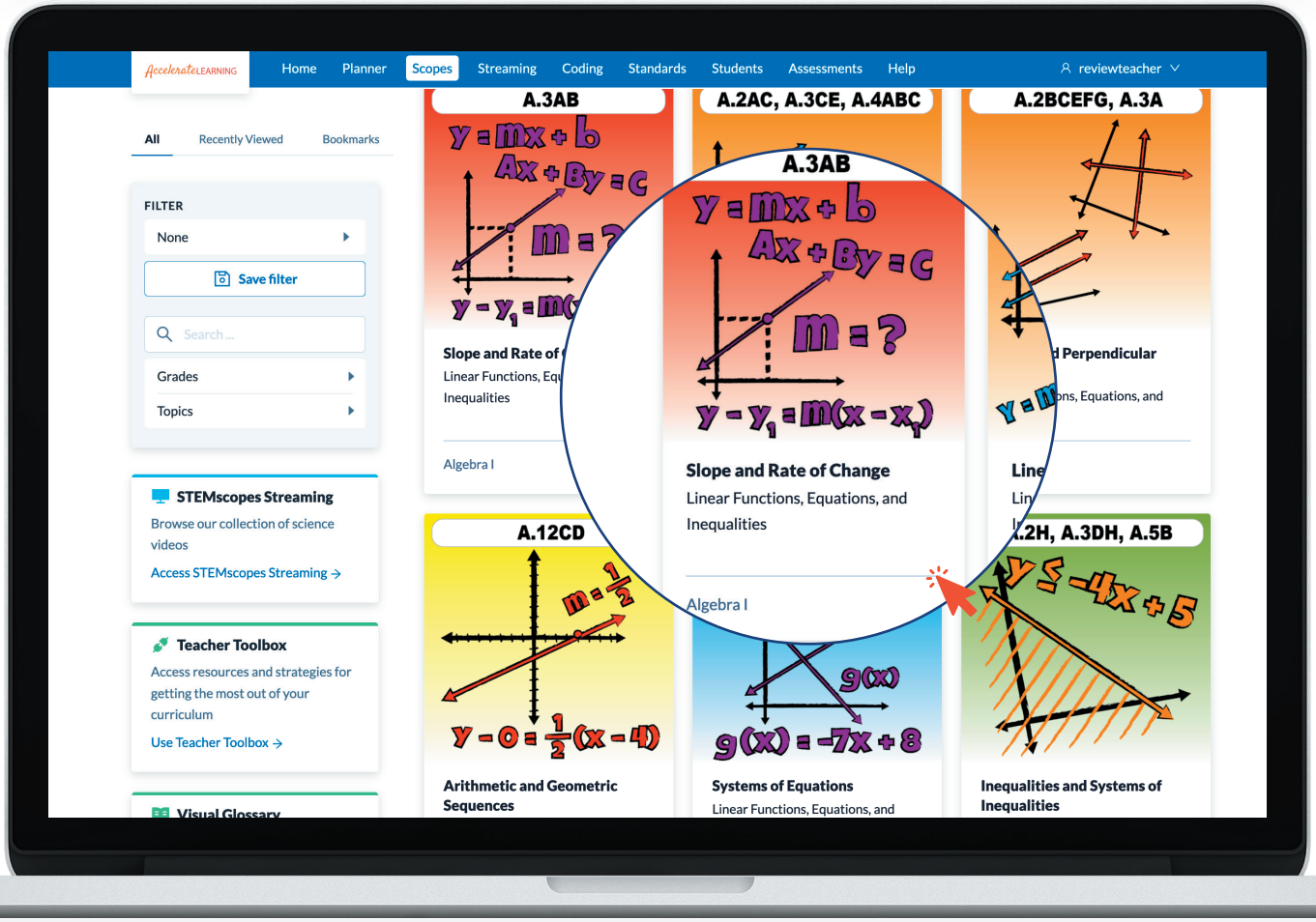
Filter

Filter to Algebra I on the Left-Hand Side



Select Tile

Select and Click on the Slope and Rate of Change Scope Tile



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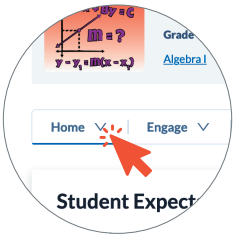
Home

NAVIGATION STEPS



Click Home

Click on Home in the White Menu Bar

Review Content

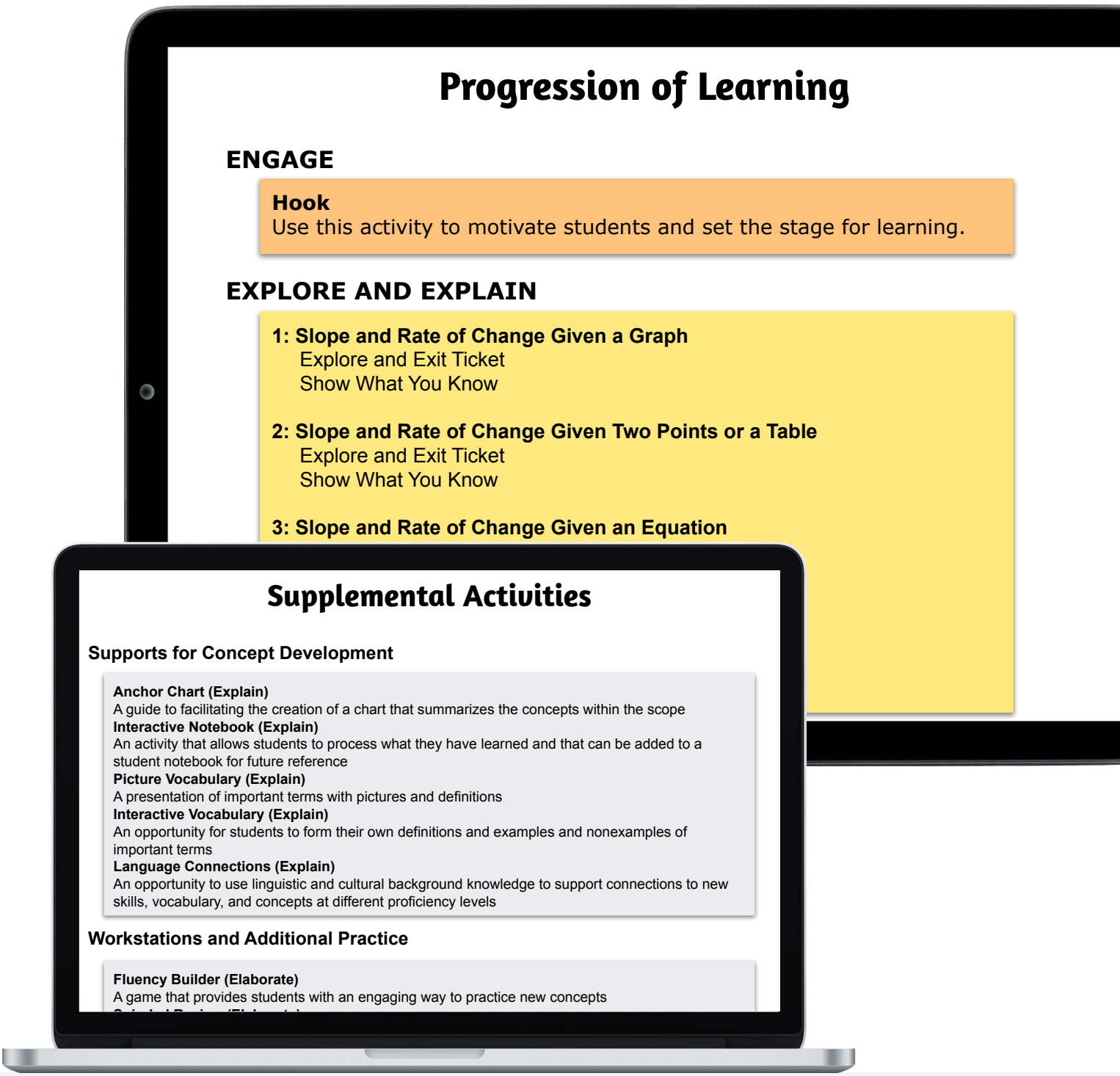
Use the Dropdown to Review Teacher Support and Resources

Our program is built by practicing and former teachers, so we know what you need to teach and that your curriculum should provide it all.

Each lesson starts with a tailored **Home** section with planning essentials, including a daily lesson calendar, comprehensive standards analysis, and letters for communicating with families.

SCOPE OVERVIEW

The Scope Overview provides a comprehensive insight into the key components that enable teachers to deliver a well-rounded and effective learning experience. It includes a Progression of Learning, which details the essential elements for mastering the standards and offers Supplemental Activities that present various options for assessment, intervention, and enrichment of the core content.



CONTENT SUPPORT

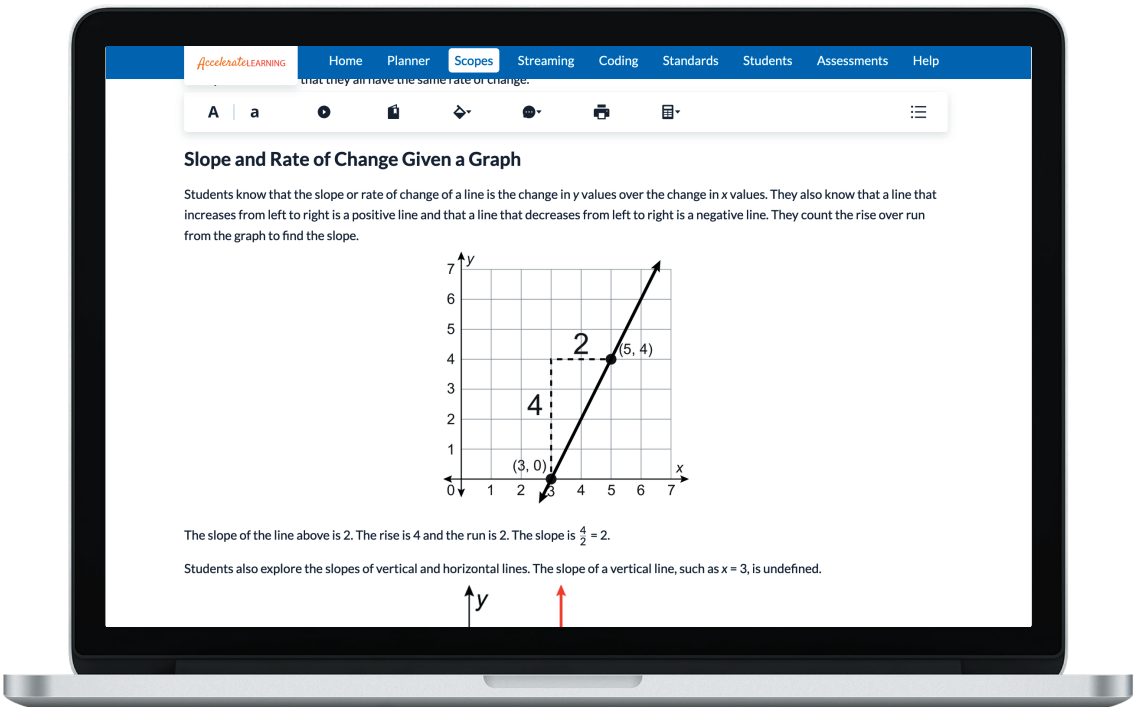
Content Support is a comprehensive unit overview that provides the background content knowledge and academic vocabulary necessary to effectively teach the concepts in the unit.

A.3A Determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$.

A.3B Calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.

Background Knowledge

In previous grades, students interpret unit rate as slope and determine rate of change or slope from a table or graph. Students also calculate the slope of a line comparing the change in y values to the change in x values using the formula $m = y_2 - y_1 / x_2 - x_1$ using two points found on a line.



CONTENT UNWRAPPED

Content Unwrapped breaks down the TEKS by identifying the nouns and verbs within the standards, includes a list of instructional implications, and provides a vertical alignment.

Standards

A.3A Determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$.

A.3B Calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.

Dissecting the Standard

Breakouts

A.3A

(i) determine the slope of a line given a table of values

(ii) determine the slope of a line given a graph

(iii) determine the slope of a line given two points on the line

(iv) determine the slope of a line given an equation written in various forms, including $y = mx + b$

(v) determine the slope of a line given an equation written in various forms, including $Ax + By = C$

(vi) determine the slope of a line given an equation written in various forms, including $y - y_1 = m(x - x_1)$

A.3B

(i) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical problems

(ii) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of real-world problems

Verbs: What should students be doing?

- *calculate*: to determine the amount of something mathematically
- *determine*: to solve for; to figure out
- *represent*: to show how terms are related; to stand for something else
- *write*: to record a mathematical statement

Nouns: What concrete words should students know?

- *equation*: a mathematical sentence that uses numbers, one or more operation symbols, and an equal sign
- *graph*: a visual representation of data
- *linear function*: a relationship that when graphed is a straight line
- *slope*: how steep a line is; represented as m in the slope-intercept equation
- *table*: a chart that uses rows and columns to organize information
- *point*: a dot that represents a specific spot on a number line or coordinate plane; a geometric object with no dimension used to indicate a location
- *rate of change*: the rate that shows how one quantity changes in relation to another quantity
- *real-world problem*: a contextual-based problem that can be interpreted, represented, and analyzed through the application of mathematics

Implications for Instruction

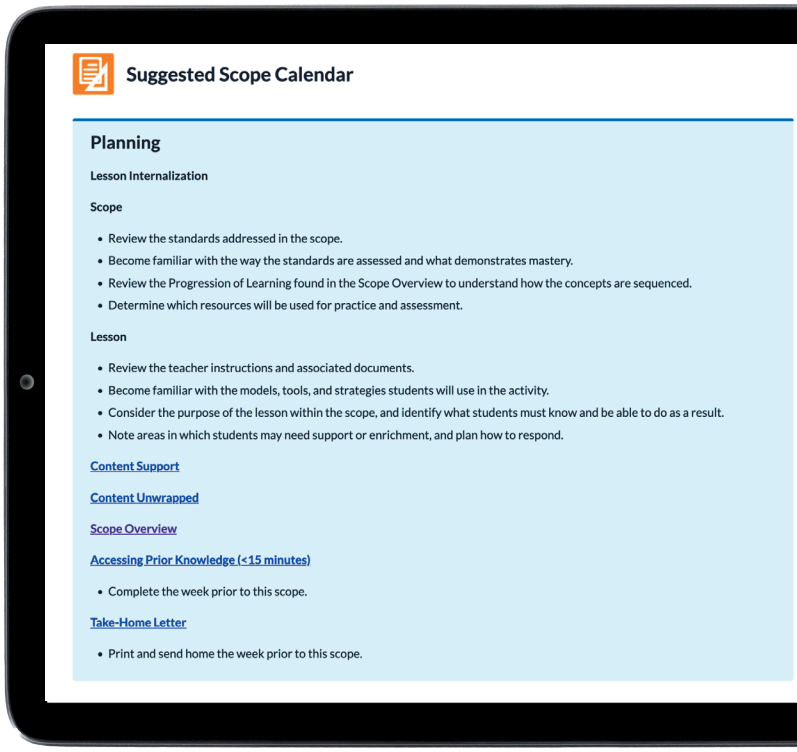
- In previous grade levels, students interpreted unit rate as slope and determined rate of change or slope from a table or graph.
- In previous grade levels, students calculated the slope of a line. They compared the change in y values to the change in x values using the formula $m = y_2 - y_1 / x_2 - x_1$ using two points found on a line.
- In this grade level, students should be given the opportunity to identify the slope from the various forms of an equation and should avoid rewriting the equation in only one form before finding the slope.
- Students frequently reverse the order of the change in y and the change in x when calculating slope, which can lead to misunderstanding the rationale for making a y to x comparison instead of x to y.
- When identifying slope from a graph, students will count the number of boxes or tick marks on the graph to identify the change in y or the change in x rather than use the appropriate scales. Instructionally, it is useful for students to see graphs with different intervals along the x- and y-axis. Allow them to select two points on the graph and use those values to calculate slope.

Vertical Alignment

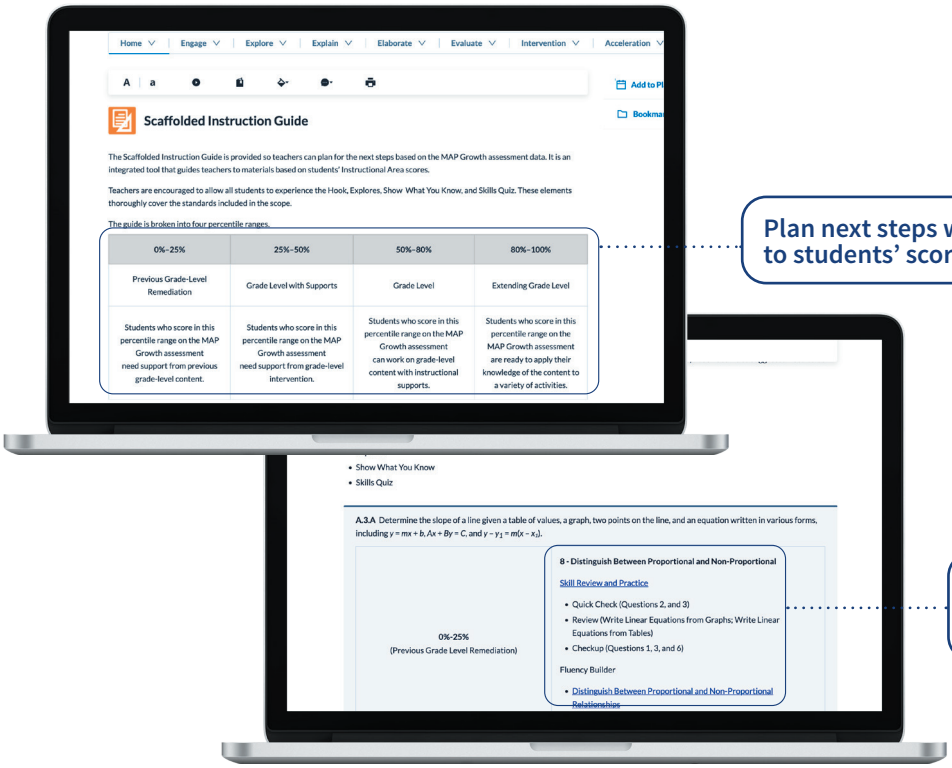
STANDARD
6.6A Identify independent and dependent quantities from tables and graphs.
7.4B Calculate unit rates from rates in mathematical and real-world problems.
8.4A Use similar right triangles to develop an understanding that slope, *m*, given as the rate comparing the change in *y*-values to the change in *x* values, $\frac{y_2-y_1}{x_2-x_1}$, is the same for any two points(x_1, y_1) and (x_2, y_2) on the same line.
8.4B Graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship.
8.4C Use data from a table or graph to determine the rate of change or slope and *y*-intercept in mathematical and real-world problems.
A.3A Determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$.
A.3B Calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.
A.2C Write linear equations in two variables given a table of values, a graph, and a verbal description.

SUGGESTED SCOPE CALENDAR

Dive deep into comprehensive, structured unit and lesson plans that detail daily objectives, questions, tasks, materials, instructional assessments, and suggested timing.



SCAFFOLDED INSTRUCTION GUIDE



Plan next steps with activities tailored to students' scores.

Access activities through direct links and then print or digitally assign.

TAKE-HOME LETTER

Procedure and Facilitation Points

1. As you prepare for each scope, send a Take-Home Letter with students the week before to explain planned concepts.
2. Be prepared to explain Math outside the Classroom! conversation starters as questions arise.

