

# **THE AMERICAN SOUTHWEST: ARE WE RUNNING DRY? COLORADO RIVER BASIN**

## **Activity 1a Water, Water Everywhere...Or Is It?**

Essential Questions: What did Arthur C. Clarke mean when he said, “How inappropriate to call this planet Earth when it is clearly planet Ocean?” How does knowing that there is only one ocean change our thinking about water on our planet? How does knowing that there is only one ocean inform our thinking about the overall health of our planet?

*This activity is adapted from the LHS GEMS unit Ocean Currents, Session 2.*

### **Block 1**

#### **Objectives:**

- Students will analyze a model of the Earth (a globe).
- Students will be able to explain how the Earth’s oceans are interconnected.

#### **Materials:**

- Water-based markers – 1 red and 1 blue for each team
- Large inflatable globes, 1 for each team.  
(Traditional globes may be used, but be sure the markers will clean off of the surface.)
- Pump to inflate the globes
- Student worksheet, one per team
- Scratch paper and pencils

#### **Procedures:**

1. Prior to this activity you will need to inflate the globes. If you do not have a pump you might consider blowing them up over several days to avoid hyperventilation.
2. Divide students into teams of four.
3. Give each team one globe and allow them time to simply explore and talk about the globe within their team.
4. When you think they are ready, distribute the Student Worksheet, and 1 red and 1 blue water-based marker to each team.
5. Explain the term *ocean basin* as a way to describe the Atlantic Ocean, The Pacific Ocean, and the Indian Ocean. The Artic Ocean and the Mediterranean Sea are considered smaller basins that are connected to the larger ones.

6. Assign question 1. Explain that there will be a class discussion about those questions, and then they will complete the rest of the worksheet. When completed and all teams have shared to the whole group and answered questions, move on to question 2.
  
7. Work through and discuss questions 3 through 6 with the whole class, although the students may remain in their teams.  
***Be sure to emphasize these points:***
  - Water covers about  $\frac{3}{4}$  of the Earth's surface.
  - The ocean is the most important feature on the surface of the Earth. While it appears to be the most dominant feature on the surface, it is really a very thin layer of about 4 kilometers deep. Earth is the only planet in our solar system with this feature.
  - Water provides most of the world's food supply.
  - Historically coastlines have been where information, products, and ideas are exchanged.
  
8. Work through and discuss questions 7 and 8.  
***Be sure to emphasize these points:***
  - ALL Earth's oceans are interconnected. What circulates through one ocean, circulates through all oceans.
  - There is only one ocean.

**When this activity is completed, be sure to wash the marker lines off the globes to avoid staining.** You may want to leave them inflated for Activity 2.

# **THE AMERICAN SOUTHWEST: ARE WE RUNNING DRY?**

## **COLORADO RIVER BASIN**

### **Activity 1a – Student Worksheet**

1. Work with your team members to plan a trip around the world traveling **ONLY on land**. Mark your route around the globe with the **red** water-based marker provided drawing one continuous line. You may not lift the pen from the globe to pass over water. On the back of this paper list in order the places you would travel.

- How many continents were you able to visit? \_\_\_\_\_
- What mode(s) of transportation did you use? \_\_\_\_\_
- How many lines of longitude did you cross? \_\_\_\_\_
- How many lines of latitude did you cross? \_\_\_\_\_
- Is this trip and route feasible? Could you actually do it? What problems, if any, might you encounter?

Be prepared to share your trip with your classmates, and be prepared to answer questions!

2. Work with your team members to plan a second trip. This time you will be traveling around the world **ONLY on water**. Mark your route around the globe with the **blue** water-based marker provided drawing one continuous line. You may not lift the pen from the globe to pass over land. On the back of this paper list in order the places you would travel.

- How many continents were you able to visit? \_\_\_\_\_
- What mode(s) of transportation did you use? \_\_\_\_\_
- How many lines of longitude did you cross? \_\_\_\_\_
- How many lines of latitude did you cross? \_\_\_\_\_
- Is this trip and route feasible? Could you actually do it? What problems, if any, might you encounter?

Be prepared to share your trip with your classmates, and be prepared to answer questions!

3. Look carefully at your globe from all angles. Find the view that has the most land. What continent(s) do you see? What hemisphere are you looking at?

4. Again, look at your globe from all angles. Find the view that has the most ocean? What ocean basin(s) do you see? What hemisphere are you looking at?

