



# Weather forecasting

from the Esri GeoInquiries™ collection for Upper Elementary

Target audience – Upper elementary

Time required – 15 minutes

## Activity

This activity helps students interpret weather maps and make weather predictions.

## Standards

**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.

**NGSS:4-ESS2-2.** Analyze and interpret data from maps to describe patterns of the earth's features.

**C3:D2.Geo.4.K-2.** Explain how weather, climate, and other environmental characteristics affect people's lives in a place or region.

## Learning Outcomes

- Students will use temperature, pressure, and precipitation maps to analyze current weather conditions.
- Students will use a current weather map to predict weather in the future.

Map URL: <http://esriurl.com/fourGeoInquiry12>



## Engage

### What weather can you predict from temperatures?

- Click the URL link above to open the map, or type it in to your Internet browser.
- ? What patterns do you see on the forecasted temperature map? [*Cold in the Northeast and across the Rocky Mountain region; warm across the far West, Southwest, and most of the South.*]
- ? Based on temperature data, if precipitation was falling across the U.S., where would it be rain and where would it be snow? [*It would be snow in the Northeast and Rockies, and rain everywhere else.*]
- ? How would you know where the snow would be? [*Where temperatures are below freezing.*]



## Explore

### Where are high and low pressures?

- From the Details pane, click the Show Contents Of Map button.
- Select the Temperature layer check box and the Isobar layer check box.
- ? What are isobars? [*Lines that connect all locations that have the same barometric pressure (measured with a barometer).*]
- ? Looking at the isobars on the map, where is the pressure the highest? [*Near Lake Ontario (northern New York) and over Colorado.*]
- ? Where is the pressure the lowest? [*In the central U.S. and the Pacific Northwest.*]
- Select the Highs And Lows layer check box to show students where the high and low pressures are located (indicated on the map by H and L markers).

## Explain

### Where might there be precipitation?

- Select the Fronts layer check box.
- Explore the low pressure in the central U.S.
- ? What direction is the cold front moving? [*Southeast*]
- ? What direction is the warm front moving? [*North*]
- ? Based on the location of the fronts, where would you predict precipitation will be falling? [*Student answers will vary, but they should say that precipitation would be falling east of the cold front and around the warm front.*]
- Select the Precipitation layer check box.
- ? What might the yellow color indicate? [*Thunderstorms and/or heavy rain*]
- ? Where color might snow be? [*Blue*]

## Elaborate

### What weather can be predicted for the next day?

- ? If you live in Alabama, would you expect sunny skies or rain? [*Rain*]
- ? If you live in Ohio, would you expect warmer or colder temperatures? [*Warmer*]
- ? Where might there be snow falling? [*Northwest Texas, Oklahoma, and Kansas*]

## TURN A MAP LAYER ON AND OFF

- Make sure that the Details pane is selected, and click the Show Contents Of Map button.
- To show individual map layers, select 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.

## ADJUST LAYER TRANSPARENCY

- In the Details pane, click the Show Contents Of Map button.
- Under the layer, click the three small blue dots and point to Transparency to open a drop-down list.
- You can modify transparency to see an active layer below the top layer.

## 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...

- Make predictions for specific cities across the United States based on current weather maps. Collect weather data for the predicted cities over the next few days to see if the predictions were correct.
- Explore the *Twister Dashboard* (U.S. tornadoes from 1980-2012) story map at <http://esriurl.com/Geo4281>.

## 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, Level 4* by Harcourt — Unit D
- *Exploring Science All Around Us* by Five Ponds Press — Chapter 6