The Invention of Irrigation in Mesopotamia

Overview:

Students will learn how humans in the age of early agriculture recognized the importance of living near water sources. They captured and used water sources, such as the Tigris and Euphrates Rivers and their tributaries, to irrigate crops in the Fertile Crescent. Students will develop an irrigation system in the garden similar to that used in early agriculture.

Objectives:

At the end of the lesson, students will be able to:

- **Explain** the importance of access to water when growing plants and establishing communities of people.
- **Analyze** what conditions contributed to the birth of agriculture in Mesopotamia.
- **Identify** where the Tigris-Euphrates originated and where they flowed.
- **Demonstrate** how a portion of a large, main water source can be diverted/ controlled by humans in order to irrigate large planting fields.

Preparation:

- Identify which garden beds will be used for irrigation simulations.
- Determine small group teams for simulation.
- Prepare seedlings in pots to place in their garden beds.
- Collect materials for construction of irrigation simulation.
- Review the handout.

Materials:

- Large map of the world today
- Map of Mesopotamia with Tigris and Euphrates rivers (see attached for projection)
- Trowels
- Gloves
- Water source (hose or watering cans)
- Boards/wood blocks to use as gates, dams, and levees for their irrigation system
- Seedlings in pots
- Unplanted beds where irrigation simulations can be constructed
- Handout 1: “Irrigation Techniques”
- Sample crops

On the Board:

- Student Reflection Questions

Suggested Snack:

- Whole wheat pita bread with a dip, like labneh or hummus
- Or, barley salad: http://www.ouichefnetwork.com/2013/06/middle-eastern-barley-

Vocabulary:

- agriculture
- irrigation
- snowpack
- canal
- dam
- reservoir
- river
- levee
- Mesopotamia

Learning Activities:

1. Presentation (15 min.)
   A. Elicit from students the four things needed to grow plants (air/wind, water, sun, and healthy soil).
   B. Ask students to define *agriculture*. Agriculture is the science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products.
   C. Ask students how they think people found food prior to the introduction of agriculture.
   - Invite students to share what they already know about the hunters and gatherers period of ancient history.
   - Ask students: What are the benefits of the planned growing of crops (agriculture) compared to hunting and gathering? (Community [permanent settlements], steady food supply, reduced time it takes to obtain food.)
   - Explain to students that with the time saved from not having to hunt and gather food, the Sumerians were able to use that time to invent new technologies.
   D. Ask students in what area of today's Middle East did agriculture begin about 10,000 years ago.
   - Show students the map of the Tigris and Euphrates Rivers, and point out the area (modern day Turkey, Syria, Iraq and Iran) on a modern map.
   - Ask students: What does the word Mesopotamia mean? It means "the land between two rivers."
   - On the map, point out the Taurus Mountains in Southern Turkey and define *snowpack*. Snowpack forms from layers of snow that accumulate in high altitudes where the climate is cold for extended periods during the year. Snowpack is an important water resource that feeds streams and rivers as they melt.
   - Explain that the melting snow often caused flooding, but then the dry summers often caused drought. Ask students what they think the challenges of living in an area prone to both flooding and drought might be?

E. Ask students: Where does much of the drinking water in California come from? Snowpack from Northern California (the Sierra Nevada Mountain Range).
F. Define *irrigation*: humans redirect water to assist in the production of crops.
G. Ask students how irrigation was essential for the development of agricultural lands.
H. Distribute Handout 1: "Irrigation Techniques" and define the following terms:

- *river*: a natural flowing watercourse, usually freshwater, flowing towards an ocean, sea, lake, or another river
- *canal:* an artificial waterway constructed to carry water to fields for irrigation
- *levee:* an embankment built to prevent the overflow of a river
- *dam:* a barrier that holds back rivers or underground streams
- *reservoir:* an enlarged natural or man-made storage space for water

2. Garden Activity: Building an Irrigation System (25 min.)
   A. Bring students out into the garden. Tell students they are going to pretend that they are Sumerians living in the Fertile Crescent.
   - Their task is to (1) "plant" the seedlings in the pots around the raised bed to "create" a farm, then (2) they are to design an irrigation system to get water from the water source (hose or watering can), to the plants in their farm in a controlled manner.
   - Tell students that once they have finished construction, they will simulate a flood and see how well they are able to store water and distribute it across the bed to reach all the plants in the farm.

   B. Demonstrate how, using the provided materials, students can build rivers, canals, levees, dams, and reservoirs.
   C. Split the class into groups, depending on how many garden beds are available.
   - Give students 15 minutes to "plant" the seedlings in the pots and create their irrigation system so that water will reach them.
   - Then, test it with them by turning on the hose.

   D. Discuss how they could have improved it, so that water reaches all the plants without flooding them.

3. Snack (5 min.)
   A. Ask students if they have ever eaten barley before. Tell them it was the major crop — a staple — of the Fertile Crescent and one of the world's first cultivated grains.

B. Let them sample a Middle Eastern barley salad or pita bread, made out of wheat which was also a staple crop in the Fertile Crescent.

4. Have students answer the Reflection Questions in their journals. (5 min.)

Student Reflection Questions:

1. What did you learn from building your own irrigation system?
2. In what ways has your thinking changed about water and irrigation?
3. In what ways was the development of agriculture crucial to the development of ancient cities and the modern world?

