STEMscopes TEXAS MATH
POWERED BY ACCELERATE LEARNING

Grade 8

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

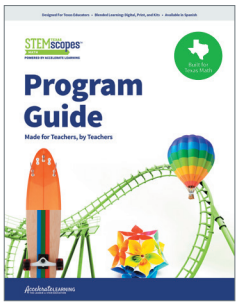
The following pages feature resources that mirror what teachers and students can access digitally. Each section includes clear navigation steps that seamlessly guide you through the content online, ensuring quick and easy access. Look for red circle callouts in the top left corner, which correspond directly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

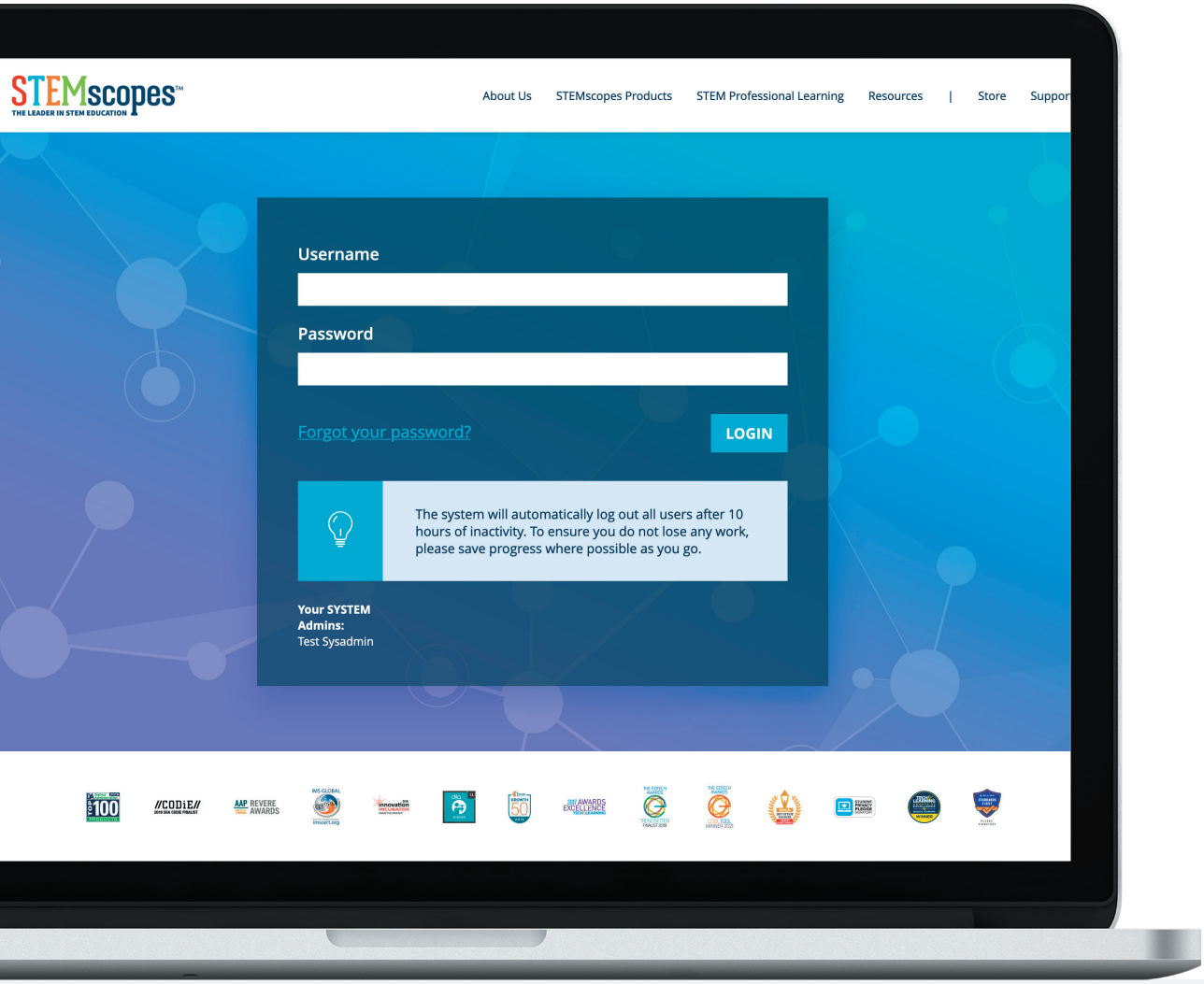
The entire STEMscopes Texas Math curriculum is online.

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.



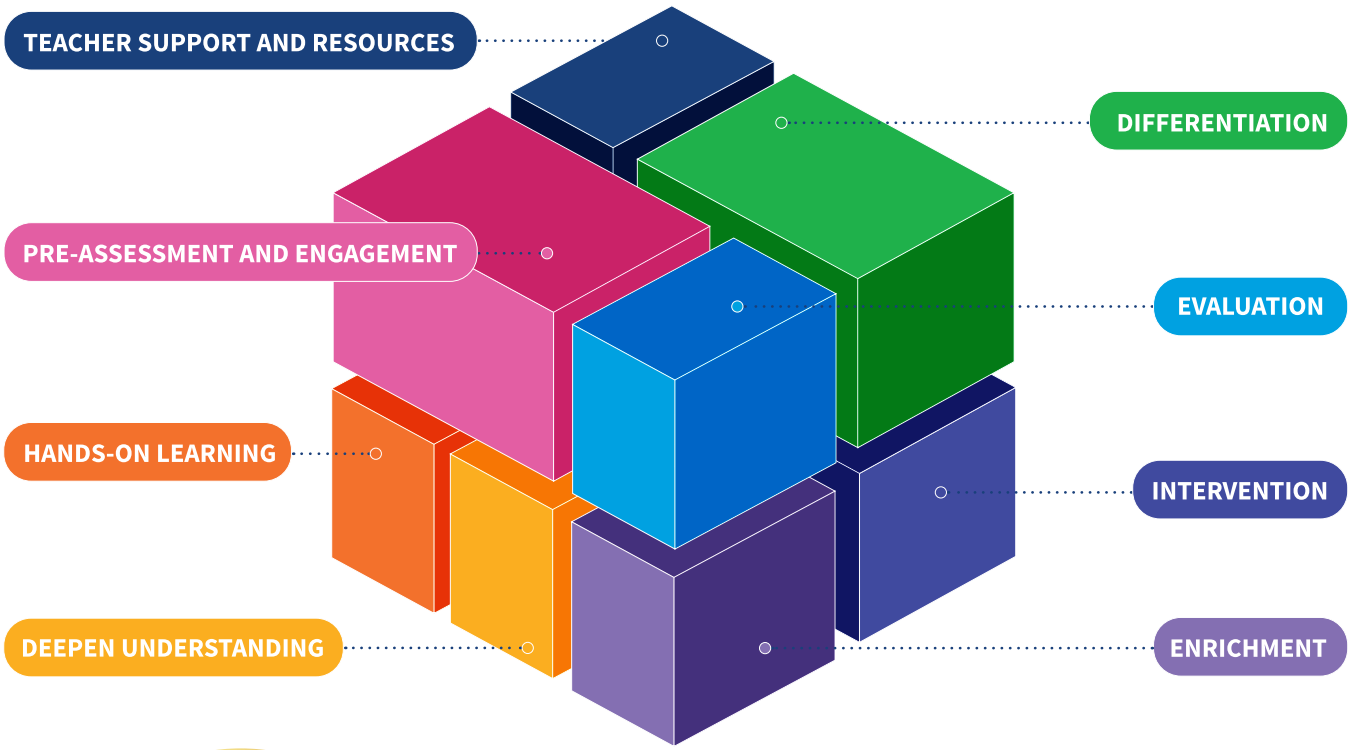
AccelerateLEARNING
THE LEADER in STEM EDUCATION

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



Grade 8 Lessons

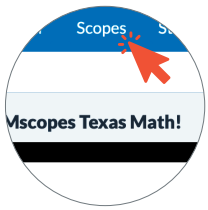
LESSON	TEKS
Real Numbers	8.2A, 8.2B, 8.2C, 8.2D
Equations and Inequalities	8.8A, 8.8B, 8.8C
Functions	**8.5G**
Proportional Relationships	8.4A, 8.4B, 8.5A, 8.5E
Non-Proportional Relationships	8.4C, 8.5B
Distinguish between Proportional and Non-Proportional	8.5F, 8.5H, 8.5I
Pairs of Linear Equations	8.9A
Bivariate Data	8.5C, 8.5D, 8.11A
Mean Absolute Deviation and Random Samples	8.11B, 8.11C
Pythagorean Theorem	8.6C, 8.7C, 8.7D
Angle Relationships	8.8D
Volume	8.6A, 8.6B, 8.7A
Surface Area	8.7B
Dilations	8.3A, 8.3B, 8.3C, 8.10D
Transformations	8.10A, 8.10B, 8.10C
Simple and Compound Interest	8.12A, 8.12B, 8.12C, 8.12D
Personal Financial Literacy	8.12E, 8.12F, 8.12G

Grade 8, Functions

NAVIGATION STEPS

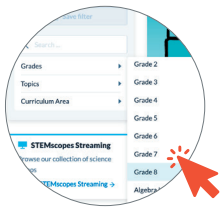
Log In

Use Your Credentials



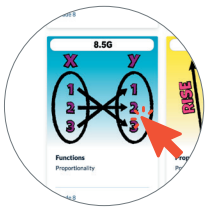
Click Scopes

Click on Scopes in the Blue Navigation Bar



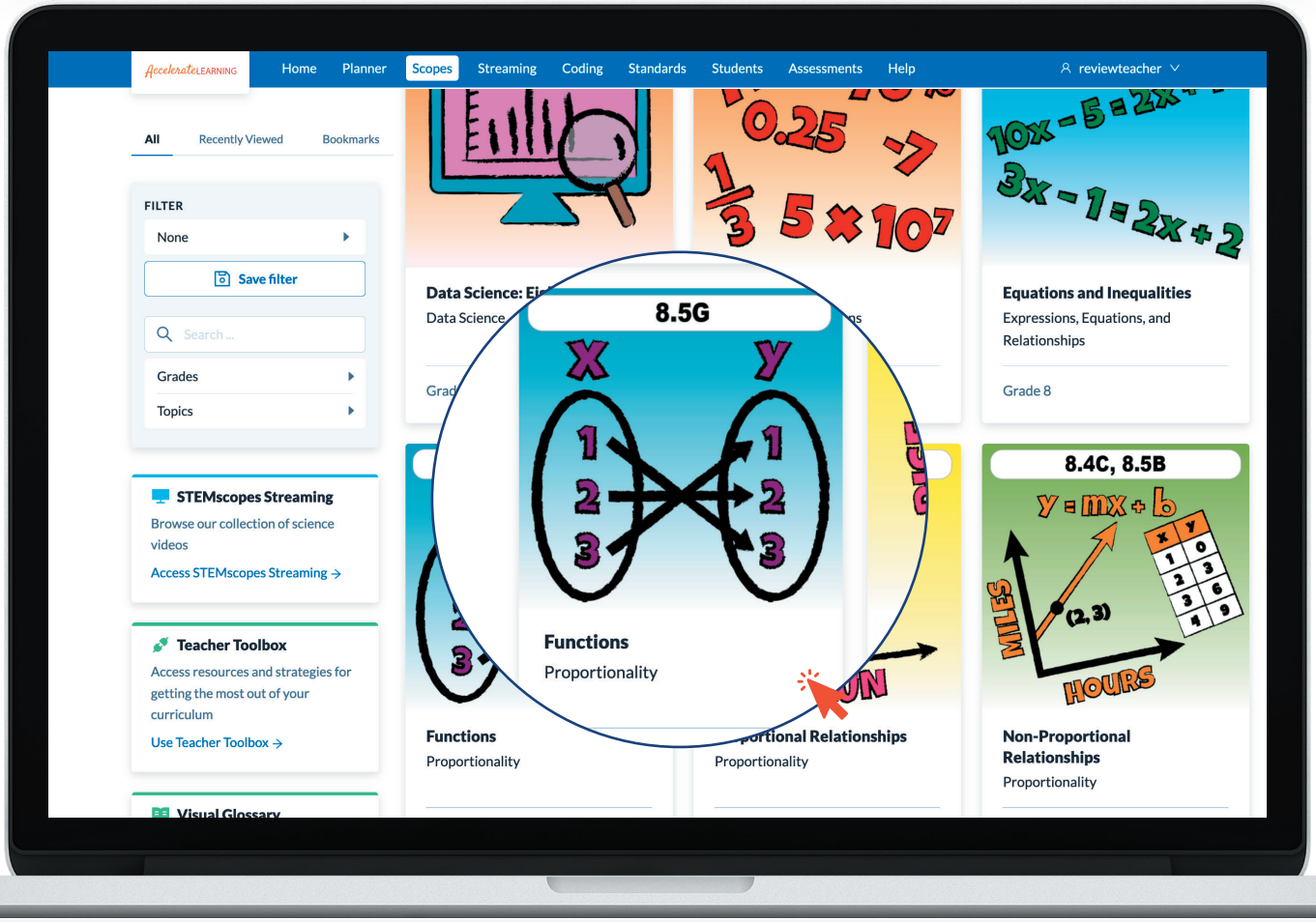
Filter

Filter to 8th Grade on the Left-Hand Side



Select Tile

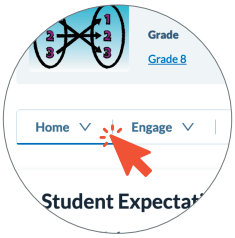
Select and Click on the Functions Scope Tile



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

Home

NAVIGATION STEPS



Click Home

Click on Home in the White Menu Bar

Review Content

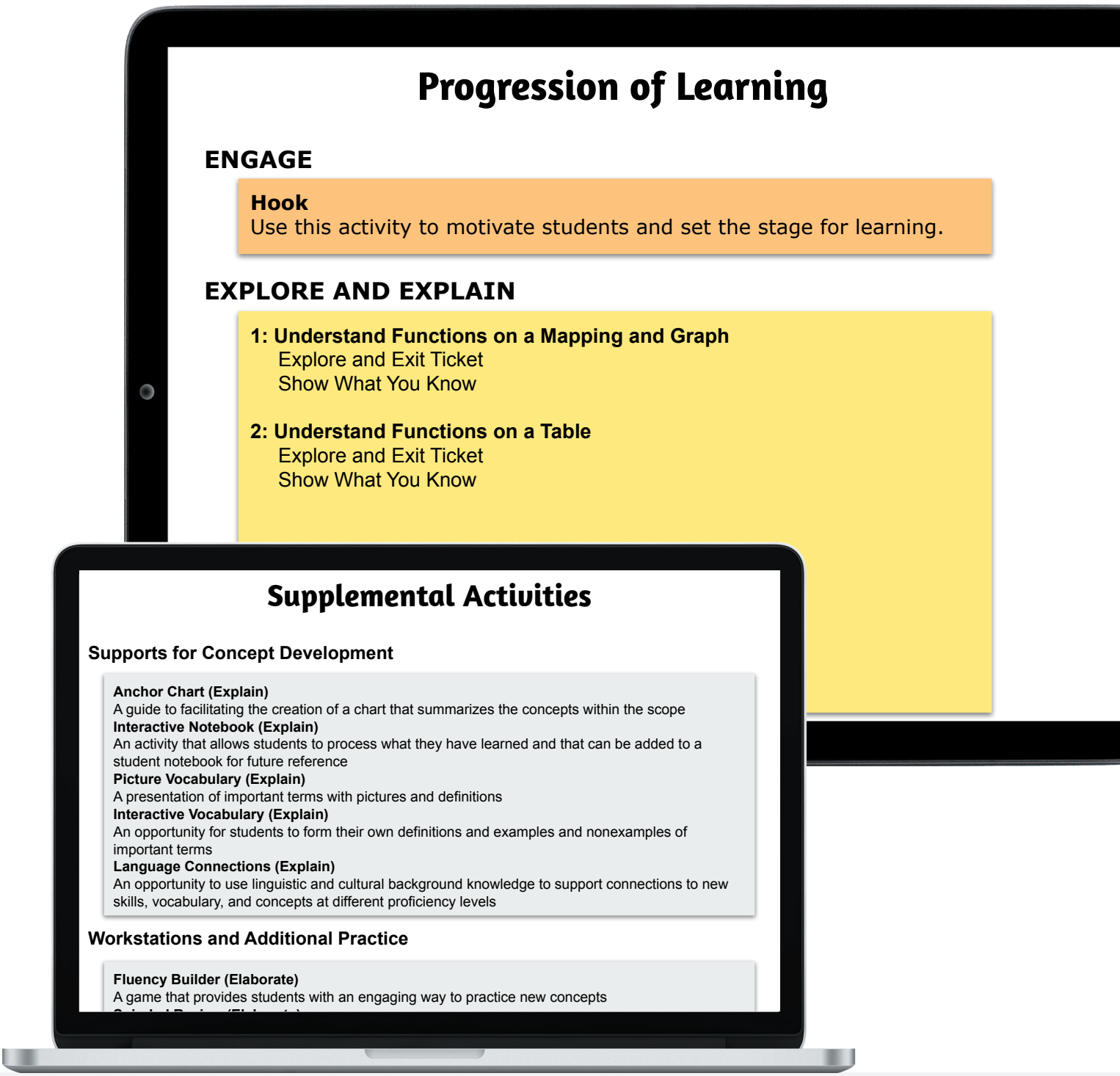
Use the Dropdown to Review Teacher Support and Resources

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.



