BirdBrainScience

Name_____

Period_____

Date_____

IT'S ALIIIIIVE

living, non-living, organism, cell

Cells Unit

I'm going to give you a list of words and I want you to tell me which of these things are alive, and which are not. Okay, here it is: dog, rock, people. If you picked "dog" and "people" you're right. I bet that question was too easy for you.

Why did you pick "dog" and "people" but not "rock"? What are some things that dogs and people do that make you think they are living? We know that dogs and people move around, eat food, breathe air, and grow. Since rocks don't do any of those things, they must not be alive.

Does something that is alive need to do all of those activities on your list? Plants do not walk, and very little babies and people who need to stay in a wheelchair can't walk, but I'm sure that you would consider them alive. That changes the list we made to explain why dogs and people should be considered living things. Let's make a new list of words that describe something that is alive: eat food, breathe air, and grow.

Food gives plants and animals the energy they need to grow and stay alive. Food also gives animals the energy they need to move around and think. You might feel too tired to play or run when you are very hungry because you do not have enough energy to do those activities. Trees and flowers definitely grow, but do they eat food? Sort of. Plants do not have mouths, so instead of eating like we do, they soak in water and other chemicals that they need from the soil. The water and chemicals that plants soak in help them make their own energy.

How do plants soak in the water and chemicals? The next time you take a shower or wash the dishes, place a dry sponge at the bottom of the tub or sink. At the end of the shower, or when you are done cleaning, look at the sponge. I bet you'll see that it has soaked up a lot of water. The roots of plants do the same thing. Plants can then use the water and chemicals that they soak up to make the energy they need to grow.

Now let's talk about breathing. People and animals use their nose and mouth to breathe in air. How do you think plants breathe in air, since they do not have a nose or mouth? Underneath a leaf from a flower or tree there are teeny, tiny holes. These holes are where air goes in and comes out.

Not everything alive breathes, though. There are living things at the bottom of the ocean that live near underwater volcanoes. The water there is so hot that people would die if they swam up to these living things. These creatures don't stay alive the same way as plants and animals. Instead, they use the energy from the heat to get the energy they need to stay alive. Now it's getting harder to say what it means to be alive. We think that to be **living** means you need energy, work to stay alive, and that you grow.

We have decided that in order for something to be considered alive, it needs to use energy, work to keep itself alive, and grow. That means we can say that if something does not need energy, does not work to keep itself alive, or does not grow, it is not alive. A rock does not need energy, it does nothing to protect itself or stay as a rock, and it won't grow--no matter how much you try to feed it. We can call things that are not alive **non-living** things.

Scientists call anything that is living an **organism**. If anything that is living is called an organism, that means that animals, plants, and people are all organisms. The next time you hear a dog barking, you can say "The organism is barking." If you say that, the people around you will think that you are super smart!

All organisms are made up of small pieces called **cells**. Have you ever played with a puzzle? You can think of the puzzle as the organism and all the puzzle pieces as cells. Since you are an organism, you are made up of cells. However, just like those holes that are underneath leaves, your cells are super-duper tiny and much too small to be seen without using a microscope.

Does everyone in a school do homework, teach, serve lunch, and drive the bus? No, of course not. Each person has a different job or task. In a school, students learn, teachers teach, the lunch staff serves lunch, and the bus driver drives the bus. When everyone has their own job to do, they can put all of their energy and time into doing that job. You might not do as well on your classwork if you had to spend time serving

lunch or driving the bus too.

Your body divides up the work of living just like people divide up the work of running a school. Each task is given to an organ. The heart pumps the blood, the lungs bring air in and out of the body, and our brains think. Since each of these organs has a different job, they need to be made up of different cells. The cells of these organs are slightly different from each other because they need to do different tasks. However, they are still called cells. If you are confused, think about people. Even though people can be tall or short, funny or serious, we still call them all people.

What have we learned today? We learned that almost all living things breathe, grow, and need energy. There are a few organisms that do not breathe, but we can talk about them later. We also learned that all living things are called organisms, and all organisms are made up of tiny cells. Finally, we learned that there are many different types of cells, and that they all do a different job for our body.

