

# learning focus:

- ✓ identify functions and distinguish between proportional and non-proportional situations
- ✓ identify values that satisfy two linear equations from a graph
- ✓ use multiple representations to understand slope, rate of change, and direct variation

# LINEAR RELATIONSHIPS UNIT

## 15 DAY TEKS-ALIGNED UNIT



**LINEAR RELATIONSHIPS UNIT**  
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**IDENTIFYING FUNCTIONS**  
Representation of  $y$  as a function of  $x$ . Circle the names of the functions that are functions. Then, unscramble the underlined letters of the circled functions.

SOEIA:  $\begin{matrix} x & y \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \end{matrix}$

DESHAUN:  $\{(-6, 7), (-1, 4), (2, 9), (-6, 11)\}$

COLBY:  $\begin{matrix} y \\ x \end{matrix}$

**LINEAR RELATIONSHIPS UNIT**  
PACING GUIDE

DAY	TOPIC	RESOURCE
DAY 1	Identifying Functions	Student Handout 1 Homework 1
DAY 2	Slope and Rate of Change	Student Handout 2 Homework 2
DAY 3	The Slope Formula	Student Handout 3 Homework 3
DAY 4	Functions and Slope	Mini-Quiz 1
DAY 5	Functions and Slope	Student Handout 4 Homework 4
DAY 6	Slope-Intercept Form: Part I	Student Handout 5 Homework 5
DAY 7	Slope-Intercept Form: Part II	Student Handout 6 Homework 6
DAY 8	Multiple Representations	Quiz 1
DAY 9	Multiple Representations	Student Handout 7 Homework 7
DAY 10	Systems of Equations	Student Handout 8 Homework 8
DAY 11	Systems of Equations	Student Handout 9 Homework 9

A MANEUVERING THE MIDDLE® RESOURCE

# LINEAR RELATIONSHIPS



a 14 day TEKS-aligned unit

TEKS: 8.4A-C, 8.5A-B, 8.5E-I, 8.9A

**ready-to-go, scaffolded  
student materials**

## LINEAR RELATIONSHIPS UNIT

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# LINEAR RELATIONSHIPS



a 14 day TEKS-aligned unit

TEKS: 8.4A-C, 8.5A-B, 8.5E-I, 8.9A

## student friendly + real-world application

interactive practice

Unit: Linear Relationships  
Student Handout 1

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

### IDENTIFYING FUNCTIONS

A donut shop has a small vending machine with the items shown.

	A	B
1	MILK	CHOC. MILK
2	ORANGE JUICE	APPLE JUICE

a. If Nate inputs B2, what will he receive?  
b. If Mia inputs A2, what will she receive?  
c. If 5 people in a row input B1, what should each receive?

### FUNCTIONS

- A function is a relation. Each \_\_\_\_\_.
- A graph that is a function is a \_\_\_\_\_ line.

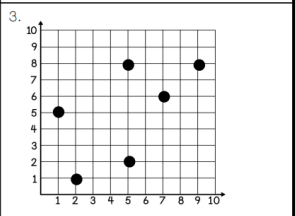
- Would a vending machine like the one shown be a function?

- A customer chose A3 and received fruit milk, would the vending machine represent a function?

Determine if each representation shows a function.

1.

x	-2	-1	0	1
y	7	1	-1	1

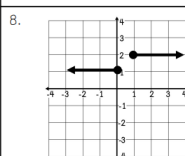
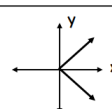


Determine if each representation is a function by writing "yes" or "no." Justify your answers.

5.  $\{(3, 7), (4, 7), (5, 7), (6, 7)\}$

6.

x	-7	-5	-7	5
y	1	3	-1	13



10. The set of ordered pairs shown is  $\{(9, -1)\}$

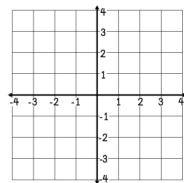
- a. Give an example of an x-value that \_\_\_\_\_  
b. Give an example of an x-value that \_\_\_\_\_

Create your own examples and non-examples.

### EXAMPLES

$\{( \_, \_ ), ( \_, \_ ), ( \_, \_ )\}$

x				
y				



Summarize today's lesson:

multiple representations

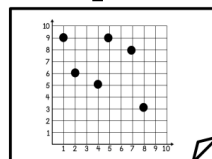
Unit: Linear Relationships  
Homework 1

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

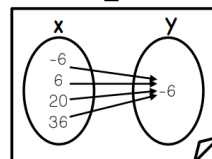
### IDENTIFYING FUNCTIONS

Students were asked to create a representation of y as a function of x. Circle the names of the students who correctly completed the task. Then, unscramble the underlined letters of the circled names to answer the question at the bottom.

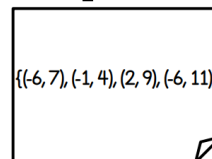
CHARLOTTE



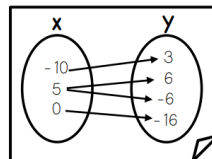
SO~~F~~IA



DE~~S~~HAUN



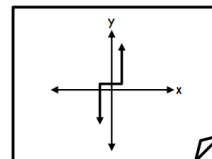
JACE



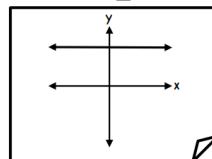
NATHAN

x	-4	0	5	11
y	-8	-13	-4	14

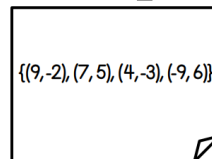
COLBY



ABBY



ORLANDO



STEPHANIE

x	-4	0	7	-4
y	6	0	-2	-6

WHAT IS THE ONLY NUMBER WHOSE LETTERS ARE IN ALPHABETICAL ORDER?