Assessment Questions:

1. Define agriculture. **(Agriculture is the science or practice of farming, including cultivation of healthy soil for the growing of crops and the rearing of animals to provide food, wool, and other products.)**
2. Define irrigation. **(Irrigation is when humans redirect water using various techniques to assist in the production of crops and ornamental plants.)**
3. Explain how irrigation made agriculture possible. **(Irrigation allowed societies to control their water source and bring water to land that otherwise might be too dry to yield crops.)**

Standards:

Common Core State Standards

- CCSS.ELA-LITERACY.SL.6.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues building on others' ideas and expressing their own clearly.

- CCSS.ELA-LITERACY.RH.6-8.4

Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

- CCSS.ELA-LITERACY.RH.6-8.7

Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps).

Irrigation Techniques

Name: Teacher: Date:

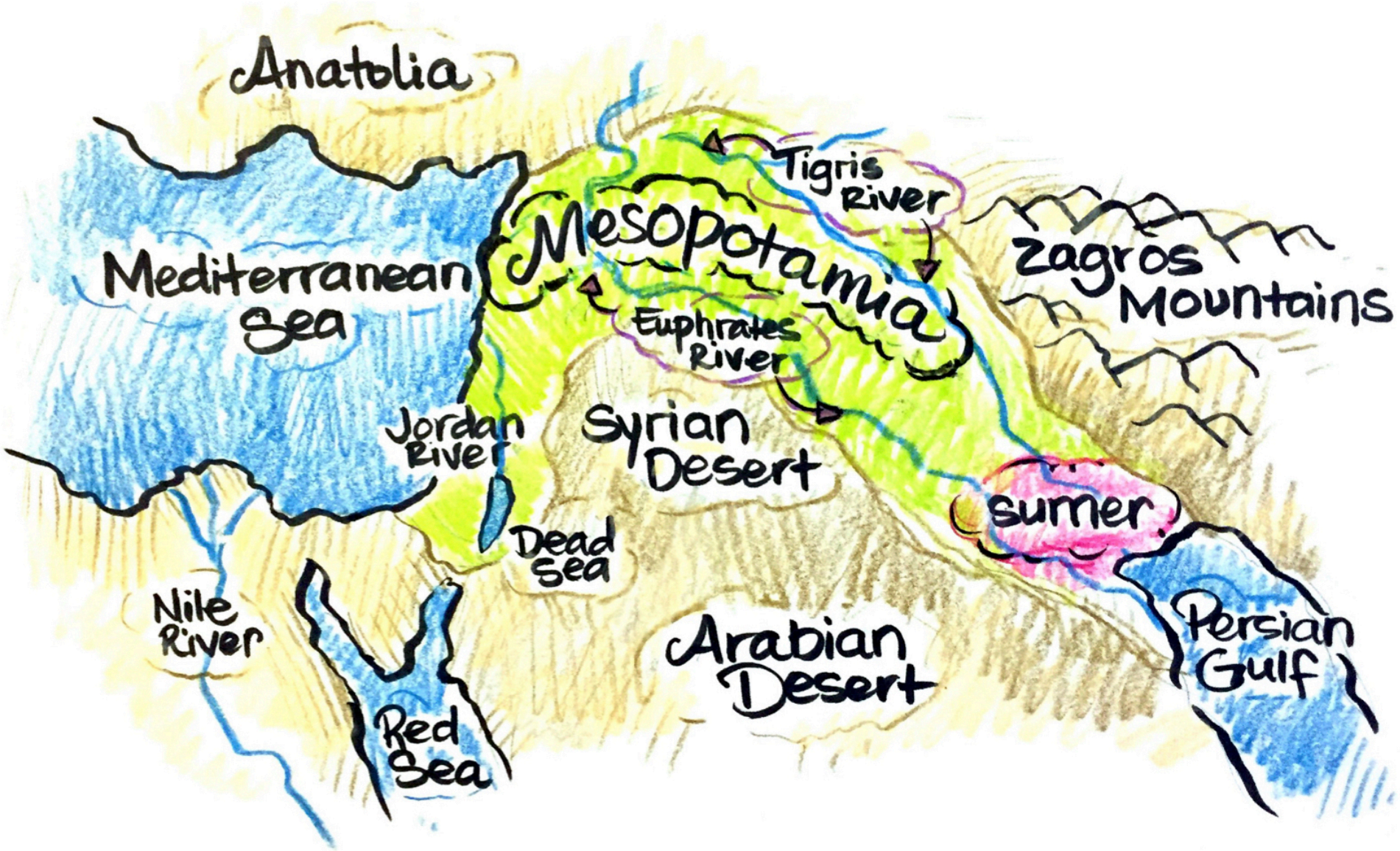
river: a natural flowing watercourse, usually freshwater, flowing towards an ocean, sea, lake, or another river

reservoir: an enlarged natural or man-made storage space for water

levee: an embankment built to prevent the overflow of a river or other water source

canal: an artificial waterway constructed to convey water usually for irrigation

dam: a barrier that impounds water or underground streams


Anatolia
Tigris River
Mediterranean Sea
Mesopotamia
Zagros Mountains
Euphrates River
Jordan River
Syrian Desert
sumer
Dead Sea
Nile River
Arabian Desert
Persian Gulf
Red Sea