S.E.A. AQUARIUM
EDUCATOR
RESOURCES

PRIMARY SCHOOL

Introduction to Classification

Introduction to Classification

This ***Introduction to Classification*** resource aims to support educators teaching Science at Primary 3 and 4 levels. The topic of this resource is *Diversity of living and non-living things* and is recommended to be used as a pre-introduction to classification.

This resource will illustrate to students that living things can be organised into groups in many ways based on their similarities. Students will learn about the importance of classifying things and broaden their knowledge about the diversity of aquatic animals.

Target Group: Primary 3 & 4

Duration: 35 – 45 minutes

Learning Objectives:
- Define and explain *classification*
- Identify different ways to classify things
- Recognise the importance of classifying living things

Required Resources:
- Corresponding *Introduction to Classification* slides
- Flipchart papers
- Markers

Note for educators: Educators may choose to skip ***Brainstorming Activity.***

Introduction

<u>Slide 2:</u>

Begin the lesson by asking students, "What do you know about classification?" Accept all answers and encourage students to explain their answers to have an idea of students' understanding of classification.

Proceed to define and explain classification to students. Classification involves grouping items into one or more categories based on certain distinguishing characteristics. The categories are thoughtfully labeled so that the labels become descriptors for the members of the category.

Brainstorming Activity

<u>Slide 3:</u>

Engage the students in a brainstorming session. Get them to classify the buttons, as shown on the slide, into various categories. Educators are encouraged to record down the responses on the whiteboard.

<u>Slides 4-5:</u>

Review the categories recorded. Conclude that there are actually numerous ways to classify items and classification is dependable on the type of information we require.
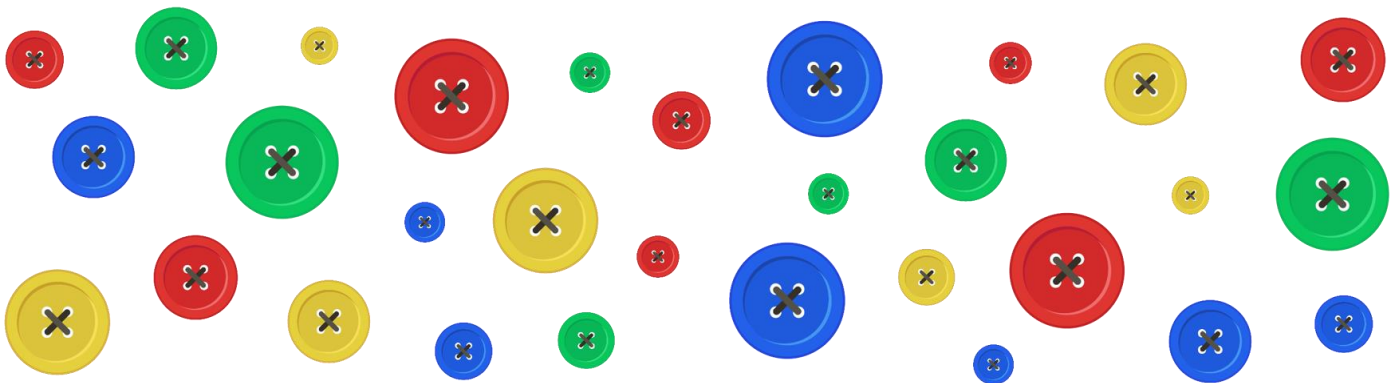
Possible categories:
- Size of buttons
    - Extra small, small, medium, and large
- Colour of buttons
    - Red, yellow, blue and green

Group Activity: Let's Classify!

Educators may also refer to the *Appendix* for more information.

Preparation:

Divide students into groups of 4-5 students. Distribute flipchart papers and markers to each group.

Activity Details:

Show students 8 different aquatic animals on slide 7. Students are to classify these aquatic animals shown in as many different ways as possible. Students are also encouraged to record down their classification methods and categories on the flipchart papers provided.

End of Activity:

Round up the class to discuss how each group have classified the aquatic animals. Prompt students with the following questions:

➢ What are some characteristics that helped you to decide which group an aquatic animal belongs to?
➢ Did any of the aquatic animals fit into more than one group? Why or why not?
➢ Do you think classification helps us to have an easier life? Why or why not?
➢ Why do you think scientists use classification when they are studying things?

(Answers may vary. Encourage students to explain their answers.)

Importance of Classification

Slide 10:

Classification allows us to better understand the relationship among things. It helps us to make sense of the world around us, whether it is classifying objects or living things. This facilitates studying and sharing information about living things.

<u>Appendix</u>

<u>Additional Information for Educators</u>

Group Activity: Let's Classify!

