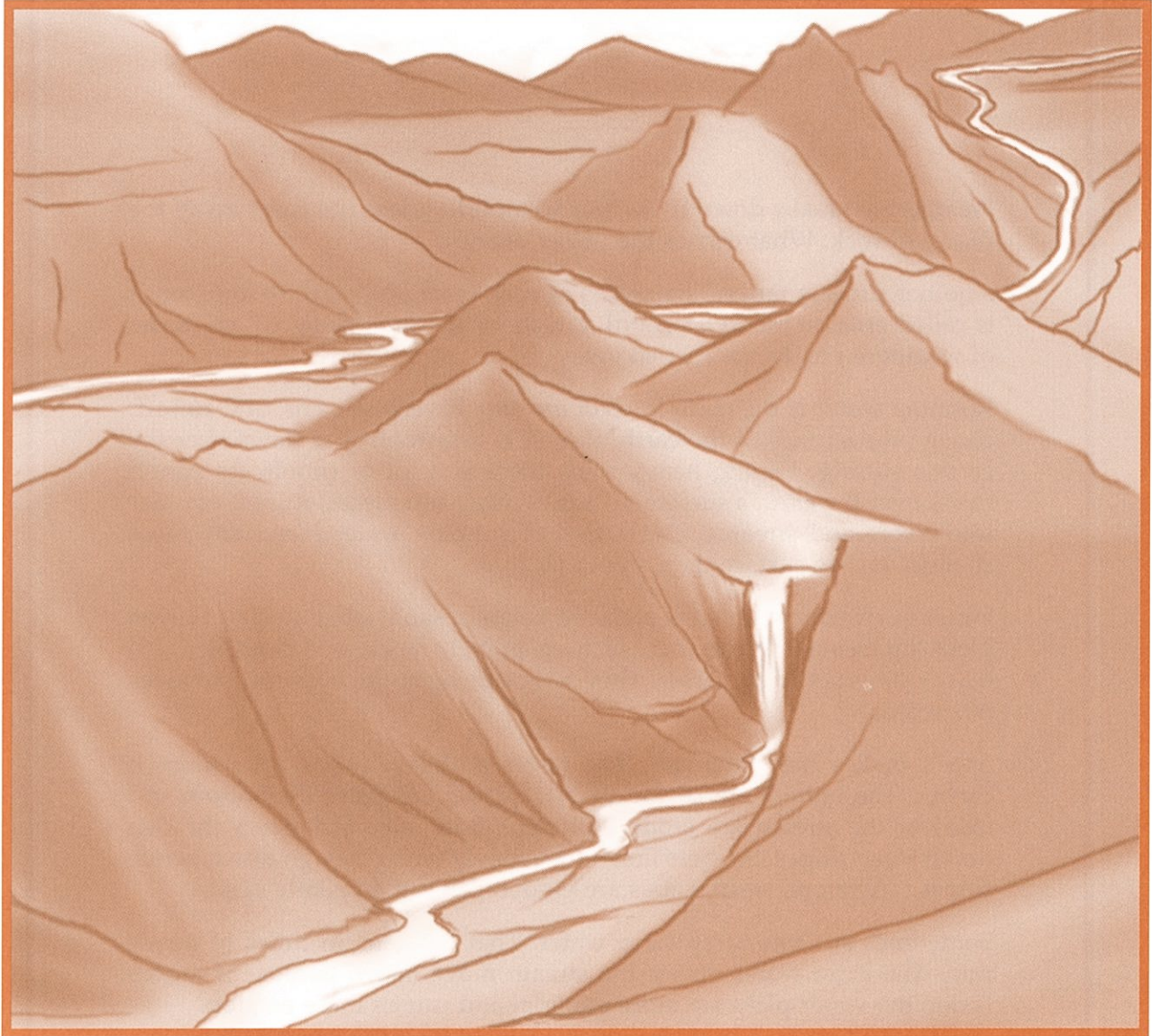


## How does running water cause erosion?



### KEY TERMS

**erosion:** process by which weathered material is moved from one place to another.

**runoff:** rainwater that flows into streams and rivers

# LESSON | How does running water 15 | cause erosion?

Weathering breaks down rocks, but weathering does not carry away the pieces of rock. What carries the pieces away?

