LESSON 2: ARIZONA’S GEOGRAPHY

Estimated Time for Lesson
2 hours, 30 minutes

State Standards

Standards Taught

• Social Studies – S4C1PO7: Locate physical and human features in Arizona using maps, illustrations or images: physical — Grand Canyon, Mogollon Rim, Colorado River, Gila River and Salt River; human — Phoenix, Yuma, Flagstaff, Tucson, Prescott, Hoover Dam and Roosevelt Dam.

• Social Studies – S4C1PO2: Interpret political and physical maps using the following map elements: title, compass rose, symbols, legend and scale.

• Social Studies – S4C1PO6: Describe characteristics of human and physical features: physical — river, lake, mountain, range, desert, valley, canyon, plateau and mesa; human — city, state and roads.

• Social Studies – S4C2PO3: Locate the landform regions of Arizona (plateau, mountain and desert) on a map.

• Social Studies – S4C2PO5: Describe how regions and places (e.g., Grand Canyon and Colorado River) have distinct characteristics.

Standards Addressed

• Social Studies – S4C1PO1: Use different types of maps to solve problems (e.g., historical maps).

• Science – S6C3PO1: Identify the sources of water within an environment.

• Science – S6C3PO2: Describe the distribution of water on the Earth’s surface.

• Social Studies – S4C2PO1: Describe how the Southwest has distinct physical and cultural characteristics.

• Social Studies – S4C2PO4: Compare the landform regions of Arizona according to their physical features, plants and animals.

• Visual Arts – PO 202: Create an artwork that serves a function.

Objectives

Content Objectives

• Students will be able to identify and distinguish physical and human features on an Arizona map.

• Students will be able to identify and label the three regions of Arizona.

• Students will be able to describe the differences among the three regions of Arizona (animals, plants, places, rainfall levels and general characteristics).

Language Objective

Students will use descriptive adjectives, including comparatives and superlatives (dry/drier/driest), to describe the three regions of Arizona.

Vocabulary

Cardinal directions: the four main points of the compass (north, east, south and west)
Compass rose: a symbol on a map indicating direction (e.g., north, southwest)
Desert Region (Basin and Range): southernmost region in Arizona characterized by little rain and numerous mountain ranges separated by lower-elevation basins
Human features: the patterns that people make on the surface of the Earth, such as cities, roads, canals, farms and other ways people change the Earth
Legend: the map key that explains the meaning of map symbols
Mountain Region (Central Highlands): central region in Arizona characterized by mountainous terrain, higher elevation and relatively high levels of precipitation
Physical features: characteristics of a place that are part of the physical environment (e.g., mountains, deserts and bays)
Plateau Region (High Desert): northeastern region in Arizona characterized by relatively flat terrain but high elevation (See Background Information for further description.)
Relief map: a type of map that shows elevation and land features in three dimensions
Background Information

Desert Region: This region is also called the Basin and Range Region. It is located from the southern border of Arizona to the northwestern edge of the state. It encompasses parts of the Sonoran Desert, Mohave Desert and Mexican Highland. This region is where the majority of Arizona’s population resides and includes cities such as Phoenix, Tucson and Yuma. The Central Arizona Project is a man-made river that stretches 336 miles across this region. This region is known for its hot, sun-baked, low-elevation basins. Dirt, dust and sand pave the desert floor. Dust storms and monsoons are seasonally common in this region. The climate in this region is very dry and seasonably warm. Due to the soil conditions in the area, when the region receives rain, very little water percolates the dry, cracked and pebble-paved ground at first, often having the effect of major flood events. About a week after a rain event in the spring season, wildflowers carpet the desert floor.

The saguaro cactus is a trademark of the region. You can also find the palo verde tree, mesquite, barrel cactus, prickly pear and agave. Animals in the region include coyotes, antelope jackrabbits, Gila monsters, javelina, mountain lions, black bears, Sonoran Desert toad, Costa’s hummingbird, desert tortoise and the California myotis bat.

