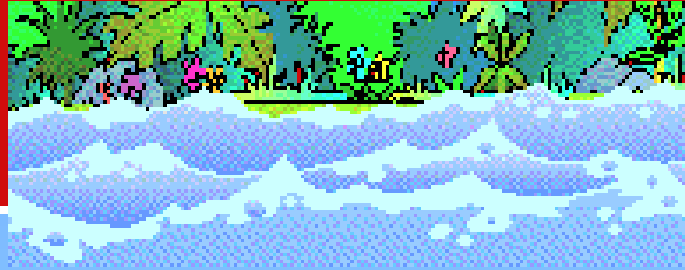


# Chapter **Running Water**

## 6



**You will be able to...**

- *Describe the ability of a stream to erode and transport material*
- *Identify the two general types of stream valleys*
- *Predict the cause of floods*

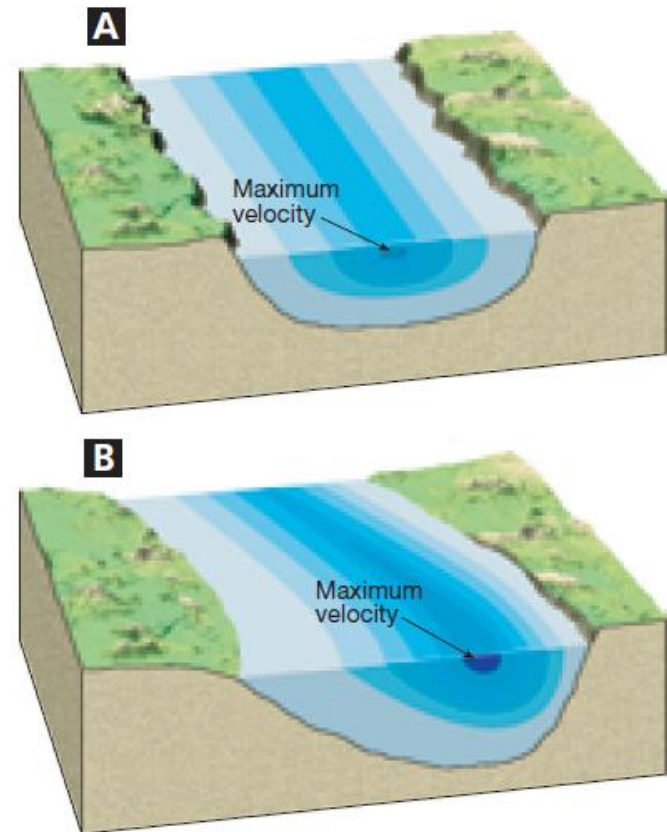


# 6.1 Streamflow

- ◆ The ability of a stream to erode and transport materials depends largely on its velocity (speed).

**Figure 3** **A** Along straight stretches, stream velocity is highest at the center of the channel. **B** When a stream curves, its zone of maximum speed shifts toward the outer bank.

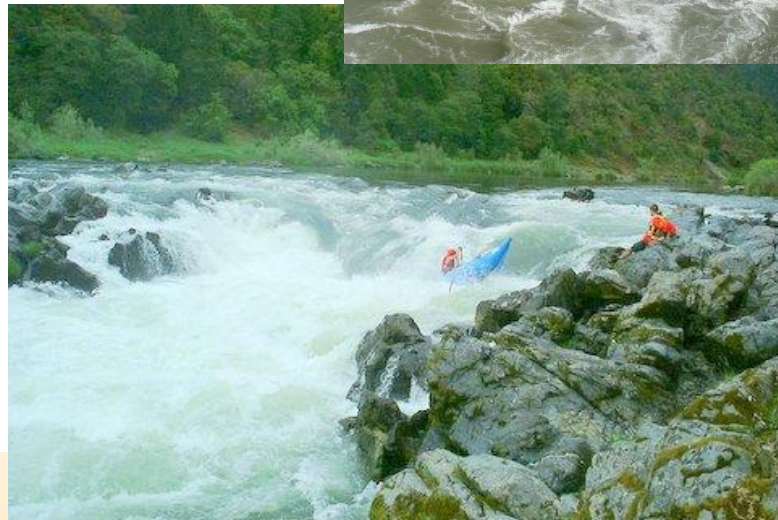
**Interpreting Diagrams** How does velocity change with depth in the middle of the stream?



