LESSON TITLE	Sources of Water on Our Planet
SUBJECT (S):	Earth Science, Environmental Science, Geography
GRADE LEVEL:	6-12 · **AUTHOR:** Jerome Patoux
TYPE OF LESSON (activity, lab, project…)	Group activity, literacy, research. · **DAY(S):** 5

OBJECTIVE

Students will make a model of the water cycle, identify the various reservoirs, and predict the paths of water through the reservoirs. They will determine which reservoirs can be exploited for human consumption, as well as which are renewable, and which are being depleted. They will review different water uses (drinking water, agriculture, industrial uses, etc.), different means of water extraction, and will research and present the cost and feasibility of extracting water for different regions of the U.S. and different countries of the world. They will practice systemic thinking (balanced systems, inputs, outputs) and will use schematics and pie charts to analyze and share their results in a visually appealing and relevant way.

NGSS/CC STANDARDS

NGSS
Science and Engineering: 2, 4, 5, 7, 8
Crosscutting Concepts: 2, 3, 4, 5, 7
Core Ideas: ESS2, ESS3, LS2, PS1

PERFORMANCE EXPECTATIONS
Earth and Space Sciences: HS-ESS2-2, HS-ESS3-1, HS-ESS3-3, HS-ESS3-4, HS-ESS3-5, HS-ESS3-6; MS-ESS3-1, MS-ESS3-3, MS-ESS3-4

CC Math
HS – 7.RP.A.2, MP.2, MP.4

CC ELA/Literacy
HS – RST 9-10.7, RST 11-12.7

ASSESSMENT(S) & GRADING/RUBRIC

Some answers and ideas are provided within the lesson plan. Key to graphic organizer and assessment information are included in attachments.

SUBJECT AREA(S):

This activity can be used in earth or environmental science (water resources, importance of water to society, the water cycle, human impacts on our natural resources), as well as in geography.

TEXTS/MATERIALS/TECHNOLOGY/AUDIO-VIDEO/OTHER RESOURCES:

Reference text and handouts provided in attachment.
The USGS website (http://water.usgs.gov/edu/) is a very reliable resource in general.
Research information on the internet with key words “water uses” or “water sources” with individual city or country name, or simply, for example, “where Las Vegas gets water.”

Colored pencils, computer lab, scissors

INSTRUCTIONAL STRATEGIES/PROCEDURES/GROUPING:

Day 1: **Reservoirs of the water cycle**

In day 1, students will develop a model of the water cycle that can be used in subsequent activities. The idea is to concentrate on the “natural system” in day 1.

(10-20 min) Discuss with students the concept of “**reservoir**” and have students read and annotate the reference text, **Handout #1 – The water cycle**, with emphasis on the first three paragraphs. A suggestion for annotation is to do the following:

- Number the paragraphs
- Underline topic sentences and main ideas
- Highlight science terms
- Circle words or phrases you do not understand
- When something in the text connects with you, write in the margins how it connects

(5-10 min) Have students list all the reservoirs of the water cycle. Lead a class discussion and write the list on the board, but have the students copy the list on a sheet of paper for the subsequent activities:

- the oceans
- the atmosphere (can be separated into moisture (water vapor) and clouds)
- mountain glaciers and snow
- lakes
- rivers and surface runoff
- groundwater
- deep aquifers
- polar ice and snow
- possibly vegetation, or land

(5-10 min) On a separate sheet of paper (and section of the board), have them identify and explain some of the “**paths**” that water can follow to go from one reservoir to another. (They might not think about all of them right away, but that’s fine. Some more will come up as they draw the hydrological cycle. This is just preparatory.)

- evaporation (ocean → atmosphere and land → atmosphere)
- precipitation (atmosphere → ocean, atmosphere → land, atmosphere → glaciers)
- melting (glaciers → rivers and glaciers → oceans)
- sublimation (glaciers and snow → atmosphere)

- surface runoff (land → ocean)
- etc.

(20-25 min) Have students make a model of the **hydrological cycle** (water cycle), in a way that explicitly shows the **reservoirs**, and the **paths** between the reservoirs. Sometimes, a path can also be considered part of a reservoir, as for surface runoff and precipitation, but the distinction is somewhat academic.