Mountain Region: The Mountain Region is also called the Central Highlands. This region is the transition zone between the basins and the Colorado Plateau. The Mountain Region consists of a chain of valleys and basins (Chino Valley, Verde Valley, Tonto Valley, San Carlos Basin, Safford Valley and Duncan Basin) formed by colliding tectonic plates. But much of the tall mountains that may have existed long ago have been worn down by weathering and erosion. This region receives more rain than the rest of the state, and during winter is snow-packed. Streams and small man-made lakes abound in the area. There is a rich mining history in the region, including mines in Jerome, Globe, Miami, Clifton, Kearny, Hayden, Morenci and Bisbee. The geologic landforms display a variety of colors, as seen in Sedona. Many of the plants found in the Mountain Region are similar to those found in the Plateau Region of Arizona. There are ponderosa pine forests mixed with oak and numerous areas of natural wildflowers. Elk, black bear, mountain lions and reintroduced Mexican gray wolves are some of the remarkable animals found in this region. You might also see the javelina, antelope and wild turkey.

Plateau Region: This region, also referred to as the Colorado Plateau, consists of a series of flat-topped plateaus 4,000 to 9,000 feet in elevation. The western boundary of the Plateau Region is the Grand Wash Fault, and the southeastern edge is the Mogollon Rim. The hallmark of this region is the Grand Canyon, which thousands of tourists visit each year. However, the Plateau Region is also popular for lesser-known systems of deep and majestic canyons, weather-worn rock formations, vast untrammeled landscapes and unique life zones. The region is characterized mostly by high deserts, but mountainous areas pop out of the desert shrubbery like a forest island in the middle of a shrub sea. Within the mountainous regions of the plateau, you might see ponderosa pine, blue spruce, alpine fir, elm, cottonwood and aspen. However, the majority of the land in the Plateau Region is high desert containing yucca plants, various cactus plants and numerous shrubs, including high-desert sage. Some of the smaller flowers include Indian paintbrush, lupine and columbine. The Plateau Region of Arizona has a wide variety of animals ranging from the large black bear and great horned owl, two of the predators found in the region, to Arizona’s most sought-after mule deer population. Some of the other animals include the ring-tailed cat, coyote, gray fox, badger, prairie dog, horned lizard, garter snake, bald eagle, collared lizard and even Townsend’s big-eared bat.
Procedures

Activity 2.1: Geography Scavenger Hunt
45 minutes

Teacher draws attention to the map of Arizona hanging on the focus wall or bulletin board.

Today we are going to learn about the geography of Arizona. We will learn about physical and human features of our state as we play a scavenger-hunt game.

First, students will explore a map of Arizona through a map scavenger hunt. Pass out Arizona Physiographic Regions maps and Activity 2.1 Map Worksheets, “AZ Map Scavenger Hunt.” Review the Arizona Physiographic Regions map before you begin. Then let students work in pairs or teams to read and follow the directions on the scavenger-hunt sheet. Facilitate students’ questions as they explore the map and discover some of the unique features of Arizona. Monitor students for understanding, difficulties and progress. Ask questions to allow students to explore the map of Arizona. This time is about exploration, so encourage students to record questions they have about Arizona as they do the activity.

As students finish the scavenger hunt, pull the whole group together for a wrap-up. Review the map with the students, allowing students to come up to a class map and label where they found the geographical features.

Allow students time to ask questions about the map.

What questions do you have about Arizona now that you’ve done this activity? What are you curious about? What do you want to learn more about?

Record students’ answers on chart paper or the whiteboard.

Materials

- Any Arizona map, or enlarged and laminated Arizona Physiographic Regions map, placed on focus wall or bulletin board
- Activity 2.1 Map Worksheet (1 per student pair or team)
- Arizona Physiographic Regions maps (1 per student)
- Colored pencils

Science Notebooking

Have students record questions they have about Arizona and about the map in their science notebooks while working. Afterward have students paste their maps into their science notebooks for later review.
Activity 2.2: Regions of Arizona
60–90 minutes

Introduce the activity to students.

We worked with a two-dimensional map in the first activity. Now we are going to work with a different type of map called a relief map. Relief maps show elevation levels or how high areas on a map are. Today we are going to make our own relief maps of Arizona!

We will be making the maps with a special kind of dough. We will also be labeling important and unique places in Arizona, so we will make labels and affix the labels to the map with toothpicks.

Have students get out their maps from Activity 2.1. Give each student their toothpicks and labels. Working with students, guide them to write the following physical features on labels in blue and attach them each to a toothpick: Grand Canyon, Mogollon Rim, Colorado River, Gila River, Salt River, Verde River, Plateau Region, Mountain Region and Desert Region.

