

Diversity of Living Things

Materials:

- Red & Blue Play-Doh
- 5 copies each of blood smears for an: amphibian, mammal, reptile, bird, fish.
- 5 copies each of a photo of an: amphibian, mammal, reptile, bird, fish.

Introduction:

1. What do scientists do?
2. Where do you find scientists?
3. What is a scientist? What is a biologist?
4. How does this type of science affect your life? What about other types?

Things on Earth:

1. Can you list some living and non-living things? *Try to get things like water and soil into the discussion as non-living.*
2. Today we will be discussing 5 Major Types of Life. *Have them try to guess the 5 kingdoms; should get plants and animals, may have the help with monera, protista, and fungi.*
3. Can you guess how many types of creatures there are on Earth? *Roughly 10 billion.*
4. All Living Things: *List gets more specific as you go down. Try to offer examples of the more obvious ones such as Kingdom, Class, Family, and Species*
5. All Non-Living Things: *Go through and explain why each of these is not alive, but important for living things anyhow.*

Kingdoms Breakdown:

1. Have students try to name as many of the pictures as possible. Try to have some idea of their function as the students may be curious.
 - a. Animals: *Towering sponge, wild turkey, ladybug, humans*
 - b. Plants: *Rose, moss, algae, palm tree*
 - c. Fungi: *Mushrooms, yeast, mould*
 - d. Protista: *Planaria, amoeba, giardia (causes beaver fever), euglena*
 - e. Monera: *Bacillus, coccoid, cyano bacteria*

The Diverse Animal Kingdom:

1. Do you know some of the major animal groups? *Fish, birds, mammals, reptiles, amphibians.*

2. What sorts of characteristics do these animals have? *These are all vertebrates; they all have a backbone and are highlighted in blue in the next slide.*

Animal Kingdom Groups:

1. Go through the **invertebrates** briefly to familiarize students with the concept (highlighted in green). Point out more familiar creatures to make the connection (jellyfish, earthworms).

How Can We Distinguish?

1. What are some differences between the Animal Kingdom Groups?
 - a. Skeleton: *Some creatures have an internal skeleton, while others (insects and crustaceans primarily) have an exoskeleton to support them.*
 - b. Hearts: *The number of hearts an animal has differs; fish have two chambered-hearts, reptiles and amphibians have three chambers and mammals have four.*
 - c. Body Temperature: *Some animals are cold-blooded and some are warm.*
 - d. Red Blood Cells: *Are different in form and function depending on the animal.*

Blood!

1. The 6 functions of blood:
 - a. Carries oxygen from lungs (or gills, skin) to tissues
 - b. Carries carbon dioxide from tissues to lungs (or gills, skin)
 - c. Protection from disease
 - d. Moving nutrients through the body to feed tissues
 - e. Moving hormones through the body
 - f. Some blood components produce a natural “patch kit”
2. What molecule lets blood cells carry oxygen? *Haemoglobin*

Blood Activity:

1. Split the class into five teams, and hand out a large piece of both blue and red Play-Doh to each group to be shared.
2. Have them make models of the human blood cells.
3. Ask them to describe the shape: *Two (bi) inward dents (concave) on a disk... Biconcave disk.*
4. Why did we give you both red and blue Play-Doh? *The red illustrates blood with oxygen attached to the haemoglobin, while blue represents blood without. Have students look at their veins and show them that they have blue blood too. If*

people aren't getting enough oxygen, that's why their lips appear blue. Explain that when we have cuts, the air bond to any blood making it red right away!

What Does Blood Do?

1. Here you can take up the 6 functions of blood while students are handling their blood cells.

Who Examines Blood?

1. This is a chance to promote science as a possible career path for students who are interested in things like biodiversity.

What if YOU Were the Examiner?

1. What would you look for?
 - a. Parasite in blood: *First picture is malaria, second is sleeping sickness.*
 - b. Shapes of red blood cells: *Third picture is sickle cell disease, where cells are deformed and can't carry oxygen.*
 - c. Unusual cellular bodies or crystals: *Howell-Jolly bodies are in the fourth picture.*
 - d. Blood chemistry: *Talk about abnormal levels*
 - e. Cell counts: *We need a certain amount of white and red blood cells in order to function properly.*

Comparing Vertebrates Activity:

1. Hand each group a picture of five different vertebrates and five different blood smears.
2. Ask them what differences they see between the cells. *Size, spread, shape, nucleus's size and shape.*
3. Let them make an initial guess of which cells go with which animal.

Refining Our Guess:

1. Go over the ways that each of cell smears are different, and explain that these have to be different to help the animals all do very different things.

Hints:

1. Let students swap their answers around one more time as you read the hints, then go through your final correct arrangement with them and see who managed to get it.