- First, have the students draw and label a *realistic* model of the water cycle with an ocean, rivers, lakes, clouds, etc. that uses arrows to indicate the direction the water is moving. For example: http://water.usgs.gov/edu/watercyclesummary.html
- Then have them draw a *schematic* model of the water cycle, with boxes and arrows, as done here, for example: https://www.whoi.edu/sbl/liteSite.do?litesiteid=18912&articleId=28406

In a schematic, the relative size of the reservoirs can be shown by using smaller or bigger boxes. Colors could also be used to identify reservoirs.

Students can research the water cycle in books or on the internet, or use the text provided below for reference. They can work individually, or in groups of 2 to 4.

If time is running short, students can finish their model for homework.

Day 2: **Water uses**

In day 2, students review the different uses we make of water, and determine which of the reservoirs they identified in day 1 can be used for those particular needs.

(5-10 min) Have students take out their model and Handout #1 from the day before. Briefly review the water cycle, in particular the various reservoirs. Have students quickly look at the first four paragraphs from Handout #1.

(5-10 min) Have students list all the **water uses** they can think of. Lead a class discussion and write on the board, but have the students copy the list on a sheet of paper for the subsequent activities.
PROMPT: "What do we need water for?"

- drinking
- washing, cleaning
- watering lawn, golf courses
- agriculture (crops and animals) and irrigation
- industries (chemical processes using water, cleaning, cooling engines in factories and nuclear reactors…)
- producing electricity (hydropower)
- transportation (boats, barges, canals, locks…)
- recreational activities (boating, fishing…)

(15-20 min) Discuss with students which of the reservoirs listed earlier (in day 1) can be used as a source of water for some or all of the listed water uses (but especially for drinking/human consumption and agriculture/irrigation).

- Can we use rain water for drinking?
- Can we use ocean water for irrigation?
- Can we use the water trapped in the polar ice caps?"

Provide a couple examples during a short class discussion, then have students use the graphic organizer provided in attachment – **Handout #2 – Water sources and water uses**. Students may write *YES* or *NO* in each cell of the table, or color the cell, for example, in green for *YES*, red for *NO*, and some other color for *MAYBE, with restrictions*. Do the first one with students to model how they should fill in the chart.

Regroup as a class and go through the table together. As you do so, discuss the feasibility and cost of the water extraction and complete the table with comments as appropriate. See the key to the table in attachment.

- Rain water can be collected, but the process is inefficient, and precipitation can contain chemicals in the vicinity of cities and industries (acid rain).
- Groundwater can be tapped, but it is becoming a limited resource and aquifers can become depleted if we pump faster than the rate of recharge (see day3).
- River water can be extracted, but it can be polluted upstream.
- Ocean water can be used, but it needs to be desalinated.
- Etc.

Make the point that man relies primarily on river runoff and groundwater.
Emphasize that we have been pumping and extracting ever more water from rivers and aquifers, to serve the needs of our growing population.

Conclude the day by raising some questions and having students answer them quietly on their own paper:

- Can we pump as much water as we want? Explain.
- Will there always be enough water in rivers and aquifers? Explain.
- Is this *sustainable*? Explain.

Day 3: **Renewable water sources and sustainability**

In day 3, students will make simple models of water reservoirs as systems and will determine if those systems are in balance or not.

(5-10 min) Review the water cycle from day 1, in particular the various reservoirs. Have students read or review the reference text, **Handout #1: The water cycle**, with emphasis on the fourth paragraph.

(20-25 min) Introduce and define the concept of a **renewable** resource, as well as a **sustainable** practice (or economy).

Hand out the third attachment, **Handout #3 – Water sources: renewability and**

sustainability, explaining that you will look at some examples of water sources and determine whether they are renewable or not. The handout is made of 4 vignettes that can be cut out. Students can work on the handout itself, but we suggest that they cut out the vignettes and paste them on their science notebook or a sheet of paper, as they work through the 4 examples.