Have students write the following human features on labels in red and attach each to a toothpick: Phoenix, Tucson, Prescott, Flagstaff, Yuma, Hoover Dam, Roosevelt Dam and Central Arizona Project.

Materials

- Maps from Activity 2.1
- Additional map copies (1 per student)
- Scissors
- 1 piece heavy cardboard (about 8-by-11 inches) per student (or use large shoebox lids)
- Toothpicks (17 per student)
- File-folder labels (17 per student)
- Colored pencils (red and blue)
- Salt dough in 3 colors (purple, green, yellow) *See salt dough preparation directions below.

Salt Dough Preparation
(for 25 students)

- 13 26-ounce packages of salt
- 2 bags all-purpose flour
- 1.25 gallons water
- Food coloring
- Purple = 4 drops blue, 10 drops red
- Green = 4 drops blue, 10 drops yellow
- Yellow = 15 drops yellow
- Gallon-size ziplock bags (at least 3)

Directions
(may want to do in parts)

In a bowl, mix equal parts salt and flour until thoroughly blended.

Add water a little at a time until the mixture reaches the consistency of dough (about half as much water as dry ingredients). Stir thoroughly. Be careful not to add too much water. Students can always add more if it is too thick. Dough that is too wet will not have the desired effect.

Separate the mixture into three parts (use large ziplock bags and mix one part purple, one green and one yellow until each color is well-blended).
Ask students to recall the three regions of Arizona (plateau, mountain and desert) using their maps from Activity 2.1. Have students say the words as they do hand motions for the three regions (plateau = flat hands stretched above head; mountain = fingertips together to form a mountain in front of face; desert = flat hands near waist).

Pass out blank Arizona maps. Have student trace the borders between the three regions of Arizona and label each region. Have students cut out the maps and glue them onto their piece of cardboard or shoebox top. Using shoebox tops is ideal because they provide a border around the map so dough does not run.

We are now going to make our map with salt dough. Each of the regions will be a different color. We’ll make the Plateau Region out of purple dough first.

Give students each a large lump of purple salt dough. Have student make a high plateau in that region with the salt dough. As students are molding the Plateau Region, discuss the ecology and other characteristics of the region with the students. Background information about each region can be found in the Background Information section of this lesson. Record questions they have about the region on chart paper at the front of the room. After the lesson, allow students time to research those questions or discuss them.

After students mold the Plateau Region, have them carve the Colorado River and Grand Canyon in the dough. Have them stick the toothpicks that belong in that region into their topographic maps in the appropriate places. If dough is too runny, toothpicks will fall over. In that case, let maps dry for one day and try again.

Repeat this procedure for the Mountain (with green salt dough) and the Desert (yellow salt dough) regions of Arizona. Again discuss the ecology of the region as well as the physical and human features of each region as students work. It may be nice to show students pictures of animals and plants found in the region while they are shaping each region. Finally, have students place their toothpicks in the salt dough where they belong.

Allow salt dough maps to dry for at least one to two days. The wetter the dough, the longer they will take to dry.

Literacy Link
(WS3C2PO3) Have students write and illustrate a tourism brochure of the three regions of Arizona, featuring cities, flora, fauna, climate and more. Students could research questions they have about each region to include in their brochure.
Activity 2.3: Annual Rainfall Patterns and Analysis
30–45 minutes

Optional: You can do the activity in small groups or student pairs by copying the Arizona map and the precipitation data table back-to-back for each student and passing out colored pencils.

Make sure an enlarged map of Arizona is hung. Introduce the activity:

Now we are going to examine precipitation levels in the different regions of Arizona. We will be analyzing some data about the precipitation levels in various cities in Arizona.

Pass out the chart titled “Average Yearly Precipitation in Arizona.” The students will use either colored sticky dots or water-soluble pens to mark the amount of rainfall of the listed locations from the chart on the map. Hand out the chart and then write the four color-coded categories on the board.

It is difficult to find patterns in an unorganized data list. If we can group the rainfall into ranges of amounts, we may be able to see a pattern of rainfall in Arizona.

You can assign locations to individuals or have them work in teams. An option is to give the students copies of the map in pairs and students label the cities on the map using the chart and colored pencils.

Have students decide which color dot to use for their city and stick on the class map. Once student teams have finished, review the map as a class and allow students to copy the colors on their own maps for each city. Have students give this map the title “Average Annual Precipitation.”