Algebra I: Slope and Rate of Change

In math class, your student is about to explore slope and rate of change. To master this skill, they will build on their knowledge of finding the rate of change in different representations, such as graphs, charts, and equations. As your student extends their mathematical knowledge, they will learn the following concepts:

- Find the rate of change from a table.
  Example: The points in the table lie along line k when graphed. What is the slope of line k?

x	−8	−4	4	12
y	−7	−6	−4	−2

The rate of change is $\frac{1}{4}$. Using the points (−8, −7) and (−4, −6), calculate the slope. $\frac{-6-(-7)}{-4-(-8)} = \frac{1}{4}$

- Find the rate of change from an equation.
  Example: Line d is represented by the equation $-3x + 7y = 14$. What is the slope of line d?

The slope is $\frac{3}{7}$. This equation is written in standard form. It can be rewritten in slope-intercept form to find the slope of line d.

$$-3x + 7y = 14$$
$$-3x + 3x + 7y = 14 + 3x$$
$$7y = 14 + 3x$$
$$\frac{7y}{7} = \frac{14+3x}{7}$$
$$y = \frac{3}{7}x + 2$$

Math outside the Classroom!

Slope and rate of change are used all around our everyday lives. Chat about where you use slope and rate of change in your everyday life. Here are a few examples.

★ Think about a swimming pool at the local recreation center. At the end of summer, employees have to drain the water out of the pool. There are two different hoses they can choose from. Which hose would be faster to help drain the pool? How would using 3 of the same hose affect the draining time?

★ Has your family ever been sledding or watched a movie with children sledding in the snow? How does the steepness of the snow hill affect the speed at which the sled travels? What steepness would you prefer to sled down? What steepness would you prefer to climb up in the summer?

★ Has anyone in your family ever been on a roller coaster? Tell stories about some of the wildest-looking roller coasters you have ever seen. What are the differences between roller coasters for young children and roller coasters for older children? Which roller coasters do you think would be faster and why?

Álgebra I. Pendiente y tasa de cambio

En la clase de Matemáticas, su estudiante está por explorar la pendiente y la tasa de cambio. Para dominar esta habilidad, desarrollarán su conocimiento para encontrar la tasa de cambio en diferentes representaciones, como gráficos, tablas y ecuaciones. A medida que su estudiante amplíe su conocimiento matemático, aprenderán los siguientes conceptos:

- encontrar la tasa de cambio de una tabla;
  Ejemplo: Los puntos en la tabla se encuentran a lo largo de la recta $k$cuando se representan gráficamente. ¿Cuál es la pendiente de la recta k?

x	−8	−4	4	12
y	−7	−6	−4	−2

  La tasa de cambio es $\frac{1}{4}$. Usa los puntos (−8, −7) y (−4, −6), para calcular la pendiente. $\frac{-6-(-7)}{-4-(-8)} = \frac{1}{4}$

- encontrar la tasa de cambio a partir de una ecuación;
  Ejemplo: La recta d está representada por la ecuación $-3x + 7y = 14$. ¿Cuál es la pendiente de la recta$d$?
  La pendiente es $\frac{3}{7}$. Esta ecuación está escrita en forma estándar. Se puede reescribir en forma de pendiente-intersección para encontrar la pendiente de la recta d.

$$-3x + 7y = 14$$
$$-3x + 3x + 7y = 14 + 3x$$
$$7y = 14 + 3x$$
$$\frac{7y}{7} = \frac{14+3x}{7}$$
$$y = \frac{3}{7}x + 2$$

¡Matemáticas fuera del salón de clases!

La pendiente y la tasa de cambio se utilizan en nuestra vida cotidiana. Converse sobre dónde usa la pendiente y la tasa de cambio en la vida diaria. Aquí hay algunos ejemplos:

★ Piense en una piscina en el centro recreativo local. Al final del verano, los empleados tienen que drenar el agua de la piscina. Pueden elegir dos mangueras diferentes. ¿Qué manguera sería más rápida para ayudar a drenar la piscina? ¿Cómo afectaría el tiempo de drenaje el uso de 3 mangueras iguales?

★ ¿Alguna vez su familia ha estado en trineo o ha visto una película con niños en trineo en la nieve? ¿Cómo afecta la pendiente de la colina de nieve la velocidad a la que viaja el trineo? ¿Qué pendiente preferiría descender en trineo? ¿Qué pendiente preferiría escalar en el verano?

★ ¿Alguien en su familia ha estado alguna vez en una montaña rusa? Cuente historias sobre algunas de las montañas rusas más salvajes que jamás haya visto. ¿Qué diferencias hay entre las montañas rusas para niños pequeños y las que son para niños mayores? ¿Qué montañas rusas cree que serían más rápidas y por qué?

Available in Spanish!

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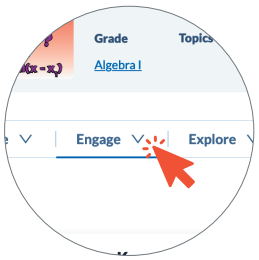
Engage

NAVIGATION STEPS



Click Engage

Click on Engage in the White Menu Bar

Review Content

Use the Dropdown to Review Engage Content

Our **Engage** activities kick off student learning by capturing students' attention and making math approachable! Use these elements to pinpoint knowledge gaps and inform your instructional approach.

ACCESSING PRIOR KNOWLEDGE

Diagnostic

Accessing Prior Knowledge is a brief, teacher-led activity to gauge students' prior knowledge before engaging in the inquiry process. This diagnostic assessment is aligned with previously taught content standards. Students examine a series of tables based on the prior standard and determine which option does not belong with the group. This element is designed to uncover student misconceptions; it should not be taken for a grade.

Preparation

- Print one copy of Does Not Belong for each student or group.
- You may place students in groups of two or three.

Procedure and Facilitation Points

1. Pass out Does Not Belong to each student or group.
2. Explain that each table on the handout contains four options. Three of the options go together, while one does not belong.
3. Facilitate a discussion about the handout. This provides an opportunity to gather an understanding of prior student knowledge before beginning the lessons. Encourage students to support their answers, and check for understanding and misconceptions. Sample student responses include the following:
    a. *First slide: Answer choice D does not belong. Answers A, B, and C all simplify to a slope of 3/5, and D simplifies to a slope of 1/3.*
    b. *Second slide: Answer choice A does not belong. Answers B, C, and D all simplify to a slope of –4/3, and A represents a slope that is undefined.*
    c. *Third slide: Answer choice B does not belong. Answers A, C, and D all represent a slope of 2/3, and B represents a slope of 1/3.*
4. If students are struggling to complete this task, do the Foundation Builder to fill the gap in prior knowledge before moving on to other parts of the scope.

Does Not Belong

Slope and Rate of Change

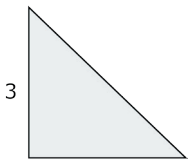
Accessing Prior Knowledge

Name:_____ Date:_____

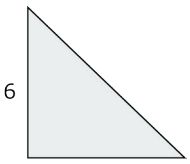
Does Not Belong

Determine which letter does not belong in each group, and explain your thinking.

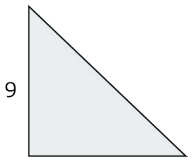
A



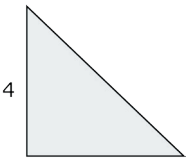
C



B



D



Letter _____ does not belong because _____

_____

_____

_____

_____

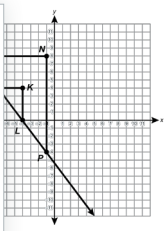
Slope and Rate of Change

Accessing Prior Knowledge

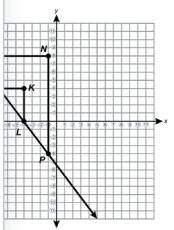
Name:_____ Date:_____

Does Not Belong

Determine which letter does not belong in each group, and explain your thinking.



$$= \frac{4-0}{-7-(-4)}$$



$$= \frac{8-4}{-10-(-7)}$$

_____

_____

_____

Slope and Rate of Change

Does Not Belong

	y
	0
	4
2	8
3	12

$$= \frac{2}{3}x$$

_____

_____

_____

_____

_____

_____

Does Not Belong

Slope and Rate of Change

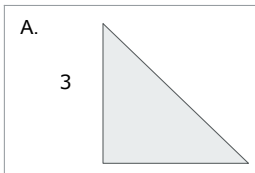
Accessing Prior Knowledge

Name:_____ Date:_____

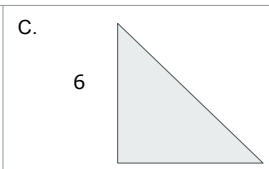
No pertenece

Determina qué letra no pertenece a cada grupo y explica tu razonamiento.

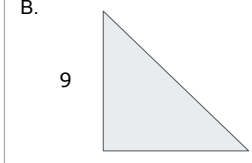
A.



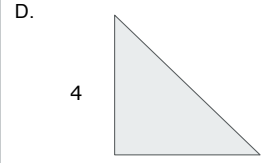
C.



B.



D.



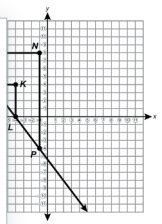
La letra _____ no pertenece porque _____

Slope and Rate of Change

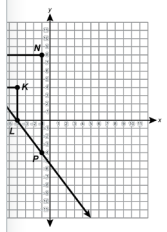
Accessing Prior Knowledge

No pertenece

Determina qué letra no pertenece a cada grupo y explica tu razonamiento.



$\frac{4-0}{-7-(-4)}$



$\frac{8-4}{-10-(-7)}$

Slope and Rate of Change

	y
	0
	4
2	8
3	12

$= \frac{2}{3}x$

FOUNDATION BUILDER

This early intervention activity fills gaps in understanding before diving into new content. Students identify statements as true or false.

Preparation

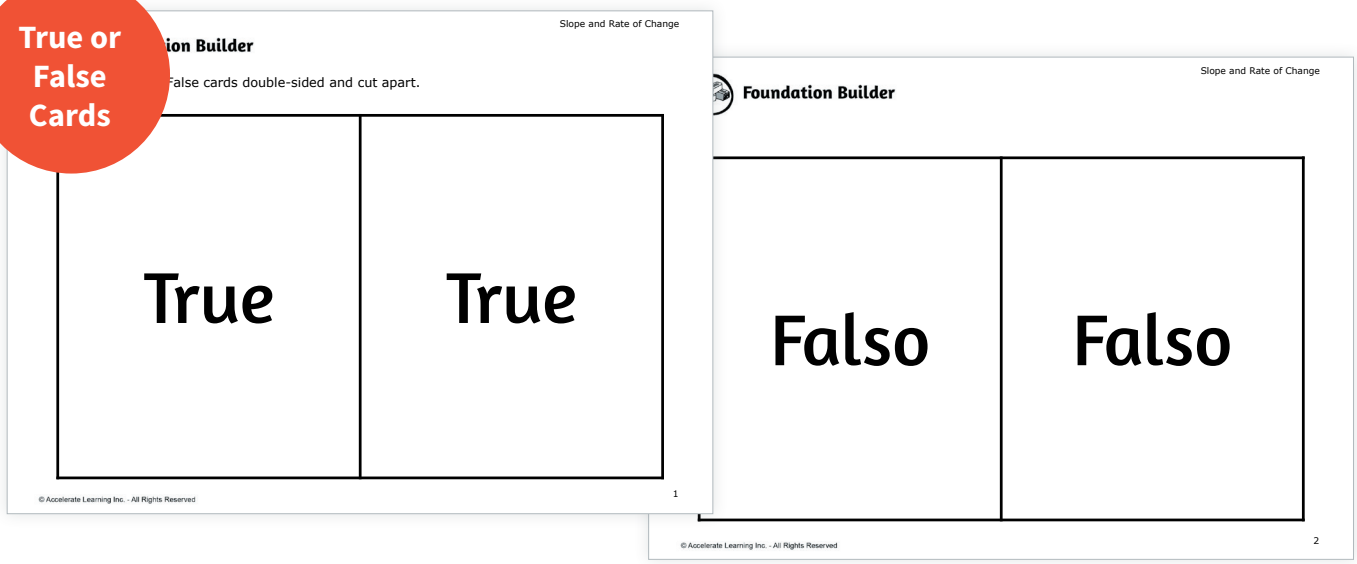
- Prepare to project the Slideshow for the students.
- Print a double-sided True/False Card for each student. Laminate the cards, and use them throughout this course for each True or False Showdown activity.
- Place students in pairs.

Procedure and Facilitation Points

1. Have each pair of students sit across from one another, and provide each student with a True/False Card, whiteboard, and dry-erase marker or scrap paper. Each student holds their card underneath their desk.
2. Present students with a statement relating to the content of the lesson.
3. Allow students time to work out their thinking and to predict whether the statement is true or false. When students have formed a decision, they will place their markers or pencils down on their desks or tables as a signal that they are ready.
4. Say, “One! Two! Three! Showdown!” Students hold up the True or False side of their cards to face their partners.
5. Students take turns using complete sentences to verbally justify their answers. Provide the following sentence frames as needed: “I disagree with the statement … because … , and to fix the statement, I would …”, or “I agree with the statement … because …”
6. Clarify/verify the appropriate answer with the whole class.
7. Repeat steps 3–6 for each statement.

True or False Showdown Slideshow

True or False Cards



HOOK

Use the Hook to motivate students and start to connect their learning to real-world contexts. Students make predictions based on slopes of lines.

Preparation

- Plan to show the Phenomena.
- Prepare to project Slope and Rate of Change for the whole class to view.
- Prepare to introduce the scenario and to encourage students to think about how to solve it. Be prepared to move to the Explore activities, returning students to the Hook activity with newly gained knowledge after the Explores have been completed.

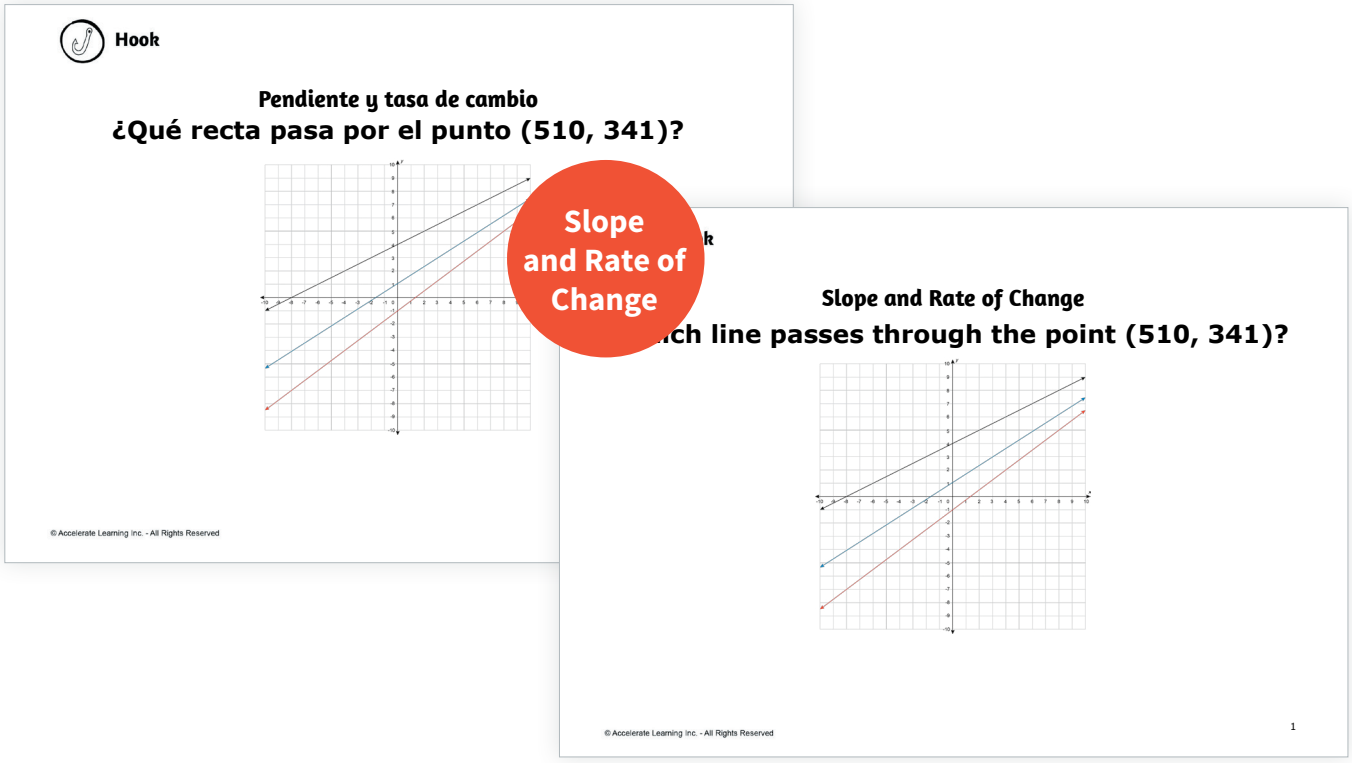
Procedure and Facilitation Points

Part I: Pre-Explore

1. Introduce this activity toward the beginning of the scope. The class will revisit the activity and solve the original problem after students have completed the corresponding Explore activities.
2. Show the Phenomena. Ask students the following questions: *What do you notice? Where can you see math in this situation? Allow students to share all ideas.*
3. Explain the scenario to the class: *A military ship is trying to hit an enemy satellite with a laser beam.*
4. Allow the students to ask questions and clarify the context as needed. Encourage them to share their thoughts and experiences with the class using the following questions:
    a. What are satellites used for? What experience do you have with them?
    b. What is a laser beam?
5. Project Slope and Rate of Change.
6. Discuss the following questions with the class:
    a. **DOK-1** How could this graph and question connect to the satellite and laser situation? *Answers will vary. The lines could show different trajectories of the laser beam, and the point (510, 341) is the location of the satellite.*
    b. **DOK-1** What information would you need to answer the question? *Answers will vary. We could use the slopes, y-intercepts, and equations of each line to help us answer the question.*
    c. **DOK-2** Why is graphing an inefficient method for answering this question? *We would have to extend each of the graphs very far to verify which line passes through (510, 341).*
7. Move on to complete the Explore activities.

Part II: Post-Explore

1. After students have completed the Explore activities for this topic, show the Phenomena again and repeat the scenario.
2. Refer to the Slope and Rate of Change slide, and discuss the following questions with the class:
   a. **DOK-1** How could this graph and question connect to the satellite and laser situation? *The lines show different trajectories of the laser beam, and the point (510, 341) is the location of the satellite and therefore the point the laser beam must pass through in order to hit it.*
   b. **DOK-1** What information would you need to answer the question? *We need to know the slope of each line, and knowing their y-intercepts would be helpful.*
   c. **DOK-2** Why is graphing an inefficient method for answering this question? *We would have to extend each of the graphs very far to verify which line passes through (510, 341), which may not be practical.*
3. Refer to Slope and Rate of Change, and discuss the following questions with the class:
   a. **DOK-1** What skills can you use to answer this question? *I could find the slope of each line using two points and then see if the slope between the point (510, 341) and one of the points on each line is the same.*
   b. **DOK-1** Which line passes through (510, 341)? *The blue line*
   c. **DOK-1** What is the slope of the blue line? *Show you are correct in two ways. 3 - 1 / 3 - 0 = 2 / 3 and 341 - 1 / 510 - 0 = 2 / 3*
4. As time allows, challenge students to determine a reasonable domain and range for the laser beam based on the scenario. Encourage students to use appropriate formats for writing the domain and range. Have students discuss whether the satellite and laser beam would be a discrete or continuous situation.



Scan and Watch the Hook Phenomena Video

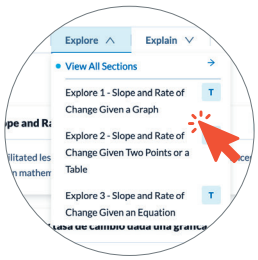
Home | Engage | **Explore** | Explain | Elaborate | Evaluate | Intervention | Acceleration

Explore

NAVIGATION STEPS

Click Explore

Click on Explore in the White Menu Bar



Review Content

Use the Dropdown to Review Explore Content

Scaffolded, hands-on **Explore** activities are at the heart of each lesson. We know students learn best by doing, so we go beyond worksheets and memorization, providing opportunities to engage in rich mathematical discourse within real-world contexts.

