

Sediment Deposition

LET THE RIVER RUN

ACTIVITY



In the Mississippi River, sediment such as soil, rocks, and plants are swept downstream by the force of the river. When the river flows into the quiet Gulf of Mexico, most of the sediment is deposited. As sediment accumulates over time, it forms deltas. The Mississippi has formed many distinct deltas over the last 7,000 years. These deltas have become coastal Louisiana. Today, sediment deposition by the Mississippi River is no longer building Louisiana's land at the rate it once did. Instead, for the last 100 years, Louisiana's coastal land area has been shrinking.

In this activity, you will examine changes in sediment deposition at locations along the Mississippi River. You will use data collected at stations by the U.S. Geological Survey (USGS). You will import data and use the TI-73 Explorer™ to graph and analyze the monthly and annual changes in sediment deposition at locations in the upper and lower Mississippi River.

How does sediment deposition compare between upper and lower Mississippi River over a period of one year? How did sediment deposition change between 1950 and 1980?

Focus Question

How is sediment deposited by the Mississippi River?



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Part A — Transfer the Sediment Deposition Data

Procedure

You will examine two types of data: monthly sediment deposition and annual sediment deposition. (Data Source: *GEOLOGICAL SURVEY CIRCULAR 1133, Contaminants in the Mississippi River, Reston, Virginia, 1995.*)

- a. The *monthly sediment deposition data* shows the monthly sediment deposition measured in millions of metric tons at two locations along the Mississippi River. There are three lists associated with this data.
 - i. MONTH. The month of the year. The months are represented by numbers in order to easily graph the values (1 = January, 12 = December).
 - ii. UPPER. Sediment deposition data collected at Burlington, Iowa.
 - iii. LOWER. Sediment deposition data collected at Tarbert Landing, Mississippi, near the mouth of the Mississippi River.

- b. The *annual sediment deposition data* represents the sediment deposition measured in millions of metric tons per year. The data was collected at two locations in the Mississippi River Basin from 1950 to 1980. There are three lists associated with this data.
 - i. YEAR. The year the data was collected.
 - ii. OMAHA. Sediment deposition data collected in the Missouri River near Omaha, Nebraska. *Note: The Missouri River is a tributary of the Mississippi.*
 - iii. BATON. Sediment deposition data collected in the Mississippi River near Baton Rouge, Louisiana.

1 Reset the TI-73 Explorer™ to the default settings.

- a. Turn on the TI-73 Explorer™.
- b. Press **2nd** [MEM] **7** **2** **2**.

2 Transfer the sediment deposition data to your TI-73 Explorer™.

- a. Turn on the TI-73 Explorer™ without the sediment deposition data.
- b. Use the link cable to connect the TI-73 Explorer™ without the sediment deposition data to the TI-73 Explorer™ with the sediment deposition data.
- c. Make sure both graphing devices are turned on.

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Materials

- TI-73 Explorer™



TI-73 Explorer™



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TI-73 Explorer™ without sediment deposition data.

- Press **[APPS]** to display the APPLICATIONS MENU.
- Select 1:Link and press **[▶]** to display the LINK RECEIVE MENU.
- Select 1:Receive. The message “Waiting...” and the busy indicator are displayed. The receiving unit is ready to receive the deposition data.



TI-73 Explorer™ with sediment deposition data.

- Press **[APPS]** to display the APPLICATIONS MENU.
- Select 1:Link to display the LINK SEND MENU.
- Select 4:List to display all the data items (see Key below). Press **[▲]** and **[▼]** to move the selection cursor (E) to each data item for the deposition data (BATON, LOWER, MONTH, OMAHA, UPPER, and YEAR) and press **[ENTER]** to select each item. Once selected the items will be marked with a black box (■).
- Press **[▶]** to display the TRANSMIT MENU.
- Select 1:Transmit. The name of each data item is displayed line by line on the sending unit as the item is sent, and on the receiving unit as each item is received.



Part B — Examine Monthly Sediment Deposition: Upper Mississippi River

Procedure

1 Make a graph of sediment deposition in the upper Mississippi River over several months.

- Press **[2nd]** **[PLOT]**.
- Press **[1]** to define Plot1.
- Turn Plot1 on by pressing **[ENTER]**.
- Press **[▼]** **[▶]** **[ENTER]** to select LINE GRAPH (↗).
- Set the Xlist. Press **[▼]** **[2nd]** **[STAT]**, scroll down to MONTH using **[▼]**, and press **[ENTER]**.
- Set the Ylist. Press **[▼]** **[2nd]** **[STAT]**, scroll down to UPPER using **[▼]**, and press **[ENTER]**.
- Press **[▼]** **[▶]** **[▶]** **[ENTER]**.
- Press **[GRAPH]**.
- Press **[ZOOM]** **[7]** to adjust the scale on your graph.



2 Complete the Data Analysis section. Answer the questions in your journal.



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Data Analysis

While observing the graph, press **TRACE** and use the arrow keys (**▶** and **◀**) to move the cursor along a line. The X-coordinate and Y-coordinate of each data point are displayed below the graph.

Make a sketch of your graph in your journal and label it *Monthly Sediment Deposition: Upper Mississippi*. Answer the questions in your journal by observing your graph.

