

Learn the Vocabulary

Objective Talk and write about functions and ordered pairs using the vocabulary.

30 minutes



Teach this lesson:

- **Before** introducing lessons on functions and ordered pairs in the grade-level math textbook
- **Before** students complete the activities on page 118 of the student worktext

You need these materials:

- index cards
- large cardboard box
- Transparency 59

Lesson Vocabulary

Essential Vocabulary

function
function table (input/output table, table of values)
ordered pair

Additional Vocabulary

horizontal	vertical	pattern*
rule	value	
axis/axes*	to graph*	coordinate

* - Terms with Vocabulary Cards.



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Learn the Words

A **function** is a rule that tells the relationship between two variables. If you know the value of one of the variables, you can use the rule to find the value of the other variable.

You can write a function as an equation or in words.

Here are some functions:

$a = 7 + n$	$s = 3w$	$r = p \div 2$
a is 7 more than n .	s is 3 times greater than w .	r is half of p .

You can also write a function in a **function table**, which is also called an input-output table, or a table of values.

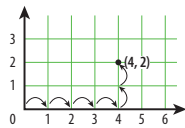
Here is a function table for the function $a = 7 + n$:

n	1	2	3	4	5
a	8	9	10	11	12

An **ordered pair** tells where a point is on a graph.

You write an ordered pair like this: (4, 2)

The first number tells how many steps you go to the right, starting from 0. The second number tells how many steps you go up.



Practice the Words

Directions Complete each sentence. Use the three words given. Answer number 4 in a complete sentence on a separate sheet of paper.

- | | |
|--|--|
| <p>1 An ordered pair _____ tells the location of a point _____ on a graph _____.</p> <p>graph ordered pair point</p> | <p>3 A function _____ is a rule _____ that tells how two variables are related _____.</p> <p>rule related function</p> |
| <p>2 You can make a function table _____ to show the values _____ of the variables _____.</p> <p>table variables values</p> | <p>4 Which is not an ordered pair: (4, 5), (7, 3), or (6, 4, 2)? Write a sentence to explain how you know. (6, 4, 2) Possible explanation: (6, 4, 2) has three numbers instead of two.</p> |

A Introduce

Read aloud the Lesson Objective with students.

BP 3 Have students look over the previous lesson with a partner. Ask them to write on index cards some important words used in the lesson, one word per card. On the back of each card, ask them to write a simple definition or provide an example of the word in words or pictures or both.

- **Have one pair of students display one of their cards for the class and read the word on it aloud.** Ask other pairs to display the same word, if they have it. Ask a volunteer to count the number of groups that used that word. Say *Six groups chose the word _____*, and have students repeat. Write the word on the board.
- **Repeat until all cards are used.** Have students form sentences to describe the frequency of each word using the sentence frame: *_____ groups chose the word _____.*

Read aloud the list of words on the board. Add any Essential Vocabulary terms that have not been mentioned. Explain that all these words can be useful in talking about number patterns and functions.

Choose words from the Additional Vocabulary box that you think will be useful. Elicit or provide examples for these words.

Highlighted words and phrases may affect student comprehension.

B Teach and Learn

Display a large cardboard box. Remind students that they heard about functions in the previous lesson. Explain that the box is a function machine. Say that the machine changes numbers according to a rule, or system, so it does the same thing to each number.

- **Say:** *Let's put the number 5 into this function machine.* Pretend to drop something into the box. Then shake it as dramatically as possible. Encourage students to make sound effects. Reach into the box. Say: *The 5 turned into a 7! The function machine took 5 and turned it into 7.* Write on the board: *When $x = 5$, $y = 7$.* Read the statement aloud with students.
- **Ask students for guesses about what the function machine does, or what the rule is.** Emphasize that it is impossible to know the rule for sure with only one example, but we can guess. If students have difficulty expressing their ideas in words, ask what they think will happen if you put the number nine into the box.
- **Put the number nine into the box.** Establish that 11 will come out. Repeat with 20 (22). Elicit that this is a *plus two* (or *add two*) machine. Say: *My machine's rule is to take the in number and add 2 to it.*
- **Check students' understanding by challenging them to tell what will come out if eight is put in.** Help students say *When x equals 8, y equals 10.*


BP 3 Have students use small boxes to play the game with a partner. Ask one student to think of a simple rule and give a few examples. Have the other student guess the rule. Then have partners switch roles. Observe pairs as they work and provide assistance as necessary.

