

# SCIENCE·3D

## SEA TURTLE WORLD

In this packet, sample student answers are provided in **red** and notes to teachers are in **blue**.

In this **Mission Research**, students will work to develop a better understanding of the proportions of different forms of water on Earth. They will also develop ideas about how energy and matter flows through a sea turtle's ecosystem.



## Activity 1: Water World

Turtles and tortoises are found in many different habitats. Most turtles are found in freshwater, and a few species – such as sea turtles are found in saltwater. Could this be because there is more freshwater on the surface where turtles can live? Use the data below to find out.

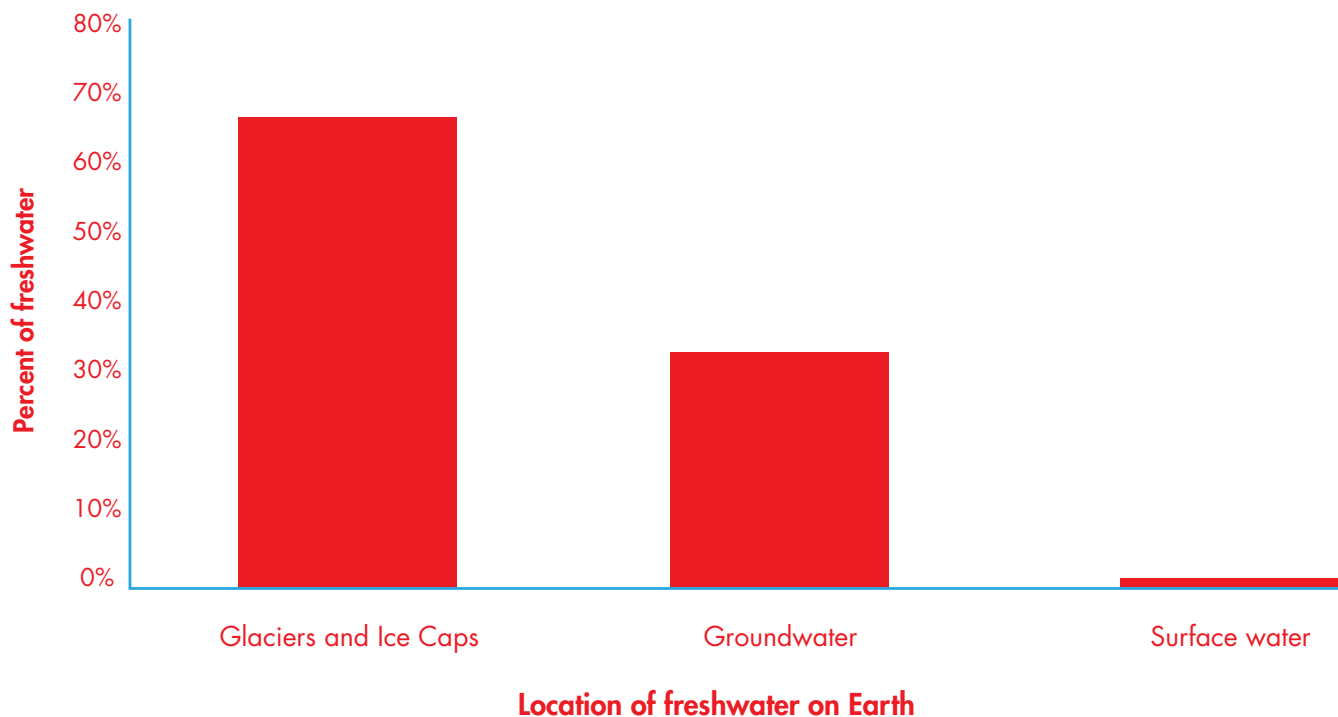
**Table 1. Distribution of water on Earth**

Types of Water	Percent of Total
Oceans	96.5%
Other salty water	1%
Freshwater	2.5%

**Table 2. Location of freshwater on Earth**

Types of Water	Percent of Total
Ground water	30%
Glaciers/Ice caps	69%
Surface water	1%

1. **Draw** a graph of the percentage of freshwater in each of the categories shown in Table 2. Remember to caption the figure.



2. Use the data from Tables 1 and 2 to construct an argument about the following statement:  
There are more species of turtles in freshwaters because there is more available habitat.

