Name:…………………………………..

‘Fragments of hope’ learning programme

Explorer

Workbook



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**A1. What is a coral reef?**

1. Do you think a coral is a plant or an animal? Circle either *plant* or *animal*.

*Task:* You are going to make an edible coral polyp!

You will need: a section of banana; sour candy straws; sugar sprinkles (same colour as the sour candy straws); jam; a round cracker or biscuit; some crinkly crackers or crisps; a plastic or paper plate; a straw and a toothpick (or similar) to make holes.

Make a hole (*the mouth*) in the top half of the banana section with a straw. The bottom half has no hole (*the gut*). Make six holes with a toothpick around the mouth. Push 6 candy straws (*the tentacles*) into the holes around the mouth. Add sprinkles (*zooxanthellae*) to the banana. Stick the banana on to a round cracker or biscuit (*the substrate* - the surface the coral polyp lives on) with jam. Add crinkly crackers or crisps around the base (*the calcium carbonate skeleton*).

There are many types of coral polyps. Draw your coral polyp. Label the mouth, gut, tentacles, zooxanthellae.

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Coral polyps fuse (join) their skeletons together and form large coral colonies. These fused polyps are the basis for coral reefs. You can fuse (join) your coral polyps to other learners’ coral polyps and add more crinkly crackers to make a coral colony.

Coral polyps reach their tentacles out from their skeleton to feed and bring them back into the skeleton for protection. Coral colonies can look very different depending on whether these tentacles are in or out. When coral polyps die, the calcium carbonate skeleton stays intact. You can often find pieces of white coral, the remains of former coral colonies, washed up on tropical beaches.

The tentacles bring food into the animal’s one opening, which is used both to take in food and to get rid of waste matter.

Zooxanthellae are marine algae, some of which live inside the tissue of corals. Both the coral and the algae benefit from this relationship.

If coral is affected by an environmental stress such as increased temperature, the zooxanthellae leave the coral, and the coral turns white. This is called ‘coral bleaching’. The coral will then slowly starve. Coral bleaching can be deadly for the coral if the coral polyps do not get any more zooxanthellae. Coral bleaching is a big concern as sea surface temperatures rise due to climate change. You are going to hear a lot more about this!

What do we know about plants and animals?

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| --- | --- |
| **Plants** | **Animals** |
| Use the sun’s energy to make food | Cannot produce their own food from the sun and must eat other organisms to get food and energy |
| Have roots, stems and leaves | Do not have roots, stems and leaves |
| Do not move from one place to another | Can move to catch food |
| Have chlorophypll in their cells to capture light energy | Do not have chlorophypll in their cells |
| Their cells have walls | Their cells do not have walls and are more flexible and variable in shape |

Let’s ask the question again. Have you changed your mind?

1. Do you think a coral is a plant or an animal? Circle either *plant* or *animal*.

A coral is an animal. It eats other organisms by capturing them with its tentacles. It does not have plant parts. It cannot make food from the sun’s energy without the help of zooxanthellae.

**A2. Belize – the country.**

*Task:* Either search on the internet, use an atlas or research in a book to find where in the world Belize is located. Then find out information about Belize and create a fact sheet about Belize, by colouring in the flag and filling in the gaps.

|  |  |
| --- | --- |
| **Belize**(also known as the “Jewel in the heart of the Caribbean basin.”)The Belize flag:A black and white flag with two men holding axes  Description automatically generatedBelize is bordered by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the north, the Caribbean Sea to the east, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the west and south. The official language is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. More than 90% of the people of Belize can read, and most can speak three languages: English, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.The capital is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.Belize has a \_\_\_\_\_\_\_\_\_ kilometres of coastline.The national flower of Belize is the black \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.Belize is a land of mountains, swamps, and tropical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. There are more than 450 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and islets on the Belize barrier reef, the world's second longest. Belize's islands are known as cayes, pronounced "keys”. Mangroves border much of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and cayes of the country and form a vital part of the natural ecosystem. The Belize Coral Reef System holds more than 500 types of \_\_\_\_\_\_\_\_\_\_\_ and is a UNESCO World Heritage Site.

|  |
| --- |
| fish islands Guatemala English 280 Mexico Spanish Belmopan jungle coastline Creole orchid |

 |

**A3/4. The Belize Coral Reef System.**

The Belize Coral Reef System is the second longest barrier reef in the world.

1. Where do you think the world’s longest barrier reef is?

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1. What is the world’s longest barrier reef called?

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*Task:* Visit The Earth Museum’s Belize Coral Reefs map and explore the Belize coastline.

There are more than 450 islands and islets on the Belize barrier reef. Belize's islands are called **cayes**. When we say the word ‘cayes’, it sounds like "keys”.

Placencia is a village and beach resort on the Caribbean coast of Belize. It is at the southern tip of the Placencia Peninsula. Find the Placencia Peninsula and explore the cayes nearby.

*Task:* Find out what the Belize coastline looks like by watching films at these places:

Dale’s Reef

Silk Caye

Inner Cayes

Laughing Bird Caye

*Task:* Imagine you are visiting one of the cayes on the Belize coastline. Either describe or draw what you might see.