Another process moves the pieces of rock from one place to another. It is called **erosion** [ee-ROH-zhun]. Erosion is the process by which pieces of weathered rocks are carried away.

Running water is the main force of erosion. Rivers, streams, and **runoff**, change the surface of the earth. Runoff is rainwater that flows over the earth's surface. During heavy rains there is a lot of runoff. As runoff flows over the earth's surface, it carries away soil pieces. Runoff empties into rivers and streams. The action of running water has made more changes on the surface than any other force.

Water in rivers and streams picks up pebbles, sand, silt, and clay. It even picks up heavier fragments, such as gravel, rocks, and boulders. All these things act as abrasives. They scrape away at the bottoms and sides of streams.

Speed makes the difference. The faster a stream moves, the more it carries. The more material the stream carries, the faster the bottom and sides of the stream are eroded. Streams flow very fast when they go down steep slopes. Streams flow more slowly when they go down gentle slopes. Therefore, steep slopes are eroded faster than gentle slopes.

Sometimes streams carry extra water. That happens in times of heavy rain. The extra water makes the stream move faster. Because it moves faster, the water picks up more material and causes more erosion.

Streams are the greatest force of erosion. They have worn away large parts of our earth's surface.

## WHAT DO THE PICTURES SHOW?

The Grand Canyon was once flat land. The land was eroded away by the Colorado River.

In some places the canyon is up to one mile deep.

It took the Colorado River about 30 million years to erode so much land.

Even today, the river is slowly making the canyon deeper and wider.

Find the Colorado River in the photo. It is not very large . . . but it is very powerful.