EXPLORE 1 - SLOPE AND RATE OF CHANGE GIVEN A GRAPH

Students identify the slope or rate of change of a line from a graph. They also explore the slopes of vertical and horizontal lines.

Mathematical Process Standards

- (A) Apply mathematics to problems arising in everyday life, society, and the workplace.
- (C) Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- (D) Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- (E) Create and use representations to organize, record, and communicate mathematical ideas.
- (F) Analyze mathematical relationships to connect and communicate mathematical ideas.

Preparation

- Plan to have students work in groups of 3 or 4 to complete the activity.
- Print a Student Journal and an Exit Ticket for each student.
- Print a set of GPS Graphs on card stock for durability for each group.

Procedure and Facilitation Points

Part I

1. Read the following scenario to the class: *Marcus and Tomas went hiking on Saturday. They recorded their ascent using a GPS app on Tomas's phone. Evelyn may want to hike the same trail next weekend with her friends, so Tomas shares the GPS file of the Saturday hike with her as well as GPS files for some other routes he knows. Help Evelyn determine what to expect along different sections of the trails using a graph of the elevation gain data from the GPS file.*
2. Help students access the task by asking the following guiding questions:
   a. What are some situations where you have used a GPS tracker before?
   b. How could a GPS tracker be helpful to a runner? What information would be necessary for it to be effective?
3. Give a Student Journal to each student.
4. Give a set of GPS Graphs to each group.
5. Explain to students that they will work with their groups on problems where they evaluate the slope of a line given a graph. They record their work on their Student Journals.
6. Monitor students, and check for understanding as needed using the following guiding questions:
   a. **DOK-1** How do you calculate the slope of a line? *I divide the change in the vertical dimension y by the change in the horizontal dimension x over an interval.*
   b. **DOK-2** On the hiking graph, which part looks the steepest? How does the slope of that section compare to the other slopes for the hiking graph? *The steepest section is WP3–WP4. When I compare the numerical values for the slopes, the slope for that section has the greatest value.*
   c. **DOK-2** How are the slope and steepness of a line related? *When the magnitude of the slope increases, the steepness of the line also increases. They are directly related. Similarly, when one decreases, the other decreases.*
   d. **DOK-2** What is the slope of a horizontal line? *The slope is zero.*
   e. **DOK-2** What is the slope of a vertical line? *Because the change in the horizontal dimension is zero, dividing by zero is undefined, meaning the slope is undefined.*
7. Give students time to complete Part I and answer the questions.

Slope and Rate of Change

Explore

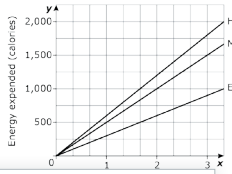
Reflect

1. What does the slope of a line tell you about a line?
2. What is the difference between a positive and negative sl
3. How are the slopes of horizontal and vertical lines differer
4. When calculating the rate of change, will the result be diff the points used to calculate the rate of change? Use simil explain if the ratios of $\frac{\Delta y_1}{\Delta x_1}$ and $\frac{\Delta y_2}{\Delta x_2}$ will or will not be

Slope and Rate of Change

Explore

Evelyn studied the graph below, which shows the approximate hour for a person of average weight hiking a variety of terrains.

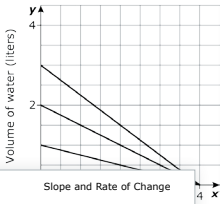


Slope and Rate of Change

Explore

Part II

Evelyn needs to determine how much water per hour someone can drink if they want their starting water supply to last until the end of the hike. The graph shows three lines representing three water supply options.



option, and complete the

3 liters, what is the rate of change from hour 1 to

3

Slope and Rate of Change

Explore

2. Tomas also likes to rock climb. He has recorded the follow his favorite route. Complete the table below, and answ

Section	
1: WP1–WP2	
2: WP2–WP3	
3: WP3–WP4	
4: WP4–WP5	
5: WP5–WP6	

a. What sections of the route can Tomas hike or scram

b. What sections definitely require climbing ropes and

c. How is the slope in section 5 different than the slop

Student Journal

Slope and Rate of Change

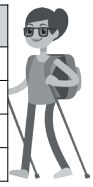
Name:_____ Date:_____

nd Rate of Change Given a Graph

1. Tomas marked waypoints (WP) along the route as he and Marcus ascended. Given the elevation plots from the GPS, determine the changes in x, the changes in y, and the slopes of the different trail sections. Use the table provided to record your data. Then, answer the questions that follow.

$$\text{Slope} = \frac{\Delta y}{\Delta x}$$

Section	Δx (miles)	Δy (feet)	Slope (ft./mi.)
WP1–WP2			
WP2–WP3			
WP3–WP4			
WP4–WP5			



a. Which section of the trail will be the steepest part of the hike? How do you know?

b. What does a zero slope mean for WP1–2?

c. What would a negative rate of change tell us about Tomas and Marcus's hike? Did any section have a negative rate of change?

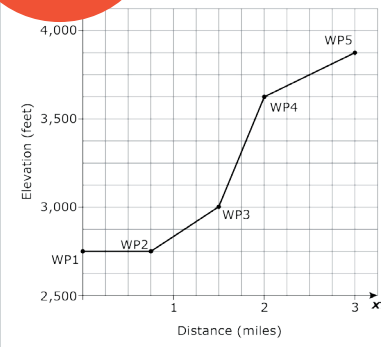
1

GPS Graphs

Slope and Rate of Change

GPS Graphs

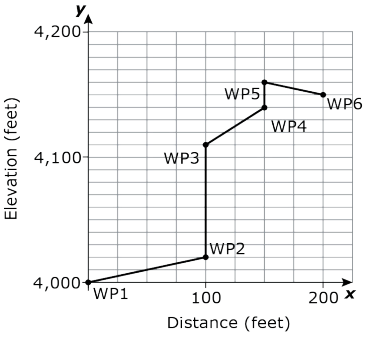
Hiking



Slope and Rate of Change

Explore

Rock Climbing



Slope and Rate of Change

Explore

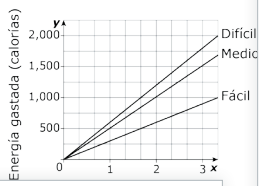
Reflexiona

1. ¿Qué te dice la pendiente de una recta acerca de una rect
2. ¿Cuál es la diferencia entre una pendiente positiva y nega
3. ¿En qué se diferencian las pendientes de las rectas horizo
4. Al calcular la tasa de cambio, ¿será diferente el resultado utilizados para calcular la tasa de cambio? Usa triángulos para explicar si las razones de $\frac{\Delta y_1}{\Delta x_1}$ y $\frac{\Delta y_2}{\Delta x_2}$ serán o n

Slope and Rate of Change

Explore

Evelyn estudió la siguiente gráfica, que muestra las calorías apr
por hora para una persona de peso promedio que recorre una v



Slope and Rate of Change

Explore

2. A Tomás también le gusta escalar rocas. Ha registrado lo
elevación para su ruta favorita. Completa la siguiente t
preguntas relacionadas.

Sección	
1: PR1–PR2	
2: PR2–PR3	
3: PR3–PR4	
4: PR4–PR5	
5: PR5–PR6	

a. ¿Qué secciones de la ruta puede subir o bajar Tomá

b. ¿Qué secciones definitivamente requieren cuerdas y

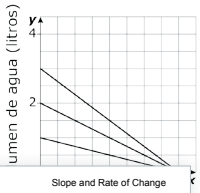
c. ¿En qué se diferencia la pendiente de la sección 5 d
secciones 1 o 3?

Slope and Rate of Change

Explore

Parte II

Evelyn necesita determinar cuánta agua por hora puede beber alguien si quiere que su suministro de agua inicial dure hasta el final de la caminata. La gráfica muestra tres rectas que representan tres opciones de suministro de agua.



uministro de agua y completa

ro de agua de 3 litros, ¿cuál
uál es la tasa de cambio de
explicar tus resultados.

3

Slope and Rate of Change

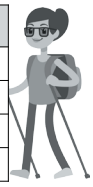
Name:_____ Date:_____

y tasa de cambio dada una gráfica

1. Tomás marcó puntos de ruta (PR) a lo largo de la ruta mientras él y Marcus ascendían. Dadas las gráficas de elevación del GPS, determina los cambios en x, los cambios en y y las pendientes de las diferentes secciones del sendero. Usa la tabla provista para registrar tus datos. Luego, responde las preguntas que siguen.

$$\text{Pendiente} = \frac{\Delta y}{\Delta x}$$

Sección	Δx (millas)	Δy (pies)	Pendiente (ft/mi)
PR1–PR2			
PR2–PR3			
PR3–PR4			
PR4–PR5			



a. ¿Qué sección del sendero será la parte más empinada de la caminata? ¿Cómo lo sabes?

b. ¿Qué significa una pendiente cero para PR1–2?

c. ¿Qué nos diría una tasa de cambio negativa sobre la caminata de Tomás y Marcus? ¿Alguna sección tuvo una tasa de cambio negativa?

1

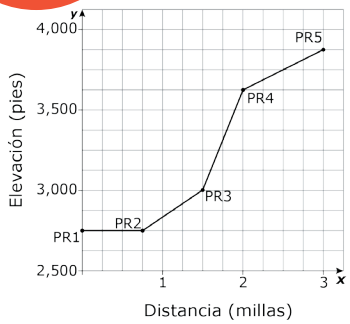
Student Journal

GPS Graphs

Slope and Rate of Change

áficas de GPS

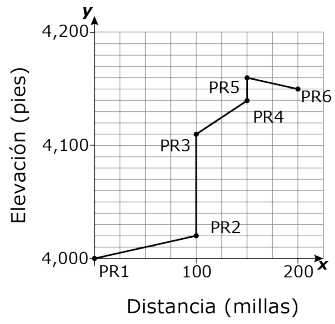
Senderismo



Slope and Rate of Change

Explore

Escalada de roca



Math Chat

After the Explore Part I, invite the class to a Math Chat to share their observations and learning.

Questions	Sample Student Responses
DOK-2 What does the value of a line's slope indicate about a line?	It indicates the steepness and direction.
DOK-2 If a line has a positive slope, does it slant up and to the right or down and to the right?	It goes up and to the right.
DOK-2 If a line has a negative slope, does it slant up and to the right or down and to the right?	It goes down and to the right.
Choose a Structured Conversation routine to facilitate the following questions. **DOK-2** If you determine one line is steeper than another, what does that tell you about the slope? Explain.	It has a greater magnitude than the other. A line with a slope of −10 would be steeper than a line with a slope of 2.

Part II

1. Read the following scenario to the class: *In addition to researching trails, Evelyn and her group are carefully planning what they will need to take with them. To have a safe hike, they will need water, food, appropriate clothing, and first-aid supplies. Review the recommendations for two of the most essential items: water and food (calories).*
2. Explain to students that they will work with their groups to analyze the food and water graphs and help Evelyn understand the slope of a line given a graph. They record their work on their Student Journals.
3. Monitor students, and check for understanding as needed using the following guiding questions:
   a. **DOK-2** In question 1, what sign do you expect the slopes to have given that the lines are heading down and to the right? *I expect them to all be negative.*
   b. **DOK-1** How can a right triangle be used to determine the slope of a line? *A right triangle can be constructed with a horizontal side, a vertical side, and a long side on the line. The ratio of the vertical side to the horizontal side will give the slope of the line.*
   c. **DOK-1** What does it mean when two triangles are similar? *They have congruent and corresponding angles, and the ratio of corresponding sides is the same.*
4. Give students time to complete Part II and answer the reflection questions.
5. Ask students to share their strategies, and encourage them to ask each other questions and make connections.

Math Chat

After the Explore Part II, invite the class to a Math Chat to share their observations and learning.

Questions	Sample Student Responses
DOK-2 What does the slope of a line tell you about the relationship among the variables being plotted?	The slope gives the rate of change of the dependent variable (plotted on the vertical axis) with respect to the independent variable (plotted on the horizontal axis).
Choose a Structured Conversation routine to facilitate the following question: **DOK-2** When calculating the slope of a line, will the ratio of the change in *y* to the change in *x* always, sometimes, or never be the same? Explain.	It will always be the same ratio. To find the slope, we can use right triangles with a horizontal side, a vertical side, and a long side along the same line; all the right triangles on this line will be similar. In similar triangles, corresponding sides are proportional, so the ratio of the vertical to the horizontal (ratio of *y* to *x*) will be the same for both triangles.

Post-Explore

1. Have students complete the Exit Ticket to formatively assess their understanding of the concept.
2. Complete the Anchor Chart as a class.
3. Have each student complete their Interactive Notebook.

Exit Ticket

Formative

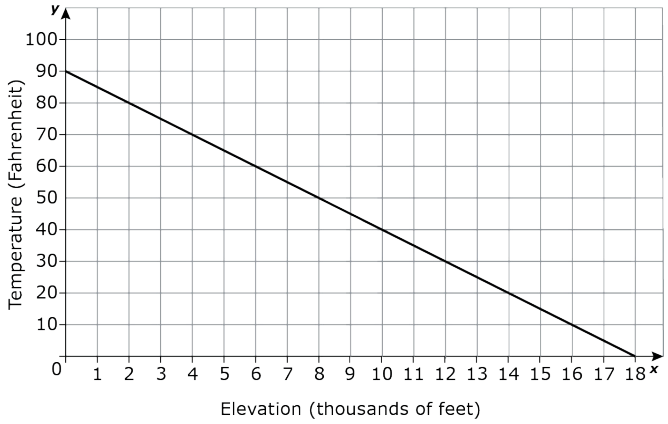
Slope and Rate of Change

plore

Name:_____ Date:_____

Slope and Rate of Change Given a Graph Exit Ticket

The relationship between the temperature and the elevation, in thousands of feet, on Mt. Baldy is shown on the graph.



What is the rate of change of the temperature with respect to the elevation?

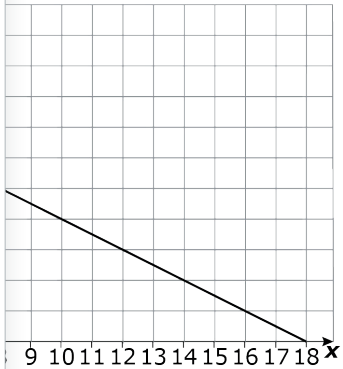
A. −0.05 °F/thousand feet
B. 2 °F/thousand feet
C. −5 °F/thousand feet
D. 5 °F/thousand feet

Slope and Rate of Change

_____ Date:_____

mbio dada una gráfica
e salida

ión, en millares de pies, en Mo. Calvo se



illares de pies)

a con respecto a la elevación?

C. −5 °F / millares de pies
D. 5 °F / millares de pies

1

Instructional Supports

1. Have students collaborate and discuss the differences between lines with different slopes, and ask how applying a number to the value of the slope can help distinguish among different lines with less ambiguity.
2. If students need additional support calculating the slope from a graph, help them identify what they are trying to measure visually, and encourage them to count the rise and run on the graph itself before moving to a more numerical approach.
3. Help students use numbers in their discussions of the steepness of each line. Encourage them to explain the visual connections between lines on the coordinate plane and slopes that are 0 or undefined.
4. If students are ready for an additional challenge, ask them to choose a slope and create multiple lines on a graph that have that slope.
5. If students are ready for an additional challenge, have them create their own polygons on a coordinate grid, and then have a partner find the slope of each side of the shape.
6. As an extension, ask students what they believe they would see for a large rate of change on a representation that is not a graph.

Language Supports

As students navigate the coordinate grid, model the correct pronunciation of the mathematical terms used to describe the coordinate plane, and have students repeat them: *origin*, *x-axis*, *y-axis*, *coordinate*, *quadrant*, *increasing*, and *decreasing*.

Discuss the meaning of the new vocabulary as it relates to other subjects. For example, how is the origin story of a superhero similar to the origin on the coordinate plane? What do an ordered pair and a pair of shoes have in common? Do you know what the horizon is? How does that relate to the word *horizontal*? Discussing the meaning of the individual words in context can help students internalize their meanings.

When asking students about their ideas, focus on the content of their responses and not on pronunciation or grammatical conventions. Encourage students to share their thoughts even if they have not yet mastered the prior vocabulary. For example, students may refer to the origin as the "start" or the *y*-axis as "the line that goes up and down."

Pair students, and instruct them to take turns explaining the meaning of slope. Each time a student explains their work, their partner should rephrase what the student said and add their thoughts. The following sentence stems can support students in this exchange of ideas:

I heard you say _____. Is that correct?

I heard you say _____. I agree because _____.

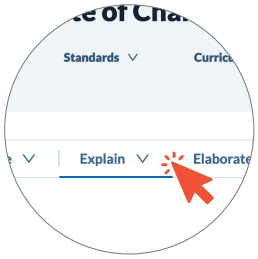
I heard you say _____. I disagree because _____.

Ask student groups to take on the role of tour guides and prepare a short presentation that shows how to find the slope and how to tell by inspection whether the slope is positive or negative as well as very large or very small. Their presentations should use formal mathematical terms to describe the key features of the coordinate plane.

The following English Language Proficiency Standards are supported:
1.BCEH, 2.CDGHI, 3.DEFGHJ

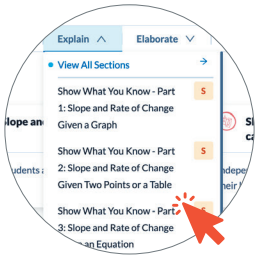
Explain

NAVIGATION STEPS



Click Explain

Click on Explain in the White Menu Bar



Review Content

Use the Dropdown to Review Explain Content

In the **Explain** section, students form authentic connections and apply their learning to various contexts. They deepen their understanding and build confidence as they master the lesson standards.

More practice and formative assessment opportunities!