Explain that the rules in these activities are examples of functions. Then read aloud the information on functions as students follow along in their student worktexts. Emphasize the fact that students can find the value of one variable if they know the value of the other one.

- **Point out that the rule you used earlier in the lesson can be written as the equation $y = x + 2$.** Say: *When you put in a number for x , you get out a number for y . That number is 2 more than x . So, we can write $y = x + 2$.*

Have students study the examples of functions with a partner. Point out that the functions, as written, all contain two variables and

an equals sign. Tell students that functions are special equations. (Note that functions sometimes do have just one variable, but fifth-grade students are not expected to work with these equations.)

 **Display Transparency 59.** Ask students if the first item on the list is a function or not. Have students explain how they know.


- **Continue with other items on the list.** For each function, ask students to express the relationship between the two variables in words. Have them use the examples in the student worktext, if needed.

Move on to the information about function tables in the student worktext. Help students read the table by saying: *When n equals 1, a equals 8.* Have students use the same sentence to express the relationships between other number pairs in the table.

- **Remind students that they have already used the sentence frame: *When _____ equals _____, _____ equals _____.*** Elicit that they used this sentence to talk about the numbers in the function machine. Say: *A function table shows the values for a function.*

Read aloud the information about ordered pairs. Sketch a simple graph on the board. Mark off five or six numbers on each axis. Plot the point (3, 4) by starting at zero, going three to the right, and going up four. Have students make the same movements with a finger in the air.

- **Then tell students that the point has a name.** Say: *We went 3e to the right and 4 up, so the point is called 3e, 4. We write the numbers inside parentheses, like this. Write (3, 4) on the board.*
- **BP 3** Then dictate the following points: (5, 2); (7, 9); (2, 0). Have students write them on index cards, including the parentheses, and hold them up so you can see whether they are correct. Chorally say (5, 2) is an ordered pair as students hold up each card.

 **Have students complete the Vocabulary Cards for the words in this module.**

C Review and Practice

Give a brief definition of each vocabulary word. For example, for *ordered pair*, say: *This tells where a point is on a graph.* Have students identify the word from its definition.

Divide students into groups of three. Assign each student in the group a different vocabulary word. Have students take turns explaining their words to the other group members.

Read aloud the directions for Practice the Words. Emphasize that all the words given for each sentence will be used. Have students complete the activity independently.

D Assess and Intervene

Can students use the vocabulary words, as shown by their work in Practice the Words on page 118? Use the rubric to identify students who need extra support through additional help and the Intervention activity.

Intermediate

- Fills in at least 6 blanks correctly.
- Writes a phrase or sentence for number 4, with some errors, to explain that (6, 4, 2) has too many numbers to be an ordered pair.

Example of a sentence a student might write: *Have too much numbers.*

Advanced

- Fills in all 9 blanks correctly.
- Writes a complete sentence for number 4, with minimal errors, to explain that (6, 4, 2) has too many numbers to be an ordered pair.

Example of a sentence a student might write: *(6, 4, 2) is not ordered pair because has 3 numbers and ordered pair has 2 numbers.*

INTERVENTION

5 minutes



Students who struggle with Practice the Words may benefit from testing the words in different parts of the sentences. Slowly read aloud number 1, putting the wrong words in the blanks. Then say: *That doesn't sound right. What's wrong with it?* Break the sentence into pieces and help students explain why the words don't make sense where they are. Repeat with other examples. Encourage students to use this strategy as they work.