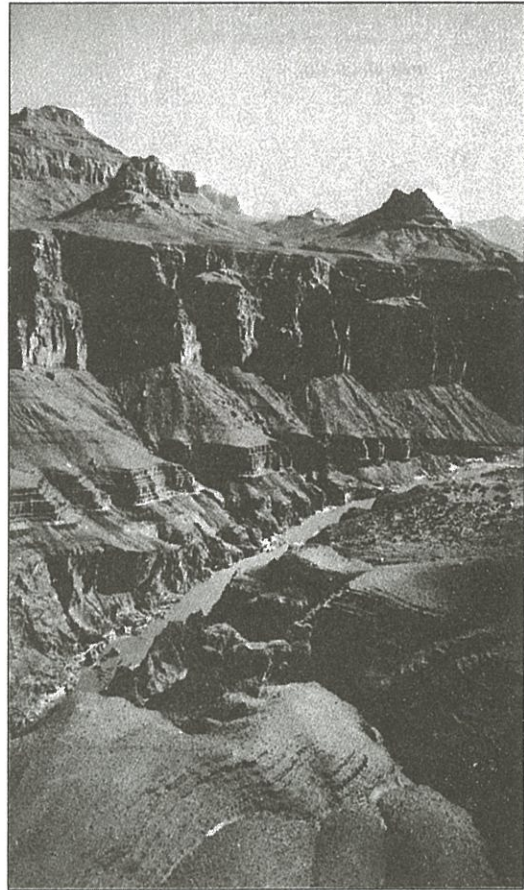


Figure A

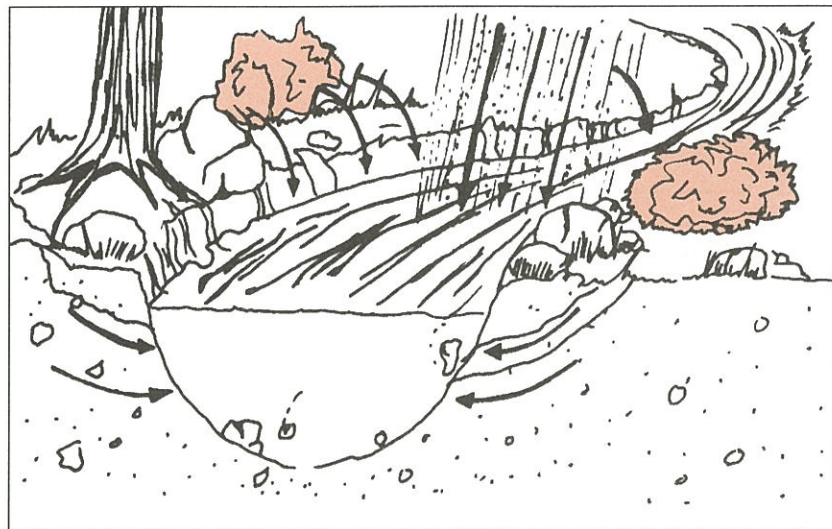


Figure B

Water enters a stream in three ways. Some rain falls directly into the stream. Some runoff water flows off from the top of the ground. Other water seeps in from under the ground.

A river system is made up of one main stream and all the streams that flow into it.

## STUDYING STREAM EROSION

Study the diagrams below. Then answer the questions under each diagram.

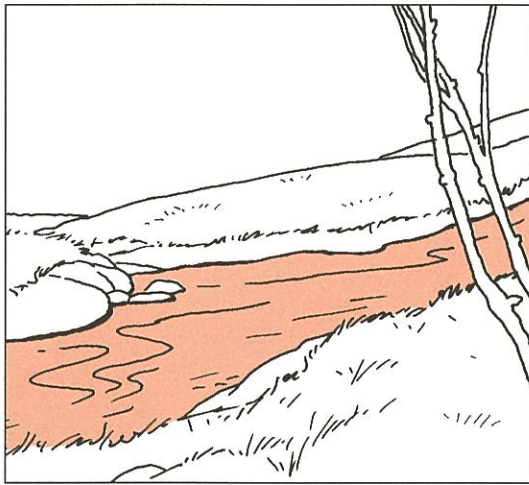


Figure C

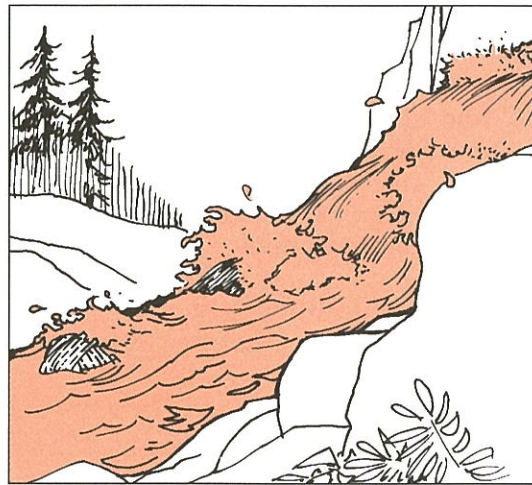


Figure D

Figures C and D show two different streams. Which stream . . .