SHOW WHAT YOU KNOW - PART 1: SLOPE AND RATE OF CHANGE GIVEN A GRAPH

Formative

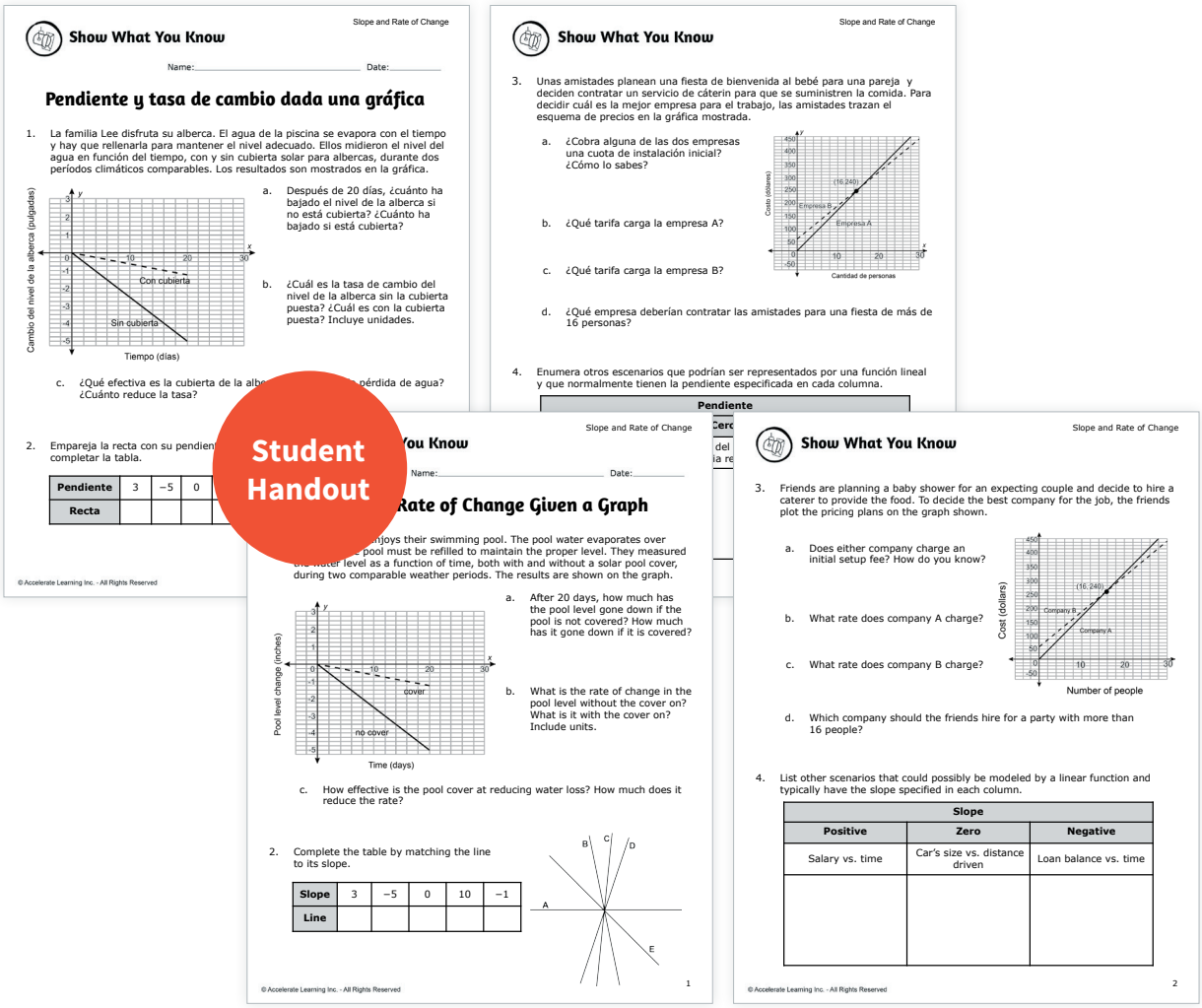
Students will practice using the knowledge and skills they have learned from the Explore activities.

Preparation

- Print a Student Handout for each student.
- The Show What You Know correlates with the Explore of the same title.

Procedure and Facilitation Points

1. Students should individually complete the Show What You Know activity that correlates with the Explore activity they just completed. Each Show What You Know piece correlates with the same number Explore. For example, Show What You Know – Part 1 will allow students to practice the skills they developed in Explore 1.



INTERACTIVE NOTEBOOK

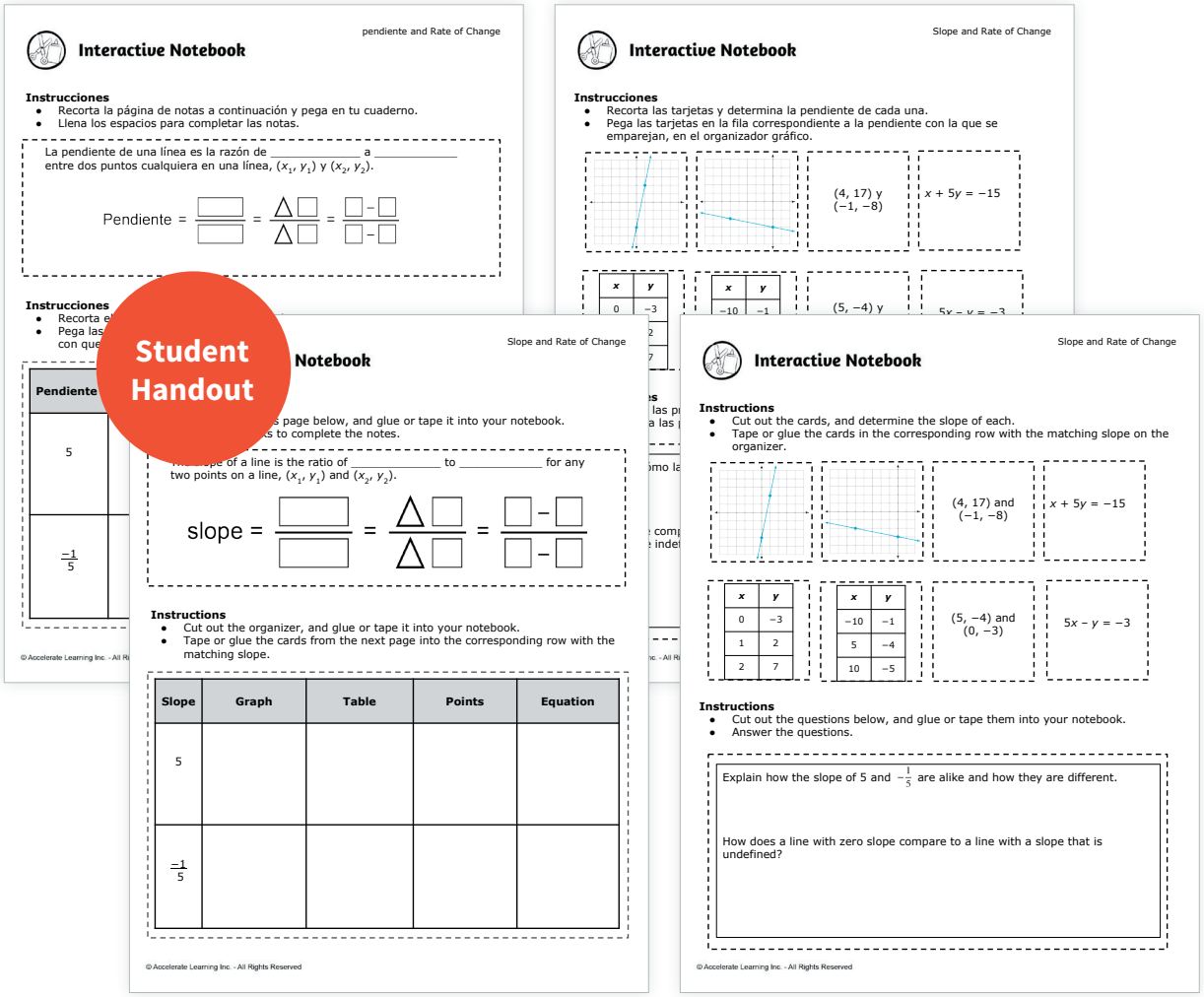
Students take notes, express ideas, and process the information presented in class using the activity and notebook.

Preparation

- Print a Student Handout for each student.

Procedure and Facilitation Points

1. Prepare an interactive notebook using a spiral or composition notebook for each student. Students can use the first few pages to create a table of contents with page numbers to keep track of activities.
2. Student instructions are given for each activity on the Student Handout.
3. Allow time for students to complete the activity and glue the pieces into their interactive notebooks.
4. Interactive notebooks can be used as a student reference during independent work and can be sent home at the end of the year as a record of their learning.



LANGUAGE CONNECTIONS

Students have the opportunity to use their linguistic and cultural background knowledge to support connections to new skills, vocabulary, and concepts at their proficiency levels.

Preparation

- Prepare for students to work with partners when necessary.
- Determine each student's English proficiency level.
- Print a Student Handout for each student at their English proficiency level.
- Allow students to have access to the Picture Vocabulary for this scope.

Procedure and Facilitation Points

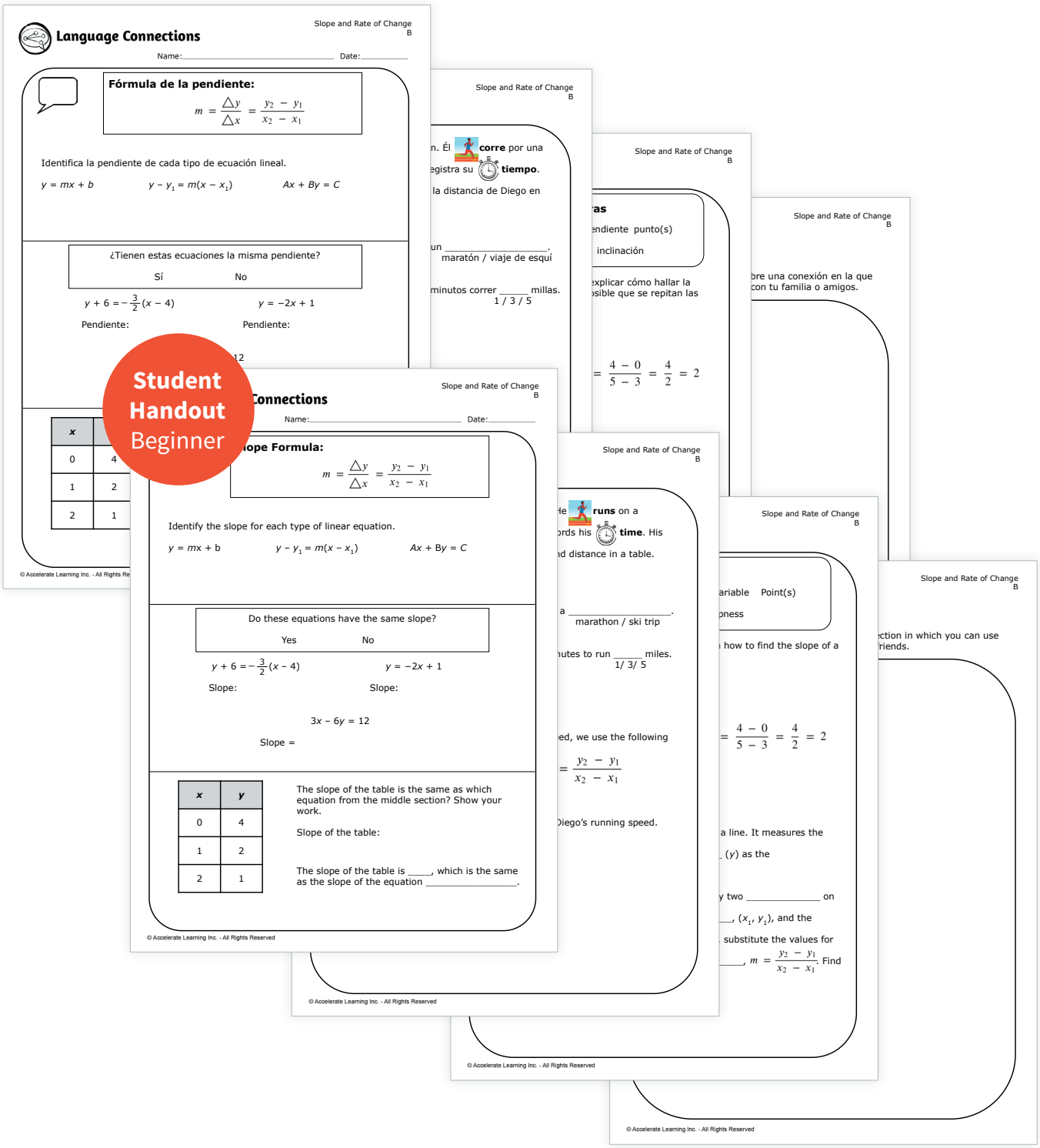
1. Distribute a Student Handout at the appropriate proficiency level to each student.
2. Use the prompts for the listening, speaking, reading, and writing portions. Use gestures, pointing at objects, and visuals as appropriate. See prompts for suggestions.
3. Allow time for students to think with their neighbors before responding.
4. Encourage students to persevere through their thinking and to use mathematical tools and models.
5. Invite students to respond appropriately to each linguistic domain.
6. Have students use the final page of the Student Handout to form connections between math concepts and the real world.

Multilingual Learner Support!

Beginner

Read the following prompts one at a time.

- *Slope measures the steepness of a line. To find the slope, we find the change in y divided by the change in x, which is written as delta y over delta x.* Point to the slope formula at the top of the handout.
- Point to the three linear equations on your handout. *What type of equation is the first equation?*
  - Have students use the following sentence frame: *The first linear equation is in ___ form.*
- *Circle the slope for the first equation.*
- *How did you know it was the slope?*
  - Have students use the following sentence stem: *I knew it was the slope because ___.*
- *What type of equation is the second equation?*
  - Have students use the following sentence frame: *The second linear equation is in ___ form.*
- *Circle the slope for the second equation.*
- *How did you know it was the slope?*
  - Have students use the following sentence stem: *I knew it was the slope because ___.*
- *What type of equation is the third equation?*
  - Have students use the following sentence frame: *The third linear equation is in ___ form.*
- *How is the third equation different from the previous two equations?*
  - Have students use the following sentence stem: *The third linear equation is different from the other two forms because ____.*
- *How would you find the slope if you were given an equation in standard form?*
  - Have students use the following sentence stem: *If we were given an equation in standard form, we would find the slope by ____.*
- Write out the steps for converting an equation in standard form to an equation in slope-intercept form. Talk aloud as you write each step. Have students copy what you write.
- *Now that we converted the equation from standard form to slope-intercept form, what is the slope? Circle it.*
- *Look at the middle section of your handout.* Point to the middle section.
- Read the question in the box aloud. *Determine the slope for these three equations.*
- Give students the opportunity to identify the slope from each equation.
- *Do these equations have the same slope? Find the slope for each. Circle* yes *or* no*.*
- *Look at the table in the last section of your handout.* Point to the table at the bottom of the handout.
- *How do you find the slope of the table?*
  - Have students use the following sentence stem: *We find the slope of the table by ____.*
- *Find the slope of the table, and write your answer on the line.*
- *Determine the equation that has the same slope. Write it on the line.*
  - Have students use the following sentence stem: *The equation that has the same slope is ____.*


Language Connections
Slope and Rate of Change
B
Name:
Date:
Fórmula de la pendiente:
$m = \frac{\triangle y}{\triangle x} = \frac{y_2 - y_1}{x_2 - x_1}$
Identifica la pendiente de cada tipo de ecuación lineal.
$y = mx + b$
$y - y_1 = m(x - x_1)$
$Ax + By = C$
¿Tienen estas ecuaciones la misma pendiente?
Sí
No
$y + 6 = -\frac{3}{2}(x - 4)$
$y = -2x + 1$
Pendiente:
Pendiente:
x
y
0
4
1
2
2
1
Student Handout Beginner
Connections
Slope Formula:
Identify the slope for each type of linear equation.
Do these equations have the same slope?
Yes
No
Slope:
Slope:
$3x - 6y = 12$
Slope =
The slope of the table is the same as which equation from the middle section? Show your work.
Slope of the table:
The slope of the table is ____, which is the same as the slope of the equation _____.
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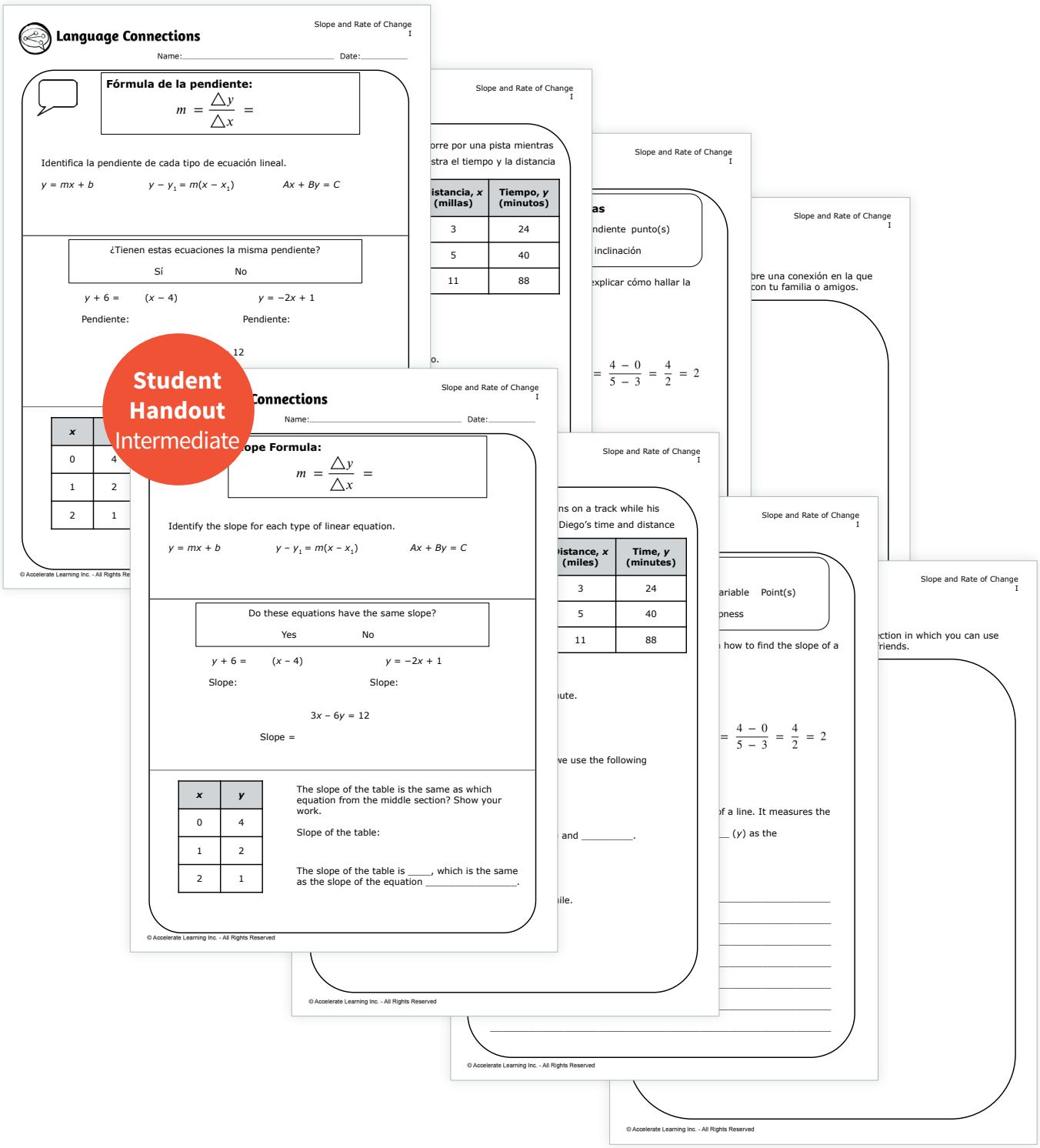
Intermediate

Read the following prompts one at a time.

