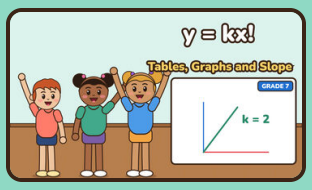
HAKILLO KIDS · TEACHER GUIDE · VIRGINIA SOL EDITION · GRADE 7 · LESSON 2

Proportional Relationships and Slope



VIRGINIA SOL (2023)
7.PFA.1

VIDEO LENGTH
4:37 · Common Core edition also available

WATCH THE LESSON FREE
hakillokids.org/math/grade-7#G7-02

PRACTICE ONLINE
learn.hakillokids.org · videos stop for each question, scored automatically

7.PFA.1 The student will investigate and analyze proportional relationships between two quantities using verbal descriptions, tables, equations in y = mx form, and graphs, including problems in context.

Materials: Graph paper, tables of values, rulers.

Students will

- Find the constant of proportionality k = y/x from a table.
- Recognize a proportional graph as a straight line through the origin.
- Write y = kx.
- Interpret k as the slope (unit rate).

Key words

proportional relationship	y/x is the same for every pair
constant of proportionality (k)	the unit rate y/x
slope	rate of change: how much y goes up for each 1 in x
origin	the point (0, 0)

Before the video 2 minutes

Show a table: 1 level → 2 gems, 2 → 4, 3 → 6. Ask: “What rule connects levels and gems?”

What happens in the video

0:00	Welcome and today's goal: proportional relationships
0:21	Two gems per level: y/x is always 2
0:44	A straight line through the origin
1:01	y = 2x: k is the slope
1:18	Spot the mistake: y/x must be the same in every row
1:44	Your turn! Students answer during each pause (see below)
4:18	Recap and goodbye

Spot the mistake at 1:18

> **Sam:** One, five. Two, six. Three, seven. It's proportional, and k is five!
> **Ivy:** Hmm... is y divided by x the same in every row?
> **Mia:** Five, then three, then about two point three. Not the same, so it is not proportional.
> **Sam:** Oops! The same k in every row, or it's not proportional.

- Ask: “What is y/x in each row?” (5, 3, about 2.33.)
- Graph the points: the line does not go through the origin.
- Conclude: not proportional, so there is no single k.

Your-turn pauses students answer out loud, then the characters give the answer

TIME	QUESTION	ANSWER IN THE VIDEO
1:45	y equals four x. What is the slope?	Four! The slope is k, the number in front of x.
2:01	Ten miles in two hours. What is k?	Five miles per hour!
2:14	k equals three. What is y when x is five?	Fifteen! Three times five.
2:30	Twelve gems for four levels. Write the equation.	y equals three x! Twelve divided by four is three.
2:47	y equals six x. What is y when x is four?	Twenty-four!
3:01	A straight line goes through zero zero and two, ten. What is k?	Five! Ten divided by two.
3:18	y equals one half x. What is y when x is eight?	Four! Half of eight.
3:33	Eighteen dollars for six tickets. What is the unit rate?	Three dollars per ticket!
3:48	A table has one, five, then two, ten. What is k?	Five! Five over one, and ten over two.
4:04	y equals seven x. What is y when x is three?	Twenty-one!

Tip: pause the video a little longer on any question your class finds hard, and ask a student to explain how they know.

After the video: talk about it

1. How can you tell from a graph that a relationship is proportional?
2. What does k mean in a real situation?
3. Is y = x + 3 proportional? Why or why not?

Go further

Real rates: students collect two real proportional relationships (price per item, pay per hour), write each as y = kx, and graph them together.

Answer key for the practice page

1. 4
2. y = 4x
3. 15
4. No (y/x is not constant)
5. $3 per pound
6. A straight line through (0, 0) rising 3 for each 1 to the right.

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HAKILLO KIDS · GRADE 7 · LESSON 2 · PRACTICE

Proportional Relationships and Slope

Name: _____ **Date:** _____

1. **Table: (2, 8), (3, 12), (5, 20). What is k?**

   Answer: _____

2. **Write the equation for that table.**

   Answer: _____

3. **y = 2.5x. What is y when x = 6?**

   Answer: _____

4. **Is the table (1, 3), (2, 5), (3, 7) proportional?**

   Answer: _____

5. **$21 for 7 pounds of apples. What is the unit rate?**

   Answer: _____

6. **Graph y = 3x for x = 0, 1, 2, 3. Describe the line.**

   Answer: _____

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Practice online with Mia, Sam & Ivy: **learn.hakillokids.org**