Go through the first example (i.e., an aquifer with very slow recharge) as a class, step by step. Describe the aquifer as a **system** with **inputs** and **outputs**. In the case of the aquifer, the **input** is underground water seeping from the surface downward. (In other words, rain water that did not flow at the surface to form rivers, but seeped through the ground until it hit an impermeable layer and started flowing horizontally.) The **output** is the extraction of water by pumping.

- If the amount of pumping is equal to (or less than) the amount of recharge, the system is in **equilibrium**, or **balance**. The recharge balances out the pumping.
- If the amount of pumping is greater than the recharge (overdrafting), the system is out of balance and the aquifer gets depleted.

In theory, groundwater is a renewable resource (through rain and seepage), but in practice, the recharge rate is often so small compared to the rate of pumping that it cannot be considered renewable.

Have students work through the 3 other examples (river, lake, and ocean). Mention that, for the sake of clarity, the drawings have been kept simple and are not necessarily complete. Students can add other inputs and outputs if they want (e.g., river runoff into the ocean, evaporation from the drainage basin, vegetation, etc.)

Make sure the students answer the following questions:

- What is the system we are looking at? [Aquifer, river, lake, and ocean.] [This is important, because each (sub)system is also part of a larger system, i.e., the earth system, so we need to know which system we are talking about.]
- What are the inputs?
- What are the outputs?
- Can the outputs be greater than the inputs? [Typically, yes, except for the ocean.]
- What will happen in the long run if the system is out of balance?

- For the lake, use the example of the Aral Sea, which was depleted of 90% of its water over only 50 years (even though it is a closed sea, and not a lake, it works the same way). Show the comparison of satellite images, before and after: http://earthobservatory.nasa.gov/IOTD/view.php?id=3730
  or use the comparison tool (very cool) put together by the Earth Observatory http://earthobservatory.nasa.gov/IOTD/view.php?id=84437
- For rivers, emphasize that many different people/states/countries usually pump the water at multiple points along the river, and that sometimes, almost nothing is left by the time we reach the estuary.
- For the ocean, emphasize that the size of the reservoir is so big that extracting a tiny fraction of it makes almost no difference.

Conclude by making the point that, although all the reservoirs seem renewable (because of the presence of rain), they are not necessarily renewable in practice: the issue is not whether there is rain or not, but whether we pump *faster* than the reservoir can recharge. This is important systemic thinking.

Day 4: **Water extraction**

In day 4, students will research and report about the different means of water extraction that are available to us, in particular their cost and feasibility.

(5-10 min) Review the various sources of water available to us (from day 1) and the needs they can serve (from day 2). Have students reread the reference text, **Handout #1 – The water cycle**, with emphasis on the second half of the text.

(5-10 min) List all extraction processes identified in day 2 (along with other processes students might think of) and assign each process to a different group of students. Have students work in groups of 2 or 3, ideally in a computer lab, otherwise at home as homework.

(20-30 min in class + homework) Have each group research a particular process and report to the class in the form of a poster, or an oral presentation (powerpoint). Guide them with the following questions/guidelines:

- Describe the water extraction process. Use both visuals and text to explain how it works.
- Are there restrictions as to where the facility can be built/installed?
- Can the facility run and produce water all year round? Does it depend on the season?
- What is the environmental impact of the water extraction process?
- Does the water need to be treated after extraction?
- What is the cost of the extraction process (building the facility, running it, water treatment, etc.) and how does it compare to the cost of other means of water extraction?
- How many people can benefit from the facility?
- What is an example of a location where the extraction process is used?

Students should present the pros and cons of the water extraction process and provide an example of a location where the process is currently used. For example:

- Desalination is costly and not very efficient. The salt needs to be disposed of. Freshwater can only be produced on the coast and needs to be transported. Desalination is used in Israel and California.
- River runoff from melting mountain snow is an ideal source of water, but it is seasonal (when glaciers and snow melt in spring and summer) and water needs to be stored for the rest of the year. It is only available to mountainous areas. The snow pack can vary from one year to the next, and many glaciers are threatened by global warming. Damming/Extraction of river water is used, for example, in the Pacific Northwest.
- Pumping water from deep aquifers has been done for centuries. However, recently, with improved technology, we have been pumping faster (on time scales of decades) than the aquifers are recharging (on time scales of centuries to millennia). Many

aquifers are being depleted, the water table is dropping, and pumping groundwater might not be a viable option for the future. A large fraction of the Great Plains of the U.S. relies on groundwater.