- *Look at the box at the top of your handout.*
- *Slope measures the steepness of a line. To find the slope, we find the change in y divided by the change in x, which is written as delta y over delta x. Point to the slope formula at the top of the handout.*
- *Write out delta y and delta x in terms of two points, (x_1, $y_1$and (x_2, y_2).*
- *Point to the three linear equations on your handout. What form is each of the equations currently written in?*
  - Have students use the following sentence frame: *The _____ linear equation is in _____ form.*
- *Circle the slopes for the first two equations.* Pause to allow time for students to circle each slope.
- *How do you know these are the slopes?*
  - Have students use the following sentence stem: *I know these are the slopes because ___.*
- *Can you circle the slope of the third equation? Why or why not?*
  - Have students use the following sentence stem: *We can/cannot point to the slope of the third equation because ____.*
- *How do you find the slope of a linear equation in standard form?*
  - Have students use the following sentence stem: *If given an equation in standard form, we find the slope by ____.With your partners, write out the steps for converting an equation in standard form to an equation in slope-intercept form.*
- *Now that we converted the equation from standard form to slope-intercept form, what is the slope? Circle it.*
- *Look at the middle section of your handout.* Point to the middle section.
- *Read the question in the box aloud.*
- *Determine the slopes for these three equations.*
- Give students the opportunity to identify the slope from each equation.
- *Do these equations have the same slope? Circle* yes *or* no.
- *Look at the table in the last section of your handout.* Point to the table at the bottom of the handout.
- *How do you find the slope of the table?*
  - Have students use the following sentence stem: *We find the slope of the table by ____.*
- *Find the slope of the table, and write your answer on the line.*
- *Determine the equation that has the same slope. Write it on the line.*
  - Have students use the following sentence stem: *The equation that has the same slope is ____.*


Language Connections
Slope and Rate of Change
I
Name:
Date:
Fórmula de la pendiente:
$m = \frac{\triangle y}{\triangle x} =$
Identifica la pendiente de cada tipo de ecuación lineal.
$y = mx + b$
$y - y_1 = m(x - x_1)$
$Ax + By = C$
¿Tienen estas ecuaciones la misma pendiente?
Sí
No
$y + 6 =$
$(x - 4)$
$y = -2x + 1$
Pendiente:
Pendiente:
12
Student Handout
Intermediate
Connections
Name:
Date:
Slope Formula:
$m = \frac{\triangle y}{\triangle x} =$
Identify the slope for each type of linear equation.
$y = mx + b$
$y - y_1 = m(x - x_1)$
$Ax + By = C$
Do these equations have the same slope?
Yes
No
$y + 6 =$
$(x - 4)$
$y = -2x + 1$
Slope:
Slope:
$3x - 6y = 12$
Slope =
x
y
0
4
1
2
2
1
The slope of the table is the same as which equation from the middle section? Show your work.
Slope of the table:
The slope of the table is ____, which is the same as the slope of the equation _____.
Tiempo, y (minutos)
3
24
5
40
11
88
Time, y (minutes)
$\frac{4 - 0}{5 - 3} = \frac{4}{2} = 2$
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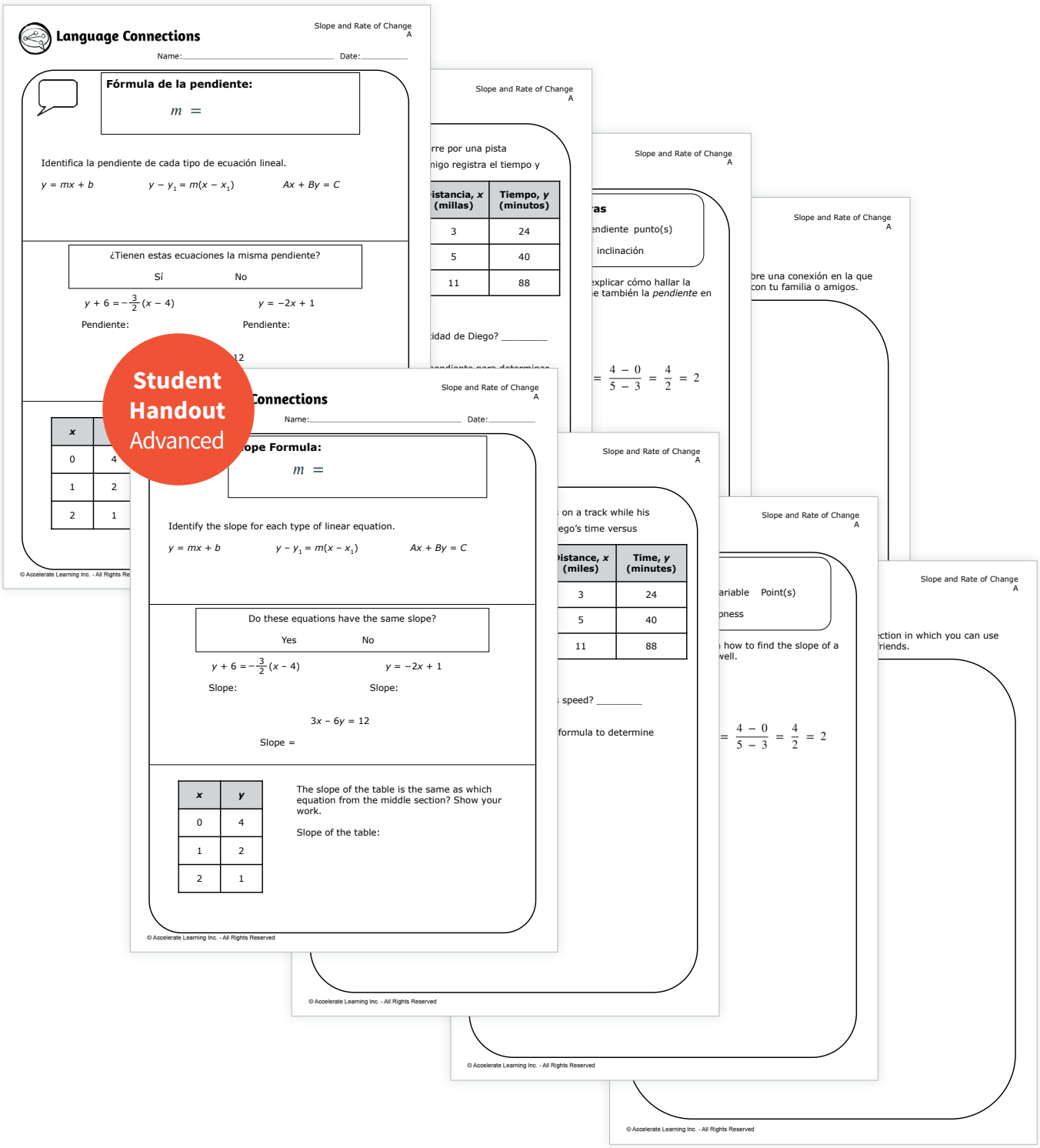
Advanced

Read the following prompts one at a time.

- *Look at the box at the top of your handout.*
- Point to the box titled Slope Formula at the top of the handout.
- *Slope measures the steepness of a line. Write the slope formula starting with delta y.*
- *What does delta y mean?*
- *What does delta x mean?*
- *Point to the three linear equations on your handout. What form is each of the equations currently written in?*
- *Circle the slopes for the first two equations.*
- *How do you know these are the slopes?*
- *Can you circle the slope of the third equation? Why or why not?*
- *How do you find the slope of a linear equation in standard form? Show your work.*
- *Now that we have converted the equation from standard form to slope-intercept form, what is the slope? Circle it.*
- *Will the expression you circled always equal the slope of a linear equation in standard form? Explain.*
- *Look at the middle section of your handout.* Point to the middle section.
- Read the question in the box aloud.
- *Do these equations have the same slope? Find the slope for each, and then circle* yes *or* no*.*
- *Look at the table in the last section of your handout.* Point to the table at the bottom of the handout.
- *How do you find the slope of the table?*
- *Find the slope of the table.*
- *Write your answer as a complete sentence.*


Language Connections
Slope and Rate of Change
A
Name:
Date:
Fórmula de la pendiente:
m =
Identifica la pendiente de cada tipo de ecuación lineal.
y = mx + b
y − y1 = m(x − x1)
Ax + By = C
¿Tienen estas ecuaciones la misma pendiente?
Sí
No
y + 6 = −3/2 (x − 4)
y = −2x + 1
Pendiente:
Pendiente:
Student Handout Advanced
Connections
Slope Formula:
Identify the slope for each type of linear equation.
Do these equations have the same slope?
Yes
No
Slope:
Slope:
3x − 6y = 12
Slope =
x
y
The slope of the table is the same as which equation from the middle section? Show your work.
Slope of the table:
Tiempo, y (minutos)
Time, y (minutes)
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PICTURE VOCABULARY

Students build academic vocabulary and connect vocabulary to their experiences. This element is meant to be used in tandem with Explores.

Preparation

- Prepare to project the Slideshow for the class.
- Print the Student Handout with multiple slides on one page for students to cut and add the Picture Vocabulary to their Interactive Notebooks.

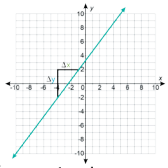
Procedure and Facilitation Points

1. Project the Slideshow for the class.
2. Read words and/or definitions with students. Discuss words or definitions that are unfamiliar to students.
3. Discuss the following questions:
    a. How can you connect this word to your work in the Explore?
    b. How would you rephrase the definition in your own words?
    c. What do you picture in your mind when you hear this word?
4. To practice vocabulary with an engaging game, see Vocabulary Strategies in the Explain section of each Launch scope.
5. Refer to the Slideshow to review Picture Vocabulary as students complete each Explore.

Tips and Tricks

- Print the Student Handout with four slides on a page. Cut out each slide, and create a math word wall in the classroom.
- Download the Picture Vocabulary slides in the Teacher Toolbox under Essentials. Use this to create a slideshow without pictures, and print with multiple slides on one page. To foster student ownership of their own learning, allow students to add their own pictures.
- For secondary grade levels, use the Picture Vocabulary Slideshow to complete Interactive Vocabulary to solidify students' understanding.

Pendiente



$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Cuán empinada es una recta; representada como «m» en la ecuación de pendiente-intersección

Forma pendiente-intersección

Forma estándar (lineal)

$Ax + By = C$

$m = -\frac{A}{B}$ *Int. de y:* $(0, \frac{C}{B})$

Int. de x: $(\frac{C}{A}, 0)$

$Ax + By = C$, donde A, B y C son constantes y A y B no son 0

Forma punto-pendiente

Punto en la recta

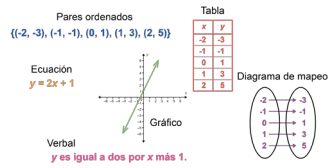
(x_1, y_1)

$y - y_1 = m\,(x - x_1)$

Pendiente

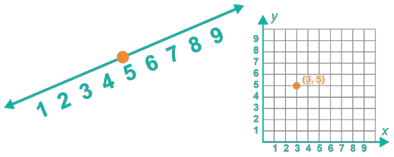
Ecuación escrita en forma de $y - y_1 = m(x - x_1)$, donde m es la pendiente y (x_1, y_1) es cualquier punto contenido en la recta

Representaciones múltiples



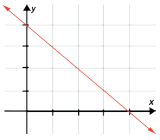
Diferentes formas matemáticas de representar una relación o una función

Punto



Punto que representa un lugar específico en una recta numérica o plano de coordenadas; un objeto geométrico sin dimensión que se utiliza para indicar una ubicación

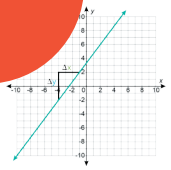
Pendiente negativa



Medida de la inclinación de una recta que muestra la inclinación hacia abajo de izquierda a derecha

Download

Slope



$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

How steep a line is; represented as m in the slope-intercept equation

Slope-Intercept Form

Standard Form (Linear)

$Ax + By = C$

$m = -\frac{A}{B}$ y-int: $(0, \frac{C}{B})$

x-int: $(\frac{C}{A}, 0)$

$Ax + By = C$, where A, B, and C are constants and A and B are not both 0

Point-Slope Form

point on the line

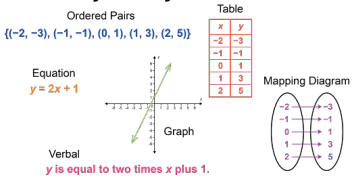
(x_1, y_1)

$y - y_1 = m\,(x - x_1)$

slope

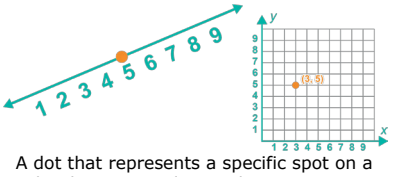
An equation written in the form of $y - y_1 = m(x - x_1)$, where m is the slope and (x_1, y_1) is any point contained in the line

Multiple Representations



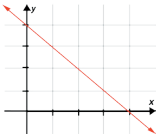
Different mathematical ways to represent a relation or a function

Point



A dot that represents a specific spot on a number line or coordinate plane; a geometric object with no dimension used to indicate a location

Negative Slope



The measure of the steepness of a line that shows the slant downward from left to right

INTERACTIVE VOCABULARY

Students form definitions of mathematical vocabulary words used throughout the scope.

Preparation

- Print a copy of the Student Handout for each student.

Procedure and Facilitation Points

1. Provide each student with a Student Handout, and ask them to individually think of ideas and to draft their thoughts.
2. Have students confer with partners, share ideas, and formulate more detailed notes together.
3. Meet as a whole class to share student thinking and to clarify any misconceptions. Use student ideas to formulate a class definition with examples. The class definition may be posted as part of a word wall or anchor chart.
4. Tips for use include the following:
    a. Students can reference Interactive Vocabulary when reviewing content, to assist with precision when verbally communicating their mathematical thinking during group work and Math Chats, and when writing about their mathematical thinking.
    b. Students can add Interactive Vocabulary to their Interactive Notebooks.
    c. Teachers can assign Interactive Vocabulary as an independent assignment for students to complete at home.
    d. Students may take their Interactive Vocabulary home at the end of the year as a record of their learning.

Student Handout

teractive Vocabulary

n:

Example of Student Responses

A number with exactly two factors, one and itself, that can only form one type of rectangular array

Prime Number

Examples:

3 and 5

Only one type of rectangular array can be formed for each of these numbers:

1 by 3

Factors of 3: 1, 3

1 by 5

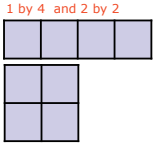
Factors of 5: 1, 5

Nonexamples:

4 and 6

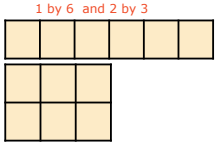
More than one type of rectangular array can be formed for these numbers:

1 by 4 and 2 by 2



Factors of 4: 1, 2, 4

1 by 6 and 2 by 3



Factors of 6: 1, 2, 3, 6

e los estudiantes

y el mismo número, que puede formar

Ejemplos:

3 y 5

Solamente un tipo de matriz rectangular se puede formar para cada uno de estos números:

1 por 3

Factores de 3: 1, 3

1 por 5

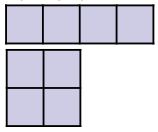
Factores de 5: 1, 5

No ejemplos:

4 y 6

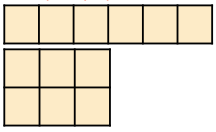
Más de un tipo de matrices rectangulares se puede formar para estos números:

1 por 4 y 2 por 2



Factores de 4: 1, 2, 4

1 por 6 y 2 por 3

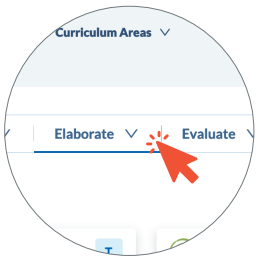


Factores de 6: 1, 2, 3, 6

Home | Engage | Explore | Explain | **Elaborate** | Evaluate | Intervention | Acceleration

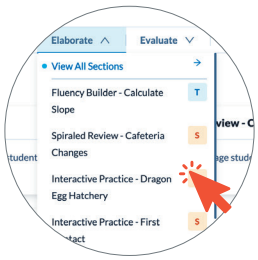
Elaborate

NAVIGATION STEPS



Click Elaborate

Click on Elaborate in the White Menu Bar



Review Content

Use the Dropdown to Review Elaborate Content

Learning math requires a personalized approach. Each lesson's **Elaborate** section offers various resources and activities to differentiate instruction and deepen understanding of diverse learners. This section is ideal for small group instruction, center and station activities, and independent practice.

FLUENCY BUILDER - CALCULATE SLOPE

In this activity, students will play a game of Go Fish! to solve math problems.

Preparation

- Make double-sided copies of the Go Fish! Cards.
- Laminate the cards for durability.
- Cut out individual cards, and place them in an envelope or bag for easy distribution and cleanup.
- Put students in pairs.

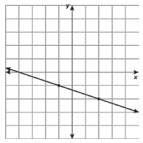
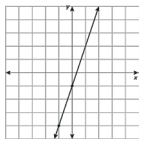
Procedure and Facilitation Points

1. Show students how to shuffle the cards.
2. Model how to play the game with a student.
    a. Pass out five cards to each player.
    b. Place the rest of the deck in a pile on the table.
    c. Players take turns asking each other for either the answer to match one of the problem cards or the problem card to match one of the answer cards. If the opponent has the matching card, the opponent must give it to the player. If the opponent does not have the matching card, the other player must pick a card from the deck.
    d. The winner is the player with the most matches when all of the cards are gone.
3. Monitor students to make sure they find accurate matches.

Go Fish! Cards

ncy Builder

Go Fish! Cards
(Front of Page 1)

What is the slope of the line if each grid is one unit? 	$-\frac{1}{3}$
What is the slope of the line if each grid is one unit? 	3
What is the slope of the line modeled by the equation $5x + 2y = 6$?	$-\frac{5}{2}$
What is the slope of the line modeled by the equation $-7x + 3y = 8$?	$\frac{7}{3}$

juego *¡A pescar!*
la página 1)

	$-\frac{1}{3}$
	3
	$-\frac{5}{2}$
	$\frac{7}{2}$

Instruction Sheet

ncy Builder

Go Fish! Instruction Sheet

Play this game with a partner.

You Will Need
1 Set of Go Fish! Cards (per pair)

How to Play

1. Shuffle the Go Fish! Cards.
2. Pass out five cards to each player.
3. Place the rest of the deck in a pile on the table.
4. Players take turns asking each other for either the answer to match one of the problem cards or the problem card to match one of the answer cards. If the opponent has the matching card, the opponent must give it to the player. If the opponent does not have the matching card, the other player must pick a card from the deck.
5. The winner is the player with the most matches when all of the cards are gone.

Fluency Builder

Hoja de instrucciones de *¡A pescar!*

pareja.

uego

l juego *¡A pescar!*
a cada jugador.
araja en una pila sobre la mesa.
an para pedir la tarjeta con la respuesta
arjetas de problema o la tarjeta de
con una de las tarjetas de respuesta. Si
rjeta correspondiente, el oponente debe
el oponente no tiene la tarjeta
o jugador debe elegir una tarjeta de la

or con más pares de tarjetas apareadas
s las tarjetas.

SPIRALED REVIEW - CAFETERIA CHANGES

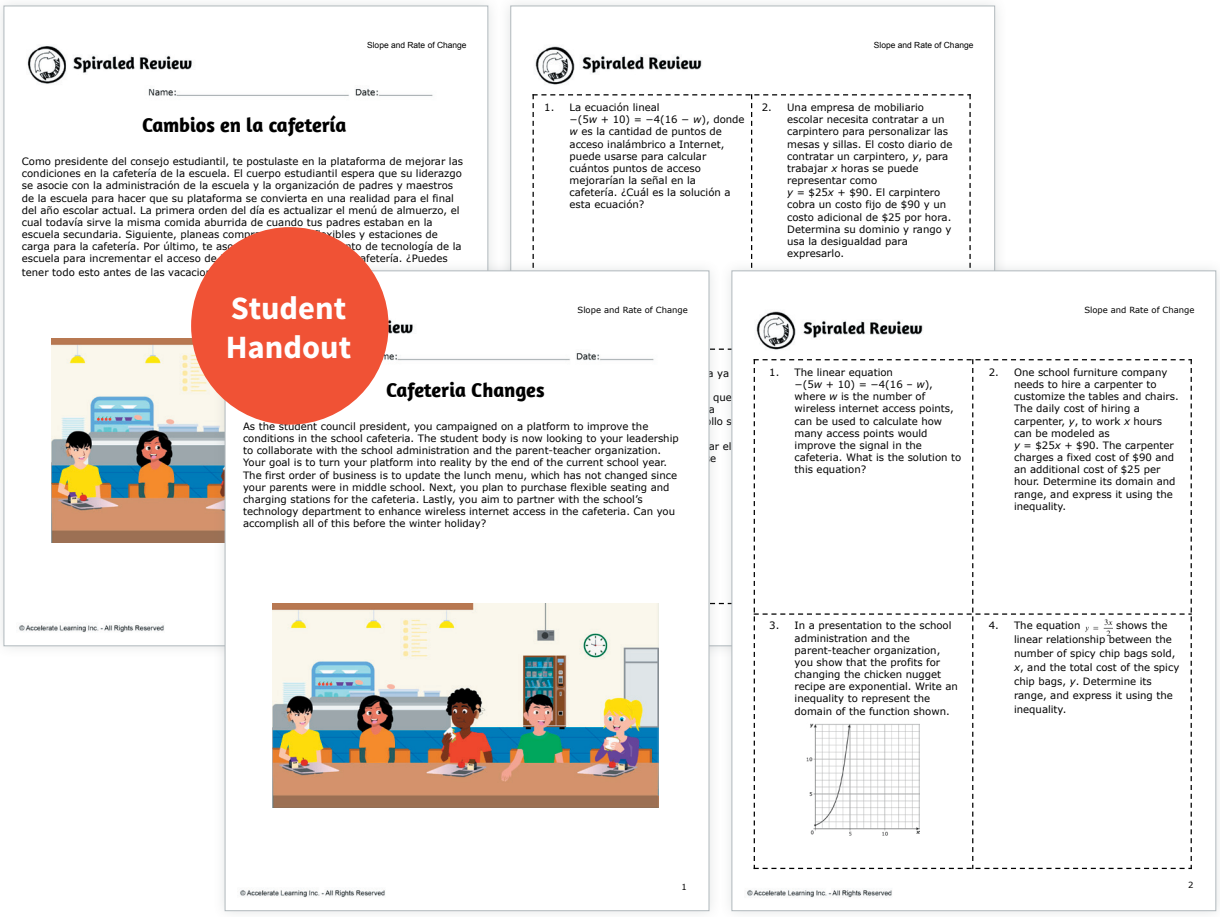
Students will review concepts and material from previous math classes and scopes to help support their work in the current scope and strengthen the skills that will be needed for later scopes.