Name: _____

Living and NonLiving Things

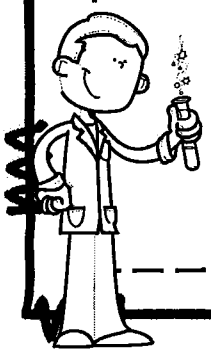
Interacting to meet their needs

Part 1 – Directions: ~~Select three ecosystems that we have studied~~ Read the Tundra ecosystem. In each box, select one living and one non-living thing and describe how they interact to meet their needs.

Ecosystem: Living Thing: Non-living thing: How they interact to meet their needs:	Ecosystem: Living Thing: Non-living thing: How they interact to meet their needs:	Ecosystem: Living Thing: Non-living thing: How they interact to meet their needs:

Part 2 – Directions: Using the same three ecosystems from above, select a living thing and a living thing and describe how they interact to meet their needs.

Ecosystem: Living Thing: Living Thing: How they interact to meet their needs:	Ecosystem: Living Thing: Living thing: How they interact to meet their needs:	Ecosystem: Living Thing: Living thing: How they interact to meet their needs:



Name: _____

Animals Change Their Environment

Part 3 – Directions: Select three animals, one for each box below, from any ecosystem we have studied and describe how they change or modify their environment.

Ecosystem: Animal: Change to environment:	Ecosystem: Animal: Change to environment:	Ecosystem: Animal: Change to environment:

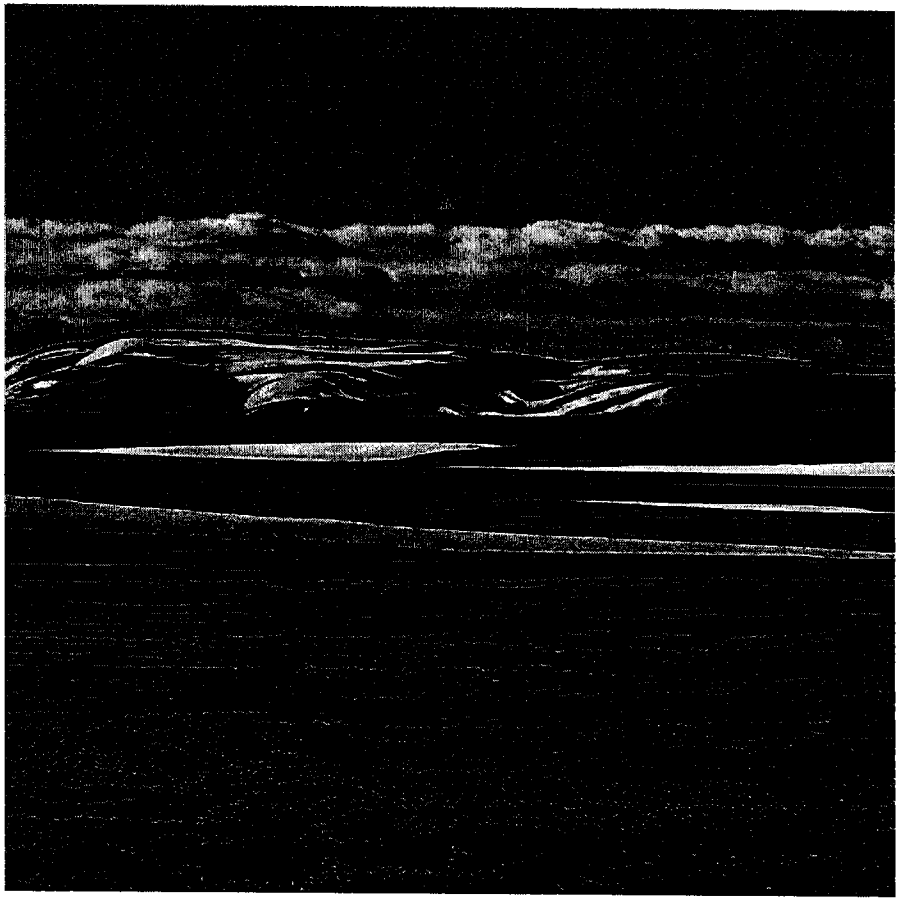
Roles of Organisms In Their Environment

Part 4 – Directions: Select three different organisms from a Coastal Wetland Ecosystem. List up to 3 possible roles that each organism has in the ecosystem.