- Fog collection is marginal and has been mostly experimental. It is used in Chile.
- Some students' parents might be collecting rain water in their yard, for watering their lawn. This basic technique is still used in many places on earth, for example in the Pacific Islands, but it can only serve residential purposes.

(15-20 min, or class day) Have students report on their findings, either as a gallery walk (posters) or as a series of short presentations or possibly as whiteboards. Presentations could take a class day. It is up to the teacher as to how students glean information.

Day 5: Freshwater

In day 5, students will build visual representations (pie charts) to show how much of earth's water is usable in the end, to serve our societal needs.

(5-10 min) Start building the conclusion as you review the previous lessons and recap the rationale that goes through days 1 to 4:

1. There exist various water reservoirs on earth (day 1).
2. Man has various water needs and taps into those reservoirs to answer his needs (day 2).
3. However, some of those reservoirs are not renewable and man is depleting them (day 3).
4. Moreover, many extraction processes are either impractical or not cost-efficient when it comes to provide large amounts of water for cities, agriculture, irrigation, industries… (day 4)
5. In conclusion: There is a lot of water on earth, but when it comes down to it, there is very little that is freshwater and that can be extracted for human consumption.

This last point is what students will now try to represent visually. Tell students that they will learn how to draw pie charts and hand out the worksheet provided in attachment, **Handout #4 – Freshwater**. A digital creation of the pie chart could be made if computers are readily available.

(10-15 min) The first pie chart will show how much of the total amount of water on earth is actually usable for consumption.

First, have students refer to the reference text again, **Handout #1 – The water cycle** (3rd paragraph) to answer the questions:

- 97% of earth's water is in the ocean (and therefore, salty)
- only 3% of earth's water is freshwater

Then, have students draw, color and properly label the first pie chart using these numbers. The pie charts provided in the worksheet are conveniently pre-divided into 100 slices, so students can color 3 slices using one color, and 97 slices using another. They can label the pie chart with, either, arrows and labels, or a legend.

(10-15 min) The second pie chart will show how much of the freshwater (i.e., how much of the 3%) is contained in polar ice as opposed to groundwater and surface water.

Have students refer to the text again (3rd paragraph) to answer the questions on the handout:

- 69% of the freshwater is locked in the polar ice caps and snow cover
- 30% is underground, but inaccessible
- rivers and lakes, the atmosphere, and aquifers constitute the remaining 1%

Have students draw, color, and properly label the second pie chart using these numbers.

For comparison, show a visual representation with bar graphs, as is done here:
http://water.usgs.gov/edu/earthwherewater.html
The bar graphs used in this web page are a good visual representation as well, but prefer pie charts in class if possible. Pie charts are a more interesting and formative exercise for students, as they practice percentages and fractions at the same time. Groundwater, for example, represents about 1/3 of the freshwater reservoir, whereas polar ice represents about 2/3.

(5-10 min) Conclude by making the point that we depend on freshwater, and that there is a limited amount of it on earth. This limited amount of freshwater is always in flux, but it is subject to variations that can greatly affect our lives (seasonal variations, variations due to human use and overuse, and variations due to climate change).

Extension/Homework (Optional): **From global to local**

(5-10 min) Review past activities, especially the limited amount of freshwater on earth and the issue or renewability and sustainability. Suggest to your students that global consequences start locally. We should know where our water comes from, and what choices our city/region has made, in terms of water extraction. “What sources of water are being exploited in the very region where we live?” (Define “exploitation of a resource” if necessary.)

(30-40 min) Have students research what sources of water are being exploited in the area where they live. Guide their research with the following questions/guidelines:

- Identify the agency or company that delivers water to your house.
- Find their website, or visit a local agency, and identify which source(s) of water is/are being used. (Aquifer? River? Lake? Ocean?...)
- How long has each source of water been used?
- Are there predictions/projections available as for how much longer we will be able to tap into that source of water?
- Does the source of water vary seasonally? Annually?
- Is the source of water affected by global warming and climate change?
- What is the relative cost of each source of water (extraction and treatment)?
- Does the agency mention alternative sources of water?
- Does your city/region typically have enough water? Does it need to purchase water from another region/state? Does it sell water to another region/state?

