

# Let's Bet on Sediments

[http://www.oceanexplorer.noaa.gov/explorations/02hudson/background/edu/media/hc\\_bet\\_on\\_sediments.pdf](http://www.oceanexplorer.noaa.gov/explorations/02hudson/background/edu/media/hc_bet_on_sediments.pdf)  
Based on Part II of the Online Activity

## Focus on Inquiry

The student will make observations about how sediment size affects the rate at which sediments are deposited.

## Lesson Overview

Students will discover how sediment size is related to the amount of time the sediment is suspended in water.

<b>Duration</b> 75 minutes	<b>Setting</b> Classroom	<b>Grouping</b> Groups of 2-3 students	<b>PTI Inquiry Subskills</b> 3.3, 3.7, 5.2, 5.3, 7.2, 7.3
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Lesson Components	Estimated Time	Inquiry Subskills Used	Technology Used	Level of Student Engagement	Brief Description
<b>Engage</b>	5 min		Internet (video)	1	Students view an online video of sediments moving down a sediment tank.
<b>Explore</b>	30 min	3.3, 3.7	None	3	Students explore how sediment size affects the rate at which sediments are deposited through two activities.
<b>Explain</b>	10 min	5.2, 5.3	None	3	Students explain the patterns they see as a result of the Explore observations.
<b>Expand</b>	30 min	5.3	Computers with Internet access	3	Students research turbidity currents and turbidities and make connections with what they did in the earlier portions of the lesson.
<b>Evaluate</b>	varies	7.2, 7.3		n/a	Teacher developed rubric for worksheet, and explanations.

### Level of Student Engagement

1	Low	Listen to lecture, observe the teacher, individual reading, teacher demonstration, teacher-centered instruction
2	Moderate	Raise questions, lecture with discussion, record data, make predictions, technology interaction with assistance
3	High	Hands-on activity or inquiry; critique others, draw conclusions, make connections, problem-solve, student-centered

### National Science Education Standards – Inquiry

Develop descriptions, explanations, predictions, and models using evidence.



### National Science Education Standards – Earth Science

Some changes in the solid earth can be described as the “rock cycle.”

### Louisiana Grade Level Expectations – Inquiry

- Gr. 8, Inquiry GLE#7 - Record observations using methods that complement investigations (e.g., journals, tables, charts) (SI-M-A3)
- Gr. 8, Inquiry GLE#12 - Use data and information gathered to develop an explanation of experimental results (SI-M-A4)
- Gr. 8, Inquiry GLE#16 - Use evidence to make inferences and predict trends (SI-M-A5)
- Gr. 8, Inquiry GLE#19 - Communicate ideas in a variety of ways (e.g., symbols, illustrations, graphs, charts, spreadsheets, concept maps, oral and written reports, equations) (SI-M-A7)
- Gr. 8, Inquiry GLE#22 - Use evidence and observations to explain and communicate the results of investigations (SI-M-A7)



### Louisiana Grade Level Expectations Earth Science

- Gr. 8, GLE#18 – Describe how sedimentary, igneous, and metamorphic rocks form and change in the rock cycle (ESS-M-A6)

## Materials List (per group)

- 3 large clean jars filled with water
- 3-1/2 cup samples of each sediment type
- per group (pebbles, sand, silt)
- 1 magnifying glass per group
- magnifying glass per group
- Computers with Internet access

## Advance Preparation

1. Gather materials for each group as indicated in the materials list above.
2. Make copies of the Sediment Activity Worksheet (found on p. 5 and 6 of online lesson) for each student.
3. Preview the Engage video. It requires RealPlayer to function.
4. Create a hot list of Internet resources the students can use to research turbidity currents and turbidites.

## Other Information

### Learning Objectives

The learner will...

- be able to investigate and analyze the patterns of sedimentation in the Hudson Canyon
- will observe how the heavier particles sink at a faster rate than the finer particles
- will learn that submarine landslides (trench slope failure) are avalanches of sediment in deep ocean canyons that form currents (called “turbidity current”) and result in a sedimentary deposit called a “turbidite.”

### Prior Knowledge Needed by the Students

None

### Procedure

#### **Engage**

1. Set the stage for students by showing them the short video (~10 seconds) of students releasing sediments in a sediment tank (see <http://www-ocean.tamu.edu/~wormuth/turbiditycurrent1.html>; this requires RealPlayer to work). Ask your students what they think will happen as the sediment moves down the tank. If they could look at a cross section of the sediment when it has finished flowing, would there be any pattern in the sediment?

#### **Explore**

Follow Part II of the online lesson plan (Student Activity):

1. Have the materials ready for students to retrieve what they need.
2. Distribute the Sediment Analysis Worksheet (p. 5 and 6 of the online lesson plan). Have the students use the worksheet to guide and record their observations of the settling of the three different sediment types.
3. Observe the action of all three sediments together and record the observations on the Sediment Analysis Worksheet.

#### **Explain**

1. Have students share the results of the Sediment Analysis activity.
2. In their groups, have students develop a description of “graded bedding” based on their observations. Share these descriptions as a class to develop a class definition/description of graded bedding, including the conditions necessary for graded bedding to form.

#### **Expand/Elaborate:**

1. Have students research the term “turbidite” and turbidity currents by using the Internet. Students can use a kid-safe search engine to locate information on the web, such as Ask Jeeves for Kids (<http://www.ajkids.com/>), Fact Monster ([www.factmonster.com](http://www.factmonster.com)), or KidsClick! (<http://www.kidsclick.org/>). Students should include in their research information about how turbidites (the sediments) and turbidity currents form in the ocean, where they are found, and a description of turbidite sediments (including how “graded bedding” is a characteristic of these types of deposits).



2. *Optional.* Have students research sediments found in the Hudson Canyon of the northeastern margin of North America. (This information is found in the Background Section of the online lesson plan. Students can also use one of the kid-safe search engines mentioned above).

**Evaluate**

1. Students will write a paragraph summarizing what they learned about turbidity currents and the sedimentation in the Hudson Canyon.
2. Students can submit their lab sheet for grading.

**Blackline Master**

1. Sediment Analysis Worksheet (p. 5 and 6 of the online lesson plan)