

Lesson 4 Stream Table Lab

Student Activity

Part 1: Effect of Gradient on Water Velocity

Question:

How does the gradient (slope) affect the water velocity?

Hypothesis:

If the gradient is increased, then the water velocity will _____
because _____.

1. Your group should rotate through the following jobs. Mark below to indicate the role you are starting with:

- _____ WATER POURER
- _____ SAND SCULPTOR
- _____ DATA RECORDER
- _____ MATERIALS MANAGER

2. Use the *empty* stream table.
3. Fill the "Normal" flow cup with water and hold finger on the hole until ready for release.
4. Time how long it takes for all of the water to reach the catch bucket at the end of the stream table.
5. Repeat three (3) times and find the average flow time for one (1) plastic block under the stream table.
6. Place another plastic block under the stream table and repeat the measurement of water velocity for the stream table with two (2) plastic blocks. Find the average of three (3) trials.
7. If time allows, use three (3) plastic blocks.

Gradient and Water Velocity

# of Blocks	Trial 1 (sec)	Trial 2 (sec)	Trial 3 (sec)	Average Time (sec)
1				
2				
3				

CER:

Make a claim; give evidence and your reasoning about the effect of gradient on water velocity.

Claim: _____

Evidence: _____

Reasoning: _____

Lesson 4

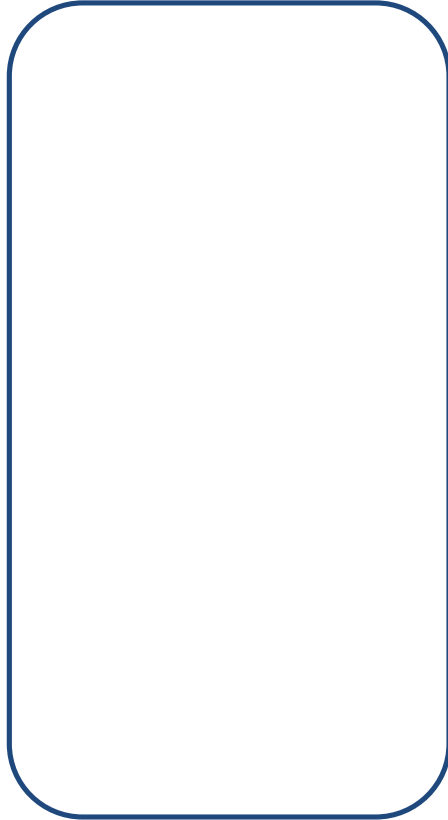
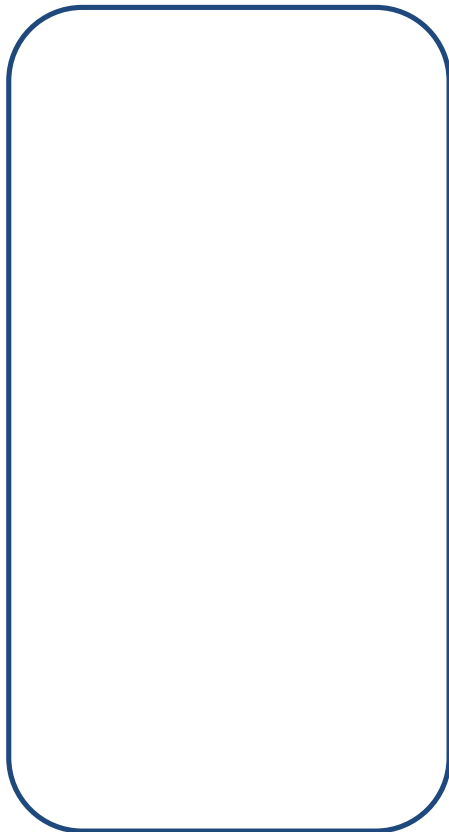
Stream Table Lab

Part II: Water Speed and Sediment Load

1. Using the stream table with sand, set one (1) plastic block under the stream table to simulate low gradient, low water speed.
2. Using the "Normal" flow cup, observe the erosion and deposition of sediments caused by a low gradient flow.
3. Draw the results of the flow of water down the stream table. Pay close attention to the erosion patterns and the deposition. Look closely at the size of the sand particles that are being eroded and deposited.
4. Have the sand sculptor reset the sand to its original position.
5. Repeat the experiment with three (3) plastic blocks under the stream table. This will simulate high gradient, and high water speed.
6. Draw the results of the flow on the stream table.

Low Gradient

High Gradient



Compare the pattern of erosion that your group observed?

Where is most of the sediment load deposited?

What do you notice about the size of particles near the bottom of the stream table?

Extension: What is the angle of elevation?

Vocabulary word bank: saturation, dynamic, erosion, deposition, sediment, load, meander, runoff, and mass movement, alluvial fan, rill, and gully.