Animal or organism: Role 1 – Role 2 – Role 3 –	Animal or organism: Role 1 – Role 2 – Role 3 –	Animal or organism: Role 1 – Role 2 – Role 3 –

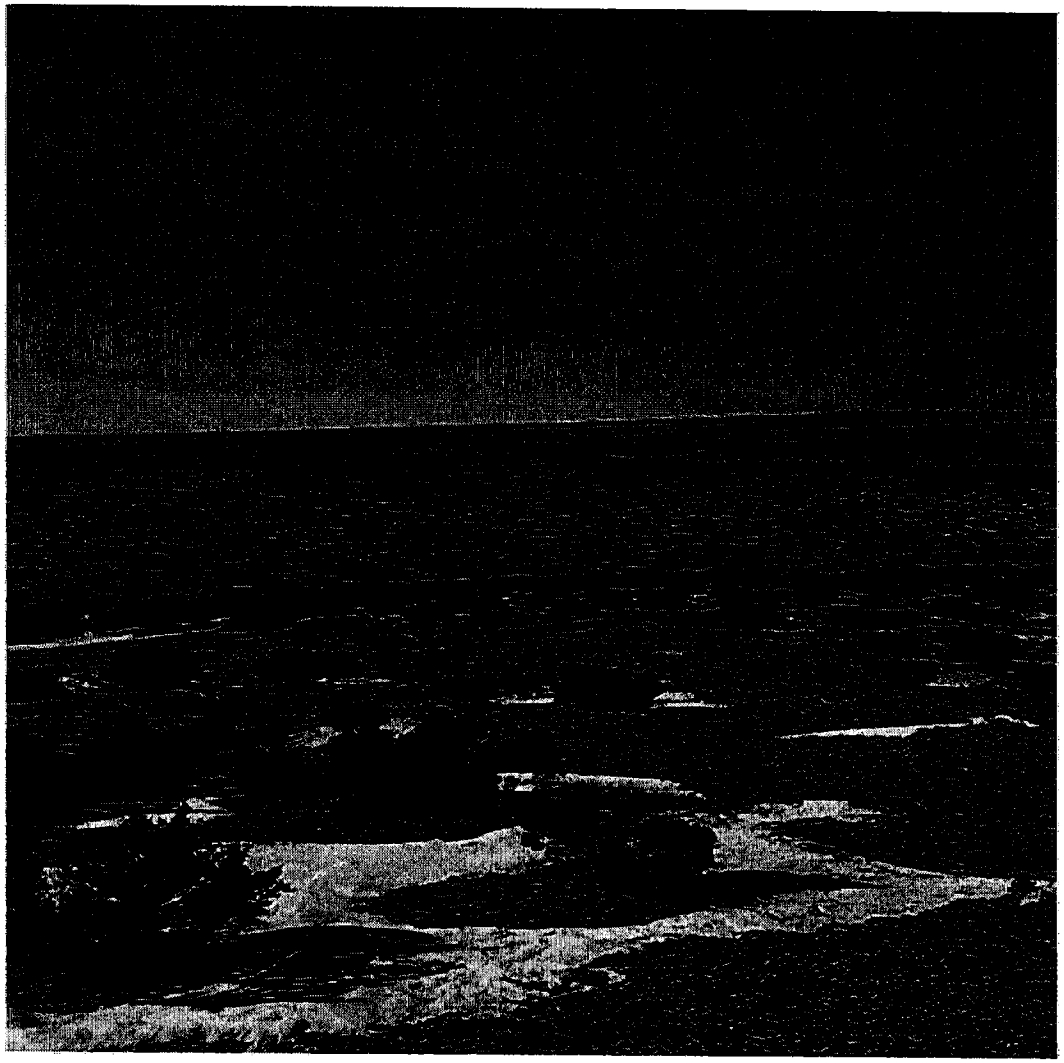
Discovering the Tundra Biome

- Welcome to the Tundra Biome!
- Students will be able to define "Tundra" and locate it on a map.
- Students will be able to identify key plant and animal life in the tundra.
- Students will be able to explain the adaptations of tundra organisms.