# 6.1 Streamflow Velocity Factors

◆ Factors that determine the velocity of the stream include:

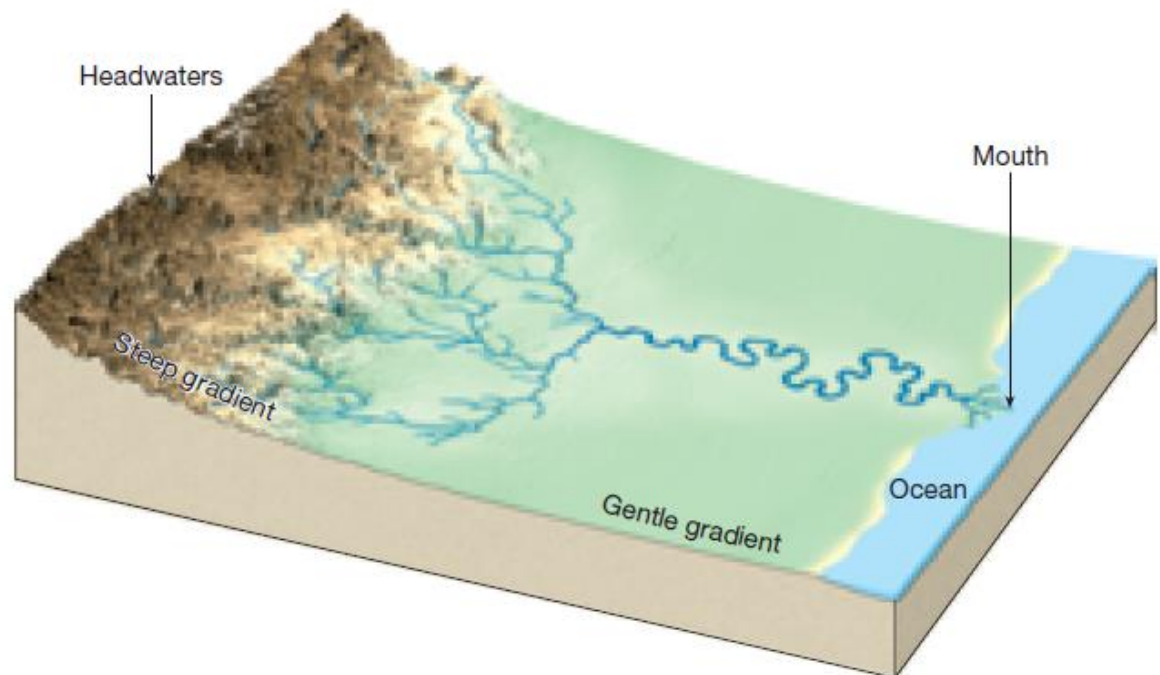
1. Gradient
2. Characteristics
3. Discharge



# 6.1 Streamflow Velocity Factors

## 1) Gradient

- is the slope or steepness of a stream channel.



**Figure 4** This cross section along the length of a stream shows a steeper gradient upstream, and a gentler gradient downstream.