Preparation

- Print a Student Handout for each student.

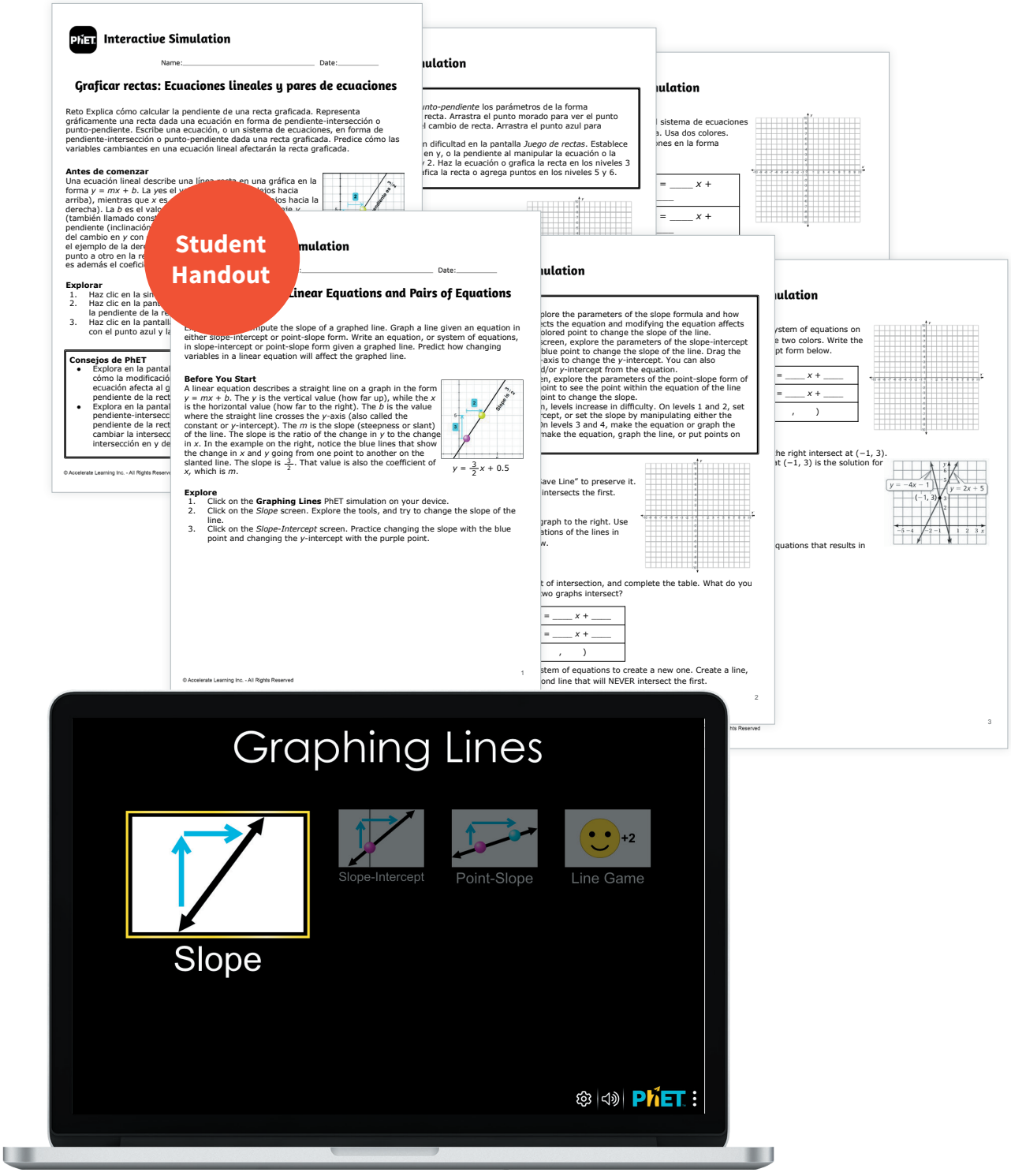
Procedure and Facilitation Points

1. Encourage students to try the questions independently without using outside resources to see what they know. Invite them to write down ideas or any fragments they remember about the topics that they were previously taught. Acknowledge that on this Student Handout, and in math class, mistakes are welcomed.
2. Use this Spiraled Review as a warm-up in class, or send it home for homework, but be sure to provide feedback and opportunities for students to correct their work and further solidify their prior knowledge.
3. Refer to the Spiraled Review Focus by Question section to assess students' content knowledge or need for further intervention. Use the Fluency Builders in the appropriate scopes if more review is necessary.
4. The Capstone includes one part from the current scope so that students see the connection and relevance of their prior learning within the current scope.



PHET - GRAPHING LINES: LINEAR EQUATIONS AND PAIRS OF EQUATIONS

Challenge: Explain how to compute the slope of a graphed line. Graph a line given an equation in either slope-intercept or point-slope form. Write an equation, or system of equations, in slope-intercept or point-slope form given a graphed line. Predict how changing variables in a linear equation will affect the graphed line.



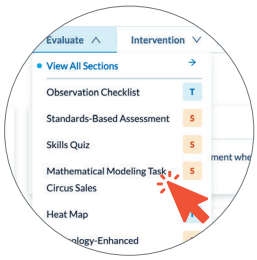
Home | Engage | Explore | Explain | Elaborate | **Evaluate** | Intervention | Acceleration

Evaluate

NAVIGATION STEPS

Click Evaluate

Click on Evaluate in the White Menu Bar



Review Content

Use the Dropdown to Review Evaluate Content

Assessments are intentionally integrated so that you can **evaluate** student progress and mastery. Collect data through TEKS-aligned assessments, along with student self-reflections and performance tasks.

OBSERVATION CHECKLIST

Diagnostic Formative

This element provides a breakdown of the key concepts and skills in the scope. It can be used as a formative assessment for teachers and as a self-assessment for students.

Preparation

- Print a Teacher Handout and Student Handout for each student.

Procedure and Facilitation Points

1. Distribute a Student Handout to each student.
2. As students are working through the Explore and Explain activities in the scope, formatively assess their progress by taking anecdotal notes on how key concepts and skills were observed. Reflection questions can be considered to measure the impact of whole-group and small-group activities.
3. Have students reflect on ways they can demonstrate their understanding and self-assess their progress on each key concept or skill as they work through both whole-group and small-group activities.
4. Students can reflect on their thinking, learning, and work in the scope; identify ways they have improved; and establish new learning goals.
5. Colleagues who provide instructional support to students can be equipped with the accommodations and modifications noted on the Teacher Handout.
6. Anecdotal notes provided on the Teacher Handout can be used as documentation for standards-based report cards.

Slope and Rate of Change

Observation Checklist

Name: _____ Date: _____

Pendiente y tasa de cambio

Estándar	Destreza o concepto clave	¿Cómo podrías demostrar que sabes esto?	¿Cómo te calificarías?
A.3A	Puedo determinar la pendiente de una recta dada una tabla de valores, una gráfica, dos puntos en la recta y una ecuación escrita en varias formas, incluidas $y = mx + b$, $Ax + By = C$ y $y - y1 = m(x - x1)$.	❑ Representarlo ❑ Dibujarlo ❑ Aplicarlo ❑ Discutir al respecto ❑ Escribir al respecto	¡Lo tengo! ¡Ya casi! ¡Aún no!
A.3B	Puedo calcular la tasa de cambio de una función lineal representada en forma tabular, gráfica o algebraica en el contexto de problemas matemáticos y del mundo real.	❑ Representarlo ❑ Dibujarlo ❑ Aplicarlo ❑ Discutir al respecto ❑ Escribir al respecto	¡Lo tengo! ¡Ya casi! ¡Aún no!

Slope and Rate of Change

Observation Checklist

Estándar del proceso	¿Cómo te calificarías?
Puedo usar las matemáticas para resolver problemas de la vida real.	☆☆☆☆☆
Puedo seleccionar herramientas y estrategias apropiadas para resolver problemas.	☆☆☆☆☆
Puedo crear y usar representaciones para organizar, registrar y comunicar ideas matemáticas.	☆☆☆☆☆
Puedo usar relaciones matemáticas para conectar y comunicar ideas.	☆☆☆☆☆
Puedo analizar información, formular un plan, encontrar una solución, justificar mi pensamiento y evaluar la razonabilidad de mi respuesta.	☆☆☆☆☆
Puedo comunicar mi pensamiento matemático mediante múltiples representaciones.	☆☆☆☆☆
Puedo usar un lenguaje preciso para mostrar, explicar y justificar ideas matemáticas.	☆☆☆☆☆

Student Handout

Slope and Rate of Change

Observation Checklist

Name: _____ Date: _____

Slope and Rate of Change

Standard	Skill or Key Concept	How could you show you know this?	How would you rate yourself?
A.3A	I can determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y1 = m(x - x1)$.	❑ Model it. ❑ Draw it. ❑ Apply it. ❑ Talk about it. ❑ Write about it.	I've got it! Almost there! Not yet!
A.3B	I can calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.	❑ Model it. ❑ Draw it. ❑ Apply it. ❑ Talk about it. ❑ Write about it.	I've got it! Almost there! Not yet!

Slope and Rate of Change

Observation Checklist

Process Standard	How would you rate yourself?
I can use math to solve real-world problems.	☆☆☆☆☆
I can select appropriate tools and strategies to solve problems.	☆☆☆☆☆
I can create and use representations to organize, record, and communicate mathematical ideas.	☆☆☆☆☆
I can use mathematical relationships to connect and communicate ideas.	☆☆☆☆☆
I can analyze information, formulate a plan, find a solution, justify my thinking, and evaluate my answer for reasonableness.	☆☆☆☆☆
I can communicate my mathematical thinking by using multiple representations.	☆☆☆☆☆
I can use precise language to display, explain, and justify mathematical ideas.	☆☆☆☆☆

Reflect on your thinking, learning, and work in this scope.

What goals are you working toward? Where did you improve in this scope?

_____

_____

Do you have any new goals? Where do you want to make improvements in the next scope?

_____

_____

STANDARDS-BASED ASSESSMENT

Summative

Students demonstrate mastery of the key concepts and skills in the scope through a standards-based summative assessment.

Preparation

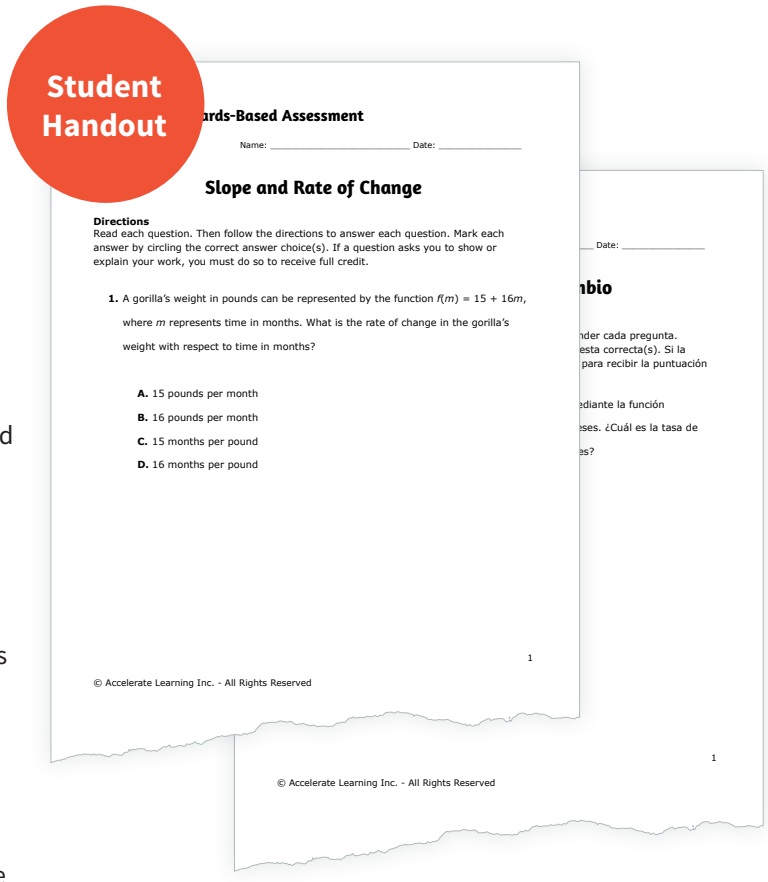
- Print a Student Handout for each student. The Student Handout can also be assigned digitally.
- Allow students to use manipulatives by request.
- Prepare Supplemental Aids for students who meet eligibility criteria.

Procedure and Facilitation Points

1. Distribute the Student Handout to each student.
2. Prompt students to show what they know in completing the assessment.
3. Allow students to reflect on their performances using the Heat Map.
4. Once student data has been collected after the assessment, refer to the Scaffolded Instruction Guide in the Home section of this scope to differentiate instruction for each student.

Tips and Tricks

- This element can be used as an assessment of learning and is intended to be assigned to students independently at their seats.
- Allow students to work with partners to review and rework problems they may have missed. Provide assistance as needed.
- The questions from this assessment can be found in the Assessment Bank and can be used to build a customized assessment.
- For test prep, print the Standards-Based Assessment, and cut out individual problems. Hang the problems along with chart paper around the classroom. Allow students to rotate through and solve each problem with partners. Challenge students to review the strategies already on the chart paper and use a different representation.
- The data from this assessment can be used to provide specific support and intervention.



SKILLS QUIZ

Formative Summative

Skills Quiz is a short, standards-based formative assessment to determine student mathematical fluency with the key concepts and skills in the scope.

Preparation

- Print a Student Handout for each student. The Student Handout can also be assigned digitally.
- Allow students to use manipulatives by request.
- Prepare Supplemental Aids for students who meet eligibility criteria.

Procedure and Facilitation Points

1. Distribute the Student Handout to each student.
2. Prompt students to show what they know in completing the assessment.
3. Allow students to reflect on their performances using the Heat Map.
4. Once student data has been collected after the assessment, refer to the Scaffolded Instruction Guide in the Home section of this scope to differentiate instruction for each student.

Tips and Tricks

- This element can be used as an assessment for learning and can be assigned to students to complete independently at their seats or as part of a workstation.
- For kindergarten and first grade, this element can be used as a one-on-one assessment or a guided small-group task to check for mastery of the standards.
- This element is a perfect opportunity to have a one-on-one conference with each student to discuss their performance, and it can be used as a foundation for setting individualized goals.
- The data from this assessment can be used to provide specific support and intervention.
- A Skills Quiz from a previous unit can also be used as a spiral review.

Skills Quiz

Name: _____ Date: _____

Pendiente y tasa de cambio

Resuelve cada problema. Muestra o explica tu razonamiento matemático.

Utiliza la siguiente información para responder las preguntas 1 a 4.

Jennifer quería comprar una magdalena especial para el cumpleaños de su hermana. Cuando entró en la pastelería, decidió comprar también una magdalena para ella. El costo de dos magdalenas especiales era de $6.80.

1. Completa la tabla para mostrar el costo de 2, 3, 4 y 5 magdalenas.

Cantidad de magdalenas (*x*)	Costo (*y*)
2	
3	
4	
5	

2. Determina el costo de una magdalena especial.

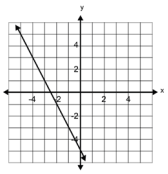
3. A esta tasa, ¿cuánto costaría ... ndalenas especiales?

4. Escribe una ecuación ... cualquier cantidad de

5. Encuentra la pendien...

Skills Quiz

6. ¿Cuál es la pendiente de la recta en la gráfica?



7. Fabián vive a 4 millas de su escuela y todos los días se va en bicicleta a la escuela. Pasa una manzana cada 50 segundos. Si cada manzana tiene 400 pies de largo, ¿cuál es la tasa, en pies por segundo, a la que Fabián monta su bicicleta?

8. La fórmula punto-pendiente está escrita como $y - y_1 = m(x - x_1)$. ¿Cuál de las siguientes expresiones pueden utilizarse para determinar la tasa de cambio?

A. $\frac{y_1 - x_1}{y - x}$ **C.** $\frac{y - y_1}{x - x_1}$

B. $\frac{x - x_1}{y - y_1}$ **D.** $\frac{x_1 - x}{y_1 - y}$

...la ec...

Student Handout

...s Quiz

Name: _____ Date: _____

Slope and Rate of Change

Solve each problem. Show or explain your mathematical thinking.

Use the following information to answer questions 1 through 4.

Jennifer wanted to purchase a specialty cupcake for her sister's birthday. When she walked into the cupcake shop, she decided to also get one for herself. The cost for two specialty cupcakes was $6.80.

1. Complete the table to show the cost of 2, 3, 4, and 5 cupcakes.

Number of Cupcakes (*x*)	Cost (*y*)
2	
3	
4	
5	

2. Determine the cost for one specialty cupcake.

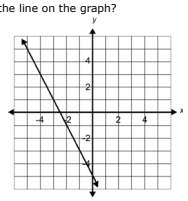
3. At this rate, how much would it cost for a dozen specialty cupcakes?

4. Write an equation that could be used to find the total cost, *y*, for any number of cupcakes, *x*.

Skills Quiz

5. Find the slope of the line defined by the equation $2x - 3y = 10$.

6. What is the slope of the line on the graph?



7. Fabian lives 4 miles from his school and rides his bike to school each day. He rides past one block every 50 seconds. If each block is 400 feet long, what is the rate, in feet per second, at which Fabian rides his bike?

8. Point-slope formula is written as $y - y_1 = m(x - x_1)$. Which of the following expressions can be used to determine the rate of change?

A. $\frac{y_1 - x_1}{y - x}$ **C.** $\frac{y - y_1}{x - x_1}$

B. $\frac{x - x_1}{y - y_1}$ **D.** $\frac{x_1 - x}{y_1 - y}$

MATHEMATICAL MODELING TASK - CIRCUS SALES

Formative Summative

Students will work individually and use mathematical tools and methods to answer questions about real-world situations.

Preparation

- Print a copy of the Student Handout for each student.
- Print a copy of the Rubric for each student. It may be beneficial to allow students time to study the Rubric so they know exactly what is expected. You will need a copy of the Rubric to score each student.