I do not think there are more freshwater turtles because there is more habitat available. There is much more water in oceans than freshwater. And, there is very little freshwater that is on the surface. A student may observe that not all ocean water is usable by animals that breathe air, even though the ocean surface is more extensive than that of lakes and rivers.

**Extend the Lesson:** Have students use the data above and the information found in the **Mission Reader** to discuss why conserving surface freshwater is so important for people. Students should construct arguments around there being relatively little water in rivers, lakes, and wetlands.

**Math Extension:** Ask students to determine the proportion of overall water that is fresh surface water. This would be  $2.5\% \times 1\% = 0.025\%$  of total water. It turns out that of this surface water, only about 25% is in lakes, rivers and wetlands. That means that for turtles in freshwater, their available habitat is only about 0.00625% (25% of 0.025%) of the water on Earth.

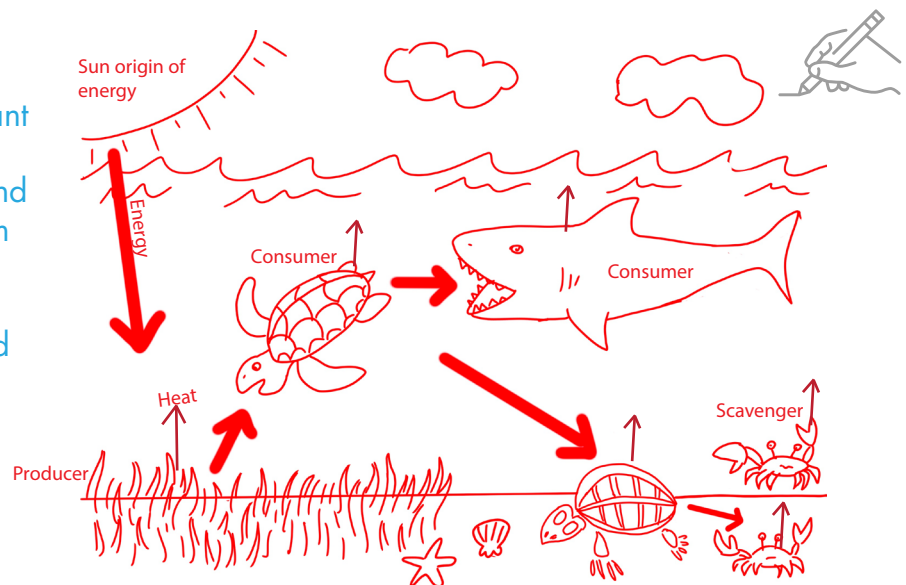
## Activity 2: Energy and Matter in Turtle Ecosystems

Getting enough energy and matter is critical for organisms to survive. Using what you learned from your **Mission Reader** and any additional research, answer the following questions.

Note: students should be able to complete the following questions using information in the **Mission Reader**. However, to reinforce learning and use of online resources, allow students to conduct online searches to learn about green turtles. For an additional geography component, ask different students or groups to research green turtles in different parts of the world such as The Bahamas, Florida, Australia, Hawaii, etc. Then, have them show the location of the areas they investigated on a map. As a group, have students compare and contrast the ecosystems and energy flows in the different areas.

1. **Draw** and **label** a diagram of how energy and heat flows in an adult green sea turtle's ecosystem. Be sure to include 1) the original source of the energy; 2) producers; 3) at least two different consumers (at least one herbivore and one predator); 4) decomposers or scavengers.