Materials
- Arizona Physiographics Regions map (enlarged)
- Average precipitation in Arizona data table (on overhead or cut into pieces for groups)
- Blue, green, yellow and red sticky dots or overhead markers
- Graph paper for Math Connection activity

Precipitation amounts
- More than 20 inches = blue
- 12–20 inches = green
- 6–12 inches = yellow
- Less than 6 inches = red
Ask each student or group to record the precipitation for their locations in the proper column on the chart. Have each student copy the figures and total each column. Then help students calculate the average precipitation for each area. Discuss why students need to average the totals. Next have students use different colors to make a bar graph.

**Follow-up Discussion:** Ask students to look at their maps and discuss their observations with their teams/partners.

- What do you notice about this map? Do you observe any patterns in the average precipitation levels?
- Do you have any questions about precipitation in Arizona?

Tell students to record their observations on the back of their maps. Record all observations and questions as you discuss findings as a class. Encourage other students to answer questions posed by their classmates. The teacher should act as a facilitator in the discussion.

If students are having a hard time getting started, lead students to think about the following questions:

- **Where are the heaviest areas of precipitation (snow, sleet, hail or rain) in Arizona?**  
  (in the mountains)

- **Which area has the lowest amount of rainfall?**  
  (the southwestern corner of the state)

- **Look at your map from Activity 2.1. How does the amount of rainfall relate to the number of rivers in an area?**  
  (The most rain and snow falls in the mountains, so there are more rivers that drain the watersheds in those areas)

- **Which has more rain and snow, the northeastern corner of Arizona or the central part of the state?**  
  (the central part of the state, in the mountains)

- When wind pushes clouds into mountains, they are forced upward where it is colder. Cold air cannot hold as much water as warm air. Soon the air is too cold to hold as much moisture as it had before, and the water condenses on dust particles and becomes rain. So where would you expect there to be more rain?  
  Point to locations on map.

- **Casa Grande or Flagstaff?**  
  (Flagstaff)

- **Sedona or Tucson?**  
  (Sedona)

- **Alpine or Phoenix?**  
  (Alpine)
Evaluation
Social Studies – S4C1PO7: Locate physical and human features in Arizona using maps, illustrations or images: physical — Grand Canyon, Mogollon Rim, Colorado River, Gila River and Salt River; human — Phoenix, Yuma, Flagstaff, Tucson, Prescott, Hoover Dam and Roosevelt Dam.

Social Studies – S4C1PO2: Interpret political and physical maps using the following map elements: title, compass rose, symbols, legend and scale.

Social Studies – S4C2PO3: Locate the landform regions of Arizona (plateau, mountain, desert) on a map.

Performance Assessment: Collect students’ Activity 2.1 maps and use the Activity 2.1 Map Rubric for scoring.

| ☑ | Labeled cardinal directions. | 1 point |
| ☑ | Located the Grand Canyon. | 1 point |
| ☑ | Located and labeled the Mogollon Rim. | 2 points |
| ☑ | Located and traced Colorado, Gila, Verde and Salt rivers. | 2 points |
| ☑ | Located Phoenix, Tucson, Prescott, Flagstaff and Yuma. | 3 points |
| ☑ | Located and labeled Hoover Dam. | 1 point |
| ☑ | Located and labeled Roosevelt Dam. | 1 point |
| ☑ | Located the Central Arizona Project (CAP) Canal. | 1 point |
| ☑ | Correctly colored and labeled the three regions of Arizona. | 3 points |
| ☑ | Score: | 15 points total |

Social Studies – S4C1PO6: Describe characteristics of human and physical features: physical — river, lake, mountain, range, desert, valley, canyon, plateau and mesa; human — city, state and roads.

Social Studies – S4C2PO5: Describe how regions and places (e.g., Grand Canyon, Colorado River) have distinct characteristics.

Ticket Out Assessment
1. Students should correctly identify the definitions for human and physical features, and give three examples of each.

2. Students should write one correct sentence for each region describing the characteristics of that region (animals, cities, elevation, rainfall, plants, etc.).

Language Objective Evaluation
Students are expected to use descriptive adjectives and comparative adjectives (dry, drier, driest) in their descriptions of the three regions of Arizona.

Lesson Closure
As a conclusion to the lesson, have the students discuss their answers to the Ticket Out questionnaire.