Procedure and Facilitation Points

1. Distribute a Student Handout to each student.
2. Encourage students to look back at their Student Journals from the Explore activities if they need to review the skills they have learned.
3. If you notice that students are stuck, use guiding questions to help them think through the problem without telling them what steps to take. If time permits, allow students to share their solutions with the class.
4. Discuss different methods students utilized to tackle the challenge.

Slope and Rate of Change

Mathematical Modeling Task

Name:_____ Date:_____

Venta en el circo

Parte I

1. Un sábado por la noche en el circo, Alma vendía entradas para el carrusel. Después, ella graficó la relación entre la cantidad de dinero, *y*, en su caja registradora después de haber comprado x entradas. La pendiente de la línea es 0.5 y la intersección con el eje Y es 8. ¿Qué significa la pendiente y la intersección con el eje Y en el contexto?

2. El domingo por la noche, Alma graficó la misma relación y la pendiente de su línea es 0 ...sección con el eje Y es 12. ¿Qué ha cambiado en el escen... estos dos números?

3. ¿Po... compa...

Student Handout

Slope and Rate of Change

...natical Modeling Task

Name:_____ Date:_____

Circus Sales

Part I

1. On a Saturday night at the circus, Alma is selling tickets for the carousel. Afterward, she graphs the relationship between the amount of money, *y*, in her cash box after *x* tickets had been purchased. The slope of the line is 0.5, and the *y*-intercept is 8. What do the slope and *y*-intercept mean in context?

2. On Sunday night, Alma graphs the same relationship. The slope of her line is 0.25, and the *y*-intercept is 12. What has changed about Alma's scenario given these two numbers?

3. Why do you think the slope of the line was lower on Sunday compared with Saturday?

Slope and Rate of Change

...ng Task

...Ashley y Mohammed trabajan como ...oche. La caja de Ashley comienza con $32 y ... turno de cuatro horas. La caja de Mohamed ...spués de un turno de tres horas.

...mo, ¿en cuál de las dos entradas, la de ...tes llegaron con mayor frecuencia el sábado? ... para explicar su respuesta.

...en su entrada y la caja

Slope and Rate of Change

...ng Task

...che. El viernes, salieron de Amarillo a las ...asta Lubbock. Llegaron a Lubbock a la 1:00 ... Lubbock a las 11:30 p. m. y llegaron a ... de Lubbock a Abilene fue de 165 millas. ... de cambio? Muestra cómo lo sabes.

...tores podrían hacer que el

Slope and Rate of Change

...ng Task

...and Mohammed are working as ticket clerks ...ts out with $32 and ends the night with $244 ...ox starts out with $10 and ends with $172

..., at which entrance, Ashley's or ...at a faster rate on Saturday? Use ...your answer.

...ur shift at his entrance, and the cash box ... shows a rate between the rates of Ashley ...ify the rate of change you created, and be ...aph.

...ash Box on Sunday

Time since start of shift (hours)

Slope and Rate of Change

...ng Task

...ach night. On Friday, they left Amarillo at ...to Lubbock. They arrived in Lubbock at 1:00 ...ock at 11:30 p.m. and arrived in Abilene at ...o Abilene was 165 miles. Which drive had a ...you know.

... town, and explain what factors could make ...te of change.

HEAT MAP

Student Self-Reflection

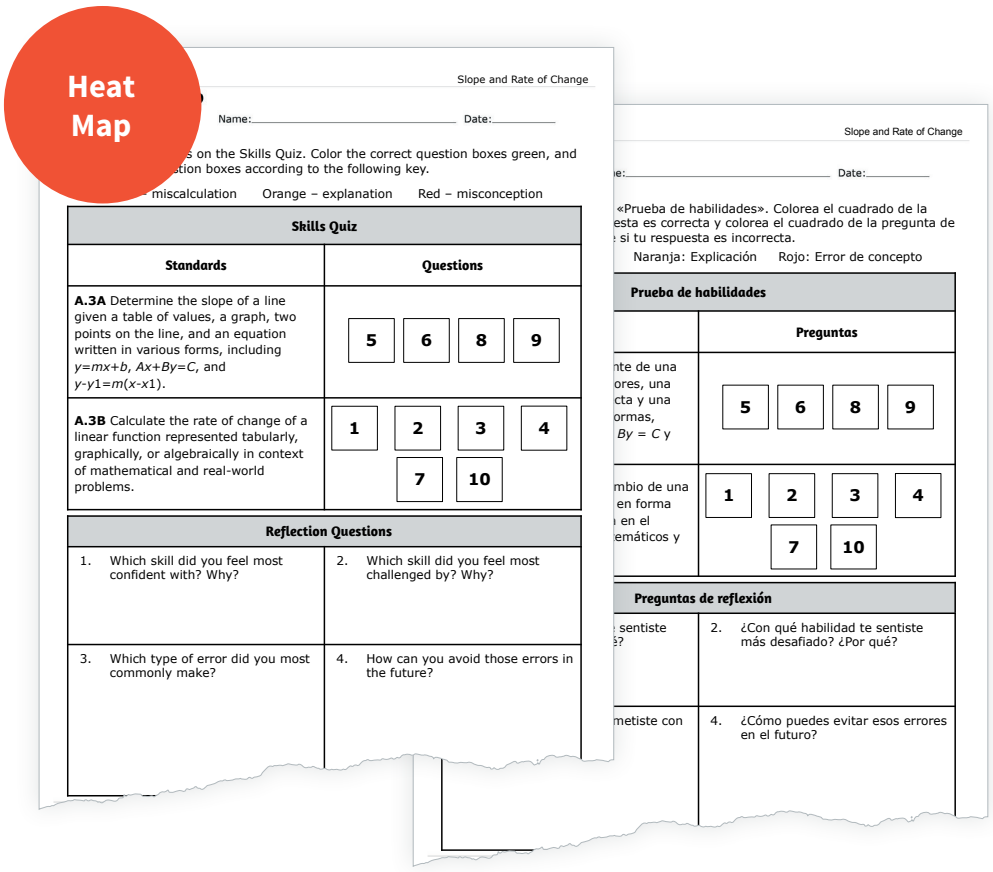
Students analyze their assessment results and determine what they did well and where they can improve.

Preparation

- Determine if students will analyze their Skills Quiz, Standards-Based Assessment, or both.
- Print a Heat Map for each student.
- Gather a red crayon and a green crayon for each student.

Procedure and Facilitation Points

1. Distribute a Heat Map to each student along with red and green crayons. Students should have their graded assessment(s) available.
2. Students use their graded assessment(s) to color-code the Heat Map. For each question answered correctly, students color the corresponding box green. For each question answered incorrectly, students color the corresponding box red.
3. Encourage students to look for patterns in their data, such as a certain standard that was missed more frequently or a standard they have clearly mastered, and use this information to reflect and set goals in the provided table.
4. Refer to the Scaffolded Instruction Guide found in the Home section to provide extension or additional support.

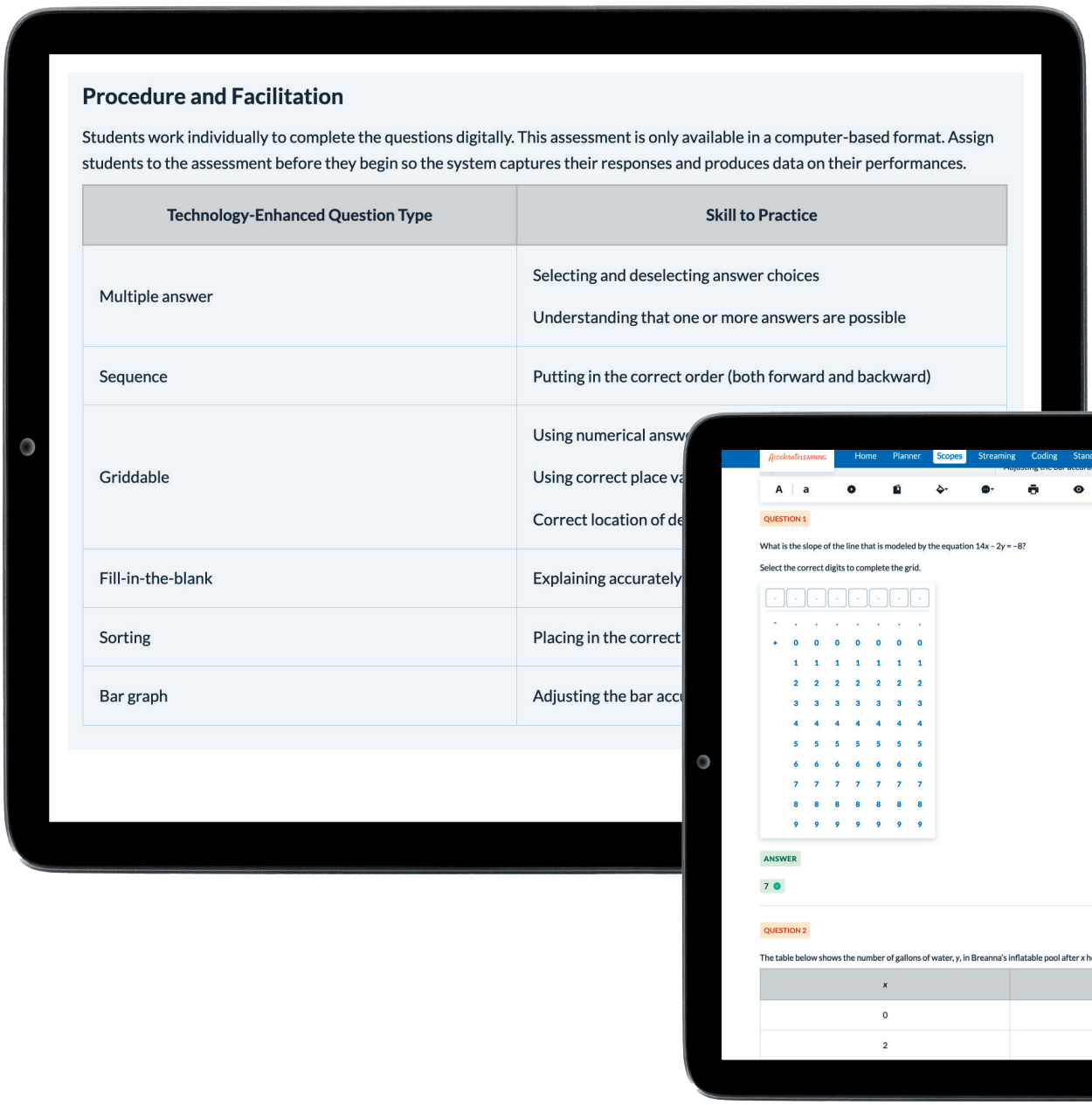


TECHNOLOGY-ENHANCED QUESTIONS Summative

Technology-Enhanced Questions are designed to allow students to answer question types that are not possible in a paper/pencil format. These computer-based questions use formats that allow for non-conventional question types, including multiple answer, sequence, griddable, fill-in-the-blank, sorting, and bar graph.

Procedure and Facilitation Points

1. Students work individually to complete the questions digitally. This assessment is only available in a computer-based format. Assign students to the assessment before they begin so the system captures their responses and produces data on their performances.



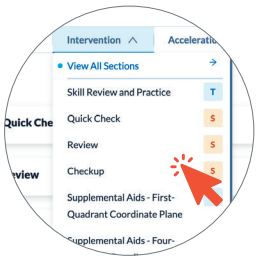
Home | Engage | Explore | Explain | Elaborate | Evaluate | **Intervention** | Acceleration

Intervention

NAVIGATION STEPS

Click Intervention

Click on Intervention in the White Menu Bar



Review Content

Use the Dropdown to Review Intervention Content

Unleash the power of hands-on learning to provide targeted instruction and tackle conceptual misunderstandings head-on! Perfect for **intervention**, re-teaching, or test preparation, these dynamic resources are your go-to tools for transforming math challenges into triumphs in the classroom.

SKILL REVIEW AND PRACTICE

Formative

This activity is designed to review the key concepts of the scope. Use it as a review or for intervention.

Preparation

- Print a copy of Quick Check, Review, and Checkup for each student.
- Optionally, place students in groups of 3 or 4 to complete the Review.
- Optionally, print an example Anchor Chart from the Explain section, or have students use Interactive Notebook as a resource.
- Optionally, print any of the supplemental aid materials for students to use as they work.

Procedure and Facilitation Points

1. Distribute a copy of Quick Check to each student.
2. Each student should complete the Quick Check independently.
3. Use the skill rubric at the end of the Quick Check to identify which students require additional help on the skills.
4. Distribute a copy of Review to each student.
5. Each student should complete the Review either as an intervention activity or an independent activity.
    a. Optionally, pull students into a small group to work on review skills. Use the Review to assist in reteaching.
6. Distribute a copy of Checkup to each student.
7. Each student should complete the Checkup independently.
8. Analyze the Checkup results using the Teacher Checklist to identify which students require additional review and which students have reached mastery of the concepts.

Quick Check

Formative

Skill Review and Practice

Name: _____ Date: _____

Quick Check

Find the slope for each equation in questions 1–4.

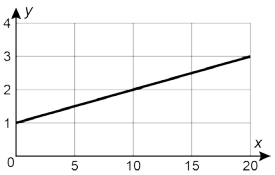
1. $y = 4x + 5$

2. $y + 5 = -2(x + 20)$

3.

x	2	4	6
y	4	8	12

4.



5. Which the following options has a slope of −2? Select all that apply.

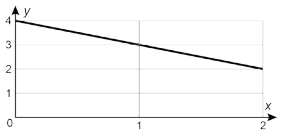
A. $y = 2x - 2$

B. $y + 2 = -2(x + 10)$

C.

x	0	5	10
y	10	0	−10

D.



Question(s)	Skill	Got It	Needs Review
1 and 2	Determine the slope and rate of change given a table.	☐	☐
3	Determine the slope and rate of change given two points or a table.	☐	☐
4	Determine the slope and rate of change given a graph.	☐	☐
5	Determine the slope and rate of change given multiple representations.	☐	☐

ew and Practice

Name: _____ Date: _____

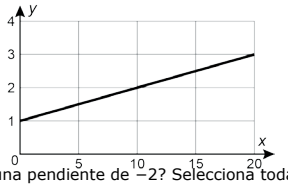
Revisión rápida

en las preguntas del 1–4.

2. $y + 5 = -2(x + 20)$

	6
	12

4.

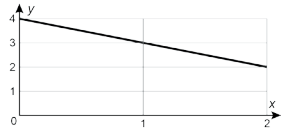


entes opciones tiene una pendiente de −2? Selecciona todas
ctas.

B. $y + 2 = -2(x + 10)$

	5	10
	0	−10

D.



	Habilidad	Entiende	Necesita revisión
1 y 2	Determinar la pendiente y la tasa de cambio dada una tabla.	☐	☐
3	Determinar la pendiente y la tasa de cambio dados dos puntos o una tabla.	☐	☐
4	Determinar la pendiente y la tasa de cambio dada una gráfica.	☐	☐
5	Determinar la pendiente y la tasa de cambio dadas múltiples representaciones.	☐	☐

Formative

Review

Slope and Rate of Change

Skill Review and Practice

Name: _____ Date: _____

Repaso

Pendiente y tasa de cambio dada una gráfica

Tasa de cambio o pendiente= $\frac{\text{Cambio en } y}{\text{Cambio en } x} = \frac{y_2 - y_1}{x_2 - x_1}$

Los siguientes pasos muestran cómo calcular la pendiente o la tasa de cambio dada una gráfica:

1. Seleccionar 2 puntos sobre una gráfica.
2. Identificar el cambio en y y el cambio en x al sustituir los valores de x y y en la fórmula de la pendiente.
3. Calcular la pendiente al dividir el cambio en y por el cambio en x.

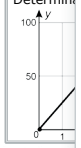
Ejemplo

Sulton acaba de completar un viaje por carretera y quiere saber cuál fue la tasa de cambio más alta de su localización. La cantidad de millas que manejó se muestra en la siguiente gráfica, dividido en 3 segmentos. Ayuda a Sulton a determinar cuál segmento fue el más rápido.

El segmento 1 incluye los puntos (0, 0) y (2, 100).
El cambio en y es +100, y el cambio en x es +2.
La pendiente es $\frac{100}{2}$ o 50 millas por hora.
El segmento 2 incluye los puntos (2, 100) y

Las tres pen
a 75 millas

Inténtalo
Determina



Slope and Rate of Change

Review and Practice

Name: _____ Date: _____

Review

Slope and Rate of Change Given a Graph

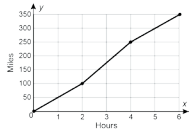
Rate of change or slope = $\frac{\text{Change in } y}{\text{Change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$

The following steps show how to calculate slope or rate of change from a graph:

1. Select 2 points on the graph.
2. Find the change in y and the change in x by substituting the x and y values into the slope formula.
3. Compute your slope by dividing the change in y by the change in x.

Example

Sulton has just completed a road trip and wants to know what the highest rate of change of his location was. The number of miles he drove is shown in the graph below, divided into 3 segments. Help Sulton determine which segment was the fastest.



Segment 1 includes points (0, 0) and (2, 100). The change in y is +100, and the change in x is +2. The slope is $\frac{100}{2}$, or 50 miles/hour.

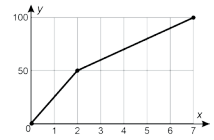
Segment 2 includes points (2, 100) and (4, 250). The change in y is +150, and the change in x is +2. The slope is $\frac{150}{2}$, or 75 miles/hour.

Segment 3 includes points (4, 250) and (6, 350). The change in y is +100, and the change in x is +2. The slope is $\frac{100}{2}$, or 50 miles/hour.

The three slopes are 50, 75, and 50, so the largest is in segment 2 at 75 miles/hour.

Try It

Determine the slope of each segment of the graph.



Slope and Rate of Change

tice

s puntos o una tabla
ar la pendiente o la tasa de cambio de una

calcular la pendiente.
bio en x al sustituir los valores de x y de y

mbio en y por el cambio en x.

Harper monitorea cuánta comida de
pesa la cantidad de comida que hay en el
cambio. ¿Utiliza la comida
ía?

7	41

Slope and Rate of Change

tice

ecuación
ormas, la pendiente se puede identificar con
pendiente de la ecuación es m.

$y = mx + b$
$y - y_1 = m(x - x_1)$

ones.

$14(x - 5)$

$+ 10$

Slope and Rate of Change

tice

Points or a Table
pe or rate of change from a linear table:
culate the slope.
e in x by substituting the x and y values into

change in y by the change in x.

monitoring how much dog food they are
of food they had in stock on a few days so
hange. Are they using food at a steady
ending on the day?

Show your work.

3.

x	y
4	24
6	36
8	48

20	50

Slope and Rate of Change

tice

uation
the slope can be identified by visual
pe of the equation is m.

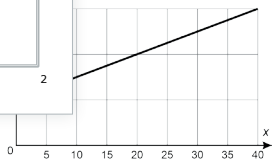
$x + b$
$= m(x - x_1)$

2. $y - 5 = 14(x - 5)$

4. $y = -x + 10$

ple Representations
ual inspection, or calculate the slope from a
magnitude of each slope.

gest slope?



Formative

Checkup

Slope and Rate of Change

Skill Review and Practice

Name: _____ Date: _____

Revisión

1. El peso de un cachorro de pastor australiano en libras durante el primer año puede ser estimado mediante la ecuación $w(m) = 2m + 2$, donde m es la edad del cachorro en meses. ¿Cuál es la tasa de cambio del peso del cachorro?

2. ¿Cuál es la pendiente de una recta que contiene los puntos (2, 5) y (1, 2)?

3. La cantidad de visitantes de un parque fue medida y registrada en la tabla de abajo. Se ... crecimiento lineal a medida que avanzó la mañana. ¿Cuál es la ta... cantidad de gente que visita el parque?