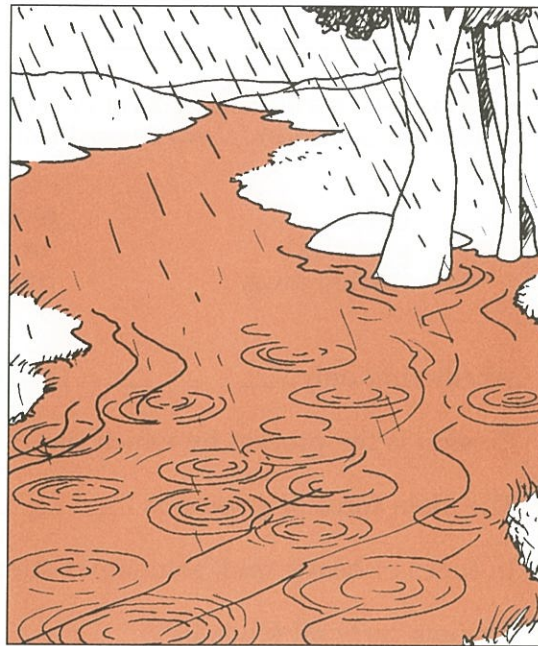
1. is moving down a gentle slope? \_\_\_\_\_
2. is moving down a steep slope? \_\_\_\_\_
3. is moving faster? \_\_\_\_\_
4. is moving slower? \_\_\_\_\_
5. carries more sediment? \_\_\_\_\_
6. carries less sediment? \_\_\_\_\_
7. erodes more? \_\_\_\_\_
8. erodes less? \_\_\_\_\_

### Conclusions:

1. Water flowing down a steep slope moves \_\_\_\_\_ than water flowing down a gentle slope.  
slower, faster
2. Fast moving water carries \_\_\_\_\_ sediment than slow moving water.  
more, less
3. Fast moving water erodes \_\_\_\_\_ than slow moving water.  
more, less



**Figure E**



**Figure F**

Figures E and F show the same stream at different times. In which diagram is the stream . . .

1. carrying more water? \_\_\_\_\_
2. carrying less water? \_\_\_\_\_
3. moving faster? \_\_\_\_\_
4. moving slower? \_\_\_\_\_
5. carrying more sediment? \_\_\_\_\_
6. carrying less sediment? \_\_\_\_\_
7. eroding more? \_\_\_\_\_
8. eroding less? \_\_\_\_\_

**Conclusions:**

1. During heavy rain, a stream carries \_\_\_\_\_ water.  
more, less
2. During heavy rain, a stream moves \_\_\_\_\_ .  
faster, slower
3. During heavy rain, a stream carries \_\_\_\_\_ sediment.  
more, less
4. During heavy rain, erosion by a stream \_\_\_\_\_ .  
increases, decreases
5. During heavy rain, the water level of a stream \_\_\_\_\_ .  
rises, falls

## FILL IN THE BLANK

---

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some words may be used more than once.

more  
particles  
carried away

erode  
breaks down  
running water

faster  
less  
downhill

1. Weathering only \_\_\_\_\_ rocks.
2. Erosion is the process by which pieces of rock are \_\_\_\_\_ .
3. The main force of erosion is \_\_\_\_\_ .
4. In times of heavy rain, sometimes streams carry \_\_\_\_\_ water.
5. Streams carry all kinds of \_\_\_\_\_ .
6. Materials carried by streams \_\_\_\_\_ the sides and bottom of the stream.
7. Streams move only in a \_\_\_\_\_ direction.
8. Steep streams move \_\_\_\_\_ than gently sloping streams.
9. Steep streams carry \_\_\_\_\_ particles than gently sloping streams.
10. Gently sloping streams erode \_\_\_\_\_ than steep streams.

## MATCHING

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Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

### Column A

- \_\_\_\_\_ 1. running water
- \_\_\_\_\_ 2. runoff
- \_\_\_\_\_ 3. erosion
- \_\_\_\_\_ 4. steep slope
- \_\_\_\_\_ 5. gentle slope

### Column B

- a) fast moving stream
- b) main force of erosion
- c) slow moving stream
- d) carrying away of weathered rock pieces
- e) empties into rivers and streams

## TRUE OR FALSE

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*In the space provided, write "true" if the sentence is true. Write "false" if the sentence is false.*

- \_\_\_\_\_ 1. During heavy rain, there is less runoff.
- \_\_\_\_\_ 2. Running water is the most important force of erosion.
- \_\_\_\_\_ 3. All streams carry sediment.
- \_\_\_\_\_ 4. All streams flow at the same speed.
- \_\_\_\_\_ 5. A slow moving stream erodes faster than a fast moving stream.
- \_\_\_\_\_ 6. A steep stream flows faster than a gently sloping stream.
- \_\_\_\_\_ 7. A steep stream erodes less than a gently sloping stream.
- \_\_\_\_\_ 8. Fast moving streams carry more sediment than slow moving streams.
- \_\_\_\_\_ 9. Heavy rain makes streams erode faster.
- \_\_\_\_\_ 10. Streams get their water from rain.