Welcome to the Tundra Biome

- Coldest biome, low temperatures, little precipitation
- Treeless, short growing season
- Permafrost: permanently frozen soil layer
- Simple vegetation: mosses, lichens, grasses, shrubs
- Animals: Arctic fox, caribou, polar bear, snowy owl



Tundra Climate: Cold, Dry, and Windy

- Extremely cold climate, with long, harsh winters and short, cool summers.
- Low precipitation levels, comparable to a desert.
- Strong winds, further lowering the effective temperature.
- Short growing season, limiting plant growth.
- Permafrost layer prevents deep root penetration.

Tundra Locations

- Primarily located in the Arctic Circle.
- Also found in high-altitude alpine regions.
- Examples include Alaska, Northern Canada, Greenland, Russia, and Scandinavia.
- Covers about 20% of the Earth's land surface.

Tundra's Unique Animal Life

- Harsh conditions require unique adaptations for survival.
- Mammals like Arctic foxes, caribou, and polar bears have thick fur and blubber for insulation.
- Birds like snowy owls have keen eyesight and sharp talons for hunting.
- Insects like mosquitoes thrive in the brief summer, providing food for birds.
- Fish like Arctic char play a crucial role in the aquatic food web.

Tundra Producers: Hardy and Resilient

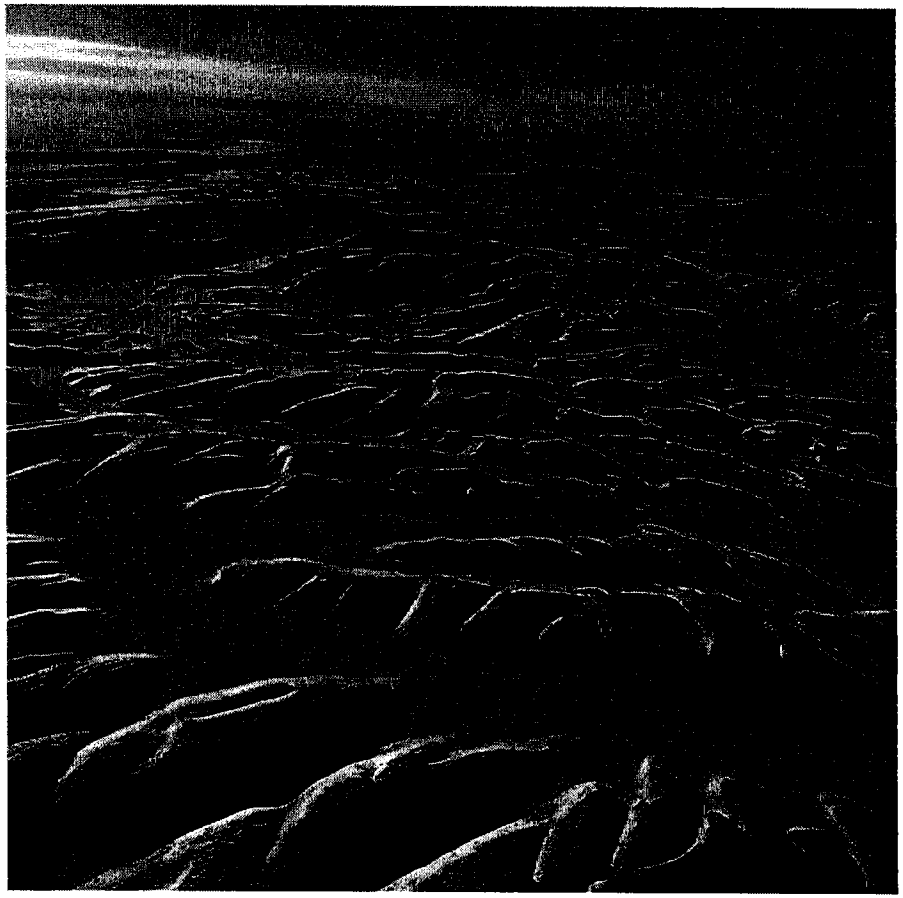
- Tundra's primary producers are lichens, mosses, grasses, and shrubs.
- These plants have adapted to the cold, dry climate and short growing season.
- They are low-growing and have shallow root systems due to permafrost.
- Some plants have hairy stems and leaves to trap heat and reduce water loss.
- Many plants reproduce asexually or through wind pollination.

