



Climate

from the Esri Geoinquiries™ collection for Upper Elementary

Target audience – Upper elementary

Time required – 15 minutes

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|--------------------------|---|
| Activity | Investigate the patterns between climate and the physiography of the U.S. |
| Standards | <p>NGSS:4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.</p> <p>NGSS:4-ESS2-2. Analyze and interpret data from maps to describe patterns of the earth's features.</p> |
| Learning Outcomes | <ul style="list-style-type: none"> • Students will identify temperature patterns in summer and winter across the U.S. • Students will relate temperature patterns to patterns of yearly precipitation across the U.S. to describe climate. • Students will investigate patterns that exist between climate and elevation across the U.S. |

Map URL: <http://esriurl.com/fourgeoinqury9>



Engage

What is weather?

- Click the map URL link above to launch the map, or type it into your Internet browser.
- Click the Show Contents Of Map button.
- ? What is weather? *[Short-term conditions in the atmosphere.]*
- ? What is the weather like in January where we are? *[Students should say that temperatures are colder in January than at other times of the year.]*
- ? What is the weather like here in June? *[Students should say that temperatures are warmer in June than at other times of the year.]*
- ? Is the weather the same in other parts of the country as it is here? *[Depending on students' experiences, answers may vary. Students should say that weather is not the same in other parts of the country.]*



Explore

What climate patterns do you see?

- ? What are two long-term atmospheric factors that make up climate? *[Temperature and precipitation]*
- ? What average temperature patterns do you see on the map? *[Northern areas of the U.S. are colder, and southern areas of the U.S. are warmer.]*
- ? Where are average temperatures the warmest? *[Across southern Florida and Hawaii]*
- ? Where are they the coldest? *[Across Alaska, the northern plains (North Dakota, South Dakota, Montana, Minnesota, and Wisconsin), and the Rocky Mountain region (Idaho, Wyoming, and Colorado).]*
- Turn off the January Temperatures layer and turn on the July Temperatures layer.
- ? Do the same patterns exist in July as they do in January? *[Approximately, except the warmest weather is in southern Arizona.]*
- Turn off the June Temperatures layer and turn on the Average Yearly Precipitation layer.
- ? Are there patterns that you see in precipitation? *[Yes, it is wet across the Pacific Northwest (Northern California, Oregon, and Washington) and all areas east of the Mississippi River.]*

Explain

Can we classify climate areas?

- ? Were the patterns of average temperatures in both January and July similar? *[Yes, they were similar—colder in the north, warmer in the south.]*
- ? Were the patterns of precipitation the same as the patterns of temperatures? *[No.]*
- Classify areas of the U.S. as warm or cold and wet or dry. *[Students should identify northern areas as cold, southern areas as warm, northwestern and eastern areas as wet, and the central U.S. as dry.]*
- Turn off the Precipitation layer, and turn on the Climate Regions layer.
- Examine how close students were to correctly identifying the regions.

Elaborate

How does climate relate to elevation?

- ? Do you see any patterns of regional climate and how they relate to elevation? *[Higher elevations seem to be colder and drier, while lower elevations are dependent on latitude.]*
- ? Do areas of higher elevation have warmer or colder climates? *[Colder climates]*
- ? Do areas of higher elevation have wet or dry climates? *[Dry climates]*

TURN A MAP LAYER ON OR OFF

- Make sure that the Details pane is selected.
- Click Show Contents Of Map.
- Click the check boxes next to the layer names.
- Hint: If a map layer name is light gray, zoom in or out on the map until the layer name is black. The layer can now be turned on.

IDENTIFY A MAP FEATURE

- Click a feature on the map, and a pop-up window will open with information.
- Links and images in the pop-up are often clickable.
- An arrow icon in the upper-right of the window indicates that multiple features have been selected.
- Click the arrow button to scroll through the features.

Next Steps

DID YOU KNOW? ArcGIS Online is a mapping platform freely available to public, private, and home schools. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at <http://www.esri.com/schools..>

THEN TRY THIS...

- Compute the difference between temperatures in January and June in an area of interest. Do this by estimating the temperature in July and subtracting the temperature in January.
- Explore the Stanford Story map, *Mapping the Impacts of Global Change*, at <http://mappingglobalchange.org>.



TEXT REFERENCES

This GIS map has been cross-referenced to material in sections of chapters from these texts

- *Science: A Closer Look by Macmillan/McGraw-Hill — Chapter 7*
- *Science by Houghton Mifflin — Chapter 10*
- *Science by Harcourt — Chapter 2*