Clownfish	Manta Ray	Blue Tang	Hammerhead Shark
Stingray	Sea Star	Dolphin	Poison Arrow Frog

Possible classification groups:

Big	Small
Manta Ray	Sea Star
Stingray	Clownfish
Dolphin	Poison Arrow Frog
Shark	Blue Tang

Dully-coloured	Brightly-coloured
Manta Ray	Sea Star
Stingray	Clownfish
Dolphin	Poison Arrow Frog
Shark	Blue Tang

Has fins	Does not have fins
Manta Ray Stingray Dolphin Shark Clownfish Blue Tang	Sea Star Poison Arrow Frog

Has gills	Does not have gills
Manta Ray Stingray Shark Clownfish Blue Tang	Sea Star Poison Arrow Frog Dolphin

Fish	Not a fish
Shark Stingray Manta Ray Clownfish Blue Tang	Sea Star Dolphin Poison Arrow Frog

Mouth on the underside	Mouth not on the underside
Hammerhead Shark Stingray Sea Star	Dolphin Poison Arrow Frog Clownfish Blue Tang Manta Ray

Consumed by humans beings	Not consumed by human beings
Stingray Hammerhead Shark Dolphin Manta Ray Sea Star	Clownfish Blue Tang Poison Arrow Frog

Carnivore	Omnivore
Stingray	Clownfish
Hammerhead Shark	Blue Tang
Dolphin	Sea Star
Manta Ray	
Poison Arrow Frog	

Has a tail	Does not have a tail
Manta Ray	Sea Star
Stingray	Poison Arrow Frog
Dolphin	
Shark	
Clownfish	
Blue Tang	

Animal Information:

Sea Star

Commonly known as "starfish", these animals are in fact not a type of fish! They belong to a group of animals called echinoderms, meaning "spiny skin" in Greek. Sea urchins and sea cucumbers also belong in this group.

Sea stars have eyespots at the end of each arm which are used to detect light. Most sea stars have five arms, although some species can grow as many as 50 arms!

The mouth of a sea star is on its underside and its diet includes shellfish, algae and coral. To feed, the sea star extends its stomach out of its mouth over its food, secreting a digestive fluid to break it down before absorbing the nutrients.

Poison Arrow Frog

Poison arrow frogs are amphibians. They are considered to be one of Earth's most toxic species. These frogs are named after the use of their poison by Central and South American Indians on the darts/arrows during hunts.

Poison arrow frogs are usually brightly-coloured. These colourful appearances warn potential predators that they are highly toxic. Just like many frogs, poison arrow frogs feed on a variety of small insects. Scientists believe that the toxicity of these poison arrow frogs are due to their diets.

Shark

Sharks are a type of cartilaginous fish and there are over 400 species of sharks around the world. The largest shark in the world is the whale shark, with the longest length recorded as 12.65m! In comparison, the smallest shark is the dwarf lantern shark which can grow up to 21.2cm.

Hammerhead sharks use their "hammer" head to pin down their prey and their wide-set eyes give them a better visual range than many other sharks.

Sharks have the unique ability to pick up electrical currents in the water using an organ called the Ampullae of Lorenzini found around their snout/facial area (appear as small black dots). This allows the shark to pick up any muscle movement from their prey despite being unable to see them.
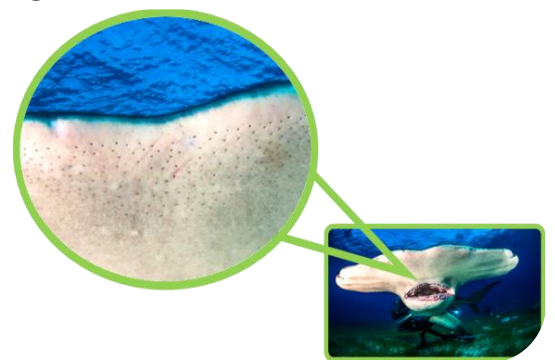
Clownfish

Clownfish are all born as males and can change their gender to female at some point in its lifetime. It is usually the largest male that will change into a dominant female.

Clownfish have a mutualistic symbiotic relationship with sea anemones. In return for a safe and protective home in the sea anemones, the clownfish benefits the sea anemones by defending them from predatory fish, keeping them parasite-free, and providing nutrients in the form of waste. Clownfish do not get stung by the stinging cells of sea anemones as they have a thick mucus covering that protects them.

