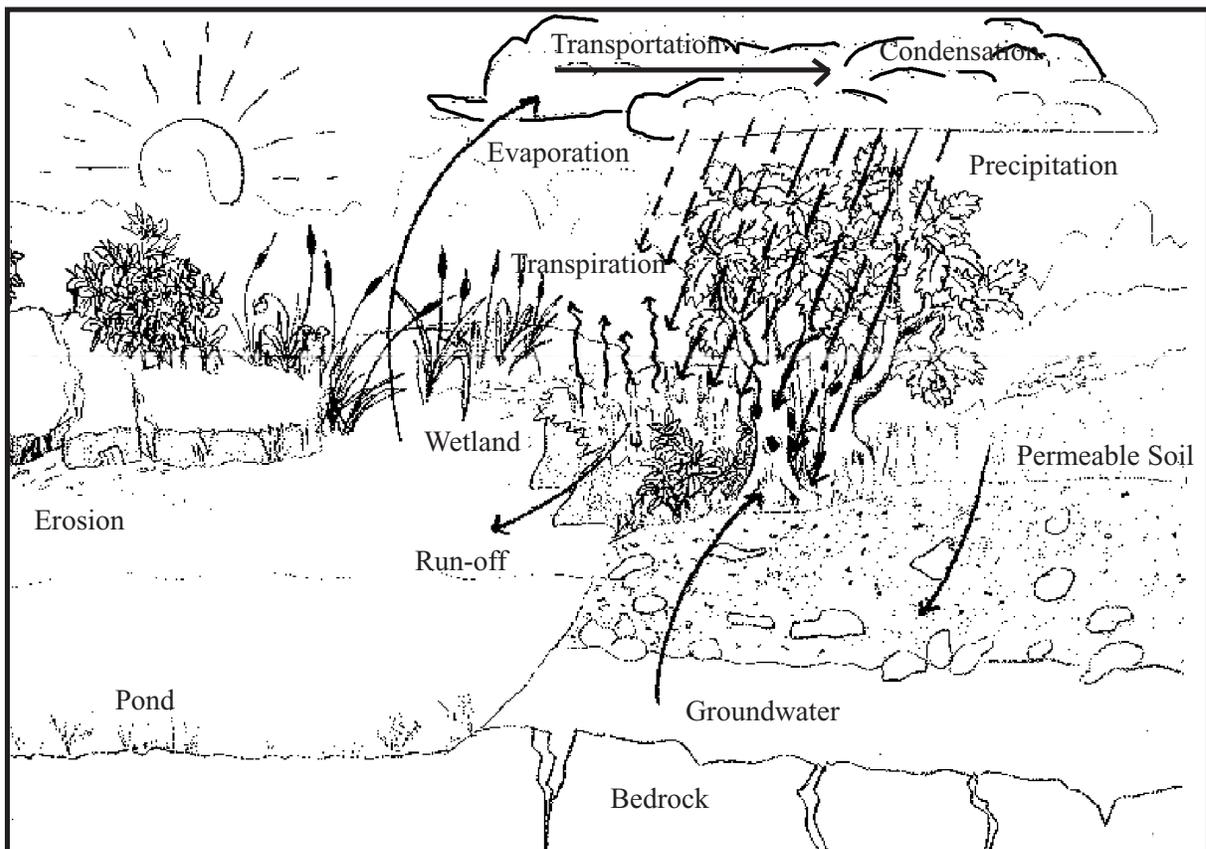


MANGROVES AND THE WATER CYCLE

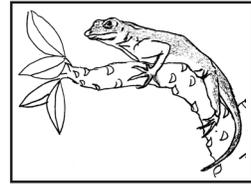
The amount of the water in the world never changes—but water is constantly changing form, from liquid to gas or solid, and back again. The movement of water from the Earth to the sea to the air and back to the Earth is called the **water cycle** (Figure 4). The water cycle is driven by the heat of the sun.

Three things can happen to water that falls as rain. Some is absorbed by plants. More hits the ground and flows away, forming rivers and streams and filling lakes and wetlands. In the Cayman Islands there are no rivers or streams as there are no mountains, and so the majority of the rain filters into the ground, filling underground reservoirs or lenses that sit above brackish water, which in turn sits above sea water that has permeated the limestone rock that makes up the islands. This is the **groundwater**. Every river, stream, and underground reservoir is supplied with water by its own area of land. This area is called a **watershed**.