# 6.1 Streamflow Velocity Factors

## 2) Channel Characteristics

- The **stream channel** is the course the water in a stream follows.
- Shape, size, and roughness



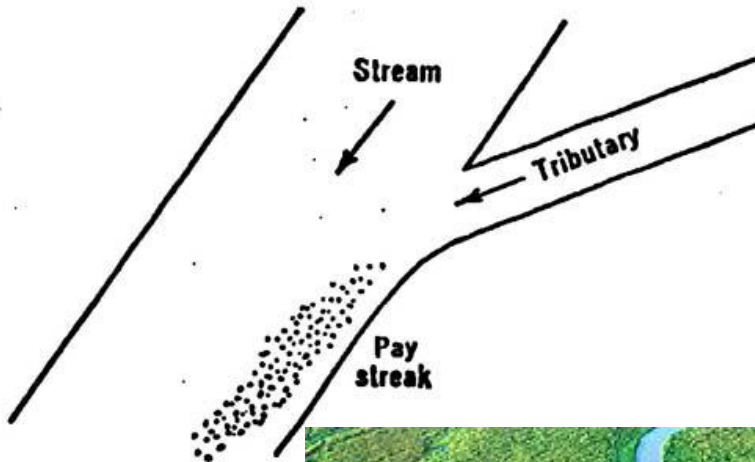
# 6.1 Streamflow Velocity Factors

3) **Discharge** of a stream is the volume of water flowing past a certain point in a given unit of time.



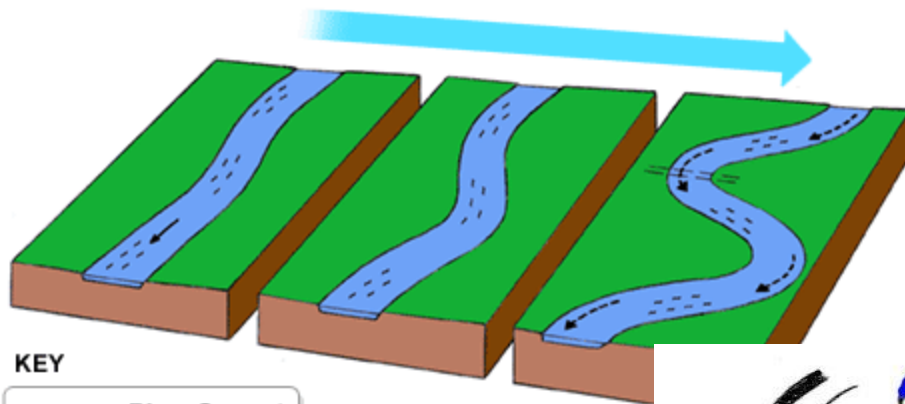
# 6.1 Changes from Upstream to Downstream

a) A **tributary** is a stream that empties into another stream.

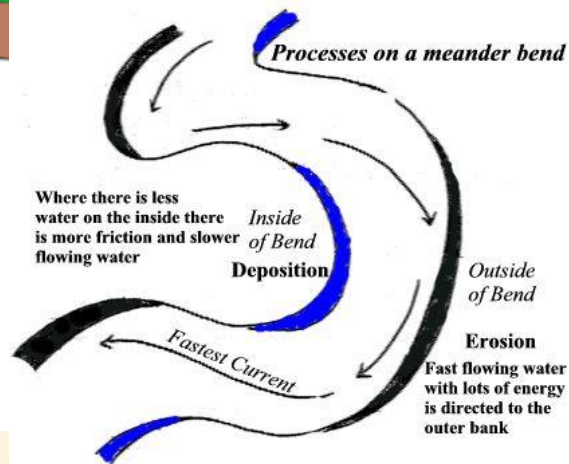
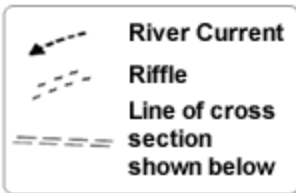


# 6.1 Changes from Upstream to Downstream

b) A stream in a broad, flat-bottomed valley often develops a course with many bends called **meanders**.