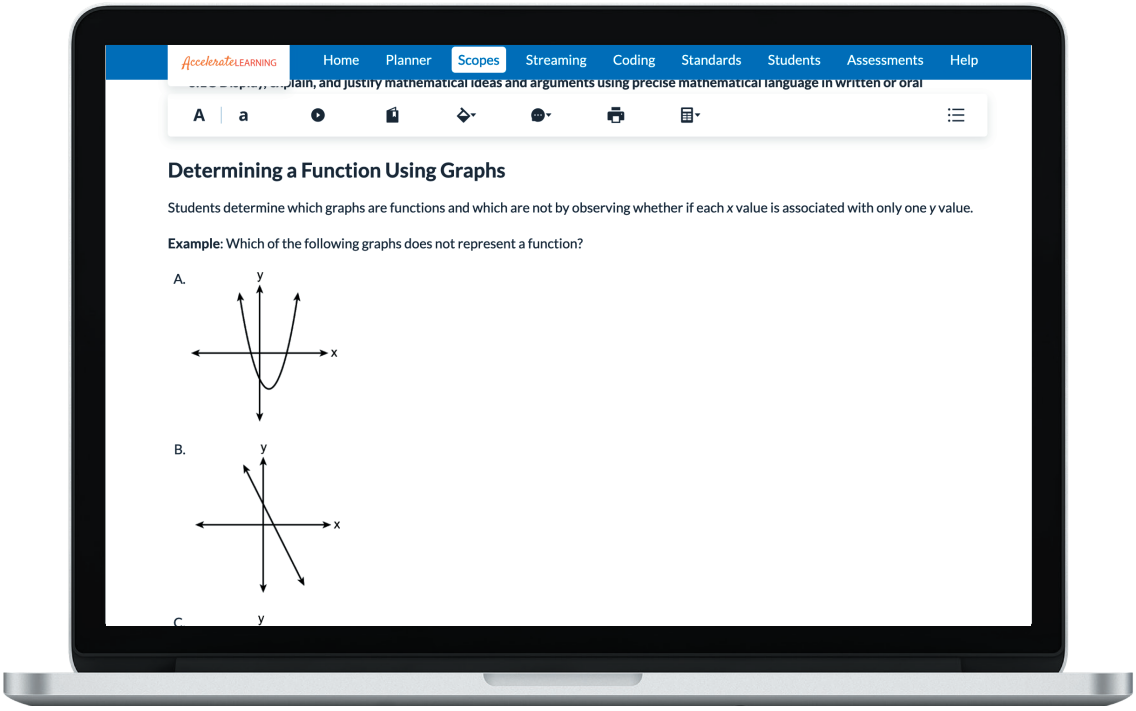
CONTENT SUPPORT

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.

8.5G Identify functions using sets of ordered pairs, tables, mappings, and graphs.

Background Knowledge

In previous grade levels, students learn how to plot points on a graph. They identify independent and dependent quantities from tables and graphs. They learn to represent the relationship between independent and dependent quantities using tables, graphs, and equations. All of these concepts tie together in order for students to understand the basics of functions.



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

8.5G Identify functions using sets of ordered pairs, tables, mappings, and graphs.

Dissecting the Standard

Breakouts

8.5G

(i) Identify functions using sets of ordered pairs.

(ii) Identify functions using tables.

(iii) Identify functions using mappings.

(iv) Identify functions using graphs.

Verbs: What should students be doing?

- *identify*: to recognize and establish what something is

Nouns: What concrete words should students know?

- *function*: a special relationship between values; each input value gives back exactly one output value
- *graph*: a visual representation of data
- *mapping*: a function represented by two sets of objects with arrows drawn between them to show relationships between the objects or data
- *ordered pair*: the location of a single point on a coordinate plane where the first and second values represent the position relative to the x-axis and y-axis, respectively (x, y); also known as coordinate pair
- *table*: a chart that uses rows and columns to organize information

Vertical Alignment

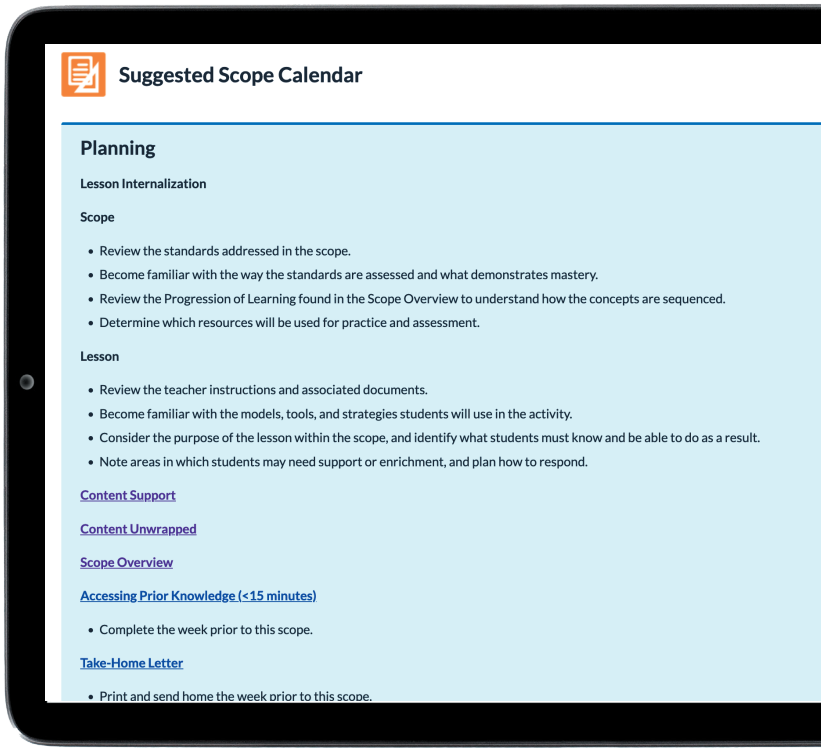
STANDARD
6.6A Identify independent and dependent quantities from tables and graphs
8.5G Identify functions using sets of ordered pairs, tables, mappings, and graphs.
A.2A Determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities.
A.6A Determine the domain and range of quadratic functions and represent the domain and range using inequalities.
2A.7I Write the domain and range of a function in interval notation, inequalities, and set notation.

Implications for Instruction

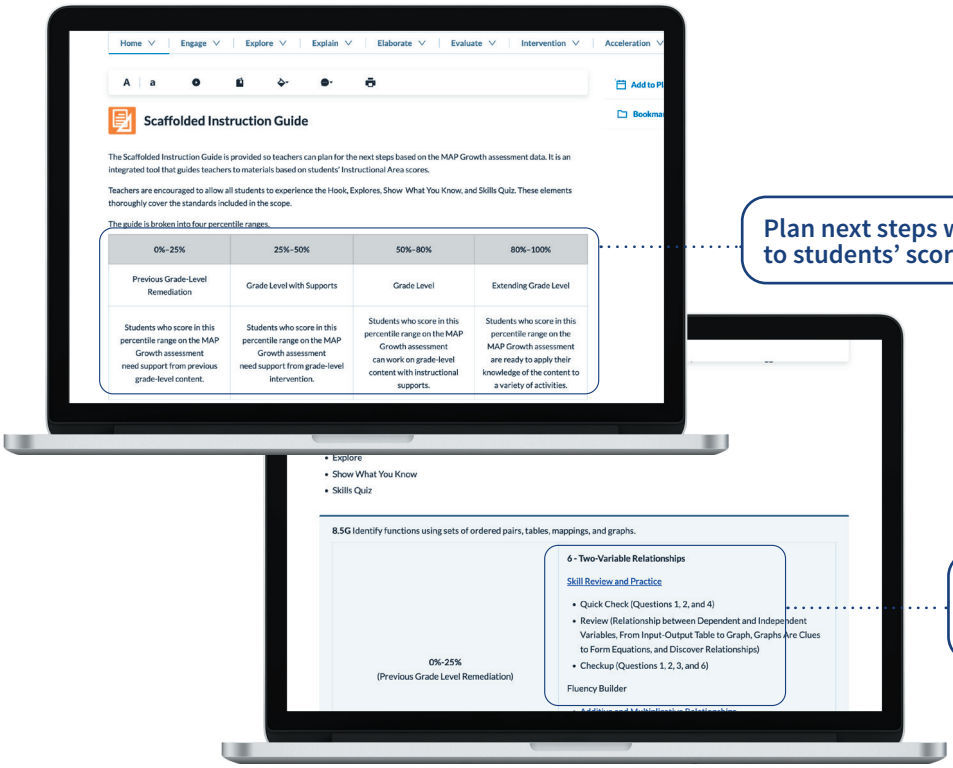
- Previously, students identified independent and dependent quantities, wrote equations from these quantities, and represented constant rates of change.
- Students should also be exposed to using the vertical line test to determine if a graph represents a function.
- Students may struggle with identifying linear and proportional relationships with data sets.
- Students may incorrectly believe that only linear data represent functions.

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.

Eighth Grade: Functions

In math class, your student is about to explore functions. To master this skill, they will build on their knowledge of representing the relationship between independent and dependent quantities using tables, graphs, and equations. As your student extends their knowledge of this concept throughout eighth grade, they will learn the following concepts:

- Understand that in a function, a rule is created that assigns every input to exactly one output. Students will be able to identify functions using graphs.

  Example: Which of the following graphs does not represent a function?

A.

B.

C.

D.

Math outside the Classroom!

Functions are used all around our everyday lives. Chat about where you use functions in your everyday life. Here are a few examples:

- ★ Look at the basic plan for your cell phone. Each month should have charged you the same amount. Discuss how each month does not have two different amounts you owe, but every month you are charged the same amount. This is a function because every input (month) has one output (price) even though it is the same price each month.
- ★ Plan a trip to the zoo for you and your student. You can create ordered pairs to show the price for one adult ticket and one child's ticket. Discuss how this would not be an example of a function because there are two prices that match to one ticket.
- ★ Take a trip to the grocery store. As you are driving, find landmarks to plot your distance from home along with the amount of time you have been driving. On the return trip, find the same landmarks, but continue adding your time from your trip to the store. Discuss how you are in the same place, but it took you a different amount of time to get there.

5

Octavo grado. Funciones

En la clase de Matemáticas, su estudiante está a punto de explorar sobre funciones. Para dominar esta destreza, incrementará su conocimiento de representar las relaciones entre cantidades independientes y dependientes con el uso de tablas, gráficas y ecuaciones. A medida que su estudiante amplíe su conocimiento de este concepto a lo largo de octavo grado, aprenderá los siguientes conceptos:

- Comprender que en una función, se crea una regla que asigna cada entrada a una sola salida. Los estudiantes serán capaces de identificar funciones con el uso de gráficas.

  Ejemplo: ¿Cuál de las siguientes gráficas no representa una función?

A. 

B. 

C. 

Mientras trabaja con su estudiante en casa, puede que los siguientes términos de vocabulario le sean de ayuda en su comunicación acerca de las funciones. Estos son términos que su estudiante será motivado a usar durante nuestras exploraciones y las charlas de matemáticas, las cuales son breves discusiones en grupo a la conclusión de cada actividad.

- **Coordenada X:** El primer término en un par ordenado; proporciona la ubicación a lo largo del eje X dentro del plano de coordenadas.
- **Coordenada Y:** El segundo término en un par ordenado; proporciona la ubicación a lo largo del eje Y dentro del plano de coordenadas.
- **Entrada:** Conjunto de valores suministrados a una función.
- **Función:** Una relación especial entre valores; cada valor de entrada devuelve exactamente un valor de salida.
- **Gráfica:** Una representación visual de datos.
- **Mapeos:** Una función representada por dos conjuntos de objetos con flechas dibujadas entre ellos para mostrar relaciones entre los objetos o datos.
- **Par ordenado:** La ubicación de un solo punto en un plano cartesiano donde el primero y el segundo valor representan la posición relativa al eje X y al eje Y, respectivamente (X, Y); también conocido como par coordinado.
- **Prueba de recta vertical:** Una manera visual de saber si una recta es una función; si cualquier recta vertical interseca la gráfica más de una vez, entonces la gráfica no es una función.
- **Salida:** Resultado de la entrada colocada en la función.
- **Tabla:** Una gráfica que usa filas y columnas para organizar información.

Haremos muchas exploraciones en clase para ayudar a su estudiante a aprender estos conceptos a través de experiencias directas. Anime a su estudiante a compartir estas experiencias con usted y a enseñarle lo que ha aprendido. Pida a su estudiante que identifique ejemplos de lo que aprende diariamente; que use los ejemplos de la página adjunta como punto de partida.

Gracias por su colaboración mientras su estudiante comienza esta nueva aventura de aprendizaje.

5

Available in Spanish!

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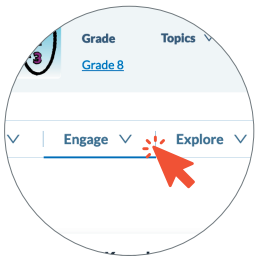
Engage

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 identify two truths and a lie by reading statements about the prior standard. This element is designed to uncover student misconceptions; it should not be taken for a grade.

Preparation

- Print the Student Handout for each student or each group.
- You may choose to put students in groups of two or three.

Procedure and Facilitation Points

1. Read the prompt aloud to the class.
2. Allow 2 minutes of thinking time for the students to read the three statements and determine which two statements are truths and which one is the lie.
3. Ask students to share with shoulder partners how they marked their sheets and why.
4. Allow 2–5 minutes of discussion.
5. 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. *The second statement is a lie. The equation should read y= 30x+ 75.*
6. 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.

Two Truths and a Lie

Functions

essing Prior Knowledge

Name:_____ Date:_____

Two Truths and a Lie

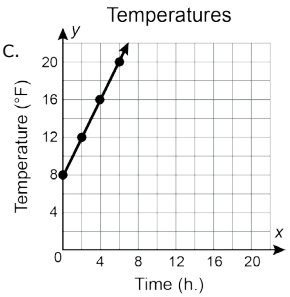
Read each statement. Identify the two truths with check marks and the one lie with an X.

A.

Months	Amount
3	1,000
5	2,000
7	3,000
9	4,000

B. $y = 75x + 30$

C.



☐ The point (11, 6000) would exist in the function represented by Table A.

☐ In Equation B, you started your bank account with $75. You are earning $30 a month by helping your neighbor.

☐ Graph C shows an increase in temperature as a result of the increase in time.

Functions

rior Knowledge

Name:_____ Date:_____

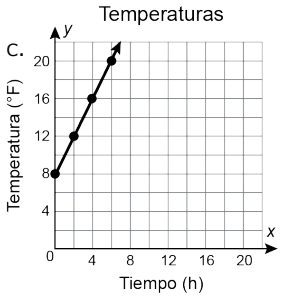
verdades y una mentira

ifica las dos verdades con marcas de verificación y la

ad

B. $y = 75x + 30$

C.



☐ , 6000) existiría en la función representada por la tabla A.

☐ ón B, empezaste una cuenta bancaria con $75. Ganas $30 yudar a tu vecino.

☐ La gráfica C muestra un aumento en la temperatura como resultado del aumento en el tiempo.

1

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, a whiteboard, and a dry-erase marker, or provide paper and a pencil. 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 determine whether the statement is true or false. Explain that 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. Tell students to listen for your cue. When you say, "One! Two! Three! Showdown!" students hold up the True or False side of their cards to face their partners.
5. Have students take turns using complete sentences to verbally justify their determination. Provide sentences as needed: "I disagree with the statement...because...and to fix the statement, I would or "I agree with the statement...because..."
6. Clarify and/or verify the appropriate answer with the whole class.
7. Repeat steps 3–6 for each statement.

True or False Showdown Slideshow

Foundation Builder

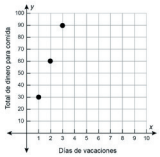
Semanas	Cantidad ahorrada
1	$15
2	$30
3	$45
4	$60
5	$75

«Semanas» es la variable dependiente.

«Dinero

Foundation Builder

Dinero para comida de Sammy



«Días de vacaciones» es la variable independiente.

«Hamburgues

Foundation Builder

Semanas	Millas en bicicleta
1	25
2	50
3	75
4	100
5	125

«Millas en bicicleta» es la variable independiente.

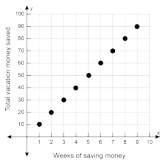
«Cantidad t

Weeks	Amount Saved
1	$15
2	$30
3	$45
4	$60
5	$75

"Weeks" is the dependent variable.

