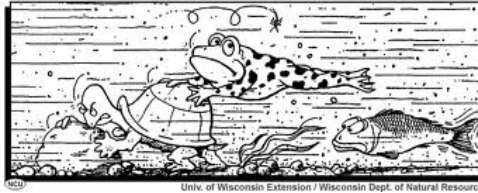


Name: _____ Class: _____ Date: _____

Stream Flow



Learner Outcomes:

- Investigate and describe stream characteristics (e.g., describe the slope, flow rate and stream profile characteristics of a model stream on a stream table)

Key Terms:

Waves

Erosion

Stream characteristics

Tides

Sediment

Terraces

Background Information: Rivers and streams carry and deposit sediment from the earth's surface. How they flow and how sediment is deposited depends upon the stream characteristics. These characteristics include; the rate of water flow, the slope of the stream bed, obstacles in the stream and whether or not the stream is terraced.

Investigative Question: What is the relationship between the slope of a stream bed and erosion of the materials in the stream bed?

Hypothesis:

Materials:

Gravel

Stream table or roof

Books

Sand

gutter

Paper towels

Buckets

Mixing Spoon

Sponges

Plastic tubing

Stopwatch

Procedure:

This investigation / activity has been adapted from:

Mah K, Martha J, McClelland L, et al. *Science in Action 9*. Toronto, ON: Addison Wesley.

1. Fill the stream table with a mixture of sand and gravel to a depth of about 3-5 cm. Spread the mixture evenly. Connect one piece of plastic tubing to function as a drain into an empty bucket.
2. Connect the second length of tubing to a water source and place the free end at the top of the table.
3. Raise the stream table 1 cm at the 'water in' end with a pile of books. Make sure the table is steady.
4. Predict what will happen under the following 3 circumstances:
 - a. Water flow and sediment deposit with the table raised 1 cm.
 - b. Water flow and sediment deposit with the table raised 5 cm.
 - c. Water flow and sediment deposit with the table raised 20 cm.
5. Allow water to flow onto the raised part of the stream bed. Observe and record the speed and direction of the water flow by timing how long it takes for the trickle of water to reach the bottom. Observe the effect of the water flow on the stream bed.
6. Repeat steps 1-5 raising the table to 5 cm, and then to 20 cm. Be sure to keep the source flow pressure consistent. Record your observations.
7. Use sponges and paper towel to clean up the table and any spills.

**** Extension:**

- a. Repeat steps 4-6 using a terraced terrain on the table, or placing larger obstacles (more gravel, rocks, or all sand) in the path of water flow to investigate how obstacles change the rate and direction of flow and distribution of sediment.
- b. Repeat steps 4-6 using varied flow pressures. Smaller or larger tubing can be used to do this.

Observations:

This investigation / activity has been adapted from:

Mah K, Martha J, McClelland L, et al. *Science in Action 9*. Toronto, ON: Addison Wesley.

Analysis:

1. What happened to the stream-bed material as water flowed over it?
2. What impact did slope of the table have on the flow rate of the water? Why?
3. How did the flow rate influence the distribution of sediment? Why?
4. Why was it important to keep the source flow of water constant?

Conclusion:

Describe the relationship the stream profile has on erosion of the material in the stream bed.

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Mah K, Martha J, McClelland L, et al. *Science in Action 9*. Toronto, ON: Addison Wesley.

Extension:

The profile and topography of a stream-bed determines the types of rapids and water flow found in a river. Rapids are often classified on a scale of 1-6 using a grading system called the "International Scale of River Difficulty". Because erosion changes the river profile, the a rapid's grade is not fixed and can change over time and with changes in weather.



Research the 6 classes of rapids and create an information pamphlet or infomercial for those interested in white-water rafting to inform consumers about the characteristics of each rapid class, the stream profile that produces these characteristics and the skills required to safely navigate each class of rapids. You are encouraged to use pictures, drawings, factoids and examples in your presentation.

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Mah K, Martha J, McClelland L, et al. *Science in Action 9*. Toronto, ON: Addison Wesley.

Observations:

Record your observations from each test - what did you see happen to the water?

| Water Test | Treated Water Sample | Untreated Water Sample A | Untreated Water Sample B |
|---|-----------------------------|---------------------------------|---------------------------------|
| Test 1: Test for Living Organisms | | | |
| Test 2: Test for Odour, Turbidity & Colour | | | |
| Test 3: Test for Solids | | | |
| Test 4: Test for pH | | | |
| Test 5: Test for Total Dissolved Solids | | | |

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| | | | |
|--------------------------------------|--|--|--|
| Test 6: Test for Hardness | | | |
| Test 7: Test for Chlorine | | | |

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