Figure 4: The Water Cycle



ALL ABOUT MANGROVES



All the water in a watershed is connected. Any activity in a watershed that affects the water will affect the other water bodies. For example, if the rivers in the mountains become clogged with silt because too many trees are cut down, less water will evaporate from the rivers, less rain will fall in the mountains, and less water will enter the rivers and streams. The wetlands by the sea will dry up. In order to protect a coastal wetland, it is necessary to protect the whole watershed.

With the flow of water to the mangrove wetlands comes a steady supply of nutrients from the surrounding land. The organic silts and sediments settle and, warmed by the sun, provide ideal conditions for the growth of microscopic plants and animals—the base of aquatic food chains. The abundance of food materials leads to some mangrove wetlands' being called the most productive systems (in terms of gross plant material) on Earth. A well-established marsh is estimated to be as much as 50 times as productive as a similar area of grassland, and about eight times as productive as cultivated land. The contribution of plant material to climate is one reason it is so important to protect mangrove wetlands.

Mangrove wetlands and climate

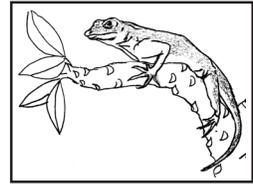
On mountainous islands, the climate is often very predictable, with hot, sunny mornings followed by heavy afternoon showers. Wetlands play an important role in maintaining this pattern. In the Caymans, especially in Grand Cayman, the Central Mangrove Wetlands perform a function similar to that of mountains, with prevailing winds moving more than 40 million gallons of water a day from east to west, where the water falls as heavy rain. Cayman Brac is much drier because it has few wetlands, whereas Little Cayman, which has extensive mangroves, has more rainfall than the Brac but not nearly as much as Grand Cayman.

Most Caribbean wetlands are densely covered by plants. A plant, because of its spreading leaves, has much greater surface area than the area of soil it covers. Plants, like the mangroves that cover the Central Mangrove Wetland, lose water through their leaves by a process called **transpiration**. Therefore, a wetland contributes much more water to the water cycle than the same area of land would if the wetland were not there.

Here is how the climatic pattern works in mountainous islands. After sunrise, the land heats up and water evaporates from the sea and from coastal and wetland plants. Prevailing winds carry this moist air inland, toward the mountains. The mountains force the warm, moist air to rise; as it reaches colder air at higher altitudes, it condenses and falls as rain, filling up both upland and lowland wetlands.

In this way, wetlands help to maintain local climates.

ALL ABOUT MANGROVES



The Water Cycle

Activity 1-C: Water Cycle Rap

Summary Students will learn the process of the water cycle through doing a rap.

Learning Objective

Students will understand the process of the water cycle.

Age Levels 4–13

Subject Areas Science, music

Time 10–30 minutes

Materials None needed

Handout Water cycle process

Background Most of the Earth is covered with water, and every living thing needs it to survive. That’s why we need to keep it clean. The water that exists today is the same water that the dinosaurs drank—because of the process of the water cycle. Many different types of rain or moisture come from the atmosphere—snow, hail, mist, fog, rain—in the process known as **precipitation**. When rain falls, it soaks into the ground, filling up lakes, rivers, and wetlands. This process is called **saturation**. Water then returns to the atmosphere as an invisible vapour. When it is emitted from plant leaves, the process is called **transpiration**. Water vapour rises from the Earth’s surface when heated by the sun in the process known as **evaporation**. As the water vapour cools it condenses, usually on tiny particles of dust in the air, and collects to form clouds. We call this process **condensation**.

Procedure

1. Review the water cycle with the students.
2. Have the students stand up and reach high above their heads, then bring their arms down as they say “precipitation”. They should then touch the ground, saying “saturation”. Next have them raise their arms partway up as they say “transpiration” and the rest of the way up as they say “evaporation”. Finally, they should form a circle with both arms raised overhead, saying “condensation”. Do this slowly at first, then have them continue to do the cycle, gradually speeding up.

Discussion/Reflection

Refer to the handout, and lead the students into a discussion of the process.