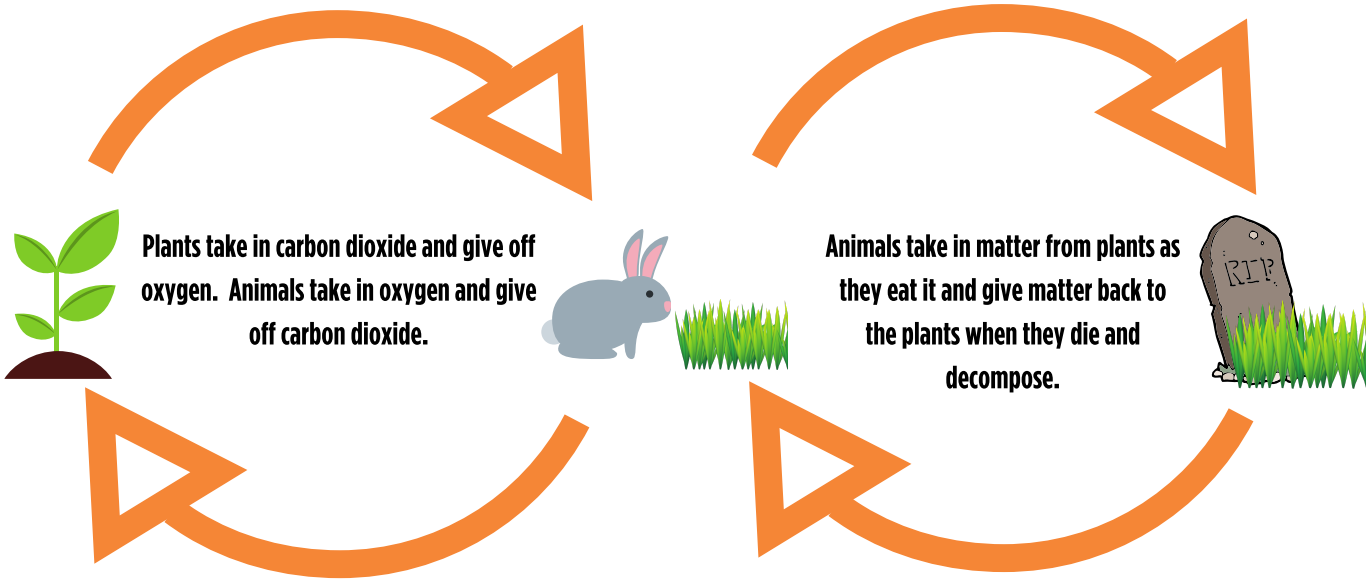
Movement of Matter in an Ecosystem

Non-living matter, such as air, water, and nutrients, are important for living things to survive.

All living things use non-living matter survive in their environments. For instance, plants use a gas, called carbon dioxide, sunlight, and water to grow and reproduce. Animals then eat those plants to grow and reproduce. The non-living matter that help plants survive also help animals to grow, move, and reproduce.

The movement of matter is also a cycle because non-living matter and living things are reused over and over again. For example, every time a new plant grows, it uses non-living matter (air, water, nutrients) from the environment to grow. Then, an animal eats the plant, transferring the matter to itself. When this animals eventually dies, organisms called decomposers eat the remains of the animal and release the matter that was in the animal back into the environment to be used by plants and other animals again.



Healthy ecosystems include non-living matter, like oxygen and sunlight, plants, and living matter, like grass, and animals.

Damaged Ecosystem

This ecosystem has been damaged by oil. Plants and animals are not healthy when they are covered in oil.

Technology and Equipment

Check out these examples of technology and Equipment that can help after an oil spill has occurred.

Containment booms can be used to help contain oil. Containment booms are large floats that go in the water and trap oil to stop it from spreading out.

Floating robots are able to clean oil off of the surface of the water. Some robots are pulled along by a boat, while others have their own motor.

Sand cleaners can take oily sand, remove the oil, and leave sand clean enough to go back on the beach.

Creating a Robot

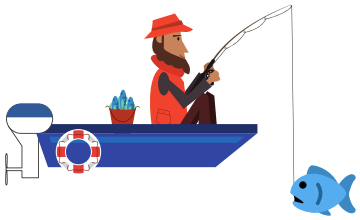
Step 1: Choose an ecosystem to monitor. Circle your choice.

Ecosystem #1

This ecosystem is home to seaweed, clown fish, tuna, and crabs.

Potential Problem: People are removing too many fish from the water.

Why this is a problem:



Fish are removed from the water.

Fish don't eat plants in the area, which means matter stops flowing from the plants to the animals.

Plants grow out of control.

