



TAKE CARE OF TEXAS: EDUCATOR MATERIALS

## HANDOUT

# River Geomorphology Student Sheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Project Name:** River Edge Development

### Background Information:

A company has announced plans for a **one-million-dollar development** to be built along the edge of a river. The project could include buildings, walkways, and community spaces, but it is close to the river, so **choosing the right location is critical**. You have been hired as an **environmental and land surveyor**. Before construction can begin, the company needs expert advice on **where along the river the project should be built** to ensure it is safe, stable, and environmentally responsible.

The river begins at its **source (headwaters)** in higher land and flows downstream through the **upper, middle, and lower courses** before reaching its **mouth**, where it meets a larger body of water such as a sea or lake. Along its journey, the river is shaped by **erosion, transportation, and deposition**, which create different river features and landforms. As surveyors, you must investigate how the river changes along its course and examine the following:

- **Tributaries**, that join the main river
- **Floodplains**, which can be at risk of flooding
- **Confluences**, where rivers meet and flow increase
- **Riverbanks**, the sides of the channel
- **Meanders**, where erosion and deposition create bends
- **Oxbow Lake**, a u-shaped lake formed from a cut-off meander
- Landforms such as **waterfalls, deltas, or estuaries** near the mouth

*Each of these features affects how stable the land is and how risky it would be to build nearby.*

Your task is to **analyze the river from its source to its mouth** and decide **the best place to build the development**. You must consider 1) how the river shape and processes change downstream 2) risks of erosion, flooding, or deposition and 3) how the development could impact the river and the surrounding environment.

Finally, you must:

- Identify and illustrate your chosen building site including the river and its key features
- Create a labeled diagram or map of the river
- Justify your choice using correct river-morphology vocabulary and scientific reasoning

The future of this million-dollar project depends on your recommendation.



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Group Members: \_\_\_\_\_

## **PART I: River Systems Hands-On Lab**

### **Before the Lab – Review**

Use your prior knowledge to answer the questions below.

1. What is the **upper course** of a river? \_\_\_\_\_  
\_\_\_\_\_
2. What is the difference between **erosion** and **deposition**? \_\_\_\_\_  
\_\_\_\_\_
3. What is a **tributary**? \_\_\_\_\_  
\_\_\_\_\_
4. Circle the features you expect to see in the **lower course**:  
Waterfall / Delta / Floodplain / Steep valley

### **Building the River System**

#### **Step 1: Upper Course (Source)**

What we did: We created a channel at the highest point of the tray and added water.

Observations:

- How did the water move? (fast/slow) \_\_\_\_\_
- What happened to the sand? \_\_\_\_\_
- At a high angle, did your water move fast or slow? \_\_\_\_\_

Process observed (circle the correct ones): Erosion / Transportation / Deposition

#### **Step 2: Tributaries and Confluences**

What we did: We added smaller channels that joined the main river.

1. Draw a simple diagram of your river and tributaries. (Use the space below)

2. What happened to the river when the tributaries joined it?  
\_\_\_\_\_  
\_\_\_\_\_

3. The point where rivers meet is called a \_\_\_\_\_

#### **Step 3: Middle Course (Meanders)**

What we did: We shaped the river into bends and added water.

1. Where did erosion mostly occur?

- Inside of the bend
- Outside of the bend

2. Where did deposition mostly occur?

- Inside of the bend
- Outside of the bend

3. What is this river feature called? \_\_\_\_\_

**Step 4: Floodplain**

What we did: We added more water to simulate heavy rainfall.

1. Did the river overflow its channel?

- Yes  No

2. What happened to the sand on the flat land next to the river? \_\_\_\_\_  
\_\_\_\_\_

3. This flat area is called the \_\_\_\_\_.

**Step 5: Lower Course (Delta or Estuary)**

What we did: We observed what happened where the river slowed down at the end.

1. What feature formed at the river mouth? (circle one)

Delta / Estuary / Neither

2. Explain how this feature formed: \_\_\_\_\_  
\_\_\_\_\_

**Key Vocabulary Check** Match the word to the correct description.

- 1. Erosion                    \_\_\_ Sand carried by water
- 2. Deposition              \_\_\_ Wearing away of land
- 3. Tributary                \_\_\_ Smaller river joining a larger one
- 4. Floodplain              \_\_\_ Material dropped by the river

**Reflection Questions**

1. Where was **erosion strongest** in your model? Why? \_\_\_\_\_  
\_\_\_\_\_

2. Where did most **deposition** occur? \_\_\_\_\_  
\_\_\_\_\_

3. How did the river change from the **upper course** to the **lower course**? \_\_\_\_\_  
\_\_\_\_\_

4. One limitation of this model compared to a real river is: \_\_\_\_\_  
\_\_\_\_\_

5. If you could improve this model, what would you change or add? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **PART II: River Systems Application**

### **Step 1: Create a River Diagram (Illustration Required)**

Draw a labeled diagram or map of the river that includes:

- The source (headwaters)
- Upper, middle, and lower courses
- At least one tributary and confluence
- Meanders and a floodplain
- The mouth of the river (delta or estuary)
- Direction of river flow

### **Step 2: Choose the Best Location**

Decide where along the river the development should be built. Consider:

- Risk of flooding
- Distance from meanders and floodplains
- Human and environmental impacts

\*\*\*\* Clearly mark the location where you recommend the project should be built.

### **Step 3: Justify Your Decision (Written Explanation)**

Write a paragraph (or more) explaining:

- Which part of the river you chose (upper, middle, or lower course)
- The river features near your site
- Why is this location safer and more suitable than others
- How river processes influenced your decision

Use correct geographical terms such as:

- erosion, deposition, meander, floodplain, tributary, confluence, channel, source, mouth

### **Success Criteria Checklist**

- My diagram is clear and fully labelled
- I correctly identified river features
- I selected a realistic building location
- I explained my choice using river morphology vocabulary
- My reasoning shows understanding of river processes