Foundation Builder

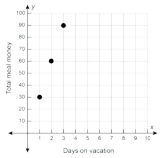
Sammy's Vacation Savings



"Money saved" is the dependent variable.

Foundation Builder

Sammy's Meal Money



"Days on vacation" is the independent variable.

Foundation Builder

Hamburgers Bought	Money Spent
1	2.75
2	5.50
3	8.25
4	11.00
5	13.75

"Hamburgers bought" is the independent variable.

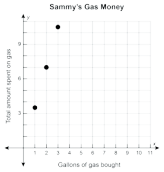
Foundation Builder

Weeks	Miles Biked
1	25
2	50
3	75
4	100
5	125

"Miles biked" is the independent variable.

Foundation Builder

Sammy's Gas Money



"Total amount spent" is the dependent variable.

True or False Cards

ion Builder

ue or False Cards double-sided, and cut them apart.

True	True

Foundation Builder

Falso	Falso

HOOK - FUNCTION OR MALFUNCTION?

Use the Hook to motivate students and start to connect their learning to real-world contexts. Students identify functions using sets of ordered pairs, tables, mappings, and graphs.

Preparation

- Plan to show the Phenomena.
- Prepare to project Function or Malfunction? 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 have students move to the Explore activities, returning 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: *Sherman's older sister Haddie is starting a cupcake business. First, she baked in her kitchen for small events. People loved her cupcakes so much that she has saved enough money to buy a food truck! She has collected all sorts of data on flavors, prices, locations, times, expenses, ingredients, advertising, and other considerations. She has put a lot of information into graphs, tables, and diagrams to make the information easy to interpret. Haddie believes that all her displays of information are functions. Sherman says they are not. Which sibling is correct?*
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. Have you ever made cupcakes in your kitchen?
    b. Have you ever been to a food truck?
5. Project Function or Malfunction?
6. Explain to students that Sherman is looking at four representations of data and says that some are not functions. He can tell by looking at them.
    a. **DOK-1** What do you think a function is? *Accept all reasonable answers.*
    b. **DOK-1** How did Haddie display her data? *Tables, ordered pairs, graphs, and diagrams*
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 Function or Malfunction? and discuss the following questions with the class:
   a. **DOK-1** What is a function? *A function is a special relationship where each input has a single output.*
   b. **DOK-2** If something is a function, how many y values exist for each x value? *Only one y value exists for each x value.*
   c. **DOK-2** How can you determine whether something is NOT a function? *It will have more than one y value for an x value.*
   d. **DOK-2** Can something be a function if a y value has more than one x value? *Yes, it can be a function.*
   e. **DOK-2** In square number one, is there more than one y value for each x value? Is it a function? *No, each x value has only one y value, so it is a function.*
   f. **DOK-2** In square number two, is there more than one y value for each x value? Is it a function? *No, each x value has only one y value, so it is a function.*
   g. **DOK-2** Determine whether square number three is a function. *No, it is not, because there are two y values for the x value of 8.*
   h. **DOK-1** Determine whether square number four is a function. *No, square number four is not a function because the x value of 1 has y values of both 20 and 25.*

Functions

Hook

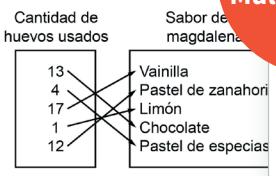
¿Función o disfunción?

Function or Malfunction?

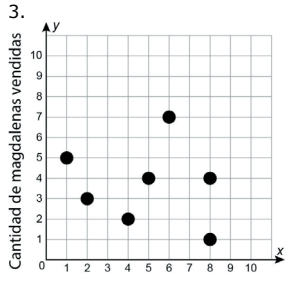
1.

Cantidad de horas abierto, *x*	Cantidad de magdalenas vendidas, *y*
1	10
2	10
4	10
6	10
8	10

2.



3.



4.

Los siguientes pares ordenados representan los efectos de las redes sociales en el anuncio del negocio de magdalenas de Haddie donde *x* representa el número de anuncios publicados en redes sociales y *y* representa el número de magdalenas vendidas ese día.

(0, 10)
(1, 20)
(1, 25)
(2, 30)
(3, 40)

Functions

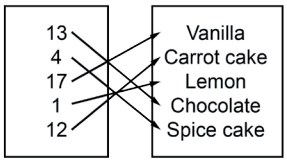
Hook

Function or Malfunction?

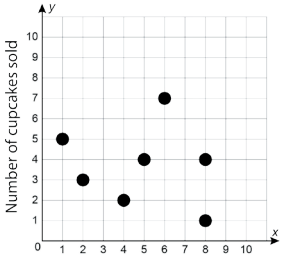
1

Number of hours open, *x*	Number of cupcakes sold, *y*
1	10
2	10
4	10
6	10
8	10

2



3



4

The following ordered pairs represent the effects of social media advertising on Haddie's cupcake business, where *x* represents the number of advertisements posted on social media, and *y* represents the number of cupcakes sold that day.

(0, 10)
(1, 20)
(1, 25)
(2, 30)
(3, 40)

Scan and Watch the Hook Phenomena Video

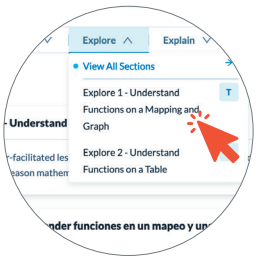
Home | Engage | **Explore** | Explain | Elaborate | Evaluate | Intervention | Acceleration

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 - UNDERSTAND FUNCTIONS ON A MAPPING AND GRAPH

Students determine which graphs are functions and which are not by looking at them. They will be able to compare the graphs of functions and nonfunctions to one another.

Mathematical Process Standards

- (D) Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- (F)Analyze mathematical relationships to connect and communicate mathematical ideas.
- (G) Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Preparation

- Plan to have students work in groups of 4 to complete this activity.
- Print a Student Journal for each student.
- Print a set of the Monthly Deposits Cards for each group. Cut out and place each set of cards in a quart-sized resealable bag. If desired, print them on card stock, and laminate them for future use.
- Print an Exit Ticket for every 2 students. Cut apart the half-page Exit Tickets so each student has one.

Procedure and Facilitation Points

Part I

1. Read the following scenario to the class: *Rosie is the sole owner of Rosie's Boutique. As owner, she has the job of making sure that all of the store's finances are well documented. It is almost tax season, and her accountant has asked her to gather together important documents and send them over to him. Before she can do that, she must create monthly and quarterly graphs of her deposits and revenues. Help Rosie analyze her diagrams to determine whether they are functions or not.*
2. Help students access the task using the following guiding questions:
3. Have you tried budgeting your allowance? How did you keep track of your spending and saving?
   a. How do you think running a business and budgeting are similar or different?
   b. Distribute a Student Journal to each student.
4. Have students use the diagrams to determine if they are functions.
5. Monitor students, and check for understanding as needed using the following guiding questions:
   a. **DOK-2** In Diagram 1, why are three different arrows pointing to 1,550? *Three inputs all have the same output.*
   b. **DOK-2** In Diagram 2, why are there two different arrows coming from 5? *5 has two different outputs.*
6. Allow students enough time to complete Part I.

Student Journal

Functions

Name:_____ Date:_____

Understand Functions on a Mapping and Graph

Use diagrams 1 and 2 to complete the table.

Diagram 1

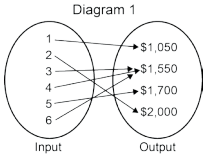
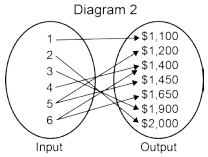


Diagram 2



Fill in the following table by writing *yes* or *no* answers.	Diagram 1	Diagram 2
Do any input values repeat (have more than one arrow)?		
Do any output values repeat (have more than one arrow)?		

What would the *x* value of an ordered pair represent? (Circle one.) Input Output

What would the *y* value of an ordered pair represent? (Circle one.) Input Output

Functions

Explore

Part II

Use the graphs and maps on the Monthly Deposits Cards to answer the questions.

January	February
What is/are the output(s) when the input is 3? _____ What is the input when the output is 150? _____ Do any of the inputs have more than one output? Yes / No Is this a function? Yes / No	What is/are the output(s) when the input is 2? _____ What is the input when the output is 350? _____ Do any of the inputs have more than one output? Yes / No Is this a function? Yes / No
March	**April**
What is/are the output(s) when the input is 4? _____ What is the input when the output is 300? _____ Do any of the inputs have more than one output? Yes / No Is this a function? Yes / No	What is/are the output(s) when the input is 4? _____ What is the input when the output is 300? _____ Do any of the inputs have more than one output? Yes / No Is this a function? Yes / No

Functions

Explore

May	June
List the coordinates of the 6 points on the graph. Is this a function? _____ What point can you remove to make this a function?	Which additional point can be plotted so that the graph continues to represent a function? A. (1, 100) B. (2, 100) C. (3, 100) D. (4, 100)
July	**August**
Do any of the inputs have more than one output? Yes / No Do any of the outputs have more than one input? Yes / No Is this a function? Why or why not? Which point can you remove to make this a function?	Place points on the graph so that it is not a function. 

Functions

Explore

September	October
List the inputs. List the outputs. Write each pair as a coordinate. Is this a function? Why or why not?	List the inputs. List the outputs. Write each pair as a coordinate. Is this a function? Why or why not?
November	**December**
List the inputs. List the outputs. Write each pair as a coordinate. Is this ... why not?	Write each coordinate. List two coordinates that could be added to keep this a function. List two coordinates that could be added that would not make this a function.

Functions

Explore

Reflect

1. When Rosie counts her money more than once a week in Part II, does this represent a function? Why or why not?

2. Define a function in your own words.

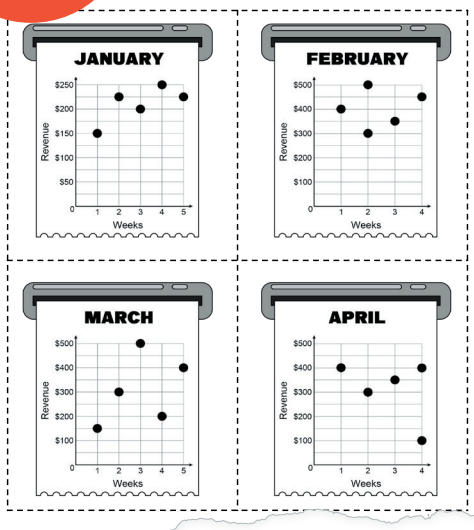
3. What do duplicate inputs create on a graph?

4. Do duplicate output values affect whether a graph is a function or not? Why or why not?

Monthly Deposit Cards

Functions

Monthly Deposits Cards



Student Journal

Name:_____ Date:_____

...prender funciones en un mapeo y una gráfica

...diagramas 1 y 2 para completar la tabla.

Diagrama 1

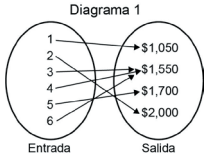
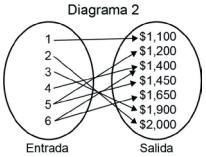


Diagrama 2



Escribe las respuestas *sí* o *no* para completar la siguiente tabla.

	Diagrama 1	Diagrama 2
¿Se repite algún valor de entrada (tiene más de una flecha)?		
¿Se repite algún valor de salida (tiene más de una flecha)?		

¿Cuál podría ser el valor de *x* de un par ordenado? (Encierra uno con un círculo). Entrada Salida

¿Cuál podría ser el valor de *y* de un par ordenado? (Encierra uno con un círculo). Entrada Salida

Explore

Parte II

Utiliza las gráficas y los mapas en las «Tarjetas de depósitos mensuales» para responder las preguntas.

Enero	Febrero
¿Cuál(es) es/son la(s) salida(s) cuando la entrada es 3?	¿Cuál(es) es/son la(s) salida(s) cuando la entrada es 2?
¿Cuál es la entrada cuando la salida es 150?	¿Cuál es la entrada cuando la salida es 350?
¿Alguna de las entradas tiene más de una salida? Sí / No	¿Alguna de las entradas tiene más de una salida? Sí / No
¿Es esta una función? Sí / No	¿Es esta una función? Sí / No
Marzo	**Abril**
¿Cuál(es) es/son la(s) salida(s) cuando la entrada es 4?	¿Cuál(es) es/son la(s) salida(s) cuando la entrada es 4?
¿Cuál es la entrada cuando la salida es 300?	¿Cuál es la entrada cuando la salida es 300?
¿Alguna de las entradas tiene más de una salida? Sí / No	¿Alguna de las entradas tiene más de una salida? Sí / No
¿Es esta una función? Sí / No	¿Es esta una función? Sí / No

Explore

Mayo	Junio
Escribe las coordenadas de los 6 puntos en la gráfica. ¿Es esta una función? ¿Qué punto puedes quitar para que sea una función?	¿Qué punto adicional se puede graficar para que la gráfica continúe representando una función? A. (1, 100) B. (2, 100) C. (3, 100) D. (4, 100)
Julio	**Agosto**
¿Alguna de las entradas tiene más de una salida? Sí / No ¿Alguna de las salidas tiene más de una entrada? Sí / No ¿Es esta una función? ¿Por qué sí o por qué no? ¿Qué punto puedes quitar para que sea una función?	Coloca puntos en la gráfica para que no sea una función. 

Explore

Septiembre	Octubre
Escribe las entradas. Escribe las salidas. Escribe cada par como una coordenada. ¿Es esta una función? ¿Por qué sí o por qué no?	Escribe las entradas. Escribe las salidas. Escribe cada par como una coordenada. ¿Es esta una función? ¿Por qué sí o por qué no?
Noviembre	**Diciembre**
Escribe las entradas. Escribe las salidas. Escribe cada par como una coordenada. ¿Es est... ...or qué sí o por qué no?	Escribe cada coordenada. Escribe dos coordenadas que se podrían agregar para que aún sea una función. Escribe dos coordenadas que se podrían agregar para que aún sea una función.

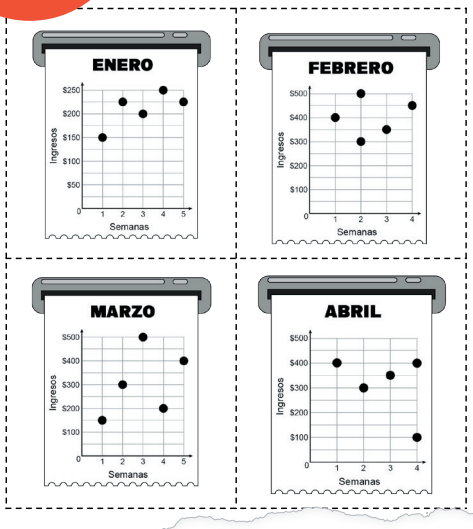
Explore

Reflexionar

1. Cuando Rosita cuenta su dinero más de una vez por semana en la parte II, ¿representa esto una función? ¿Por qué sí o por qué no?
2. Define una función con tus palabras.
3. ¿Qué crean las entradas duplicadas en una gráfica?
4. ¿Afectan los valores de salida duplicados si un gráfico es una función o no? ¿Por qué sí o por qué no?

Monthly Deposit Cards

...etas de depósitos mensuales



Math Chat

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

Questions	Sample Student Responses
Choose a Structured Conversation routine to facilitate the following question: **DOK-2** How many outputs were there for each input in Diagram 1?	Each input has exactly one output in Diagram 1.
Explain the following to the class: *Mathematicians call this type of diagram a function. A function is when each input has exactly one output.*	
DOK-2 How many outputs were there for each input in Diagram 2?	In Diagram 2, 1, 2, 3, and 4 each had exactly one output, but 5 and 6 each had two outputs.
DOK-2 Is Diagram 2 showing a function?	No, Diagram 2 does not show a function because there are two inputs that have more than one output.

Part II

1. Read the following scenario to the class: *At the end of each week, Rosie counts all of the revenue from the store and writes it down. On particularly busy weeks, she may count the money more than once. She then creates a monthly graph to compare her weekly revenue. Help decipher Rosie's graphs in order to help answer questions for her accountant.*
2. Help students access the task using the following guiding questions:
   a. **DOK-2** What experience do you have working with money?
   b. **DOK-2** What experience do you have working with graphs?
3. Distribute a set of Monthly Deposits Cards to each group.
4. Explain to the students that they will be analyzing the graphs and maps of each month to determine whether they are functions or not. They will be discussing the different inputs and outputs and how they can be arranged in order to make functions.
5. Monitor students, and check for understanding as needed using the following guiding questions:
   a. **DOK-1** How do you know when there is more than one output? *There is more than one output for one input if there are multiple y values for the same x value.*
   b. **DOK-1** Which value determines whether the graph is a function, the input or the output? *The input determines if the graph is a function.*
   c. **DOK-1** How can inputs and outputs be written as coordinates on a graph? *Inputs are the x values, and outputs are the y values.*
6. Allow students enough time to complete Part II and answer the reflection questions.
7. Ask students to share their strategies and encourage students to ask each other questions and make connections. Encourage students to notice the similarities and differences between the strategies used to determine functions from diagrams and graphs.
8. After Part II, invite the class to a Math Chat to share their observations and learning.

