I. Objectives

1. Describe the interactions between moving water and sediment using a stream table.
2. Identify common processes and features of streams.
3. Investigate how changes in slope and flow affect the results.

II. Introduction

The mass movement of rocks and sediment downslope is the great counterbalance to tectonic uplift. While both processes can be episodic, what matters in the long run is the fact that these processes are active over periods of millions of years, slowly but steadily wearing away areas of relief and, with the help of rivers, transporting this overburden to continental margins where it is often recycled tectonically. Mountain rivers often flow from deeply incised in canyons into wider channels characterized by rocks and boulders in a braided channel. Eventually, rivers tend to meander back and forth across a flood plain before dumping their bed and suspended loads in the coastal environment of a river delta.

Stream tables, such as the one you are using today, are simple but effective ways to observe some stream processes in the lab. This lab is fairly open-ended and will have you and a partner investigating how two basic factors, stream slope and flow rate, affect erosion and deposition. While some videos illustrate how meanders form (this requires more time, stream length and attention to details than we have available), this lab will focus on the chaotic environments of a braided channel and delta.

III. Materials

Stream table pan ~22” x 11” x 2.5”, ruler, two wood blocks 1” x 2” x 10”, angle scraper 2” x 2” x 10”, concave molding, two drip containers, 10 oz plastic cups with 1/8” and 1/16” holes, plastic pitcher or other water container, plastic buckets for drainage, plastic cups for sand scoopers, sand supply, bucket for wet sand

IV. Prelab Definitions

1. stream table

2. erosion

3. deposition

4. channel

5. braided stream

6. meander

7. delta

V. Lab Procedure

General Setup

1. If your tray does not already have sand in it, use the sand scoopers to fill the upper 2/3 of your tray with sand 1.5 to 2 inches deep.

2. Use a plastic cup to slowly pour water over the sand until it is nearly saturated.

Reset between each run

3. Use the wooden scraper to level and pack the sand, then use the scraper to form a steep drop-off from the sandy floodplain to the lower basin.

4. Place one of the wooden blocks under the upper end of your tray to form a gentle slope.

5. **Make sure your pan is draining into your collection bucket and avoid spilling water or sand around the lab – you must clean up before you leave!**

Part A: Run 1

6. **Vary the flow rate** by pouring water into the drip container with the small outlet hole while holding it over the upper end of your stream table. Keep the slope constant.

7. Observe and note the major differences from low to high flow.

8. Sketch a "snapshot" of the final appearance of your stream table and be sure to label major features for clarity.

9. Reset the sand box for the next run.

Part A: Run 2

10. **Vary the flow rate** by pouring water into the drip container with the larger outlet hole while holding it over the upper end of your stream table. Keep the slope constant.

11. Observe and note the major differences from low to high flow.

12. Sketch a "snapshot" of the final appearance of your stream table and be sure to label major features for clarity.

13. Reset the sand box for the next run.

Part B: Run 1

14. **Vary the slope** using the wooden block on its side under the upper end of your tray. Create a low slope with the wide edge of the block flat to the table. Keep the flow rate constant by using the big hole drip bucket for both runs.

15. Observe and note the major changes from low to high slope.

16. Sketch a "snapshot" of the final appearance of your stream table and be sure to label major features for clarity.

17. Reset the sand box for the next run.

Part B: Run2

18. **Vary the slope** using the wooden block on end under the upper end of your tray. Create a steeper slope with the narrow edge of the block flat on the table so the end of the tray is raised higher than in the previous run. Keep the flow rate constant by using the big hole drip bucket for both runs.

19. Observe and note the major changes from low to high slope.

20. Sketch a "snapshot" of the final appearance of your stream table and be sure to label major features for clarity.

VI. Lab Discussion

1. What major differences in sand transport and deposition did you observe between the low and high flow rate runs in Part A?

2. What major differences in sand transport and deposition did you observe between the low and high slope runs in Part B?

3. Describe two other important land or flow characteristics in channel formation or sediment transport that we could test with the stream table.
   a.

   b.

4. Explain how does this experiment differ from what happens in the field.

Lab courtesy of Dr. Jim Washburne