If several sources of different types are used, have your students draw, color, and label a pie chart showing the relative magnitude of each (for example, 70% deep aquifer, 30% river runoff). If the water source has a name (for example, the name of a river, of an aquifer), make sure the name appears in the labels/legend.

(30-40 min) Repeat the last exercise for other locations in the country, or for other countries. Choose locations that have very different available water resources. For example:

- Las Vegas obtains almost all of its water from the Colorado River, whereas Memphis and San Antonio pump all their water from underlying aquifers.
- Houston uses both methods (river runoff and groundwater).
- India obtains all of its drinking water from rivers, whereas Libya obtains almost all of its water from a deep, ancient aquifer.
- An interesting case study is that of the Pacific Islands, surrounded by (ocean) water, yet struggling with very scarce freshwater resources.

Assign a different location to each group of students, and have them report their results, either as posters or oral presentations.
Compare the different pie charts. If possible, have your students use the same color key for coloring their pie charts, so that they can quickly compare visually the different cities/countries. It will show them how contrasted the water issue is around the world, and at the same time reinforce the value of the pie chart as a visual tool.

SAFETY/SECURITY ISSUES:

None

NOTES/REFLECTIONS:

Important points to make:

- The total amount of water on earth is not changing, but the human population is increasing, and needs ever more water, for drinking, but also for its growing industry, and for growing food and feeding the growing human population.
- There is probably enough water for the growing world population, even at 9 billion people by 2050, but it is not evenly distributed around the earth, with too much water in some places, and not enough in others.
- A given country can be flooded in some parts, and experiencing drought conditions in others. Or flooded during the rainy season, and suffering from severe drought conditions in the dry season. Therefore, looking at the total amount of rainfall, for example, is not necessarily a good indicator of freshwater availability.
- Global warming is predicted to change the distribution of water around the globe, and will make wet areas wetter while making dry areas drier.

<u>Handout #1</u>: The water cycle

The hydrological cycle, or water cycle, describes how water circulates through the earth system from one place to another. These places are called "reservoirs" and include: the oceans (the biggest reservoir of all), the polar ice caps, rivers and lakes, groundwater, and the atmosphere (moisture and clouds). We sometimes make further distinctions between aquifers (layers of soil or rock containing water), underground water in motion (flowing through soil), and wetlands or permafrost, where the water is underground but not moving. Similarly, it is sometimes useful to think separately about permanent and temporary snow cover.

Water is transferred from one reservoir to another through different processes. For example, it evaporates from the ocean and land surface into the atmosphere, and precipitates (rains or snows) back to the ocean or land. It collects through water basins to form rivers, or seeps underground to replenish the water table. Rivers flow into lakes or oceans, from where water can evaporate once more. Polar glaciers also change over time: they flow and melt into the ocean, but also reform as fresh snow falls on top of them and gets compacted.

Human beings depend on fresh water for drinking and agriculture. Although there is a fair amount of water on earth (about 1.4 billion cubic kilometers), most of it (more than 97%) is in the oceans and is, therefore, saline (salty). Only about 3% of all water on earth is freshwater. And out of these 3%, about two thirds (69%) are locked in the polar ice caps and permanent snow cover, in the form of ice and snow. Most of the last third (30%) is locked underground and inaccessible. This leaves us with only about 1% of earth's freshwater in rivers and lakes, the atmosphere, and subterranean aquifers, our primary sources of freshwater. These are the reservoirs in which human beings must tap for their daily use, and sometimes simply for their survival.

Local populations have been creative in designing ways to capture water. In Northern Chile, for example, huge nets were erected to collect fog droplets, channel them along the canvas, and collect them into a trough, in sufficient amounts to sustain an entire village. In the U.S., many individuals capture rain water running off their roof and collect it in storage tanks for watering their lawn and plants. Saudi Arabia, being mostly desert, relies heavily on the desalination of ocean water, even though it is costly and not very efficient. Some engineers have even considered drawing water from polar ice, although they soon concluded that it would be impractical.