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 When Rosie counts her money more than once a week in Part II, does this represent a function? Why or why not?	It does not represent a function. When she counts her money more than once, it creates two different outputs for the same input.
DOK-1 Define a function in your own words.	A function is when one *x* value does not have multiple *y* values.
Choose a Structured Conversation routine to facilitate the following question: **DOK-1** Do duplicate output values with different input values affect whether a graph is a function or not? Why or why not?	No, they do not. A function only focuses on the uniqueness of the input.

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

Functions

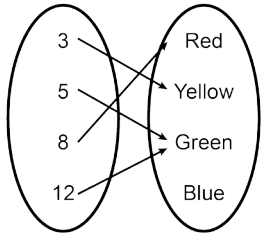
plore

Name:_____ Date:_____

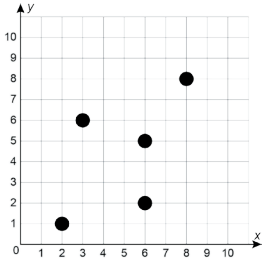
Understand Functions on a Mapping and Graph Exit Ticket

Write whether or not each of the following is a function.

a.



b.



Functions

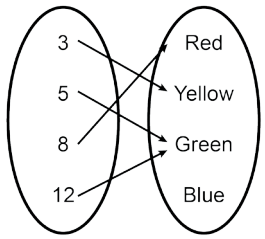
Explore

Name:_____ Date:_____

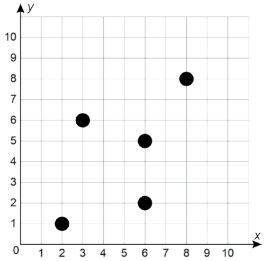
Understand Functions on a Mapping and Graph Exit Ticket

Write whether or not each of the following is a function.

a.



b.

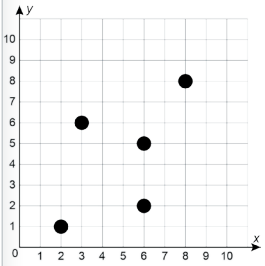


Functions

Date:_____

un mapeo y una gráfica
e salida

función o no.

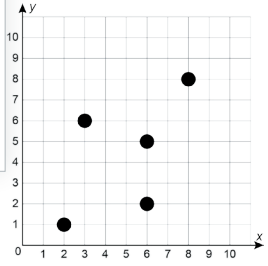


Functions

Date:_____

un mapeo y una gráfica
e salida

función o no.



12 Azul

1

Instructional Supports

1. Before the Explore, have students review coordinate-grid graphing and mapping diagrams in pairs. Encourage them to use vocabulary such as *input*, *output*, *x-axis*, and *y-axis*. This will help students access their prior knowledge of graphing to apply it to functions.
2. For students who need reduced assignments, provide flexibility by providing a labeled or completed graph for Part I.
3. In addition, you can provide flexibility by removing two months from the choices of January, February, March, and April in Part II and having students choose to complete one month from September, October, and November.
4. Students may falsely conclude that a relation is a function due to inaccurate graphing or lines drawn on their mapping diagrams. Remind them of the importance of attention to detail. For students who have varying levels of vision and dexterity, provide an enlarged graph or mapping diagram with a ruler to help them attend to detail.
5. In Part II, before discussion of what makes a function, students who need additional support can pick one month to create multiple representations of a graph and a mapping diagram. This will help address the possible misconception that only a function can be shown in a particular representation. This also may help learners find a representation that is simpler for them to use to draw their conclusions.
6. If students need an additional challenge, encourage them to create a scenario where the input and/or output contain negatives. Have students work in pairs to create each other's representations, and discuss whether negative values affect the definition of a function.

Language Supports

As students work and discuss ideas with their groups, summarize what you hear, and repeat key ideas and vocabulary that you hear through intonation, slower speech, and visual cues: *inputs*, *outputs*, *diagrams*, and *functions*.

Pair students, and instruct them to take turns explaining whether the diagrams, ordered pairs, or graphs show a function. Each time a student explains their work, their partner should rephrase what the student said and add their thoughts. The following sentence structures 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 _____.

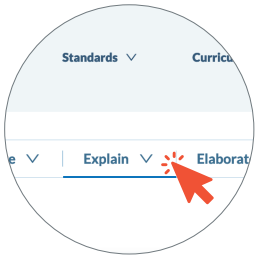
For each explanation that is shared, invite students to turn to a partner and restate what they heard using mathematical language.

The following English Language Proficiency Standards are supported:

1.AEFG, 2.CE, 3.D, 1.EH, 2.CDGHI, 3.DEFGHI, 2.CDGI, 3.BDFH

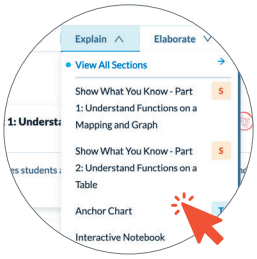
Explain

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: UNDERSTAND FUNCTIONS ON A MAPPING AND GRAPH

Formative

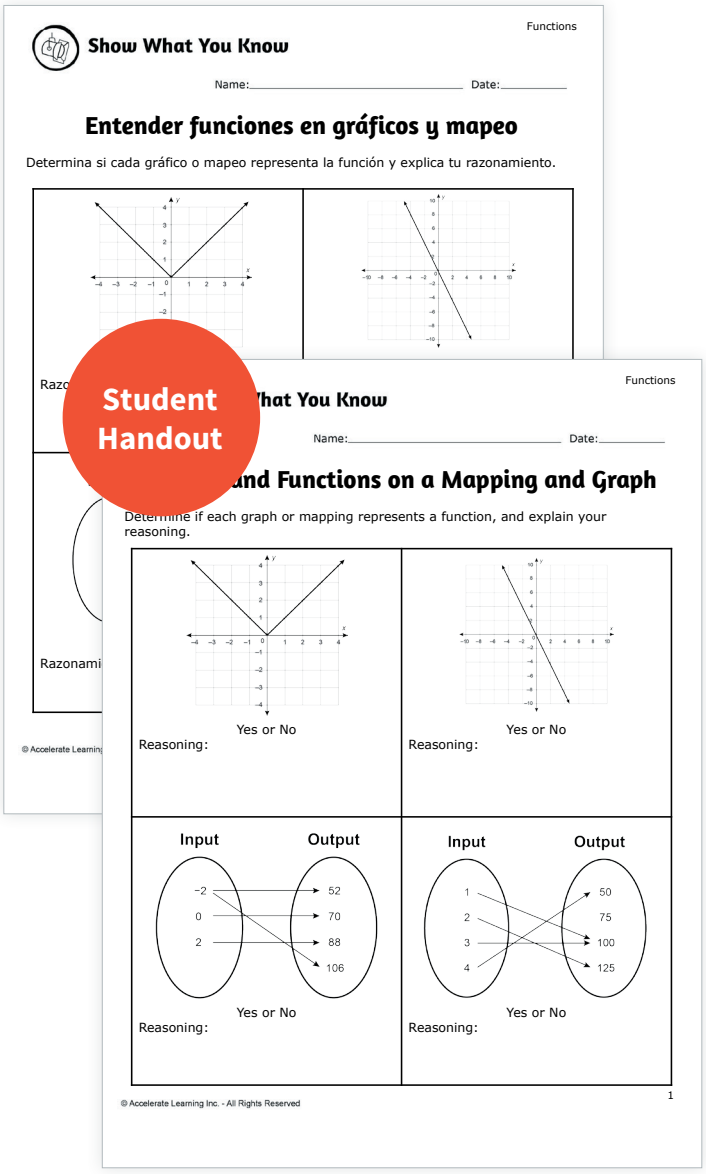
Students will practice using the knowledge and skills they have learned from the Explore activities.

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

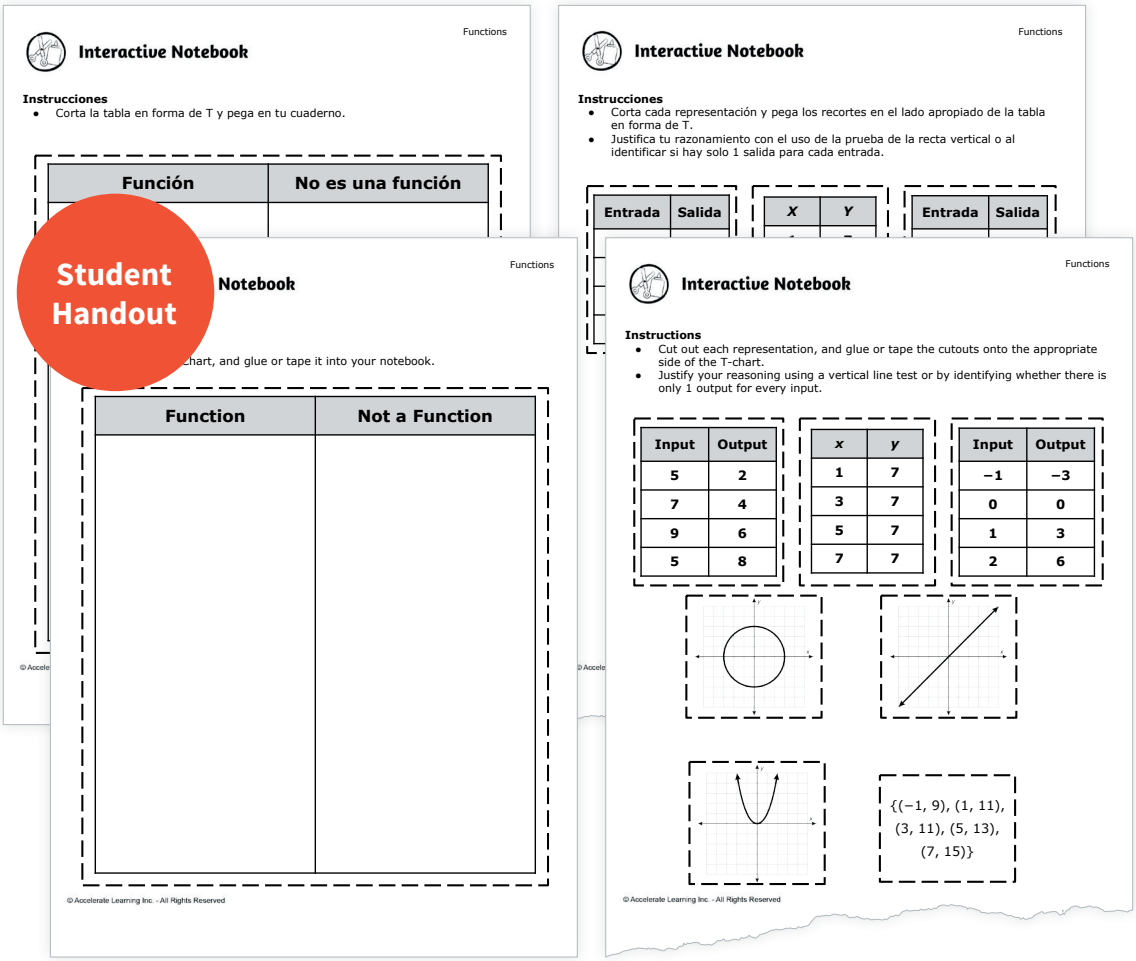
Students take notes, express ideas, and process the information presented in class using the activity and notebook.

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.
- Allow students to have access to various mathematical tools, digital and physical graphing tools, pencils or rulers for vertical line tests, and scratch paper.

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.

Beginner

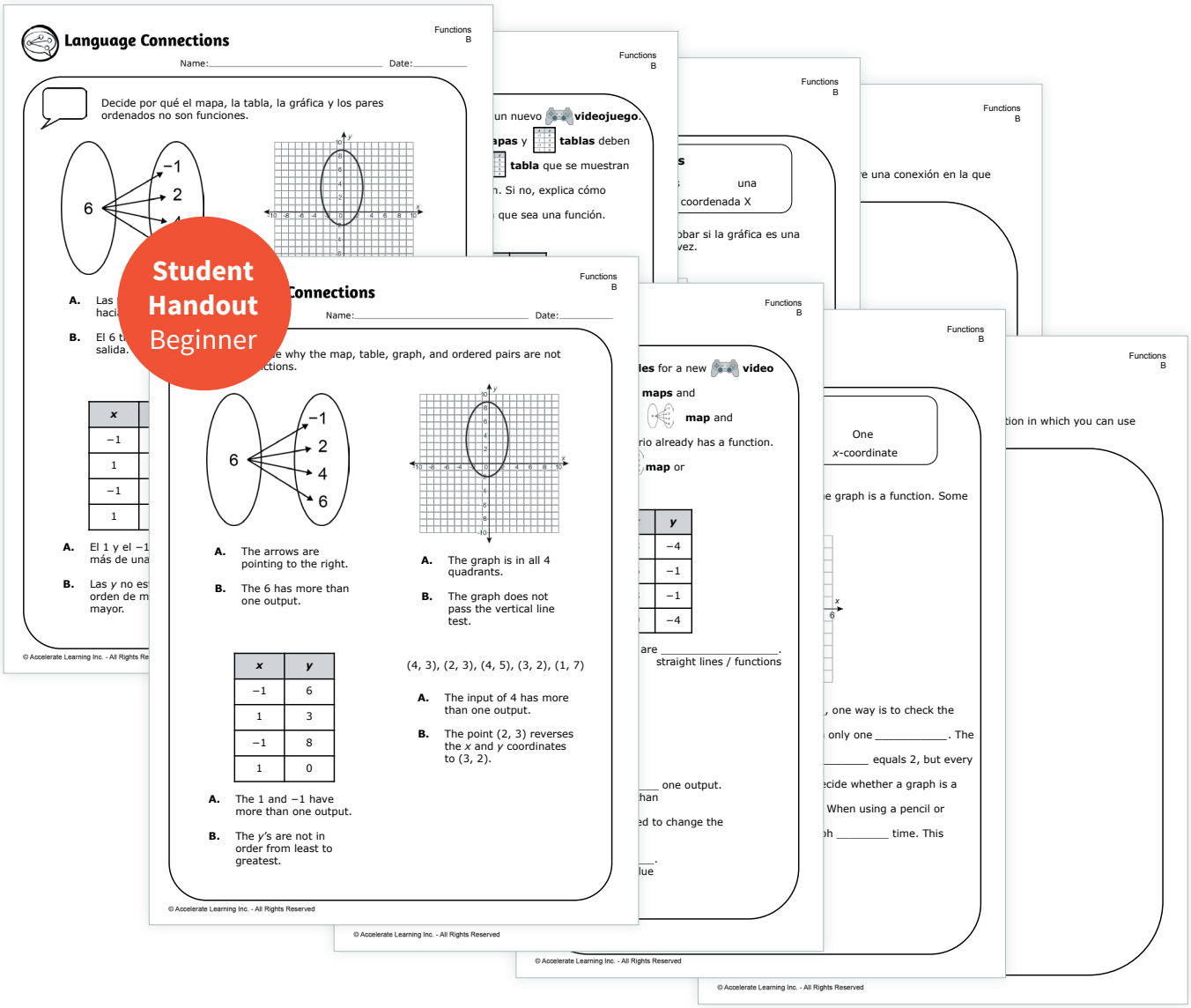
Have pencils or rulers and graphing tools readily available for students to use. Read the following prompts one at a time:

- Students may be confused by vocabulary with dual meanings such as map and table. Ensure picture vocabulary cards are within view during activities.
- *Each of the examples below is not a function. We need to decide why it is not a function.*
- *Point to the map.*
- *How can we determine whether a map is a function?*
  - Have students use the following sentence stem: *We can determine whether a map is a function by ____.*
- *One of the reasons listed is correct for why the map is not a function. Listen carefully as I read the choices.*
- Read choices A and B for the map.
- *Explain why the map is not a function.*

Multilingual Learner Support!