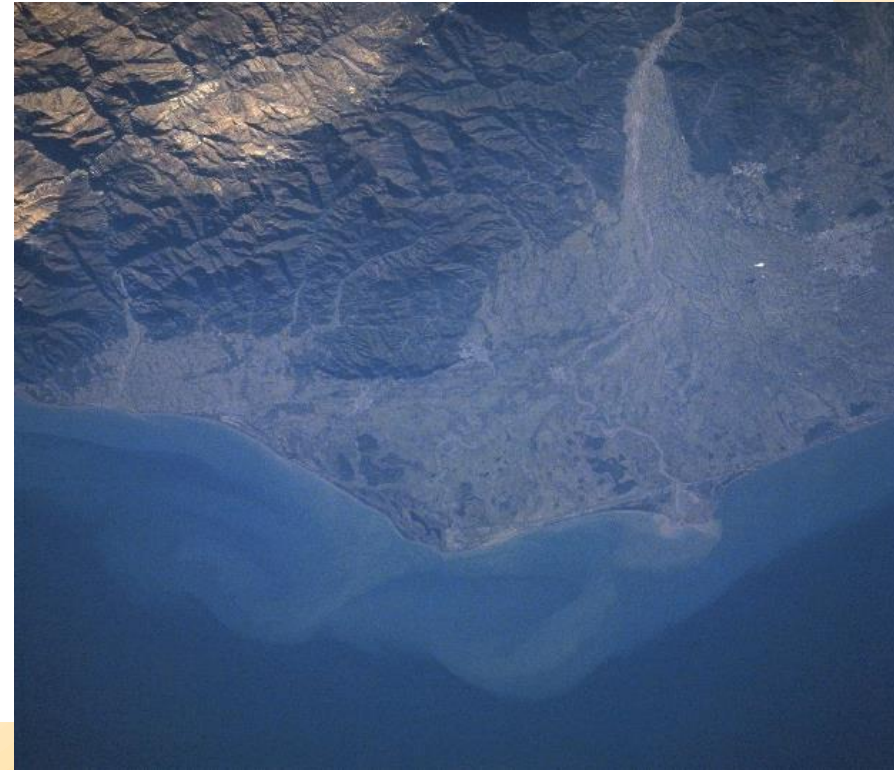
KEY



# 6.2 The Work of Streams

## Deposition

- ◆ **Deltas** are an accumulation of sediment formed where a stream enters a lake or ocean.



# 6.2 Types of Stream Valleys

## 1) Narrow Valleys

- A narrow V-shaped valley shows that the stream's primary work has been downcutting toward base level.
- Youthful River
- Features often include
  - rapids
  - waterfalls

**Figure 10** The Yellowstone River is an example of a V-shaped valley. The rapids and waterfall show that the river is vigorously downcutting the channel.



# 6.2 Types of Stream Valleys

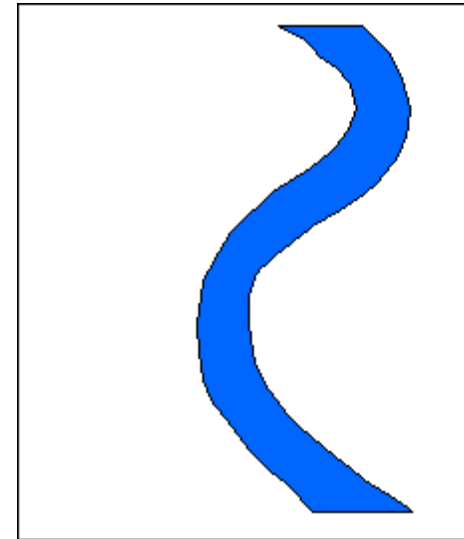
## 2) Wide Valleys (1 of 2)

- Stream is near base level.
  - Downward erosion is less dominant.
  - Stream energy is directed from side to side.
- The **floodplain** is the flat, low-lying portion of a stream valley subject to periodic flooding.
- A more mature river.



# 6.2 Types of Stream Valleys

- ◆ Wide Valleys (2 of 2)
  - Features often include
    - Meanders (**curves**)
    - cutoffs
    - oxbow lakes



## 6.2 Floods and Flood Control

- ◆ A **flood** occurs when the discharge of a stream becomes so great that it exceeds the capacity of its channel and overflows its banks.



# 6.2 Floods and Flood Control

- ◆ Measures to control flooding include:
  - artificial levees
  - flood control dams
  - placing limits on floodplain development.