# LINEAR RELATIONSHIPS



a 14 day TEKS-aligned unit

TEKS: 8.4A-C, 8.5A-B, 8.5E-I, 8.9A

streamline your planning  
process with unit overviews

## LINEAR RELATIONSHIPS OVERVIEW



### READINESS STANDARDS

**8.4B** Graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship.

**8.4C** Use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems.

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

**8.5I** Write an equation in the form  $y = mx + b$  to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.

### SUPPORTING STANDARDS

**8.4A** Use similar right triangles to develop an understanding that slope,  $m$ , given as the rate comparing the change in  $y$ -values to the change in  $x$ -values is the same for any two points on the same line.

**8.5A** Represent linear proportional situations with tables, graphs, and equations in the form of  $y = kx$ .

**8.5B** Represent linear non-proportional situations with tables, graphs, and equations in the form of  $y = mx + b$ , where  $b \neq 0$ .

**8.5E** Solve problems involving direct variation.

**8.5F** Distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form  $y = kx$  or  $y = mx + b$ , where  $b \neq 0$ .



key vocabulary



vertical alignment



sample  
pacing  
calendar

## LINEAR RELATIONSHIPS UNIT PACING GUIDE



DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Identifying Functions	Slope and Rate of Change	The Slope Formula	Functions and Slope Mini-Quiz	Slope-Intercept Form: Part I
Student Handout 1 Homework 1	Student Handout 2 Homework 2			
DAY 6	DAY 7			
Slope-Intercept Form: Part II	Multiple Representations			
Student Handout 5 Homework 5	Student Handout 6 Homework 6			
DAY 11	DAY 12			
Proportional and Non-Proportional Relationships	Direct Variation			
Student Handout 9 Homework 9	Student Handout 10 Homework 10			

### BIG IDEAS

- Functional relationships exist.
- Linear relationships can be described.
- Linear relationships are everywhere.

## LINEAR RELATIONSHIPS UNIT OVERVIEW



TOPIC	TEACHING TIPS
Identifying Functions	<ul style="list-style-type: none"><li>An analogy I like to give students is a vending machine. A "functioning" vending machine means that for any button I press, only one item should dispense. There can be more than one button for a particular item, but any chosen button (input) should only dispense one particular item (output).</li></ul>
Slope and Rate of Change	<ul style="list-style-type: none"><li>Have students draw the side view of a steep ramp and the side view of a ramp that isn't very steep. Allow students to discuss what makes one ramp steeper than the other and emphasize the differences in the vertical change over the horizontal change.</li></ul>
Slope-Intercept Form	<ul style="list-style-type: none"><li>Search "Linear Equations" on <a href="http://www.Flocabulary.com">www.Flocabulary.com</a> for a related video.</li><li>To help students remember "b" is the y-intercept, use alliteration to say that "b" represents "begin".</li></ul>
Systems of Equations	<ul style="list-style-type: none"><li>While the 8th TEKS doesn't specify that students must graph the two equations themselves, consider extending the lesson by having students practice graphing to reinforce and increase their mastery of the concepts of slope and y-intercept.</li></ul>
Proportional and Non-Proportional Relationships	<ul style="list-style-type: none"><li>An easy question students can ask to see if a situation is proportional is, "As one quantity doubles, does the other quantity double?" If the answer is yes, the relationship is proportional.</li></ul>
Direct Variation	<ul style="list-style-type: none"><li>In the equation <math>y = kx</math>, I tell students to think of "k" making the same sound as the c in "constant of proportionality" in order to help them remember the meaning of the variable "k."</li></ul>

teaching  
ideas



# LINEAR RELATIONSHIPS



a 14 day TEKS-aligned unit

TEKS: 8.4A-C, 8.5A-B, 8.5E-I, 8.9A

## unit study guide + assessments



quizzes



editable unit test

Unit: Linear Relationships  
Quiz 1

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

**QUIZ: FUNCTIONS, SLOPE AND SLOPE-INTERCEPT FORM**



1. Kayla thinks that the slope of a vertical line is undefined, while Joshua argues that the slope of a vertical line is zero. Who is correct?

2. Find the rate of change shown in the table.

x	y
1	-3
2	-9
3	-15
4	-21

3. Find the slope of the graph.

4. Which of the following triangles could question #3?

A.  B. 

5. A line has a slope of zero. Which of the following points could this line pass through?

A. (12, 9) and (12, 6)  
B. (3, -6) and (7, -6)  
C. (1, 4) and (2, 5)  
D. (-9, 7) and (9, -7)

Answers

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_

Unit: Linear Relationships  
Review

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

**LINEAR RELATIONSHIPS STUDY GUIDE**

Solve each of the problems below. These represent the types of questions on your test. Be sure to ask questions if you need more help with a topic.

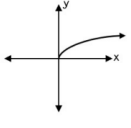
**I CAN IDENTIFY FUNCTIONS. 85G**

1. Does the set of ordered pairs represent a function? Explain.  
{(6, -6), (7, -6), (8, -6), (9, -6)}

2. Does the table represent a function?

3. Does the graph represent a function?

4. Does the graph represent a function? Explain.



5. Does the graph represent a function? Explain.

**I CAN DETERMINE SLOPE AND RATE OF CHANGE**

7. Find the rate of change from the table.

x	y
-3	10.5
-2	7
-1	3.5
0	0

8. Find the slope of the line.

## EIGHTH GRADE CURRICULUM

# LINEAR RELATIONSHIPS

UNIT THREE: ANSWER KEY

answer keys  
included



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