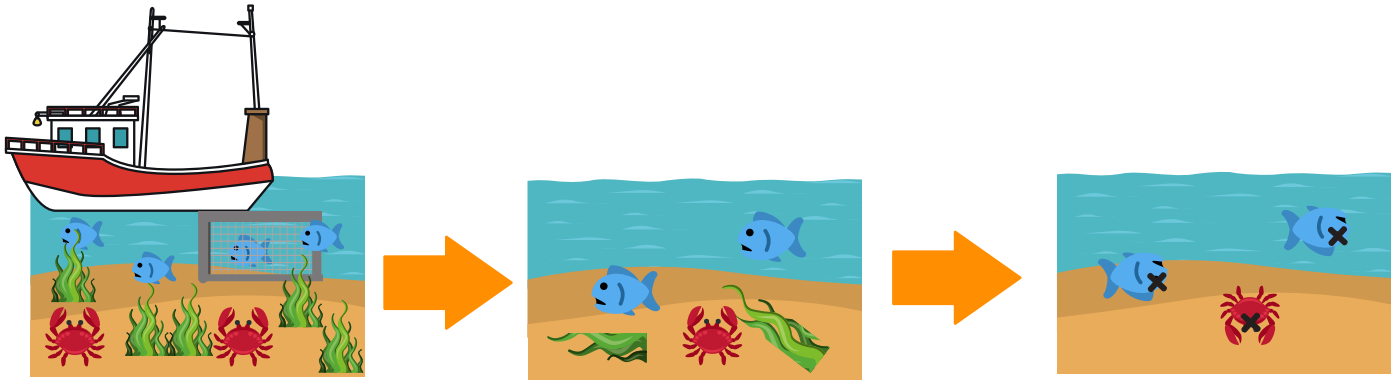
What could happen: The ecosystem can become out of balance because there are too many plants and not enough fish.

Ecosystem #2

This ecosystem is home to barnacles, seaweed, crabs, snails, and mussels.

Potential Problem: People are using machines, called ocean floor trawlers, that scrape along the ocean floor.

Why this is a problem:



People are using ocean trawlers, which are fishing nets dragged on the ground behind the boat.

Trawlers rip up and destroy plants so matter stops flowing from the plants to the animals.

Animals don't have enough food, so they might die and become extinct.

What could happen: The ecosystem can become out of balance because there are not enough plants to feed all of the animals in the ecosystem.

Step 2: Sketch a Picture of a Robot

You will design a robot that can determine whether there is damage in your ecosystem or not.

Your robot must:

- Have a way to alert oceanographers that something is wrong with the ecosystem. For example, your robot could send a text message to an oceanographer when plants are dying in an ecosystem.
- Take pictures or videos of the organisms in the ecosystem.
- Be smaller than the size of a shoebox.
- Count how many organisms of each species live in the ecosystem.
    - Oceanographers can use the data collected from the robot to figure out whether there are too many or too few of a species.

Sketch your robot in the box below. Label important parts.

Describe how your robot will determine if your ecosystem is damaged. What special features does your robot have that will allow it to determine whether there is damage in the ecosystem? Explain below:

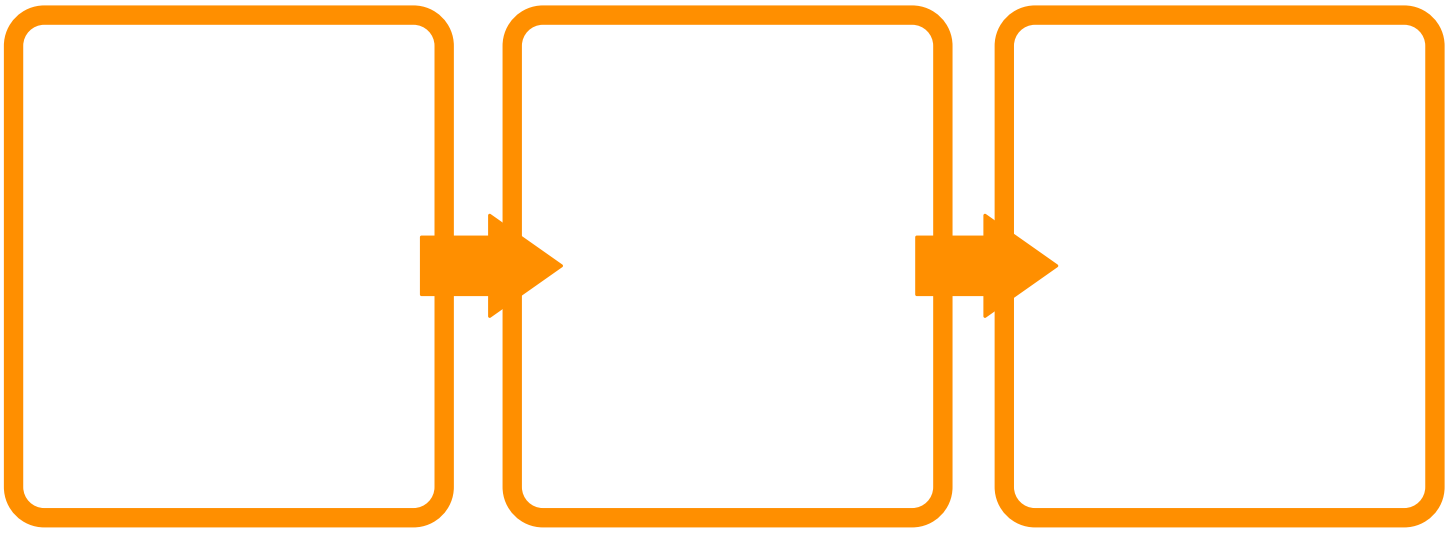
Step 3: Create Your Robot

Use art supplies to build your robot!

Creating a Diagram

Draw your healthy ecosystem after your robot fixed the ecosystem.

Identify each part of your healthy ecosystem below:



Non-living Matter | Plants | Animals