LESSON MAKER PRO

Runoff Rate Lab

Measure how quickly water moves soil.

GRADE 4 · 4.12

4.12 "Plan and carry out investigations to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, and vegetation, investigating a single form of weathering or erosion at a time."

NAME _____ DATE _____

SOIL MOVED EACH MINUTE

Water erosion happens when moving water carries soil away. To find the rate, divide the grams of soil moved by the number of minutes. To compare tests fairly, change only one condition.

WORKED EXAMPLE

Use the test data to find the soil moved each minute.

WATER EROSION TEST

Time (min)	Soil moved (g)
4	28

1. Divide the soil moved by the time.
2. 28 / 4 = 7

Answer: 7 g per minute

PRACTICE 4 problems

1 Water moves 10 g of soil in 2 minutes. How many grams move each minute?

ANSWER _____

2 Water moves 45 g of soil in 5 minutes. How many grams move each minute?

ANSWER _____

3 Water moves 8 g of soil each minute. How much moves in 6 minutes?

ANSWER _____

4 Water moves 12 g of soil each minute. How long will it take to move 96 g?

ANSWER _____

APPLY IT Show your work

1 Your class models runoff near the playground with a soil tray. Does soil move at a steady rate? State the rate.

PLAYGROUND RUNOFF MODEL

Time (min)	Total soil moved (g)
1	11
2	22
3	33

ANSWER _____

2 Your class models runoff on a dirt slope near the skate park. Water moves 50 g of soil in 10 minutes. If the rate stays the same, how much soil will move in 15 minutes?

WORK SPACE

ANSWER _____

CHALLENGE One step up

These tests use the same soil, slope, and test time. What one condition changes? How much greater is the faster soil-loss rate?

TWO WATER EROSION TESTS

Test	Water flow	Time (min)	Soil moved (g)
A	Low	5	40
B	High	5	65

WORK SPACE AND ANSWER

ANSWER KEY

Runoff Rate Lab

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Water moves 10 g of soil in 2 minutes. How many grams move each minute?	**5 g per minute**
2	Water moves 45 g of soil in 5 minutes. How many grams move each minute?	**9 g per minute**
3	Water moves 8 g of soil each minute. How much moves in 6 minutes?	**48 g**
4	Water moves 12 g of soil each minute. How long will it take to move 96 g?	**8 minutes**

PART 2 · APPLY IT

1. **Yes. Soil moves at 11 g per minute.** The total rises by 11 g during each one-minute interval.
2. **75 g** 50 / 10 = 5 g per minute. In 15 minutes, 5 × 15 = 75 g.

CHALLENGE

Water flow changes. Test B moves 5 g more soil per minute than Test A (13 g per minute compared with 8 g per minute).

Accept equivalent units, such as g/min. In the challenge, students should identify water flow as the only changed condition.