

Water: forms and availability

Lesson Map: <http://esriaustralia.com.au/education/SpatialActivity45>

Engage

What forms does water come in?

- Click on the map URL above to open the lesson map. A satellite map showing the world is evident. Under the 'Details' pane, click on 'Content' and turn on the *Antarctica layer* and *Franz-Josef Glacier*.
- ? Click on each 'pin' to bring up information about each location. You may wish to have images from Google ready to display. What form is water in when looking at these two locations? *[Solid. Some students may respond with 'ice'. It may be worth explain the difference between form and type]*
- ? Now that you've identified one form of water, what are the others? *[Hint: There are 2. One can be seen on the satellite imagery. Forms include liquid and gas; You may choose to identify examples of water in liquid and gaseous form]*

Explore

What type of water is available to us for essential living purposes?

- ? What do humans use fresh water for? *[Answers will vary but may include, drinking, cleaning, personal hygiene, food production, cooking etc.]*
- In the 'Details' pane, under the heading 'Content', tick the checkbox to turn on the layers called *Global Surface Water* and turn off other layers. Then, click the 'Bookmarks' tab (top-right) and select 'Earth's Surface Water'
- ? What do you notice about the majority of the World's Surface Water? *[The majority of Earth's surface water is made up salt water and sits in the oceans.]*
- Click the 'Bookmarks' tab and select 'Africa's Surface Water'. 97% of Earth's water is salt water. This means that only 3% of water on the Earth is freshwater. However, 2% of the 3% of fresh water is locked up in icecaps and inaccessible for large-scale human use. This means that only 1% of all water on Earth is available for human use and consumption.

Download student worksheet [here](#).

Time

30 minutes

Activity

Investigate different forms of water and the water cycle.

Learning Outcome

Students will be able to:

- Investigate spatial patterns and derive meaning
- Identify different forms and types of water (solid, liquid, gas, surface, groundwater, glacial etc.)
- Examine and analyse the challenges that exist to accessing fresh water

ACARA Curriculum Link

[Year 7 Geography - Unit 1: Water in the World](#)

[ACHGK037](#) | [ACHGK039](#) | [ACHGS051](#) | [ACHGS050](#) | [ACHGS054](#)

Teacher Feedback:

To share your feedback on this, or any Spatial Activity, please contact education@esriaustralia.com.au

- ? What types of water do you identify on the African continent? Why might this be a problem? *[There are some lakes around the equatorial region and the Nile River in Egypt. Accessing fresh water may be a problem, especially for those living in landlocked countries or desert regions]*

Explain

Secret sources of water.

- Click the 'Bookmarks' tab and select 'World'. Change the 'Basemap' to topographic. Under the 'Details' pane, click 'Content' and turn on *Major Aquifers of the World*. Turn off all other layers.
- Explain that whilst fresh water on the surface of the planet may seem sparse there are also aquifers below the surface of the Earth that humans regularly access. Zoom in on Australia.
- ? What are the names of the two aquifers in Australia? *[Great Artesian Basin and Canning Basin]*
- Under the 'Details' pane, click on 'Legend'.
- ? Are these aquifers healthy? *[HINT: click on the two aquifers to bring additional information up. The Great Artesian Basin is healthier as it is recharging lost water at 10.6 mm a year however, the Canning Basin is depleting at -9.41mm a year.]*
- Under the 'Details' pane, click 'Contents' and add the *Total Annual Precipitation* feature. Keep *Major Aquifers of the World* on. Click 'Bookmarks' and select 'Global rain'.
- ? Brainstorm and discuss why these aquifers may be integral for countries around the world, especially those away from the equator. *[Hint: remember to select 'Legend' in the 'Details' pane. Student answers will vary.]*

Extend

Why don't we access the ice at the poles?

- In the 'Details' pane, under the heading 'Content', turn on *Sea Ice Cover*. Turn off all other layers. This layer tracks sea ice cover over time. It may need a moment to load. Click 'Bookmarks' and select 'Arctic ice sheets'.
- Below the map press the 'play' icon to watch seasonal ice cover from 1979 to 2014.
- ? What issues and challenges do humans face regarding accessing and utilizing fresh

water locked up in icecaps from an environmental and practical perspective?

[Environmentally, the ice caps are not always present i.e. in the summer seasons they melt or recede closer to the north pole. Practically, the cost of transporting large amounts of water locked up in ice is unfeasible – time costs, transport costs, converting the water from solid to liquid in order to put it on transport]

- ? Brainstorm and discuss what students can do to use water more wisely now that they are aware of the accessibility and availability of fresh water. *[Students answers will vary]*

Next Steps:

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Australian schools can request a free ArcGIS Online account as part of Esri Australia's Classroom GIS Initiative. A school subscription provides additional map layers, content, features and privacy.

Learn more about ArcGIS Online, and apply for your ArcGIS Online School subscription at <http://esriaustralia.com.au/education>