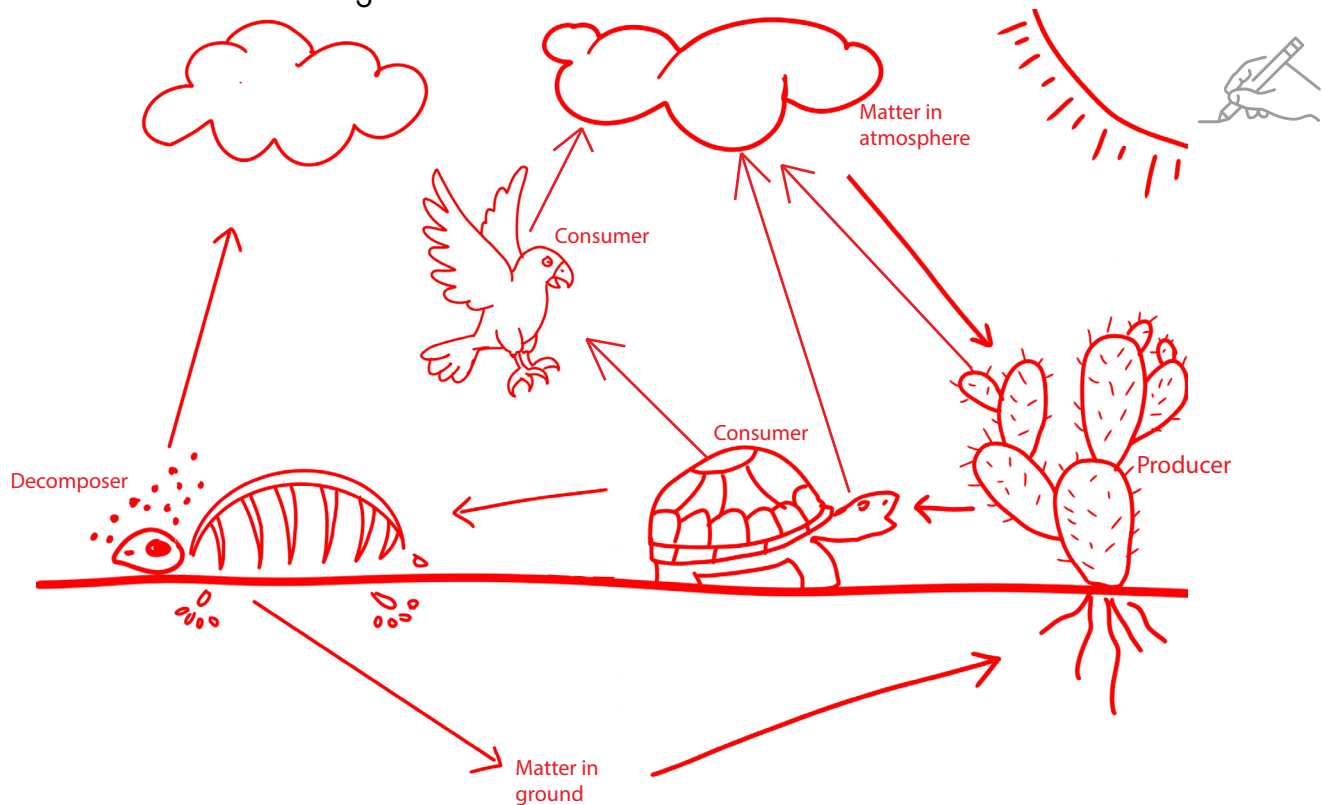
Student drawings may vary. They should cover the following important points: 1) matter comes into producers from the atmosphere (and also the soil); 2) matter moves from producers to consumers and from prey to predator; 3) matter is released from organisms and dead material/decomposers into the environment.



2. Look at your drawing above. **Predict** what would happen to this ecosystem if land is cleared near the shore and more sediment erodes and washes into the ecosystem, making the water much less clear. Hint: When the water becomes less clear (also called more turbid) less sunlight reaches the bottom. **Describe** why you made this prediction.

The ecosystem will change, and populations of plants and animals may decline or disappear because plants will get less sunlight and may die out. That means that there will be less food for herbivores, which means less food for predators. These animals may need to move, or they could die out.

3. **Draw** and **label** a diagram of how matter flows in a tortoise's ecosystem on land. Be sure to include: 1) the original source of the matter; 2) producers; 3) at least two different consumers; 4) decomposers or scavengers. Show where matter might move from the living environment to the non-living environment.



Student drawings may vary. They should include the following points: 1) matter comes into producers from the atmosphere (and also the soil); 2) matter moves from producers to consumers and from prey to predator; 3) matter is released from organisms and dead material/decomposers into the environment; 4) matter is exhaled into the atmosphere. Some students may also add animals excreting materials.

4. Think about what happens to matter when it moves from one organism to the next and from the living to the non-living environment. **Describe** what happened to the matter when it moved from the living to the non-living environment. Was matter destroyed?

The matter changed forms, but it was not destroyed. It is released back into the environment.

Since this is an important point and a common misconception, consider answering this question in a group discussion. Some students might think that matter is destroyed when animals use energy and break chemical bonds, but matter is conserved. For example, carbon from an organism's body is exhaled as carbon dioxide.