  - Have students use the following sentence stem: *The map is not a function because _____.*
- *Point to the reason that matches your explanation.*
- *Circle choice B.*
- *Point to the graph.*
- *How can we determine whether a graph is a function?*
  - Have students use the following sentence stem: *We can determine whether a graph is a function by _____.*
- *Use your pencil or ruler to do a vertical line test.*
- *Where does the graph fail the vertical line test?*
  - Have students use the following sentence stem: *The graph fails the vertical line test at coordinate ____.*
- *Listen as I read the choices as to why the graph is not a function.*
- Read choices A and B for the graph.
- *Point to the reason that matches your explanation.*
- *Circle choice B.*
- *Point to the table.*
- *How can we determine whether a table is a function?*
  - Have students use the following sentence stem: *We can determine whether a table is a function by ____.*
- If students have indicated graphing the table as a way to check whether it is a function, allow them to graph the table using paper or digital graphing tools, and follow the prompts for the vertical line test from the graph section.
- *Listen as I read the choices as to why the table is not a function.*
- Read choices A and B for the table.
- *Point to the reason that matches your explanation.*
- *Circle choice A.*
- *Point to the coordinate points.*
- *How can we determine whether coordinate points are a function?*
  - Have students use the following sentence stem: *We can determine whether coordinate points are a function by ____.*
- If students have indicated graphing the coordinate points as a way to check whether they are a function, allow them to graph the coordinates using paper or digital graphing tools, and follow the prompts for the vertical line test from the graph section.
- *Listen as I read the choices as to why the coordinate points are not a function.*
- Read choices A and B for the coordinate points.
- *Point to the reason that matches your explanation.*
- *Circle choice A.*

- *Point to the coordinate points.*
- *How can we determine whether coordinate points are a function?*
  - Have students use the following sentence stem: *We can determine whether coordinate points are a function by ____.*
- If students have indicated graphing the coordinate points as a way to check whether they are a function, allow them to graph the coordinates using paper or digital graphing tools, and follow the prompts for the vertical line test from the graph section.
- *Listen as I read the choices as to why the coordinate points are not a function.*
- Read choices A and B for the coordinate points.
- *Point to the reason that matches your explanation.*
- *Circle choice A.*

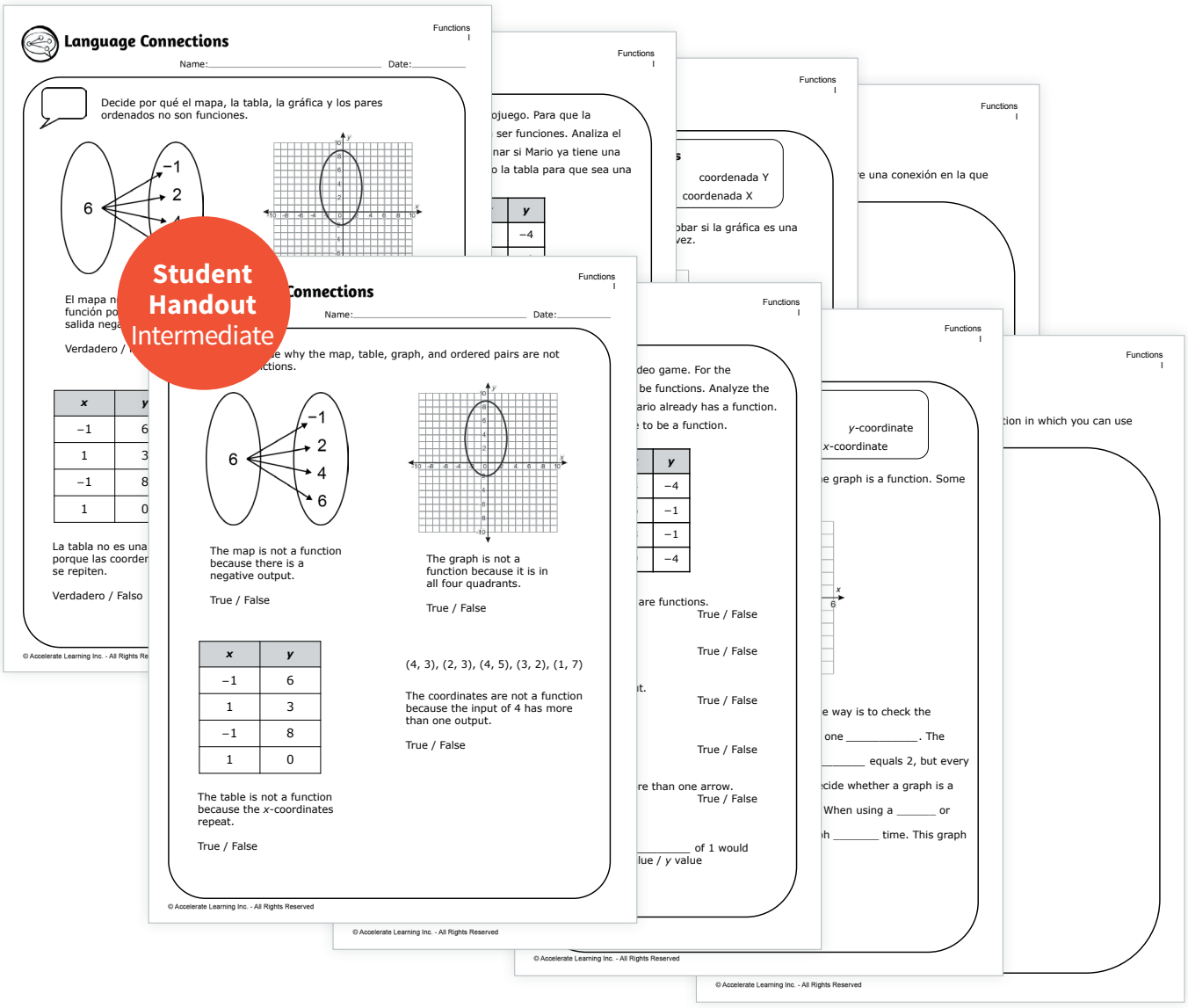


Intermediate

Have pencils or rulers and graphing tools readily available for students to use. Read the following prompts one at a time:

- *Each of the examples below is not a function. A statement explaining why is below each one. We need to determine whether it is true or false.*
- *Point to the map.*
- *How can we determine whether a map is a function?*
  - Have students use the following sentence stem: *We can determine whether a map is a function by ____.*
- *Explain why the map is not a function.*
  - Have students use the following sentence stem: *The map is not a function because _____.*
- *Listen carefully as I read the statement.* Read the statement for the map.
- *Point to whether the statement is true or false.*
- *Why is the statement false?*
  - Have students use the following sentence stem: *The statement is false because ____.*
- *Circle false.*
- *Point to the graph.*
- *How can we determine whether a graph is a function?*
  - Have students use the following sentence stem: *We can determine whether a graph is a function by _____.*
- *Use your pencil or ruler to do a vertical line test.*
- *Where does the graph fail the vertical line test?*
  - Have students use the following sentence stem: *The graph fails the vertical line test at coordinate ____.*
- *Listen as I read the statement below the graph.* Read the statement below the graph.
- *Point to whether the statement is true or false.*
- *Why is the statement false?*
  - Have students use the following sentence stem: *The statement is false because ____.*
- *Circle false.*
- *Point to the table.*
- *How can we determine whether a table is a function?*
  - Have students use the following sentence stem: *We can determine whether a table is a function by ____.*
- If students have indicated graphing the table as a way to check whether it is a function, allow them to graph the table using paper or digital graphing tools, and follow the prompts for the vertical line test from the graph section.
- *Listen as I read the statement below the table. Read the statement below the table.*
- *Point to whether the statement is true or false.*
- *What in the table proves the statement is true?*
  - Have students use the following sentence stem: *The statement is true because ____.*
- *Circle true.*
- *Point to the coordinate points.*

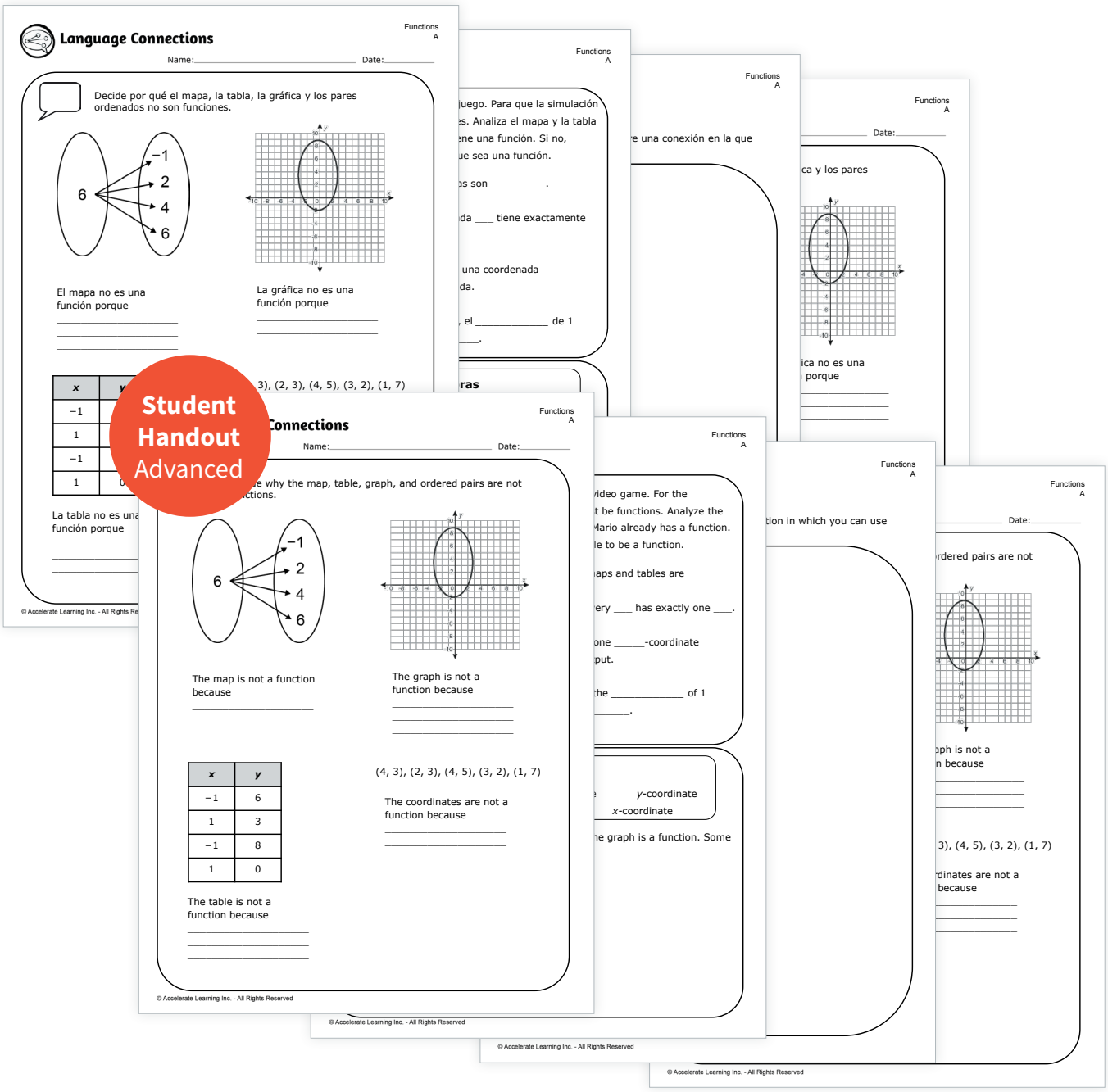
- *How can we determine whether coordinate points are a function?*
  - Have students use the following sentence stem: *We can determine whether coordinate points are a function by ____.*
- If students have indicated graphing the coordinate points as a way to check whether they are a function, allow them to graph the coordinates using paper or digital graphing tools, and follow the prompts for the vertical line test from the graph section.
- *Listen as I read the statement below the coordinate points.* Read the statement below the coordinate points.
- *Point to whether the statement is true or false.*
- *What in the coordinate points proves the statement is true?*
  - Have students use the following sentence stem: *The statement is true because ____.*
- *Circle true*



Advanced

Have a pencil or ruler and graphing tools readily available for students to use. Read the following prompts one at a time:

- *Each of the examples below is not a function. We will be writing explanations as to why it is not a function.*
- *Point to the map.*
- *How can we determine whether a map is a function?*
  - Have students use the following sentence stem: *We can determine whether a map is a function by ____.*
- *Explain why the map is not a function.*
  - Have students use the following sentence stem: T*he map is not a function because _____.*
- *Write the following on the blank: the x value of 6 has more than one y value.*
- *Point to the graph.*
- *How can we determine whether a graph is a function?*
  - Have students use the following sentence stem: *We can determine whether a graph is a function by _____.*
- *Use your pencil or ruler to do a vertical line test.*
- *Where does the graph fail the vertical line test?*
  - Have students use the following sentence stem: *The graph fails the vertical line test at coordinate ____.*
- *Explain why the graph is not a function.*
  - Have students use the following sentence stem: *The graph is not a function because _____.*
- *Write on the blank: x-coordinates, such as 0, pair with more than one y-coordinate.*
- *Point to the table.*
- *How can we determine whether a table is a function?*
  - Have students use the following sentence stem: *We can determine whether a table is a function by ____.*
- If students have indicated graphing the table as a way to check whether it is a function, allow them to graph the table using paper or digital graphing tools, and follow the prompts for the vertical line test from the graph section.
- *Explain why the table is not a function.*
  - Have students use the following sentence stem: *The table is not a function because _____.*
- *Write the following on the blank: the 1 and −1 x-coordinates pair with more than one y.*
- *Point to the coordinate points.*
- *How can we determine whether coordinate points are a function?*
  - Have students use the following sentence stem: *We can determine whether coordinate points are a function by ____.*
- If students have indicated graphing the coordinate points as a way to check whether they are a function, allow them to graph the coordinates using paper or digital graphing tools, and follow the prompts for the vertical line test from the graph section.
- *Explain why the coordinates are not a function.*
  - Have students use the following sentence stem: *The coordinates are not a function because _____.*
- *Write the following on the blank: the input of 4 pairs with more than one y value or output.*



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.

Función

UNA ENTRADA

ECUACIÓN → UNA SALIDA

Relación especial entre valores; cada valor de entrada devuelve exactamente un valor de salida

Gráfica

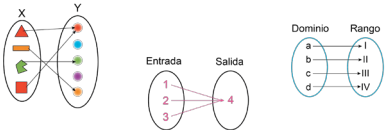
Entrada

ENTRADA: $x = 4$

$y = 3x + 2$ → SALIDA: $y = 14$

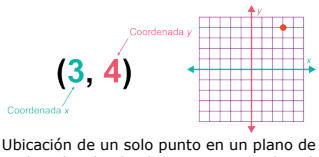
Conjunto de valores suministrados a una función

Mapeo



Función representada por dos conjuntos de objetos con flechas dibujadas entre ellos para mostrar las relaciones entre los objetos o datos

Par ordenado



Ubicación de un solo punto en un plano de coordenadas donde el primer y segundo valor representan la posición relativa al eje X y al eje Y, respectivamente (X,Y); conocido también como par de coordenadas

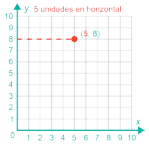
Salida

ENTRADA: $x = 4$

$y = 3x + 2$ → SALIDA: $y = 14$

Resultado de la entrada colocada en la función

Coordenada *x*



Primer término en un par ordenado; proporciona la ubicación a lo largo del eje X dentro del plano de coordenadas

Download Slideshow

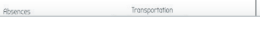
Function

INPUT

EQUATION → ONE OUTPUT

A special relationship between values; each input value gives back exactly one output value.

Graph



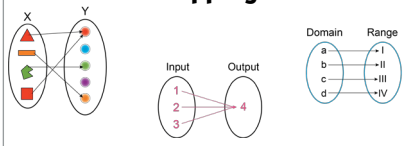
Input

INPUT: $x = 4$

$y = 3x + 2$ → OUTPUT: $y = 14$

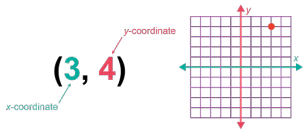
The set of values supplied to a function

Mapping



A function represented by two sets of objects with arrows drawn between them to show relationships between the relationships between the objects or data

Ordered Pair



The location of a single point on a coordinate plane where the first and second values represent the position relative to the *x*-axis and *y*-axis, respectively (*x*, *y*); also known as coordinate pair

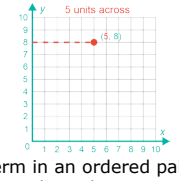
Output

INPUT: $x = 4$

$y = 3x + 2$ → OUTPUT: $x = 14$

The result of the input placed in the function

X-Coordinate



The first term in an ordered pair; provides the location along the *x*-axis within the coordinate plane

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

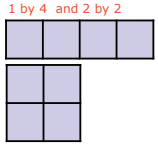
Factors of 5: 1, 5

Nonexamples:

4 and 6

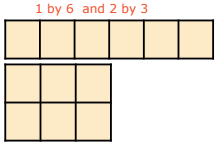
More than one type of rectangular array can be formed for these numbers:

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

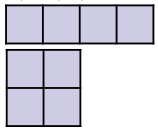
Factores de 5: 1, 5

No ejemplos:

4 y 6

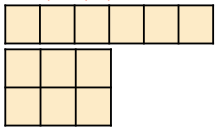
Más de un tipo de matrices rectangulares se puede formar para estos números:

1 por 4 y 2 por 2



Factores de 4: 1, 2, 4

1 por 6 y 2 por 3

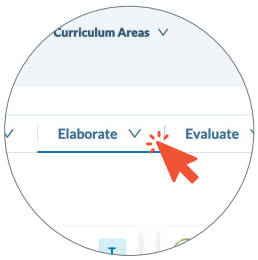


Factores de 6: 1, 2, 3, 6

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

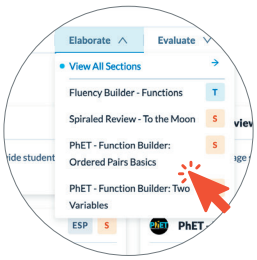
Elaborate

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 - FUNCTIONS

In this activity, students take turns drawing problem cards out of a jar and guessing the answer.