With increasing population, agriculture, and industries, we have been pumping water out of aquifers in far too great amounts and at far too high a rate for these aquifers to replenish in a timely manner, through underground seepage. Therefore, aquifers are quickly being depleted and the water table is dropping in many places on earth. This leaves many regions with only precipitation and river runoff as viable long-term water sources. However, precipitation is unevenly distributed around the globe, with some regions receiving far more rain than they need, and other regions receiving none. With human-induced desertification, global warming and climate change, these contrasts are growing sharper: wet areas are getting wetter (as in the midlatitudes, where the United States, Canada, and Europe are situated) while dry areas are getting drier (as the desert areas of the tropics). Added to the increasing demand due to the population increase and growing agricultural and industrial needs, the situation will soon become untenable. Indeed, it is already untenable in many places on earth, where water is often a subject of political tension, if not war.

The causes of tension over water resources are many and varied, as are the solutions. Many hydrologists advocate a more efficient and more responsible use of water resources. Irrigating deserts, for example, as is done in the American Southwest and the Negev Desert, is deemed too extreme. Some engineers propose to build huge transportation systems to transport water from water-rich to water-stressed regions. California has engaged in negotiations with Canada to that end. In the meantime, climate scientists advocate a reduction, or at least a limitation, of greenhouse gases in the atmosphere to limit the impacts of global warming and climate change on the water cycle. Pessimists claim that all these efforts are to no avail if we do not curb the population growth and our boundless economic development.

Handout #2 -- Water sources and water uses

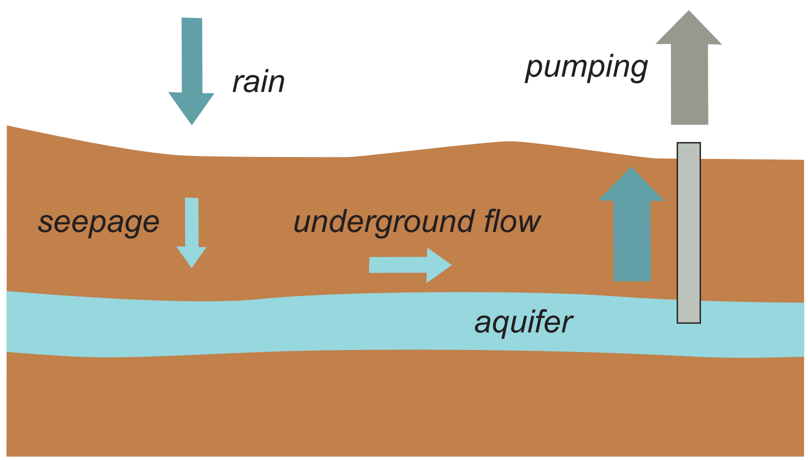
	...drinking	...washing and cleaning	...watering lawns	...agriculture and irrigation	...industries	...producing electricity	...transporta-tion	...recreational activities
Rain water can be used for...								
River water can be used for...								
Lake water can be used for...								
Ocean water can be used for...								
Polar ice can be used for...								
Mountain gla-ciers and snow can be used for...								
Groundwater can be used for...								