## WORD SCRAMBLE

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*Below are several scrambled words you have used in this Lesson. Unscramble the words and write your answers in the spaces provided.*

- 1. SINEROO \_\_\_\_\_
- 2. TENDIMES \_\_\_\_\_
- 3. SMEART \_\_\_\_\_
- 4. DANS \_\_\_\_\_
- 5. VRELGA \_\_\_\_\_
- 6. OPLES \_\_\_\_\_
- 7. ONFURF \_\_\_\_\_
- 8. ERSRVI \_\_\_\_\_
- 9. DEPSE \_\_\_\_\_
- 10. RWTAE \_\_\_\_\_

## WORD SEARCH

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The list on the left contains words that you have used in this Lesson. Find and circle each word where it appears in the box. The spellings may go in any direction: up, down, left, right, or diagonally.

WEATHERING

CHEMICAL

MECHANICAL

FROST

ROOTS

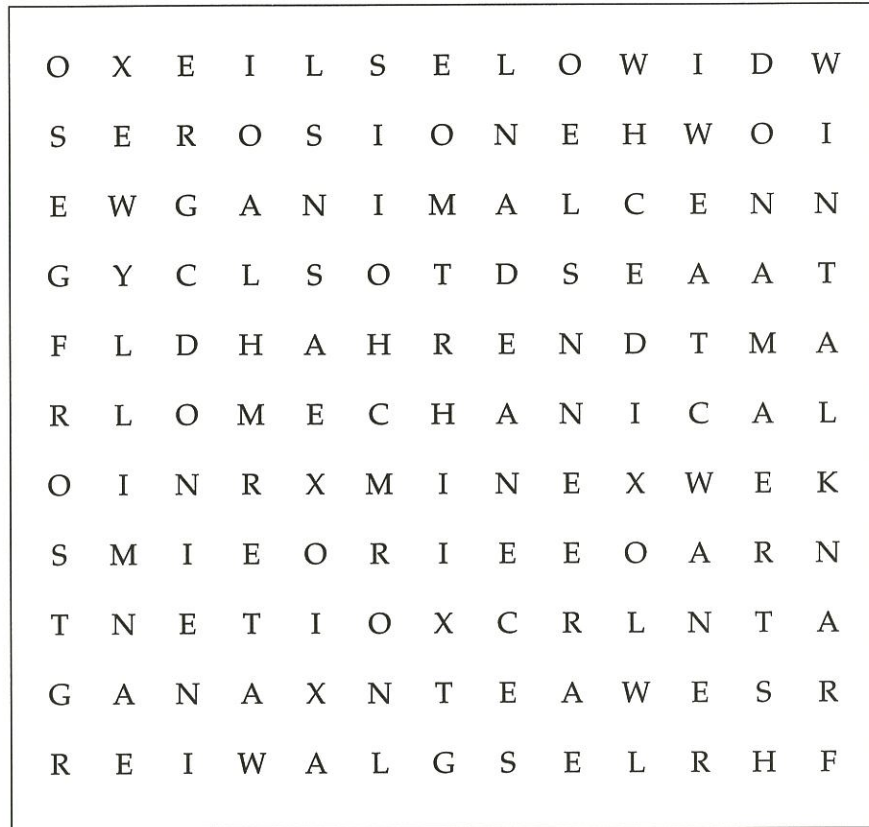
ANIMAL

OXIDE

EROSION

STREAM

WATER



## REACHING OUT

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Would planting trees on a hillside help to prevent running water from eroding the land? Explain.

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