Preparation

- Make double-sided copies of the Bam! Cards. Cards can be printed on card stock for durability, if desired.
- Cut out individual cards.
- Put students in pairs.

Procedure and Facilitation Points

1. Show students how to fold the cards and place them in the jar.
2. Model how to play the game with a student.
    a. Player 1 pulls out a card from the jar and hands it to player 2.
    b. Player 2 will read the question aloud for player 1 to solve.
    c. Player 2 can check the answer from player 1 at the bottom of the card.
    d. If a player gets a problem correct, they keep the card. If they are incorrect, the other player keeps the card.
    e. Note: If the card contains an image such as a graph or a number line, the player asking the question can show the image while covering up the answer with their hand.
    f. If a player pulls out a Bam! picture card, all of that player's cards go back into the jar.
    g. Players take turns pulling cards from the jar and answering questions until time is up.
    h. Players must try to get as many cards as they can before time is up.
    i. The player with the most cards wins.
3. Set a time limit. When time is up, the student with the most cards wins.
4. Distribute materials, and instruct students to begin when the timer starts.
5. Monitor students to make sure they solve problems correctly.

Match Cards

ncy Builder

Bam! Cards
(Front of Page 1)

{(0, 0), (0, 1), (0, 2), (0, 4)} Function or not a function? Answer: not a function	{(9, 1), (8, 1), (7, 1), (6, 1)} Function or not a function? Answer: function
	{(-1, 0), (0, 1), (-1, 2), (0, 4)} Function or not a function? Answer: not a function
{(1, 0), (2, 1), (3, 2), (0, 4)} Function or not a function? Answer: function	{(-1, 1), (-2, 1), (3, 2), (5, 4)} Function or not a function? Answer: function

© Accelerate Learning

el juego *¡Bum!*
e la página 1)

{(9, 1), (8, 1), (7, 1), (6, 1)} ¿Función o no función? Respuesta: función	
{(-1, 0), (0, 1), (-1, 2), (0, 4)} ¿Función o no función? Respuesta: no función	
{(-1, 1), (-2, 1), (3, 2), (5, 4)} ¿Función o no función? Respuesta: función	Respuesta: fu

Instruction Sheet

ncy Builder

Bam! Instruction Sheet

Play this game with a partner.

You Will Need
1 Set of Bam! Cards (per pair)
1 Jar or other container (per pair)

How to Play
1. Fold the cards in half, and place them in the jar.
2. Player 1 pulls out a card from the jar and hands it to player 2.
3. Player 2 will read the question aloud for player 1 to solve.
4. Player 2 can check the answer from player 1 at the bottom of the card.
5. If a player gets a problem correct, they keep the card. If they are incorrect, the other player keeps the card.
6. Note: If the card contains an image such as a graph or a number line, the player asking the question can show the image while covering up the answer with their hand.
7. If a player pulls out a Bam! picture card, all of that player's cards go back into the jar.
8. Players take turns pulling cards from the jar and answering questions until time is up.
9. Players must try to get as many cards as they can before time is up.
10. The player with the most cards wins.

Fluency Builder

Hoja de instrucciones *¡Bum!*

pareja.

uego *¡Bum!* (por pareja)
or par)

la mitad y colócalas en el frasco.
tarjeta del frasco y se la entrega al

regunta en voz alta para que la resuelva

rificar la respuesta del jugador 1 en la
jeta.
un problema, se queda con la tarjeta. Si
jugador se queda con la tarjeta.
tiene una imagen, como un gráfico o una
ador que hace la pregunta puede
ntras cubre la respuesta con la mano.
tarjeta de *¡Bum!* ilustrada, todas las
r se devuelven al frasco.
urnos para sacar tarjetas del frasco y
asta que se agote el tiempo.
ntentar obtener la mayor cantidad de
antes de que se agote el tiempo.
con más tarjetas ganará el juego.

SPIRALED REVIEW - TO THE MOON

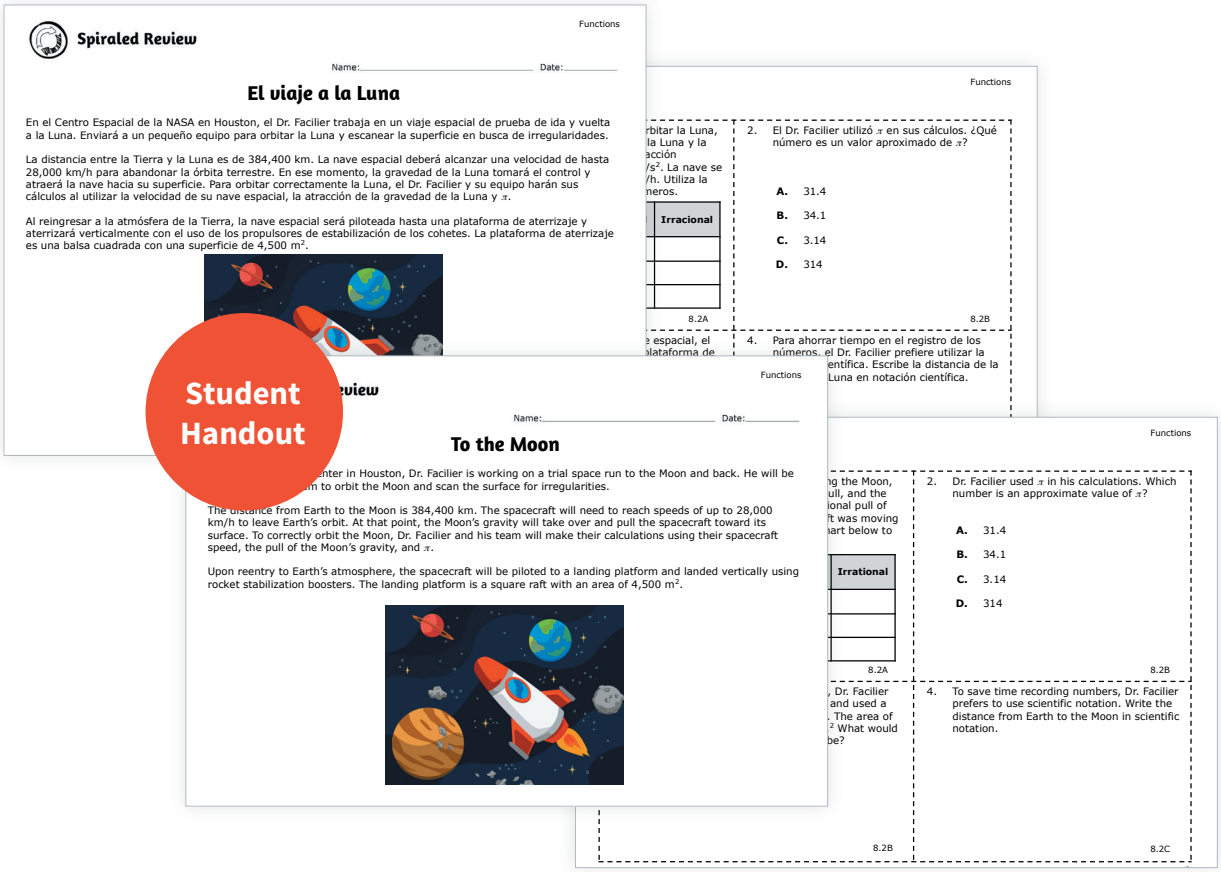
Students will review concepts and material from previous math classes and scopes to help support their work in the current scope and strengthen the skills that will be needed for later scopes.

Preparation

- Print a Student Handout for each student.

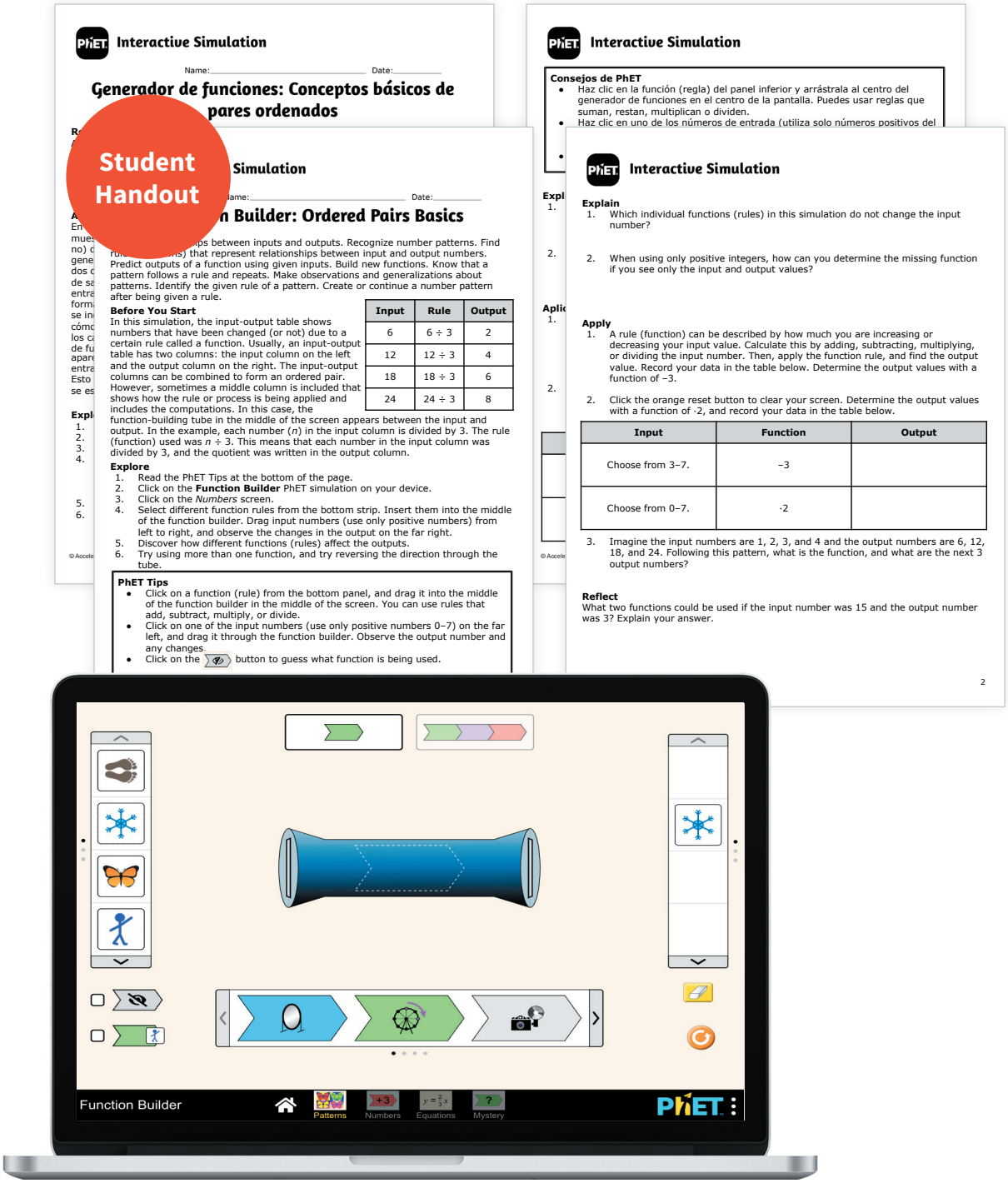
Procedure and Facilitation Points

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 - FUNCTION BUILDER: ORDERED PAIRS BASICS

Challenge: Analyze relationships between inputs and outputs. Recognize number patterns. Find rules (functions) that represent relationships between input and output numbers. Predict outputs of a function using given inputs. Build new functions. Know that a pattern follows a rule and repeats. Make observations and generalizations about patterns. Identify the given rule of a pattern. Create or continue a number pattern after being given a rule.



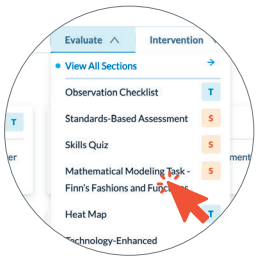
Home | Engage | Explore | Explain | Elaborate | **Evaluate** | Intervention | Acceleration

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

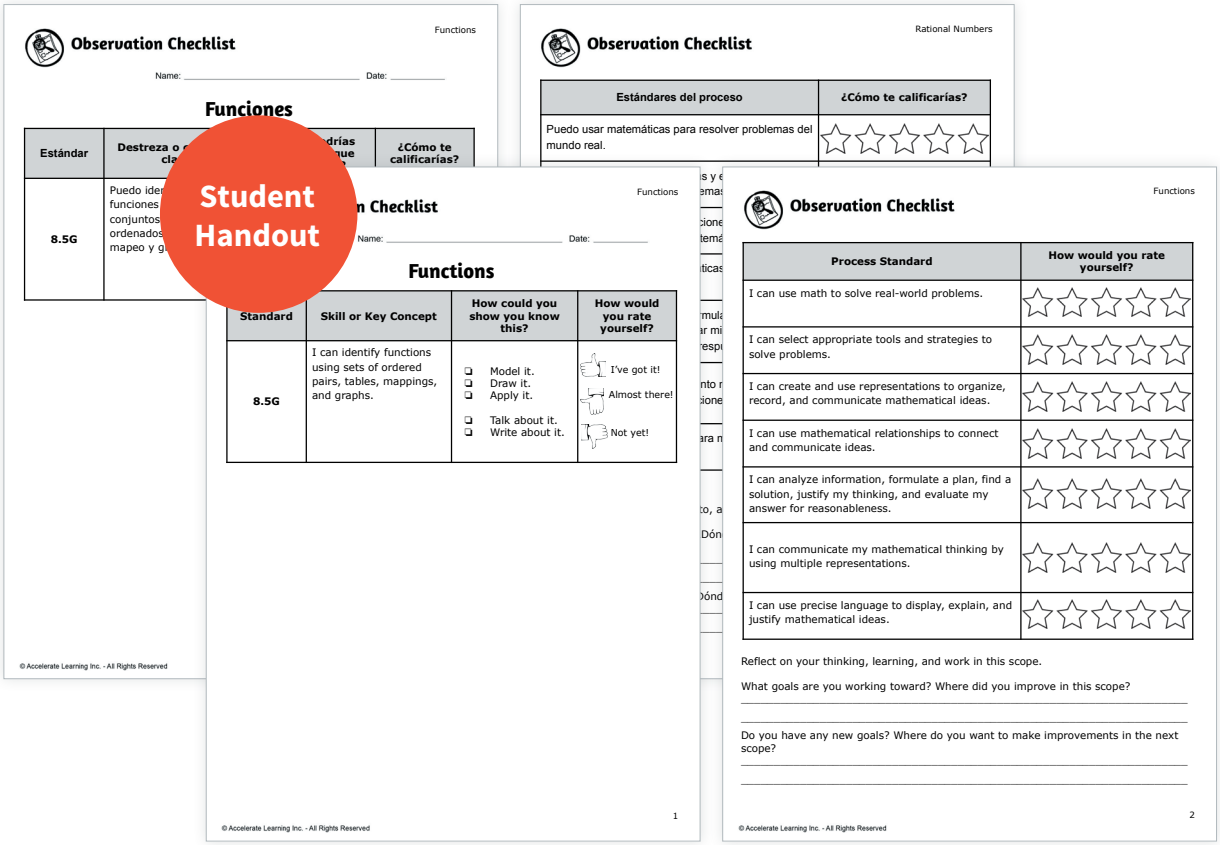
This element provides a breakdown of the key concepts and skills in the scope. It can be used as a formative assessment for teachers and as a self-assessment for students.

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.