Handout #2 -- Water sources and water uses

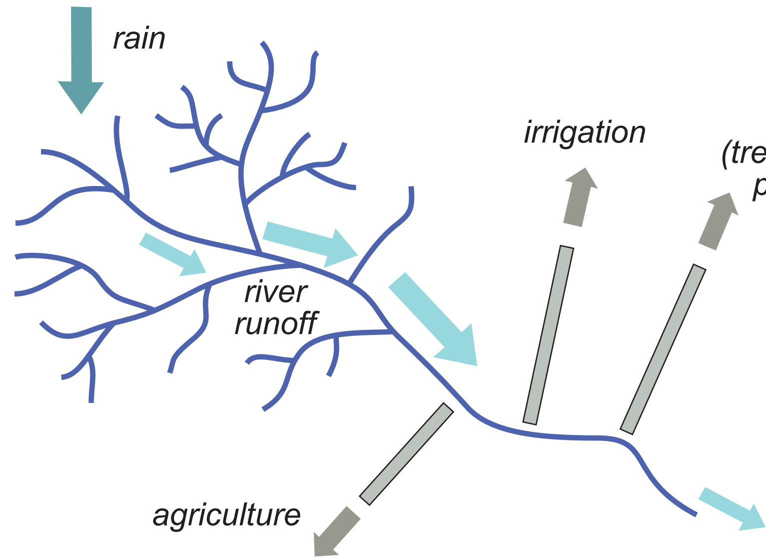
<table>
<tr><th></th><th>...drinking</th><th>...washing and cleaning</th><th>...watering lawns</th><th>...agriculture and irrigation</th><th>...industries</th><th>...producing electricity</th><th>...transporta-tion</th><th>...recreational activities</th></tr>
<tr><td>Rain water can be used for...</td><td colspan="2">Better if treated. (Acid rain, pollution, etc.)</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>River water can be used for...</td><td colspan="2">Needs to be treated.</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Lake water can be used for...</td><td colspan="2">Needs to be treated.</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Ocean water can be used for...</td><td>Needs to be desalinated.</td><td>Possibly.</td><td colspan="3">Needs to be desalinated.</td><td>Tidal energy.</td><td></td><td></td></tr>
<tr><td>Polar ice can be used for...</td><td colspan="4">Possibly, but the source is usually too far from where the water is needed.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Mountain gla-ciers and snow can be used for...</td><td colspan="6">Needs to melt first, and turn into river runoff.</td><td></td><td></td></tr>
<tr><td>Groundwater can be used for...</td><td colspan="2">Better if treated.</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Handout #3 – Water sources: renewability and sustainability