Abiotic Factors of the Tundra

- Primarily located in the Arctic Circle and high-altitude alpine regions.
- Extremely cold climate, with long, harsh winters and short, cool summers.
- Low precipitation levels, comparable to a desert.
- Strong winds, further lowering the effective temperature.
- Short growing season, limiting plant growth.
- Permafrost: permanently frozen soil layer, prevents deep root penetration.

Tundra's Global Importance

- Source of valuable resources like oil, gas, and minerals.
- Home to indigenous communities with unique cultures and traditions.
- Critical role in regulating global climate patterns.
- Provides habitat for diverse wildlife, including migratory species.
- Offers opportunities for scientific research and education.



Recent Tundra Discoveries

- Warming temperatures causing permafrost thaw.
- Thaw releases greenhouse gases, impacting climate.
- Changes in plant and animal life distribution.
- New species colonizing, others disappearing.
- Infrastructure damage due to shifting ground.

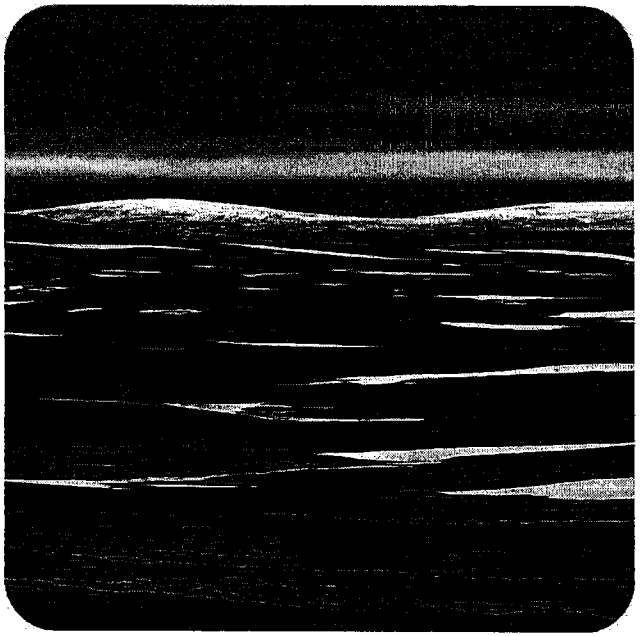
Human Impacts on the Tundra

- Oil, gas, and mineral extraction disrupts habitats.
- Pollution from industrial activities harms wildlife.
- Climate change accelerates permafrost thaw and alters ecosystems.
- Infrastructure development fragments habitats and disrupts migration routes.
- Overhunting and overfishing deplete wildlife populations.

Fun Facts About the Tundra

- Lemmings don't jump off cliffs in mass suicides - it's a myth!
- The word "tundra" comes from the Finnish word "tunturia," meaning treeless plain.
- Mosquitoes can grow twice as large in the tundra due to the short summer season.
- Caribou have hollow hairs that help them stay afloat in water and provide insulation.
- The tundra is home to the world's largest land predator, the polar bear.

Let's Discuss: Tundra Biome



- What is the most interesting thing you learned about the tundra?
- How do plants and animals survive in such a harsh environment?
- What are the biggest threats to the tundra biome?
- How does climate change affect the tundra and its inhabitants?
- What can we do to protect and preserve the tundra?