5. In your team, estimate what fraction of Earth is covered by ocean and what fraction of Earth is covered by land. Be ready to explain how you decided on these fractions. Was this a valid way to determine your response? Why or why not?
6. Name at least 3 countries that do not touch an ocean, a large body of water, or a major waterway? Of what importance is this to those countries?
7. Can you find the place where the Pacific Ocean basin ends and the Atlantic Ocean begins? What did you see that helped you decide where that boundary would be?
8. Can you find a boundary that separates the Antarctic Ocean basin from all other basins? What did you see that helped you decide where that boundary would be?

# **THE AMERICAN SOUTHWEST: ARE WE RUNNING DRY?**

## **COLORADO RIVER BASIN**

### **Activity 1b**

#### **Water, Water Everywhere...Or Is It?**

#### **Block 2**

#### **Objectives:**

- Students will recall and label a diagram of the Water Cycle.
- Students will be able to explain how rivers interact with all of Earth's systems.
- Students will show the interconnectedness of Earth's rivers, lakes, and oceans by writing or illustrating creatively.

#### **Materials:**

- Unlabeled diagram of the Water Cycle, 1 per team
- Inflatable globes, 1 per team
- Pump to inflate the globes
- Book - *Brother Eagle, Sister Sky: A Message from Chief Seattle* by Susan Jeffers
- Various paper and art supplies

#### **Procedures:**

1. Prior to this activity you will need to inflate the globes. If you do not have a pump you might consider blowing them up over several days to avoid hyperventilation.
2. Divide students into teams of four.
3. Distribute an unlabeled diagram of the Water Cycle to each team. Give the students enough time to fill in the labels. (This should be prior knowledge.) Discuss; clarify as needed.
4. Introduce Earth's systems: the **hydrosphere** (all Earth's liquid and frozen water), the **geosphere** (all Earth's land area above and below the surface, and under or in water), the **atmosphere** (the layer of gases that surround Earth), and the **biosphere** (the part of Earth in which life exists). How does the Water Cycle interconnect with each system? Calcium has built up on the geological structures surrounding Lake Mead. This appears as a large white band. Where did all this calcium come from? *(It was carried in the waters of the Colorado River and deposited on the walls as the water receded. It came from sources upriver, either rock or with runoff from the surrounding soils.)*

5. Give each team a globe and allow them time to explore and talk about the globe within their team. Direct them to look for major rivers. Name at least 2 major rivers on each continent. Where does each river begin? Where does it end? Could a river end in a lake? Why or why not?

***Be sure to emphasize these points:***

- Rivers start on land and flow downhill into the ocean through the mouth of the river.
  - Rivers carry water from the hydrosphere and sediments from the geosphere. Therefore the quality of the air and surrounding soils affect a river's water quality.
  - Through the Water Cycle rivers are connected to the atmosphere.
  - Rivers are a significant source of food for humans and wildlife that live near them.
  - The quality of a river impacts Earth's biosphere. Rivers will naturally transport pollution and/or waste downstream. Over time, unimpeded pollution and/or waste will find its way to the ocean. As learned in Activity 1, all Earth's oceans are interconnected.
6. Remind the students that Chief Seattle was quoted several times in the movie The American Southwest: Are We Running Dry? The first quote is, "The Earth is our mother. Whatever befalls the Earth befalls the sons and daughters of the Earth." Read *Brother Eagle, Sister Sky: A Message from Chief Seattle* by Susan Jeffers to the class. Discuss thoughts and impressions with the students. Why would the producers or directors of the movie quote Chief Seattle? Why would they use this specific quote? How are Chief Seattle's thoughts and ideas connected to what we know about the interconnectedness of Earth's systems to rivers?
  7. Explain to the students that they will develop and share a creative project. Encourage them to select a project that reflects their strength's. It should reflect thought about the topic. Share the following list with them.
    - Verbal/Linguistic – Create a poem about the Colorado River. Use vocabulary that draws a picture with your words.
    - Visual/Spatial – Create a drawing or painting of the Colorado River using a medium of your choice.
    - Logical/Mathematical – Create a diagram or chart that shows how Earth's systems are interconnected.
    - Naturalist – Create a appealing display showing the wildlife and/or plant life that lives in or near the Colorado River.

- *Musical* – Create a song or rap and present it to the class. (*You might consider allowing the student to present a recording of their work.*)
- *Bodily/Kinesthetic* – Write and present a skit, pantomime, or dance that you feel shares your newly gained knowledge about the interconnectedness of Earth’s systems or that reflects the movement of a river.
- *Intrapersonal* – Pretend you are Chief Seattle. Create a series of journal entries (at least 4 or 5) he might have written about visits to specific places along the Colorado River.
- *Interpersonal* – Design a service project you could do that would improve some aspect of the Colorado River or the surrounding area. You will need to describe the project, list the materials you would need, tell how many people would be involved, and how long it would take. This must be something you might actually follow through on.