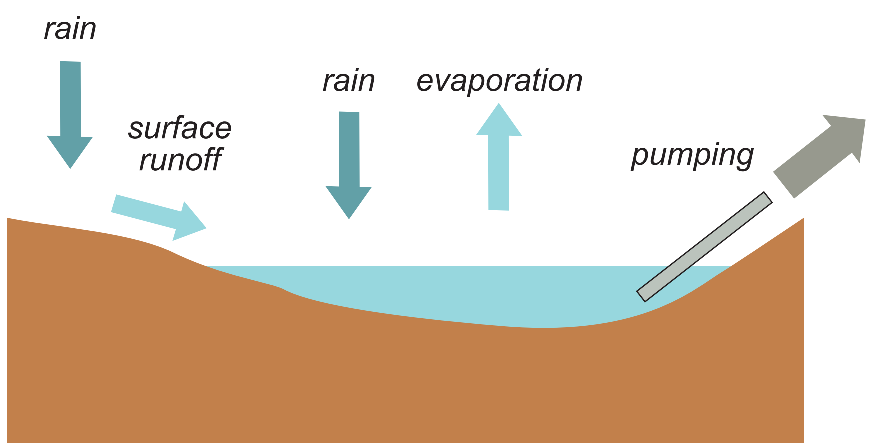
Aquifer



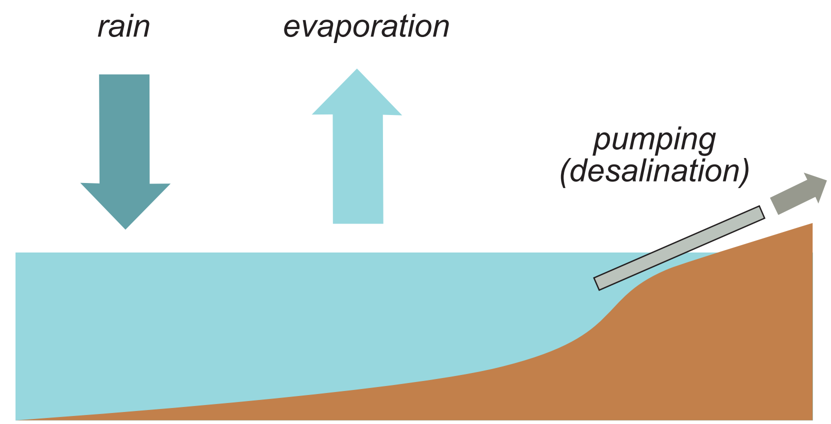
River



Lake



Ocean

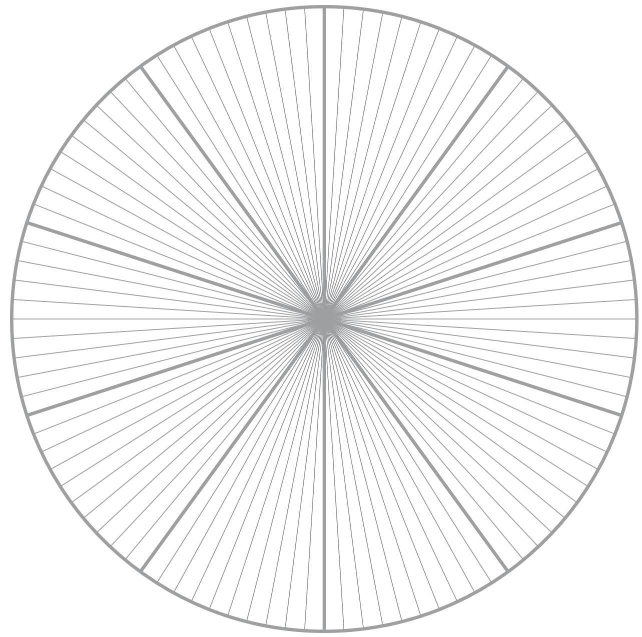


Handout #4 – Freshwater

What percentage of earth's water is in the ocean?

What percentage of earth's water is freshwater?

Show the distribution of ocean and freshwater as a pie chart.

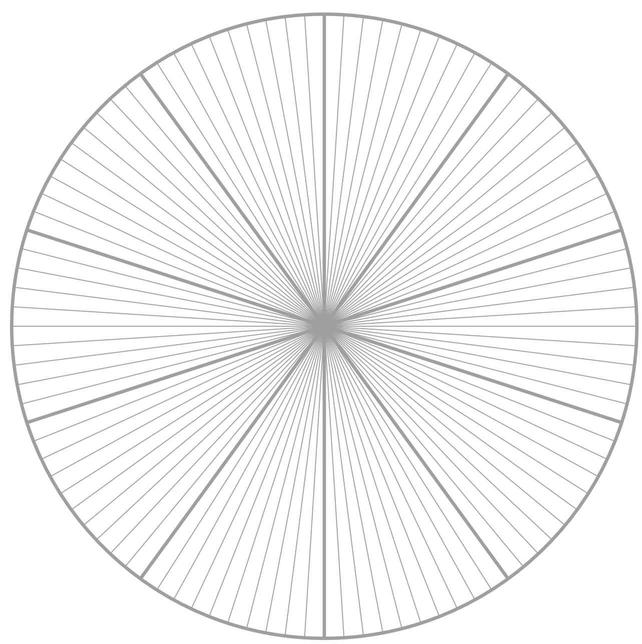


What percentage of earth's freshwater is locked in the polar ice caps and snow?

What percentage of earth's freshwater is inaccessible groundwater?

What percentage of earth's freshwater is in rivers and lakes, the atmosphere, and aquifers?

Show the distribution of freshwater as a pie chart.



Assessment items: suggestions

Day 1: Reservoirs of the water cycle	
List of reservoirs: check for completeness.	
List of paths: check for completeness.	
Water cycle, realistic model: • has all reservoirs • has all paths • has all labels • is visually clear and compelling	
Water cycle, schematic: • has all reservoirs • has all paths • has all labels • relative size of boxes corresponds to relative size of reservoirs	
Day 2: Water uses	
List of water uses: check for completeness.	
Handout #2: Use key.	
Day 3: Renewable water sources and sustainability	
Handout #3: Identified: • system • inputs • outputs Explained whether system is in balance.	
Day 4: Water extraction	
Report on specific water extraction process: • Used both text and visuals to describe process. • Described pros and cons. • Provided an example of a city or country using the process.	
Day 5: Freshwater	
Pie chart: freshwater vs. ocean earth. • size of slices (%) is correct • labels, colors, and overall presentation/clarity	
Pie chart: surface water vs. groundwater vs. polar ice. • size of slices (%) is correct • labels, colors, and overall presentation/clarity	