



Eyes on the Hydrosphere Unit 1.1: Water Cycle Diagram - Student Preparation Exercise

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You have been given a diagram of a landscape illustrating the different parts of the Earth system, including the atmosphere, hydrosphere, geosphere (notice that parts of the geosphere are exposed [i.e., land areas] and other parts of the geosphere are covered by water [i.e. ocean/lake]), and biosphere. In preparation for your next class meeting, please take some time and think a bit about Earth's hydrosphere. You should strive to complete this exercise without consulting the Internet or textbook resources and rely on your knowledge of the Earth system.

Here's what to do:

Step 1:

Start by thinking about where water is stored in the Earth system. You may have heard the word “reservoir” before and perhaps have one or more reservoirs in your community. When used in this context, a reservoir refers to a place where fluid collects and is stored. Reservoirs in your community might be natural or human-made and are used to store water for municipal and/or industrial use. Perhaps you have had to add coolant to the coolant reservoir in your car. If you are a hiker or mountain biker, you may have used a water reservoir in your backpack from which you could drink without having to use a water bottle. Just like all of these **reservoirs** are places where a fluid is stored, scientists who study water resources must consider reservoirs where water is stored in the Earth system.

On your blank diagram, label as many reservoirs as you can think of in the Earth system. One example of an Earth system reservoir to get you started is the ocean.

Here are a few thought questions for you to consider that may help you come up with ideas (no need to answer these, just use them to guide you as you brainstorm.)

- Does all water in the Earth system exist in the liquid state? If not, in which other state(s) of matter can water be found? Where would this water be found?
- Is all water in the Earth system found at the Earth's surface? If not, where else is water found in the Earth system?
- From which Earth system reservoirs do human beings mine water for personal, agricultural, and industrial use?
- Is all water in the Earth system visible to human beings? If not, why? What about that/those reservoir(s) make(s) it/them “invisible”?
- Are all reservoirs in the Earth system the same size? If not, what are some of the largest reservoirs? Which reservoirs do you think would be among the smallest?
- Do all areas on Earth have identical reservoirs? (In other words, would you expect to find the same reservoirs at the equator as you do in polar regions? Do all coastal areas and inland areas have the same reservoirs?)

Step 2:

Next, consider how water moves through the Earth system and how the reservoirs that you labeled on your diagram interact with one another. To illustrate this movement and interaction of water in the hydrosphere,

- Add arrows to your diagram showing these **transport pathways**.
- Please also speculate about which transport pathways involve large volumes of water and which involve smaller volumes, and use larger arrows and smaller arrows, respectively, to designate the relative volume of water involved in each pathway.
- Each “transport pathway” that you denote with an arrow should have either the name of the process written next to it, OR if you can describe what is happening to the water but do not know the scientific name for the process, just provide a description of what is happening.

Again, a few thought questions to get you thinking about some (not all!) possible transport pathways:

- What happens to water in different parts of the Earth system when it changes temperature (i.e., heating or cooling)? Does the water change in some way? If so, how? Will it move? If so, where?
- Which transport pathways take place over relatively long timescales? Which transport pathways occur over shorter timescales?
- How does the climate of a particular area influence the movement and distribution of water through the Earth system?
- How might humans influence water’s path through the Earth system?

Please bring your labeled diagram with you to class and be prepared to show it to your colleagues and instructor.