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*You need to be an exploration team of 3 – 5 young people.*

*Task:* Imagine that you are going to explore a barrier reef. In your team, discuss and answer these questions (write down your answers here):

1. What will you need to find your way around the coastline and the coral reefs?

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1. What would you hope to see there (animals, plants)?

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1. What dangers might there be (weather, animals, water)?

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1. How can you keep yourself safe?

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1. How can you keep the marine environment safe when you are exploring it?

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1. How will you record the information you have found?

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*Task:* Choose a spokesperson for your team who will share your team’s thoughts with the class. Discuss the answers to these questions as a class and make any more notes here:

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Task: Working on your own, you are going to create an ‘Explorer’s Guide the Belize Coral Reefs’. Use the internet to help you!

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| --- | --- | --- | --- | --- |
| The Explorer’s Guide to the Belize Coral Reefs

|  |
| --- |
| You will need: |

|  |
| --- |
| Look out for: |

|  |
| --- |
| Safety tips: |

|  |
| --- |
| Always leave rocks, plants, coral and other natural objects as you find them. |

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**A5/6/7/8. Animals and plants living in the Belize Coral Reef System.**

*Task:* Explore The Earth Museum’s Belize Coral Reefs map and find out which animals live in the Belize coral reefs. Make a note of the names of the animals you see:

|  |
| --- |
|  |

*Task:* Enjoy the ‘More Corals – More Fish Colouring Book’! Make a note of what you have learned:

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| --- |
|  |

*Task:* Take a look at the ‘Identification Guide to Common Sharks and Rays of the Caribbean’. List some of the ways that common sharks and rays of the Caribbean can be identified:

|  |
| --- |
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*Task:* Imagine you are exploring the Belize coral reefs. You are looking to identify and group which plants and animals live there. You need to ask questions about the characteristics of these living things to help you to sort them.Complete the ‘How to…’ guide for identifying and grouping plants and animals that live in Belize coral reefs by asking four more questions:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| How to identify and group plants and animals that live in Belize coral reefs

|  |  |  |
| --- | --- | --- |
|  | Is it a plant? | Is it an animal? |
| How big is it?What colour is it?Where does it live (its habitat)? |  |  |
| Does it swim?Has it fins?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  |

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*You are now working again with your exploration team of 3 – 5 young people.*

*Task:* After listening to all or part of Camille Saint- Saëns ‘Carnival of the Animals’ and identifying the animals by the movements portrayed in the music, your team will compose and perform a piece of music which portrays the movements of animals living in Belize coral reefs. Listen to each teams’ performance. Record your team’s piece of music.

1. Which animals can you hear in each team’s music?

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Still in your teams, select and use a range of materials and textiles to make either: a Belize coral reef in a box; or a Belize coral reef mural.

1. Describe your team’s coral reef:

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**A9. What do all living things need to thrive?**

1. Name one thing that all living things need to survive:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Plants and animals both need water, air, food, and shelter to survive. Plants need different types of shelter than animals. The plant's home is in the soil where their roots take hold and grow. Plants need sunlight to survive, and they also use sunlight to make their food.

*Task:* Sit in a circle. You are going to pass a pine cone around the circle. If you hold it too long it will get too hot to handle so you need to pass it on quickly. It will cool down once it is in the hands of another learner. When you have the pine cone, name an animal. See how many animals your class can name!

*Task:* Choose one animal and research how that animal survives.

1. What does your chosen animal eat?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Where does it make its shelter? What is its habitat?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Where will it find water?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Animals and plants that are better adapted to their environment are more likely to survive. If conditions are suitable then a plant or animal will thrive.

Remember that people are animals! We also need water, air, food and shelter to survive but what do we need to thrive?

1. List what you need to thrive (think about mental and physical wellbeing as well as basic needs):

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**A10. What does a coral reef need to thrive?**

Corals depend on the zooxanthellae that grow inside of them for oxygen and other things. Algae are plants. Plants need sunlight to survive.  Zooxanthellae need sunlight to survive, so corals do too.

Corals need to be in shallow water where the sunlight can reach them. They rarely thrive in water deeper than 50 metres. The water also needs to be clear to let the sunlight through.

Corals generally live in water temperatures of 20–32° C. They have tolerance to a very narrow temperature range.

Corals are sensitive to pollution and sediments. Sediment can create cloudy water and be deposited on corals, blocking out the sun and harming the polyps. Waste water discharged into the ocean near the reef can contain too many nutrients that cause seaweeds to overgrow the reef.

Corals need saltwater to survive and require a certain balance in the ratio of salt to water. This is why corals don’t live in areas where rivers drain fresh water into the ocean.

*You are now working again with your exploration team of 3 – 5 young people.*

You are going to produce a short film about a thriving coral reef. Use your team’s coral reef mural or coral reef in a box. You are going to show viewers which animals live in your team’s coral reef and explain to viewers why your team’s coral reef is thriving.

*Task:* Prepare what you are going to include in your film by completing this table:

|  |  |
| --- | --- |
| Which animals are in your coral reef? |  |
| What is the temperature of your coral reef? |  |
| How deep is your coral reef? |  |
| How clear is the water in your coral reef? |  |
| Why is your coral reef thriving? |  |

Add your team’s piece of music to your film.

Name:…………………………………..

‘Fragments of hope’ learning programme

Explorer

Certificate of Achievement



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