STANDARDS-BASED ASSESSMENT Summative

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

Preparation

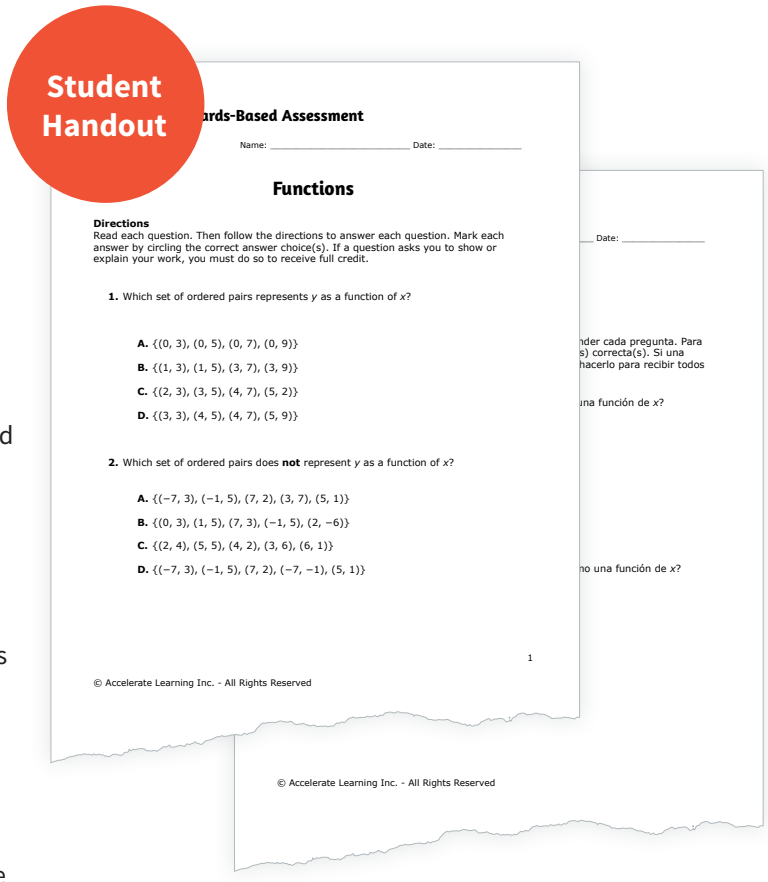
- Print a Student Handout for each student. The Student Handout can also be assigned digitally.
- Allow students to use manipulatives by request.
- Prepare Supplemental Aids for students who meet eligibility criteria.

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

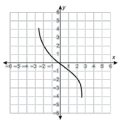
Name: _____ Date: _____

Funciones

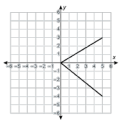
Resuelve cada problema. Muestra o explica tu razonamiento matemático.

Usa los gráficos para responder las preguntas 1 a 3.

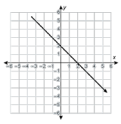
A.



B.



C.



Indica si cada gráfico representa o no una función.

1. Gráfico A:

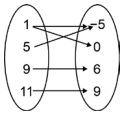
2. Gráfico B:

3. Gráfico C:

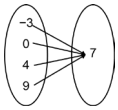
Skills Quiz

4. ¿Qué mapeo de los que muestran representa una función?

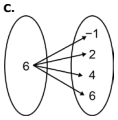
A.



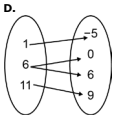
B.



C.



D.



Student Handout

Quiz

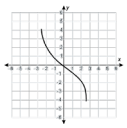
Name: _____ Date: _____

Functions

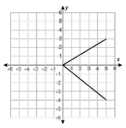
Solve each problem. Show or explain your mathematical thinking.

Use the graphs to answer questions 1–3.

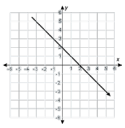
A.



B.



C.



Tell whether each graph represents a function or does not represent a function.

1. Graph A:

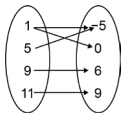
2. Graph B:

3. Graph C:

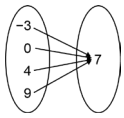
Skills Quiz

4. Which mapping shown represents a function?

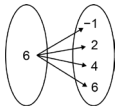
A.



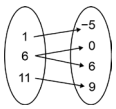
B.



C.



D.



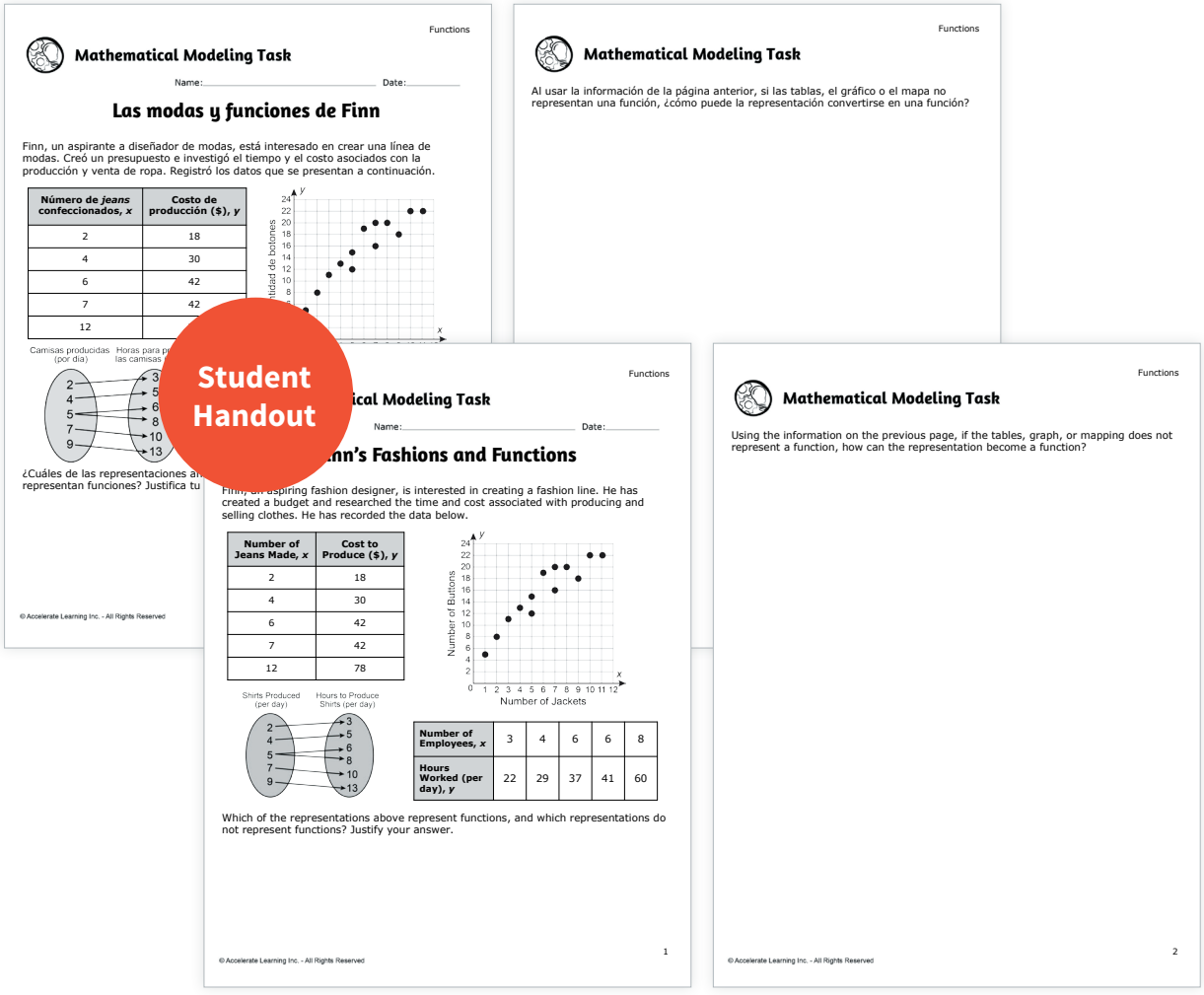
MATHEMATICAL MODELING TASK - FINN'S FASHIONS AND FUNCTIONS

Formative Summative

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

Procedure and Facilitation Points

1. Allow students to work in groups.
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 students are stuck, use guiding questions to help them think through it without telling them what steps to take next. If time permits, allow each group to share its solution with the class.
4. Discuss how different groups tackled the challenge in different ways.



HEAT MAP

Student Self-Reflection

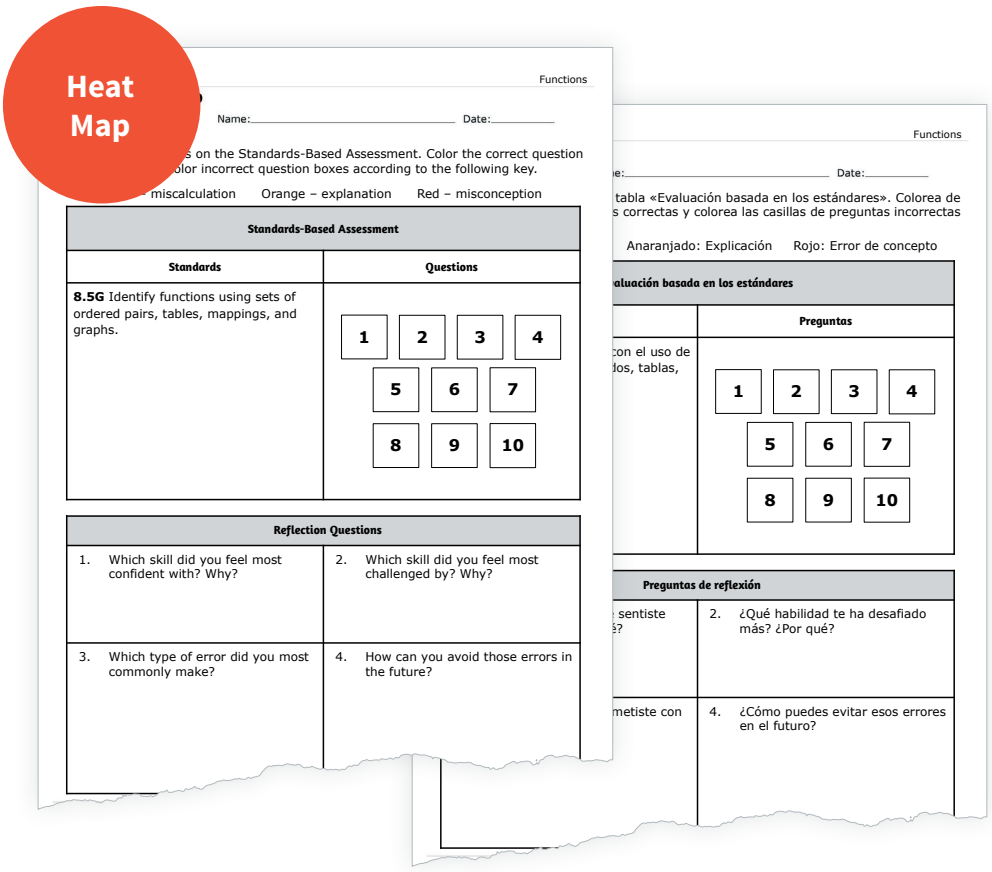
Students analyze their assessment results and determine what they did well and where they can improve.

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.

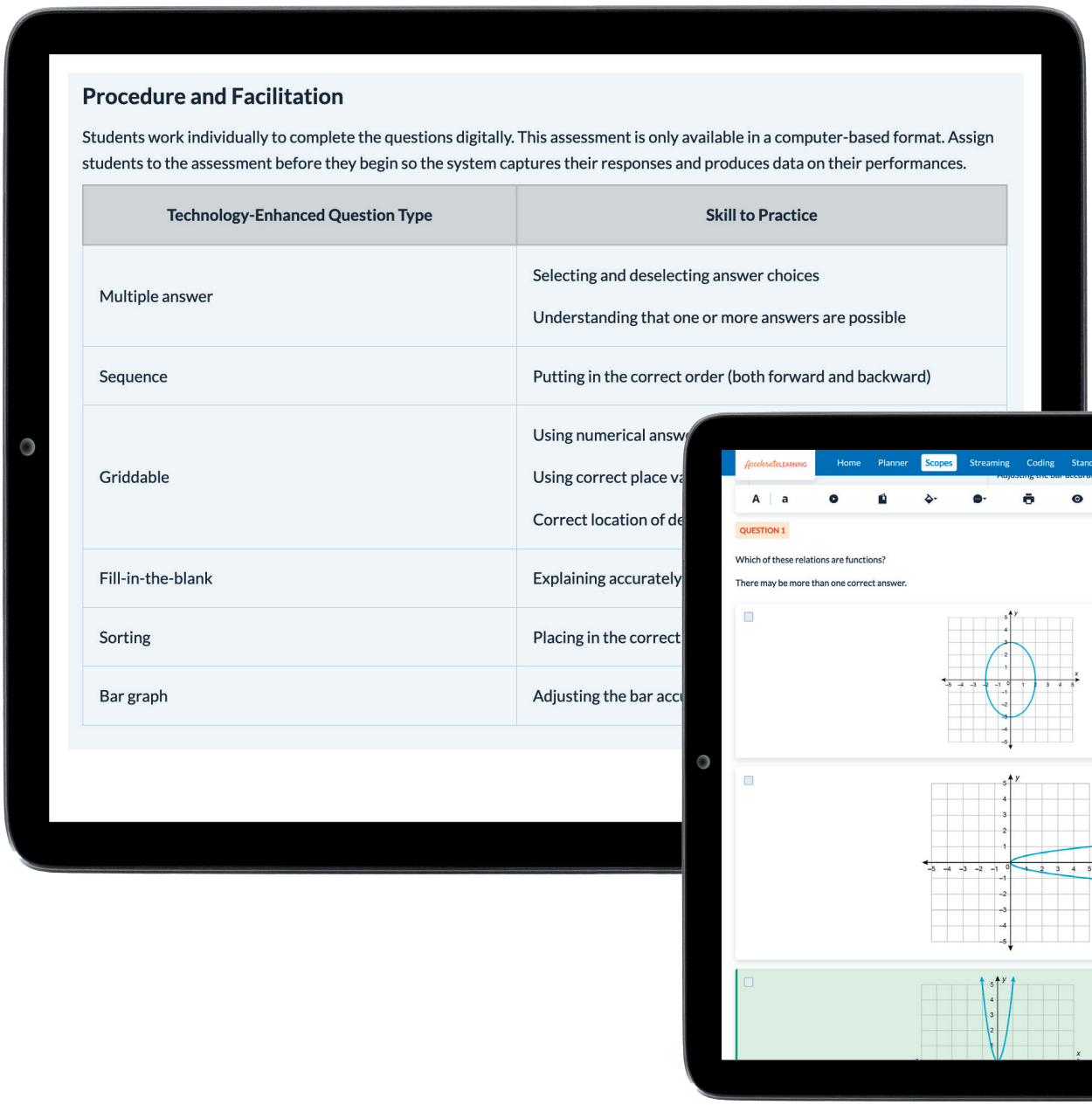


TECHNOLOGY-ENHANCED QUESTIONS Summative

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.



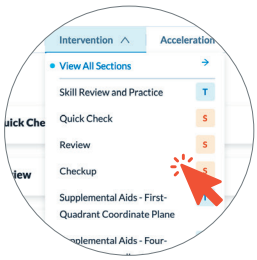
Home | Engage | Explore | Explain | Elaborate | Evaluate | **Intervention** | Acceleration

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.

Formative

Quick Check

Functions

Skill Review and Practice

Name: _____ Date: _____

Revisión rápida

1. Encierra con un círculo el conjunto de pares ordenados que no representa una función. Justifica tu razonamiento.

   A. (1, 1), (2, 2), (3, 3), (4, 4)
   B. (1, 2), (3, 4), (5, 6), (7, 8)
   C. (1, 3), (1, 4), (1, 5), (1, 6)
   D. (1, 1), (2, 1), (3, 1), (4, 1)

Marca lo siguiente como función (F) o no función (NF). Explica tu razonamiento.

2.

3.

x	y

Functions

Skill Review and Practice

Name: _____ Date: _____

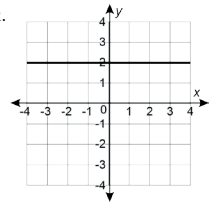
Quick Check

1. Circle the set of ordered pairs that does not represent a function. Justify your reasoning.

   A. (1, 1), (2, 2), (3, 3), (4, 4)
   B. (1, 2), (3, 4), (5, 6), (7, 8)
   C. (1, 3), (1, 4), (1, 5), (1, 6)
   D. (1, 1), (2, 1), (3, 1), (4, 1)

Mark the following as a function (*F*) or non-function (*NF*). Explain your reasoning.

2.



3.

x	y
1	5
3	15
9	36
3	12

Functions

27
4
36
99
81

mo función (F)

Functions

de	Necesita revisión

27
4
36
99
81

ngs as a function (*F*) or not a

92
108
17
75

	Got It	Needs Review
whether ion.	☐	☐
ph is a	☐	☐
function	☐	☐
graph	☐	☐
5 and 6 — Identify and justify whether a mapping represents a function or not a function.	☐	☐

Formative

Review

Functions

Skill Review and Practice

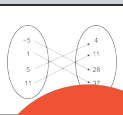
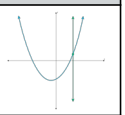
Name: _____ Date: _____

Repasar

Funciones
En una función una regla empareja cada entrada con exactamente una salida. La relación entre estas entradas y salidas en una tabla de datos se convierte en pares ordenados que se usan para representar gráficamente las funciones. Las entradas son los valores *x* y las salidas son los valores *y*.

Una no función (no es una función) tiene una entrada que tiene más de una salida. Una función no puede tener dos valores *y* correspondientes a un valor *x*. La gráfica de una no función tiene más de un valor *y* para un valor *x*.

La prueba de la línea vertical identifica si una gráfica es una función o una no función. Sujetando un lápiz verticalmente, pásalo de izquierda a derecha sobre la gráfica. Si el lápiz pasa por más de un punto a la vez, la gráfica no es una función. Cuando se pasa el lápiz verticalmente sobre la gráfica de una función, sólo se pasa un punto a la vez.

