The hydrosphere is the system of all of the water on planet Earth.

Some of the parts of the hydrosphere are ___, _____, ___________, and ________.

The hydrosphere is part of a bigger system X called: ________________.

X is part of a bigger system Y called: ________________.
The Hydrosphere

- **DEFINITION:** The hydrosphere is all of the water on planet Earth.
- The hydrosphere is a part of a bigger system called Earth’s Matter.
- The hydrosphere is itself a system that is made of parts.
- Some of the parts of the hydrosphere are the ocean, ice, water vapor in the air, water underground, and water in living things.
- Each of these parts is called a **reservoir** of the hydrosphere.
Names of Different Sized Numbers

• Look at the numbers on page 27 of the reading.

• Work in groups to fill out the table of Names of Different Sized Numbers. No % or page numbers.

• Put a star next to a number that you can say the whole number in your local language.
Make Two Small Cubes

• Make a cube that is 1 centimeter (cm) long by 1 cm wide by 1 cm high.
• Make another cube this time 2 cm long by 2 cm wide by 2 cm high.
• How much bigger is the larger cube compared with the smaller cube?
• Is there a math equation that you can use as evidence for your answer?
How Big Is A Cubic Meter?

• Look at the cubic centimeter and the cubic meter. How much bigger is the volume of the cubic meter?
• A centimeter (cm) is one hundredth of a meter (0.01 meter). Another way of saying this is that a meter is equal to 100 cm.
• A cubic meter is equal to 100 times 100 times 100, which is equal to 1,000,000 (one million).
• We could fit one million cubic centimeter boxes inside the cubic meter box.
How Big Is A Cubic Kilometer?

• Look at the one cubic meter box. How much bigger is the volume of one cubic kilometer?
• A meter (m) is one thousandth of a kilometer (0.001 km). Another way of saying this is that a kilometer is equal to 1,000 meters.
• A cubic kilometer is one thousand times longer on each side than the cubic meter.
• A cubic kilometer is equal to 1000 times 1000 times 1,000. This is equal to 1,000,000,000 (one billion) cubic meters.
• We could fit one billion cubic meter boxes inside a cubic kilometer box.
• Could we make a cubic kilometer box?
Could We Make a Cubic Kilometer Box?

- A kilometer (km) is a thousand meters. It is a little more than half a mile (1 km = 0.62 miles).
- Think about two Majuro places that are separated by 0.6 miles. A box would have to be that long, that wide and that high.
- The Majuro airport reservoir holds a lot of water (about 37 million gallons). It would take 1,000 Majuro airport reservoirs to fill a box that has a volume of one cubic kilometers.
Visual Features in Books

• **Visual Features** are things we can see in books such as drawings, graphs, photos, tables of information, and lists with • marks.

• With a partner, look through pages 26 through 31 to find at least **four** different kinds of visual features.

• Be prepared to share the visual features you have found.
Interact With A Visual Feature

• BEFORE READING: Look at your assigned visual feature. Write at least one question that you have about it.
• AFTER READING: What are one or two big ideas that the graph or other visual feature explains?
• Do you still have any questions about the visual feature?
• What would be hard for RMI Grade 6-9 students to understand about the visual feature?
• Each member of the group fills out the answers to each of the four questions for that group.
Jig Saw Activity

• Form four new groups.
• Each new group has at least one member from each of the four groups.
• In the new group, the member from Group A explains Visual Feature A and the group responses to the questions, then the member from Group B does the same, etc.
• After all groups have had four reports, there is a whole class discussion of the visual features and what they have learned about the water cycle.
Reservoirs and Flows of The Water Cycle

• Water is located in different reservoirs in different amounts.
• Water enters and leaves each reservoir but the amount of water in the reservoir tends to stay the same.
• Water can change physical states as part of entering or leaving a reservoir.
• The water cycle involves physical changes but does not involve chemical changes. The water cycle is all about H₂O.
First Ideas About the Carbon Cycle

• What are the main reservoirs of the carbon cycle? In other words, where is carbon located on our planet?
• List the names of molecules or any kinds of molecules that are part of the carbon cycle.
• How is the carbon cycle similar to the water cycle?
• How is the carbon cycle different from the water cycle?
Session 2.1

Finding Out about Carbon
Guiding Question:
Where is carbon found on Earth?
What have you heard about the atmosphere?
What have you heard about carbon dioxide?
What have you heard about how living things use air, carbon dioxide, and oxygen?
Finding **Carbon** in a Chemical Formula

- The symbol for carbon is an uppercase letter: **C**
- The C may be followed by a number: **C_6**
- The C may be followed by another uppercase letter: **CO_2**

It is **NOT** carbon if a lowercase letter follows the C:

- **CaNO_3**
- **NaCl**
Carbon is part of all living things and all things that were once alive. It is also found in many other substances.
Carbon Dioxide and the Carbon Cycle

Click on the name of each reservoir for more information.

**Carbon Cycle Reservoirs**

- **Fossil Fuels**: 10,000 Gt
  - Oil, coal, and natural gas are under Earth's surface. They are not a significant part of today's carbon cycle unless people bring them to the surface, and then burn or use them.

- **Ocean**: 41,000 Gt
  - CO₂ gas from the air dissolves in water and becomes a dissolved salt called bicarbonate. Some bicarbonate becomes CO₂ gas again, which escapes back into the air.

- **Atmosphere**: 840 Gt
  - Most of the carbon in the air is carbon dioxide, CO₂. The atmosphere is the reservoir of the carbon cycle that changes the most and the quickest. It is also the reservoir where carbon has the biggest direct effect on climate.

- **Land Biomass**: 2500 Gt
  - Biomass is matter that is in, or came from, living organisms. Most of the carbon in biomass is in trees and plants or in decomposing material in soil.

- **Rocks**: 60,000,000 Gt

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Note: Units are gigatons of carbon. One gigaton = one billion tons
http://pbslearningmedia.org
Search for PCEP Carbon Cycle Interactive
Reservoirs and Flows of The Carbon Cycle

• Carbon is located in different reservoirs in different amounts.

• Carbon can change physical states and chemical bonds as part of entering or leaving a reservoir.

• The carbon cycle involves physical changes and chemical changes. The carbon cycle is all about carbon in different chemical forms.

• Carbon enters and leaves each reservoir.

• The amount of carbon in some reservoirs can change significantly because of human activities.