- 1** During which month was the greatest sediment deposition in the upper Mississippi River?
- 2** During which month was the least sediment deposition in the upper Mississippi River?
- 3** During which months did sediment deposition in the upper Mississippi River increase?
- 4** During which months did sediment deposition in the upper Mississippi River decrease?

Part C — Examine Monthly Sediment Deposition: Lower Mississippi River

Procedure

- 1** **Make a graph of sediment deposition in the lower Mississippi over several months.**
 - a. Press **2nd** **[PLOT]**.
 - b. Press **1** to define Plot1.
 - c. Reset the Ylist by replacing UPPER with LOWER. Press **▼ ▼ ▼ 2nd** **[STAT]**, scroll down to LOWER using **▼**, and press **ENTER**.
 - d. Press **GRAPH**.
 - e. Press **ZOOM** **7** to adjust the scale on your graph.
- 2** **Complete the Data Analysis section. Answer the questions in your journal.**



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Data Analysis

While observing the graph, press **TRACE** and use the arrow keys (**▶** and **◀**) to move the cursor along a line. The X-coordinate and Y-coordinate of each data point are displayed below the graph.

Make a sketch of your graph in your journal and label it *Monthly Sediment Deposition: Lower Mississippi*. Answer the questions in your journal by observing your graph.

- 1 During which month was the greatest sediment deposition in the lower Mississippi River?
- 2 During which month was the least sediment deposition in the lower Mississippi River?
- 3 During which months did sediment deposition in the lower Mississippi River increase?
- 4 During which months did sediment deposition in the lower Mississippi River decrease?
- 5 Based on the information in the research article, why do you think the monthly amount of sediment deposition is always greater in the lower Mississippi River than in the upper Mississippi River?

Part D — Examine Annual Sediment Deposition: Omaha Region

Procedure

- 1 **Make a graph of sediment deposition in the Missouri River over a 30 year period.**
 - a. Press **2nd** **[PLOT]**.
 - b. Press **1** to define Plot1.
 - c. Turn Plot1 on by pressing **ENTER**.
 - d. Press **▼ ▶ ENTER** to select LINE PLOT (**↗**).
 - e. Set the Xlist. Press **▼ 2nd [STAT]**, scroll down to YEAR using **▼**, and press **ENTER**.
 - f. Set the Ylist. Press **▼ 2nd [STAT]**, scroll down to OMAHA using **▼**, and press **ENTER**.
 - g. Press **▼ ▶ ▶ ENTER**.
 - h. Press **GRAPH**.
 - i. Press **ZOOM 7** to adjust the scale on your graph.
- 2 **Complete the Data Analysis section. Answer the questions in your journal.**



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Data Analysis

While observing the graph, press **TRACE** and use the arrow keys (**▶** and **◀**) to move the cursor along a line. The X-coordinate and Y-coordinate of each data point are displayed below the graph.

Make a sketch of your graph in your journal and label it *Annual Sediment Deposition: Omaha*. Answer the questions in your journal by observing your graph.

- 1 During which year was the greatest sediment deposition in the Missouri River — which flows into the upper Mississippi — near Omaha?
- 2 During which year was the least sediment deposition in the Missouri River near Omaha?

Part E — Examine Annual Sediment Deposition: Baton Rouge Region

Procedure

- 1 **Make a graph of sediment deposition in the lower Mississippi River over a 30 year period.**
 - a. Press **2nd** **[PLOT]**.
 - b. Press **1** to define Plot1.
 - c. Reset the Ylist by replacing OMAHA with BATON. Press **▼ ▼ ▼ 2nd [STAT]**, scroll down to BATON using **▼**, and press **ENTER**.
 - d. Press **[GRAPH]**.
 - e. Press **ZOOM 7** to adjust the scale on your graph.
- 2 **Complete the Data Analysis section. Answer the questions in your journal.**

Data Analysis

While observing the graph, press **TRACE** and use the arrow keys (**▶** and **◀**) to move the cursor along a line. The X-coordinate and Y-coordinate of each data point are displayed below the graph.

Make a sketch of your graph in your journal and label it *Annual Sediment Deposition: Baton Rouge*. Answer questions in your journal by observing your graph.

- 1 During which year was the greatest sediment deposition in the lower Mississippi River near Baton Rouge?
- 2 During which year was the least sediment deposition in the lower Mississippi River near Baton Rouge?



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- 3** Compare the maximum value for sediment deposition in the Missouri River near Omaha and the Mississippi River near Baton Rouge.
- 4** Compare the minimum value for sediment deposition in the Missouri River near Omaha and the Mississippi River near Baton Rouge.
- 5** Dam construction was started on the Missouri River above Omaha in 1947 and completed in 1954. Based on the information in the research article and in your graphs, what was the impact of dam construction on sediment deposition in the Missouri River near Omaha?
- 6** The Missouri River, a tributary of the Mississippi River, has been the principal supplier of sediment to the Mississippi since the last ice age. Did dam construction on the Missouri River have an impact on sediment deposition in the lower Mississippi River? Explain.
- 7** Based on the research article, what is the impact of decreased sediment deposition on Louisiana's coastal land area?
- 8** Based on the research article, describe what is being done to stabilize sediment deposition in Louisiana's coastal wetlands.

ACTIVITY