4. Los Sr... ahora ... de agu...

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Slope and Rate of Change

Skill Review and Practice

Name: _____ Date: _____

Checkup

1. An Australian shepherd puppy's weight in pounds for the first year can be estimated by the equation $w(m) = 2m + 2$, where m is the age of the puppy in months. What is the rate of change of the puppy's weight?

2. What is the slope of a line that contains the points (2, 5) and (1, 2)?

3. The number of visitors at a park was measured and recorded in the table below. It was noted that there was a linear growth as the morning went on. What is the rate of change in the number of people at the park?

Time	8 a.m.	9 a.m.	10 a.m.	11 a.m.
Visitors	10	35	60	85

4. The Smiths were filling up their swimming pool. There was no water in the pool when they started, and 23 hours later there was 1,104 cubic feet of water in the pool. What is the rate of change of the volume of the water in the pool?

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1

Slope and Rate of Change

...tice

...de ahorros de Jacob se muestra en la ...e cambio del saldo de su cuenta?

...3

...de 5? Selecciona todas las...

Slope and Rate of Change

...tice

... que una ardilla recolecta y descubre que la ...antidad de bellotas que la ardilla guardó en ...e la cantidad de bellotas que guardó la

...el residuo de medicamentos en su cuerpo a ...ormación. ¿Cuál es la tasa de cambio entre

1	2	3	4
		18	15

...ea 3.

Slope and Rate of Change

...tice

...wings account is shown by the graph below. ...count balance?

...1.5 2 2.5 3 x
Years

...a slope of 5? Select all that apply.

...B. $y + 4 = -5(x + 10)$

	15	18
	2	−2

...0 1 2 3 4

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2

Slope and Rate of Change

...tice

...rns a squirrel gathers and discovers that the ...he number of acorns the squirrel saves in t ...the number of acorns in the stash?

... amount of medication left in his body over ...n below. What is the rate of change

1	2	3	4
32	23	18	15

... a rate of change of 3.

	5	8

... the same rate of change as the equation

	7	9

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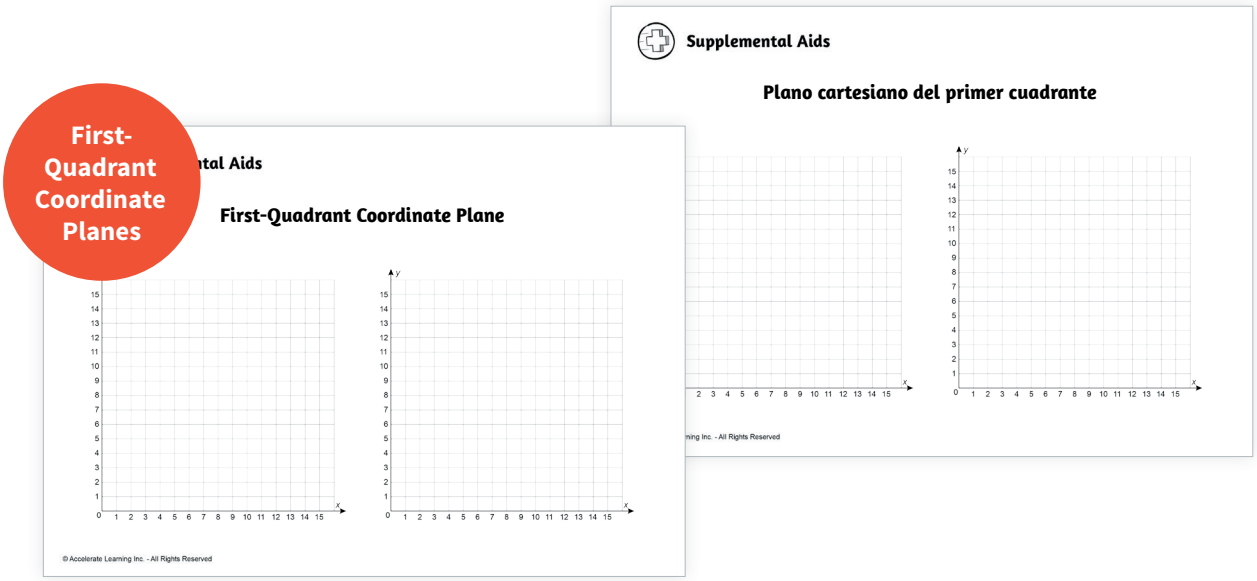
3

SUPPLEMENTAL AIDS - FIRST-QUADRANT COORDINATE PLANE

Students can use this coordinate plane to practice graphing ordered pairs.

Procedure and Facilitation Points

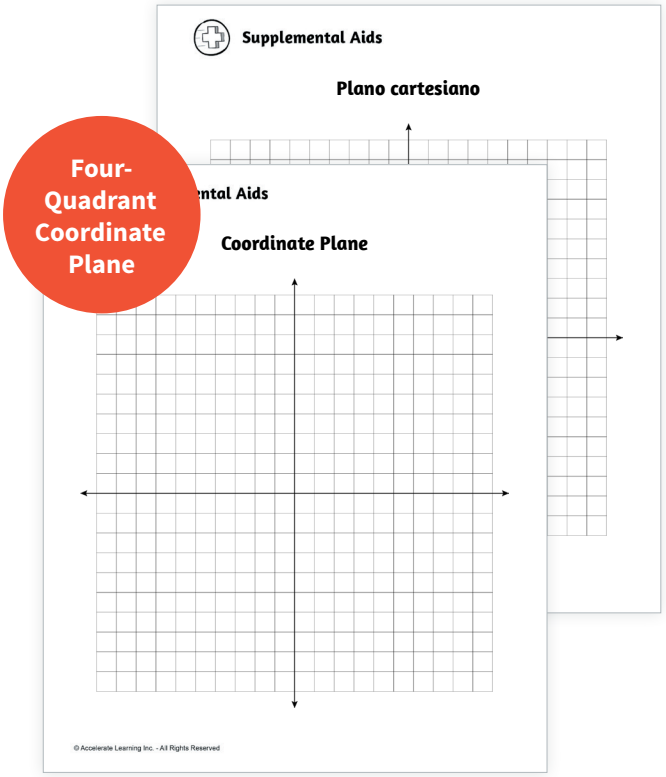
- A blank coordinate plane can be used to practice graphing ordered pairs and to reinforce the following concepts:
  - Describing attributes of the coordinate plane
  - Graphing ordered pairs in the first quadrant
  - Determining dependent and independent variables
  - Determining rates and unit rates
  - Representing linear relationships
  - Determining functions and nonfunctions
  - Graphing data sets
  - Finding patterns in data
- Model using the coordinate plane by completing the following steps:
  - Display the coordinate plane provided on the Student Handout: First-Quadrant Coordinate Plane.
  - Add a label and/or numbers to each axis to identify the x-axis, the y-axis, and the origin.
  - Model graphing ordered pairs.
  - Model determining dependent and independent variables.
  - Model finding the unit rate by looking at given rates.
  - Model identifying functions and nonfunctions.
  - Model finding patterns within data.
- If possible, laminate the coordinate plane so that students may use dry-erase markers to graph various points.



SUPPLEMENTAL AIDS - FOUR-QUADRANT COORDINATE PLANE

Students can use this four-quadrant coordinate plane to practice graphing ordered pairs.

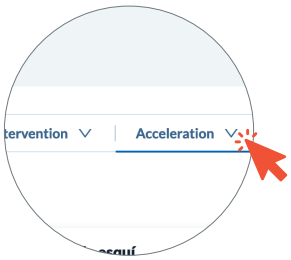
Procedure and Facilitation Points



- A blank four-quadrant coordinate plane can be used to practice graphing ordered pairs and reinforce the following concepts:
  - Describing attributes of the coordinate plane
  - Graphing ordered pairs
  - Graphing reflections
  - Determining the distance between two points
  - Determining dependent and independent variables
  - Determining rates and unit rates
  - Determining proportional relationships
  - Representing linear relationships
  - Solving pairs of linear relationships
  - Determining functions and nonfunctions
  - Modeling and comparing functions
  - Graphing data sets
  - Graphing transformations and dilations
  - Determining congruence and similarity
  - Pythagorean theorem
  - Finding patterns in data
- Model using the coordinate plane by following the steps outlined below:
  - Display the coordinate plane provided on the Student Handout: Coordinate Plane.
  - Add labels and/or numbers to each axis to identify the x-axis, the y-axis, and the origin.
  - Model graphing ordered pairs.
- If possible, laminate the coordinate plane so that students may use dry-erase markers to graph various points.

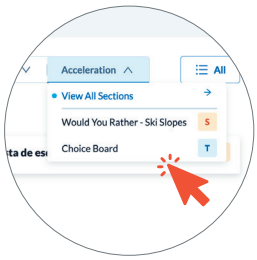
Acceleration

NAVIGATION STEPS



Click Acceleration

Click on Acceleration in the White Menu Bar



Review Content

Use the Dropdown to Review Acceleration Content

Acceleration activities allow students to dive deeper into the content and its applications, enhancing their understanding and engagement. These enrichment activities are designed for all students, providing opportunities to explore advanced concepts and develop critical thinking skills.

CHOICE BOARD

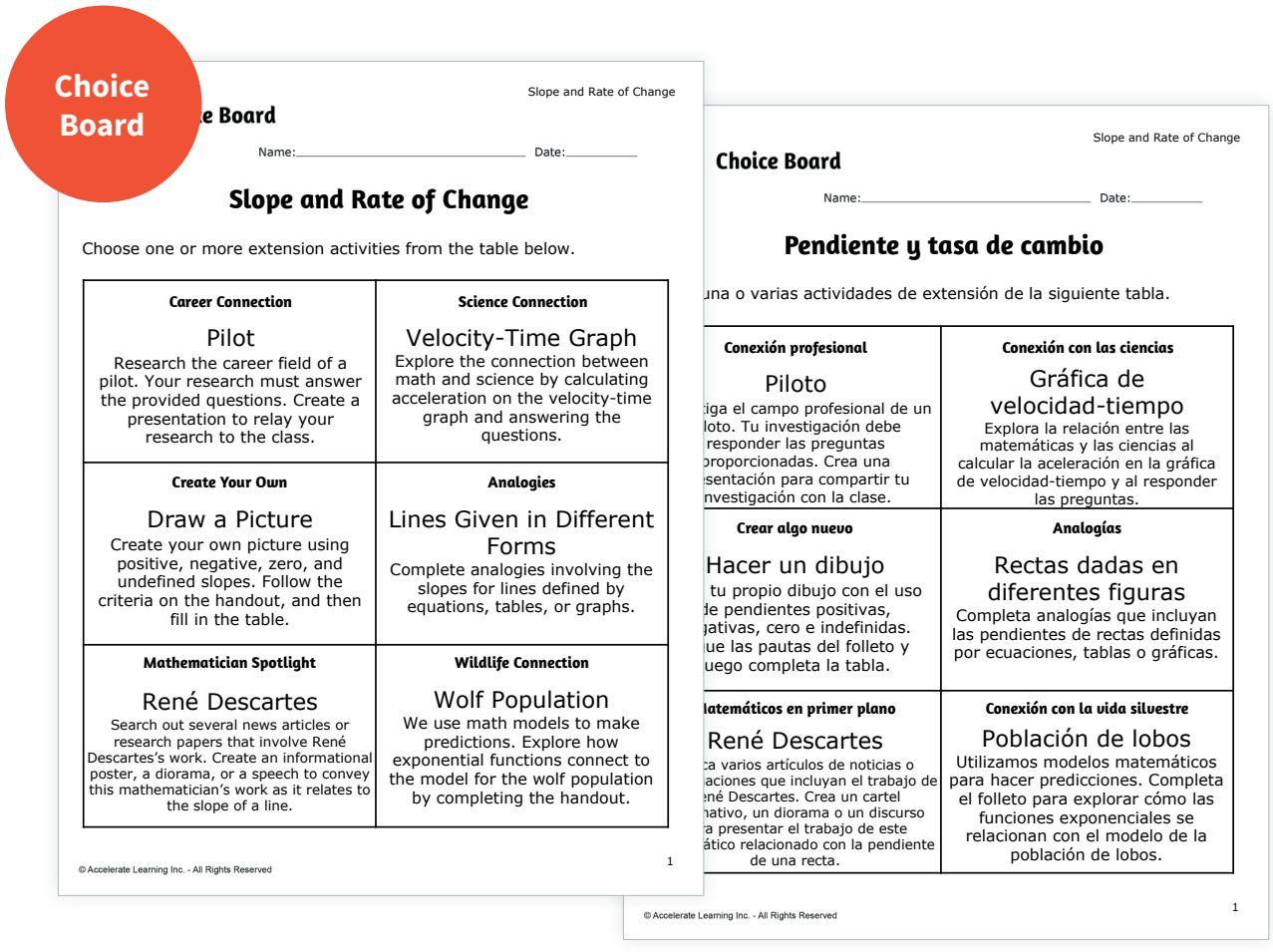
Students explore real-world connections and applications of math content through interactions with engaging activities.

Preparation

- Print a Choice Board and a set of Activity Handouts for each student.
- Print a Choice Board Self-Assessment for each student.
- Plan ahead for technology use. Research may be required for some activities on the Choice Board.

Procedure and Facilitation Points

1. Distribute a Choice Board to each student.
2. Allow students time to examine the Choice Board and select the activities they would like to explore.
3. Encourage students to attempt at least three activities.
4. Distribute the appropriate Activity Handouts according to students' choices.
5. Upon completion of each Choice Board activity, have students complete a Choice Board Self-Assessment to evaluate their own mathematical thinking and efforts on their project.



WOULD YOU RATHER - SKI SLOPES

Would You Rather is an enriching activity in which students use mathematical reasoning and creativity to justify their answers.

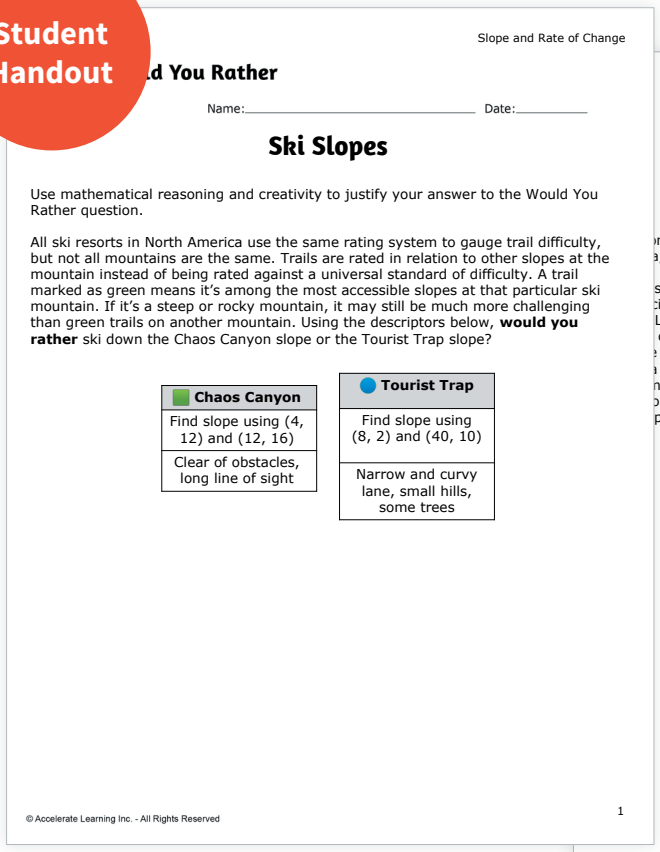
Preparation

- Print one copy of the Student Handout per student.
- Place students in pairs if desired.

Procedure and Facilitation Points

1. Distribute a Student Handout to each student.
2. Encourage students to look back at the Student Journals from the Explore activities if they need to review the skills they have learned.
3. Invite students to share their answers and justification with partners.

Student Handout



Slope and Rate of Change

d You Rather

Name:_____ Date:_____

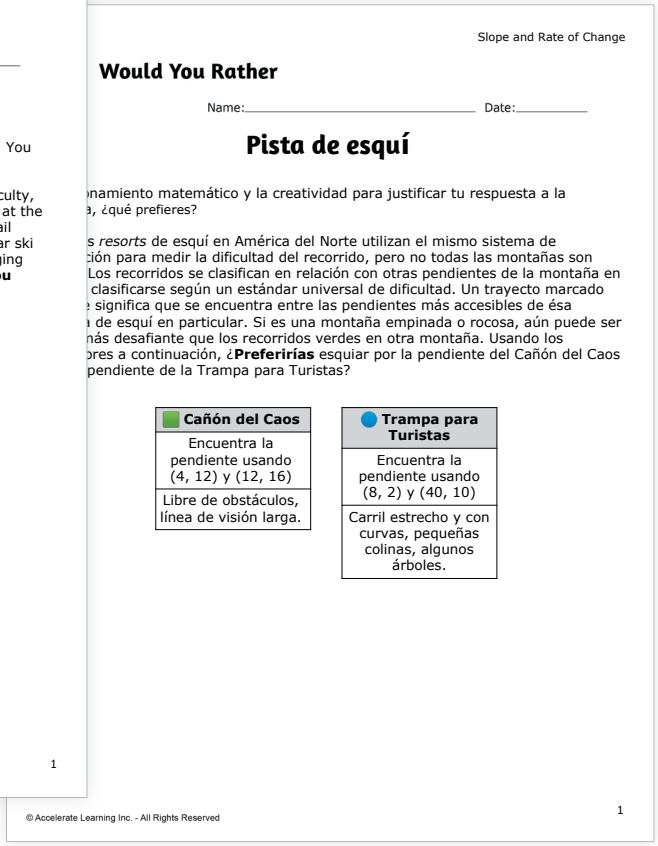
Ski Slopes

Use mathematical reasoning and creativity to justify your answer to the Would You Rather question.

All ski resorts in North America use the same rating system to gauge trail difficulty, but not all mountains are the same. Trails are rated in relation to other slopes at the mountain instead of being rated against a universal standard of difficulty. A trail marked as green means it's among the most accessible slopes at that particular ski mountain. If it's a steep or rocky mountain, it may still be much more challenging than green trails on another mountain. Using the descriptors below, **would you rather** ski down the Chaos Canyon slope or the Tourist Trap slope?

🟩 Chaos Canyon	🔵 Tourist Trap
Find slope using (4, 12) and (12, 16)	Find slope using (8, 2) and (40, 10)
Clear of obstacles, long line of sight	Narrow and curvy lane, small hills, some trees

1



Slope and Rate of Change

Would You Rather

Name:_____ Date:_____

Pista de esquí

namiento matemático y la creatividad para justificar tu respuesta a la
a, ¿qué prefieres?

s *resorts* de esquí en América del Norte utilizan el mismo sistema de
ción para medir la dificultad del recorrido, pero no todas las montañas son
Los recorridos se clasifican en relación con otras pendientes de la montaña en
clasificarse según un estándar universal de dificultad. Un trayecto marcado
significa que se encuentra entre las pendientes más accesibles de ésa
de esquí en particular. Si es una montaña empinada o rocosa, aún puede ser
nás desafiante que los recorridos verdes en otra montaña. Usando los
ores a continuación, ¿**Preferirías** esquiar por la pendiente del Cañón del Caos
pendiente de la Trampa para Turistas?

🟩 Cañón del Caos	🔵 Trampa para Turistas
Encuentra la pendiente usando (4, 12) y (12, 16)	Encuentra la pendiente usando (8, 2) y (40, 10)
Libre de obstáculos, línea de visión larga.	Carril estrecho y con curvas, pequeñas colinas, algunos árboles.

1

STEMscopes TEXAS MATH

POWERED BY ACCELERATE LEARNING

- 100% TEKS AND ELPS ALIGNED
- ALL STUDENT MATERIALS ARE AVAILABLE IN ENGLISH AND SPANISH
- ONE-STOP-SHOP FOR ALL TEACHER SUPPORT AND RESOURCES