

TEACHER GUIDE for Optional Human Impacts Connection — Water

This optional learning segment can be as short as one additional class day, and we recommend keeping the exploration of water and water issues short unless you are going to engage students in an environmental justice or conservation project related to water. You can also tie it back to the Human Impacts Project.

Slides supporting this optional learning segment can be found at the end of the unit slide deck for Atmosphere and Oceans. Much of the information in this guide is replicated in the presenter notes under those slides.

The exploration begins with a transition into thinking about the water cycle.

We encourage you to have students engage with the local (school) watershed or with a regional watershed accessible or known to the school community. You should show some images to help students become oriented to local place if at all possible.

The slide deck also provides a more generalized representation which serves three purposes:

1. It gives students a chance to reevaluate their own model.
2. It allows students to think about the idea of not only flow of water in a cycle, but the relative amounts in differing reservoirs. The distinction between the amount of salt and freshwater on the planet is a key noticing on this diagram. The next slide will problematize the idea of how we can be concerned about drinking water on a planet that is so covered by water.
3. It prepares students more broadly for conversations about reservoirs and movements of carbon in a later unit.

Once students have explored the model and have hopefully had a chance to think about water and watersheds at the local or regional level, we encourage you to provide an opportunity for student research into water issues—whether they involve flooding, drought, agriculture, water rights, water quality and access, or other local issues. We have compiled a number of resources into a list, targeting issues in the state of California.

Explain the research you'd like your students to do. This could involve either reading a one-page web-based or printed resource or watching a 3-5 minute video. We are generally leaving you to structure this activity. The idea here is broadly to connect the understanding students have developed about the water cycle to some relevant human impacts issues at local and global scales—with perhaps more attention to local phenomena. There are lots of directions you could take this exploration. Our suggestion is to keep this entire learning segment to one class period, which leaves you about 15 minutes of class time to have students do some reading and synthesizing with a partner before sharing out. You are welcome to go longer, allowing for a full class period for research if you so desire. Just be sure to adjust instructions and expectations appropriately. Keep in mind that the more time students invest, the more time you will want/need to spend making their findings public. (That is, quick research leads to quick sharing out. But if you ask for lots of student investment and then give them only a post it or a phrase to share out, you may run into problems.) You can also have students do some of the work at home if appropriate for your student population.

The California Water Problem: (Note: all states have water issues!)

We want students to get at some of the following ideas: ground water contamination (agriculture and mining), agricultural diversion of water resources, population growth, Hetch Hetchy, climate change and snowpack, drought, conservation of fish runs and water in rivers and the California Delta, the Salton Sea, etc. etc. The best approach here is to design the scope of the search to more directly address some local water issues. In some areas this means looking at a local example of run off and pollution (for example of San Diego Bay) or conservation and water allocation (for example the tunnel controversy in the San Joaquin Delta), or contamination of ground water (for example by agriculture in Salinas, CA). This is an opportunity to engage in some issues that are broadly applicable across California, the US or the World but to also hone in on some local issues related to the ever-growing drinking, wildlife and agricultural water crisis.

Lots of video resources under 5 minutes:

The Nature Conservancy

<https://www.nature.org/en-us/about-us/where-we-work/united-states/california/stories-in-california/water-future/>

CA Dept of Water Resources

<https://water.ca.gov/programs/groundwater-management>

<https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118>

Public Policy Institute of California

<https://www.ppic.org/publication/priorities-for-californias-water/>

<https://www.ppic.org/publication/water-and-the-future-of-the-san-joaquin-valley/>

<https://www.ppic.org/publication/californias-water-climate-change-and-water/>

<https://www.ppic.org/publication/californias-water-water-for-cities/>

<https://www.ppic.org/publication/californias-water-water-for-farms/>

Environmental Defense Fund

<https://www.edf.org/ecosystems/california-groundwater-management-resources>

<https://www.edf.org/ecosystems/rebalancing-water-use-american-west>

Stanford University

<https://waterinthewest.stanford.edu/programs/sustainable-groundwater>

World Wildlife Fund

<https://www.worldwildlife.org/threats/water-scarcity>

https://www.worldwildlife.org/media?threat_id=water-scarcity