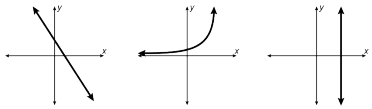
	Mapeo	Tabla	Pares ordenados	Gráfica
Función		x: 1, 5, 7 / y: 2, 6, 8	(0, 4), (3, 7), (5, 9), (8, 13)	
No función				

Functions

Skill Review and Practice

Inténtalo
Identifica si la tabla y cada gráfica representan una función (F) o una no función (NF). Explica tu razonamiento.

x	y
2	16
5	40
5	45



Encierra con un círculo el conjunto de pares ordenados que no representa una función. Explica tu razonamiento.

A. (1, 1), (2, 2), (3, 3), (4, 4)

B. (1, 2), (3, 4), (5, 6), (7, 8)

C. (1, 3), (1, 4), (1, 5), (1, 6)

D. (1, 1), (2, 1), (3, 1), (4, 1)

Functions

Review

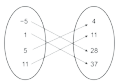
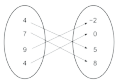
Name: _____ Date: _____

Review

Functions
In a function, a rule pairs each input with exactly one output. The relationship between these inputs and outputs on a data table becomes ordered pairs used to graph functions. Inputs are the *x* values, and outputs are the *y* values.

A non-function (not a function) has an input that has more than one output. A function cannot have two *y* values corresponding to one *x* value. A graph of a non-function has more than one *y* value for an *x* value.

A vertical line test identifies if a graph is a function or non-function. Holding a pencil vertically, pass it from left to right over the graph. If your pencil passes more than one point at a time, the graph is not a function. When a vertical pencil passes over the graph of a function, just one point is passed over at a time.

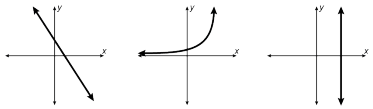
	Mapping	Table	Ordered Pairs	Graph
Function		x: 1, 5, 7 / y: 2, 6, 8	(0, 4), (3, 7), (5, 9), (8, 13)	
Non-Function		x: 2, 9, 9 / y: 7, −14, 14	(−1, 5), (1, 9), (3, 8), (−1, −5)	

Functions

Skill Review and Practice

Try It
Identify whether the table and each graph represent a function (F) or a non-function (NF). Explain your reasoning.

x	y
2	16
5	40
5	45



Circle the set of ordered pairs that does not represent a function. Explain your reasoning.

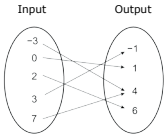
A. (1, 1), (2, 2), (3, 3), (4, 4)

B. (1, 2), (3, 4), (5, 6), (7, 8)

C. (1, 3), (1, 4), (1, 5), (1, 6)

D. (1, 1), (2, 1), (3, 1), (4, 1)

Does the mapping below represent a function? Explain your reasoning.



Formative

Checkup

Functions

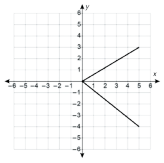
Skill Review and Practice

Name: _____ Date: _____

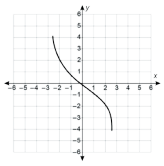
Revisión

Identifica si cada siguiente gráfica es una función o no. Explica tu razonamiento.

1.



2.



Functions

representan una función o no.

no.

Functions

sent a function or not.

ctions or not.

15	135
20	180

2

Functions

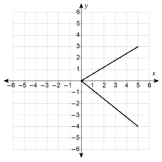
Skill Review and Practice

Name: _____ Date: _____

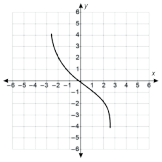
Checkup

Identify whether each graph below is a function or not a function. Explain your reasoning.

1.



2.



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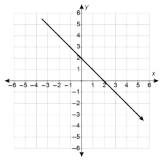


4. Can a vertical or horizontal graph line be a function? Explain.

1

Functions

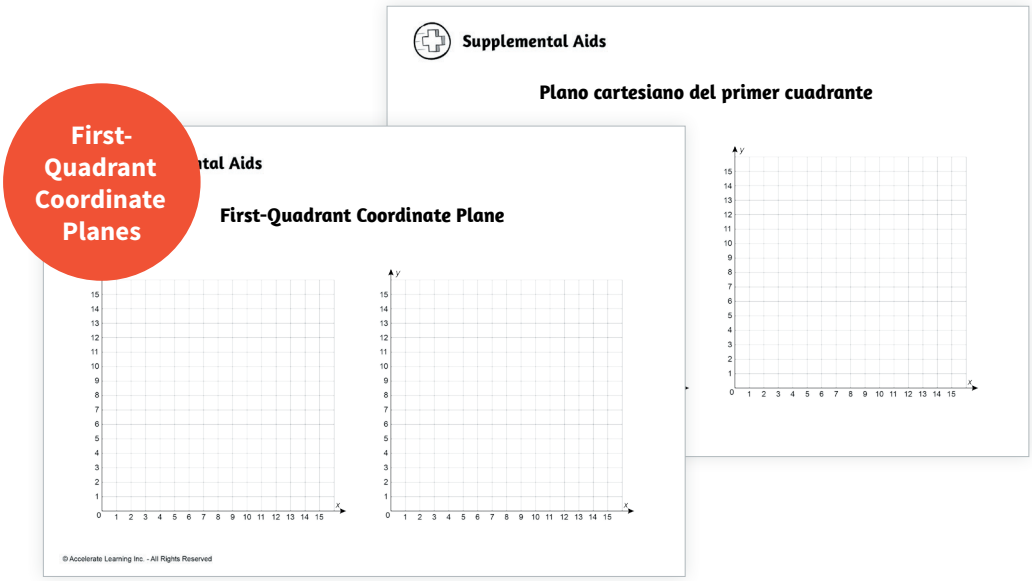
3

SUPPLEMENTAL AIDS - FIRST-QUADRANT COORDINATE PLANE

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

Procedure and Facilitation Points

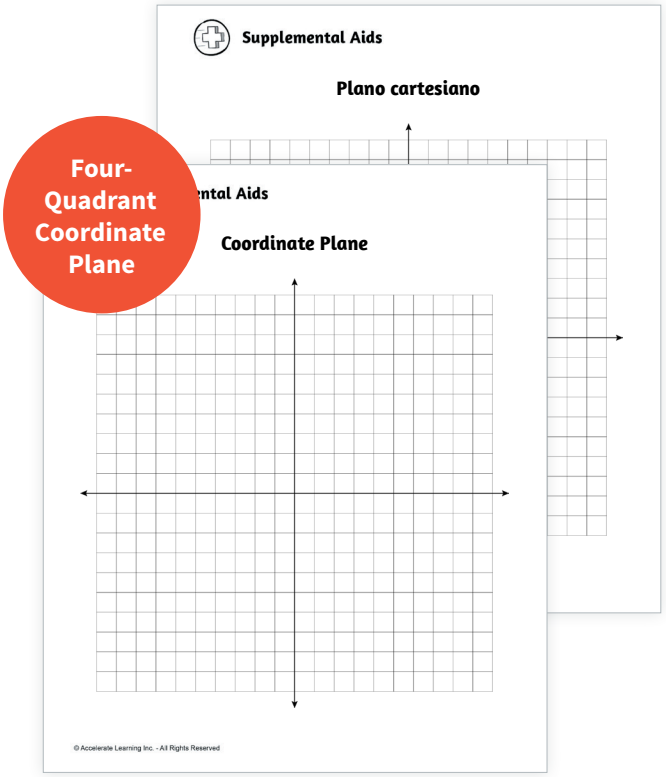
- A blank coordinate plane can be used to practice graphing ordered pairs and to reinforce the following concepts:
  - Describing attributes of the coordinate plane
  - Graphing ordered pairs in the first quadrant
  - Determining dependent and independent variables
  - Determining rates and unit rates
  - 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.

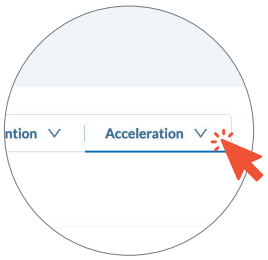
Procedure and Facilitation Points



- 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.

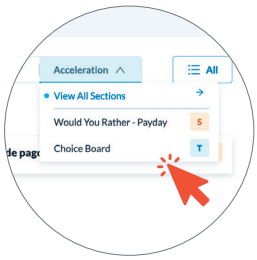
Acceleration

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

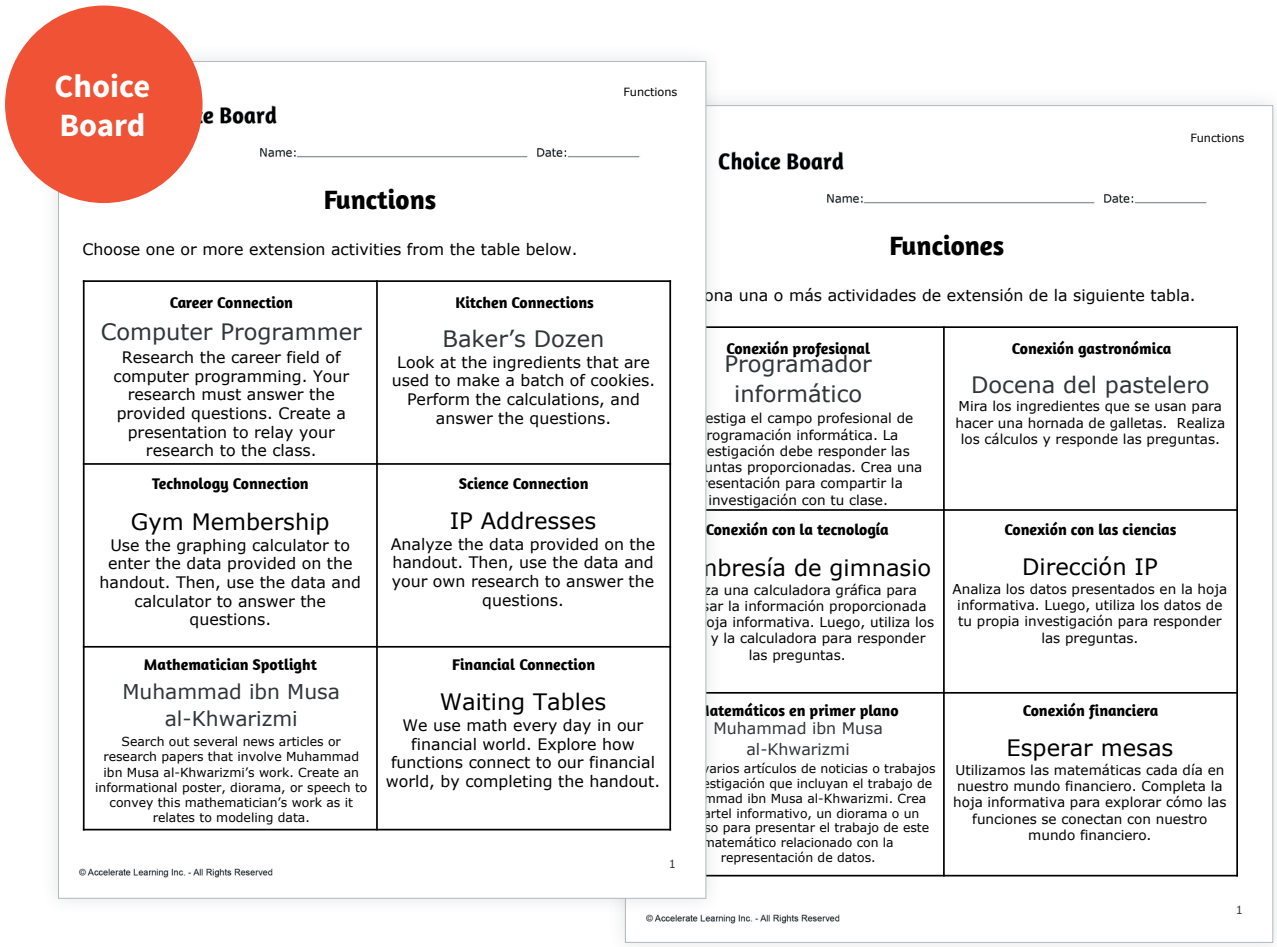
Students explore real-world connections and applications of math content through interactions with engaging activities.

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.



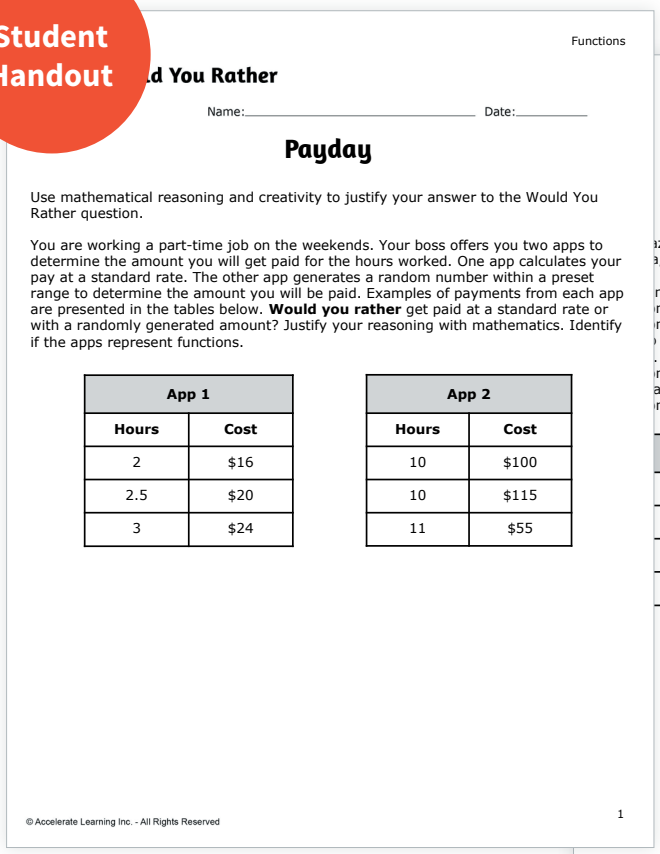
WOULD YOU RATHER - PAYDAY

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

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



Functions

Would You Rather

Name:_____ Date:_____

Payday

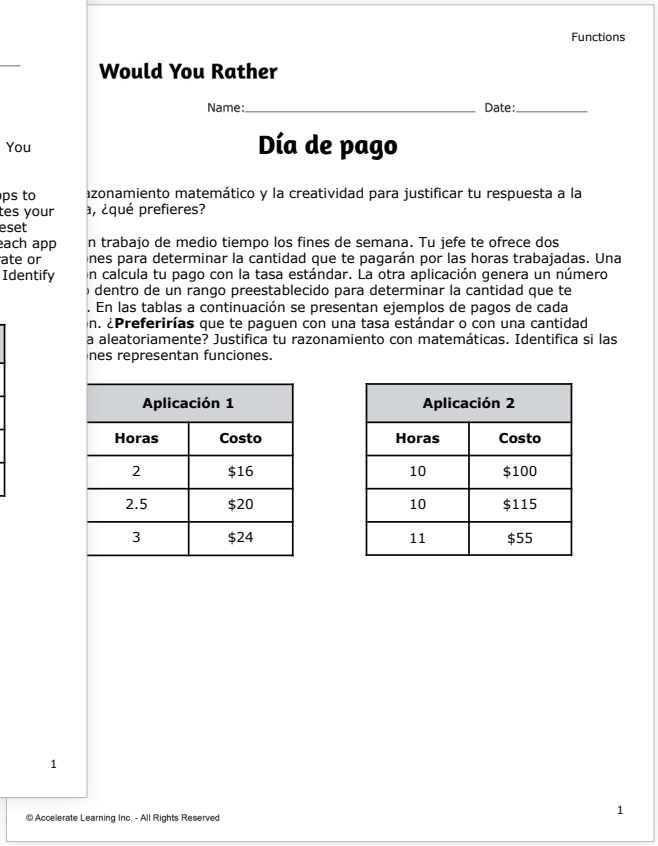
Use mathematical reasoning and creativity to justify your answer to the Would You Rather question.

You are working a part-time job on the weekends. Your boss offers you two apps to determine the amount you will get paid for the hours worked. One app calculates your pay at a standard rate. The other app generates a random number within a preset range to determine the amount you will be paid. Examples of payments from each app are presented in the tables below. **Would you rather** get paid at a standard rate or with a randomly generated amount? Justify your reasoning with mathematics. Identify if the apps represent functions.

App 1	
Hours	**Cost**
2	$16
2.5	$20
3	$24

App 2	
Hours	**Cost**
10	$100
10	$115
11	$55

1



Functions

Would You Rather

Name:_____ Date:_____

Día de pago

Aplicación 1	
Horas	**Costo**
2	$16
2.5	$20
3	$24

Aplicación 2	
Horas	**Costo**
10	$100
10	$115
11	$55

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