Blue Tang
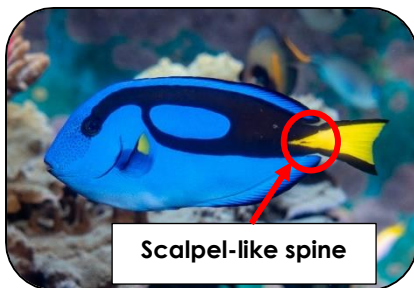
Scalpel-like spine

The blue tang is a type of surgeonfish, a group of fish named for scalpel-like spines on their sides of the body. The blue tang uses these spines to defend itself against predators. When erected, these sharp spines make the blue tang harder to be swallowed by predators.

The blue tang reproduces through broadcast spawning, where females release thousands of eggs while males release clouds of sperms into the water column at the same time. The sheer number of suspended eggs and sperms increases the likelihood for eggs to be fertilised and developed into juvenile fish.

Stingray
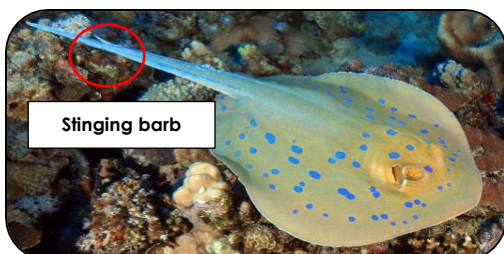
Stinging barb

Stingrays are a group of cartilaginous fish related to sharks. Stingrays can have one or more stinging barbs on their tail which they use for self-defence, and in some species these barbs are venomous.

The stingray's coloration usually resembles that of the seafloor, allowing it to camouflage from predatory sharks and larger rays. Stingrays prey on
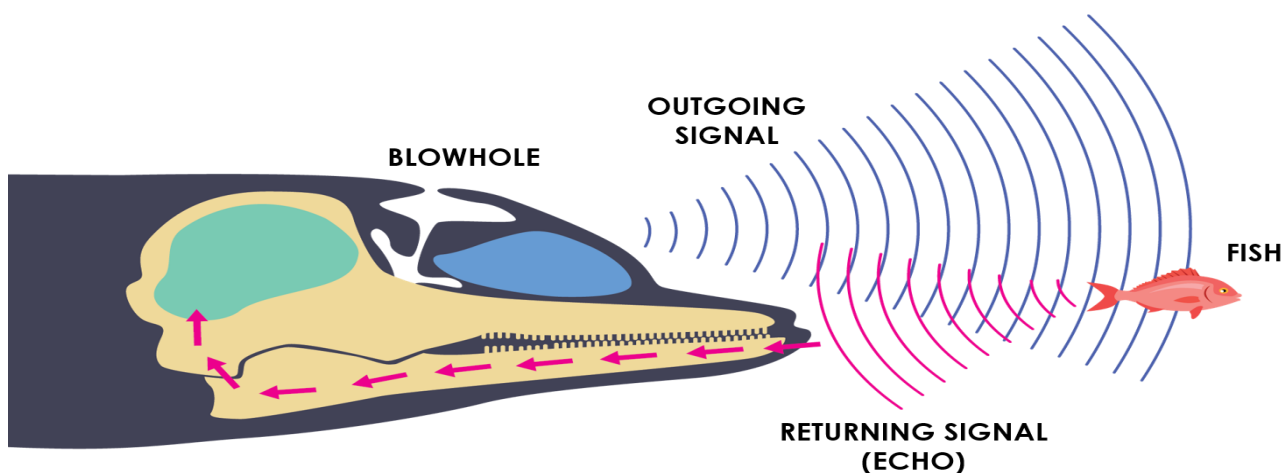
mollusks such as clams, oysters, and mussels, and possess strong jaws that to crush the shells of their prey.

Dolphin

Dolphins are mammals that are well-adapted to life in aquatic environments. Their streamlined bodies allow them to swim swiftly while they use their flippers for steering.

Dolphins make use of their echolocation abilities to hunt, navigate, and avoid predators underwater. They do so by producing sounds in the form of clicks and whistles through phonic lips underneath their blowholes. These sounds are pass through the melon (a mass of fatty tissues) in their forehead, which enables them to project the outgoing sound waves.

These sound waves then bounce off objects in water in the form of echoes, which are picked up by the lower jaw of the dolphins, and conducted to the ear and brain to be interpreted.

Manta Ray

Manta rays are cartilaginous fish that have a rod-like tail. Unlike stingrays, they do not possess stinging barbs on their tails.

Manta rays are gentle giants in the ocean as they feed on the tiniest organisms – plankton. These filter feeders filter out plankton from the water using gill rakers in their gills and can consume 20 to 30kg of plankton each day.

Manta rays are often victims of bycatch as they get caught unintentionally by fishing lines and in nets. When this happens, manta rays may die from their injuries or from the lack of oxygen due to the inability to swim.