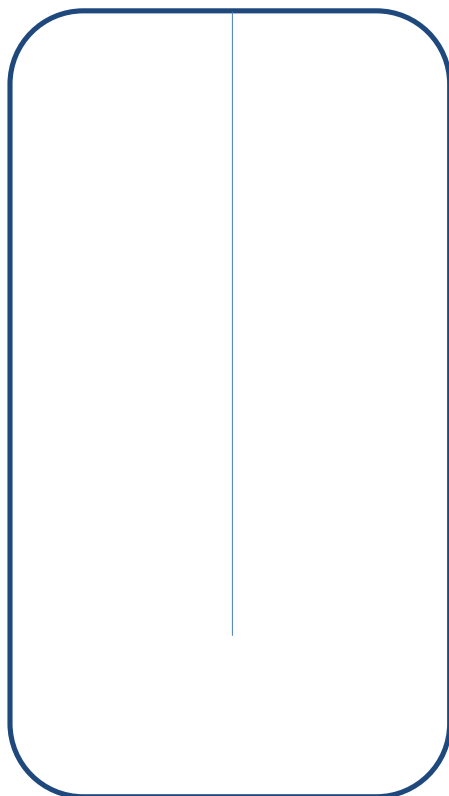
Lesson 4

Stream Table Lab

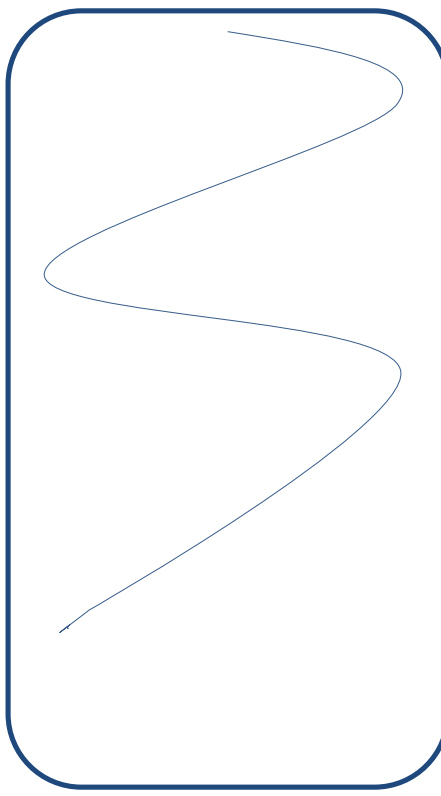
Part III: Channel Shape and Pattern of Deposition

1. Change your role.
2. Use two (2) or three (3) plastic blocks.
3. Sand Sculptor will reset the sand in the stream table. Instead of making it smooth and evenly spread, cut a shallow channel straight from the water source to the drain hole.
4. Using the "Normal" flow cup. Run the experiment.
5. Draw the results of having a straight river channel. Be sure to pay attention to areas of erosion and areas of deposition as well as the size of the sand particles.
6. Repeat the experiment except, this time make the channel wind back and forth across the stream table.
7. Draw the results of having a winding river channel. Be sure to pay attention to areas of erosion and deposition, as well as the size of the sand particles.

Straight Channel



Curved Channel



Compare the patterns of erosion that your group observed?

Where is most of the sediment load deposited?

What do you notice about the different sizes of particles?

Extension: What is the angle of elevation?

Vocabulary word bank: saturation, dynamic, erosion, deposition, sediment, load, meander, runoff, and mass movement, alluvial fan, rill, and gully.

Lesson 4

Stream Table Lab

Experimental Design: Design an inquiry with the following materials. Write down the question you would like to investigate and collect evidence (experimental observations and measurements) to support your claim. Then, use your science textbook and lectures to use scientific reasoning to conclude.

Materials

- Stream Table
- 1 Dumping Bucket
- 2 Paint sticks
- 1 Hand Washing Bucket
- 3 lbs. of Sand
- 100 g of Clay
- 2 Plastic Rectangular Blocks
- Tape
- Food Coloring
- Plastic houses

Vocabulary word bank:

saturation, dynamic, erosion, deposition, sediment, load, meander, runoff, and mass movement, alluvial fan, rill, and gully.

Question:

Before

After

Claim:

Evidence:

Reasoning:

Critical Thinking Questions

Lesson 4 Stream Table Lab

Directions: Answer using complete sentences Use your vocabulary word banks to write your answers.

Where is the sediment being deposited in your tray?

Explain how increasing the gradient affected the deposition of sediments.

How would you change the experiment to better show the relationship between rivers and erosion (for example, “add more water”)? List 3 revisions, and explain how each would improve the model.

- 1.
- 2.
- 3.

List 3 limitations of the stream table model.

- 1.
- 2.
- 3.