



The Undiscovered Island

Learning Resource for KS1 & KS2

**INVENT
& MAKE**

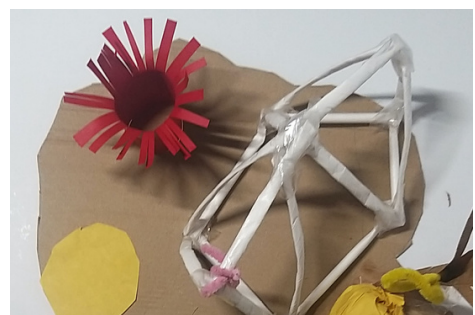
Your own
Imaginary
Island

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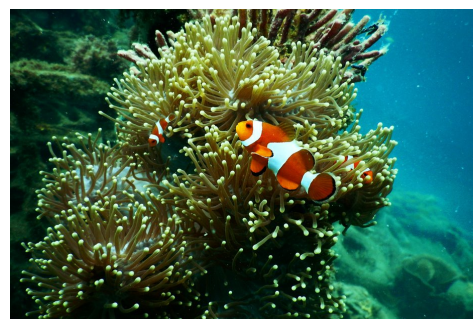
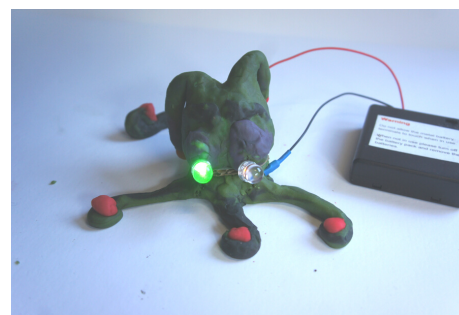
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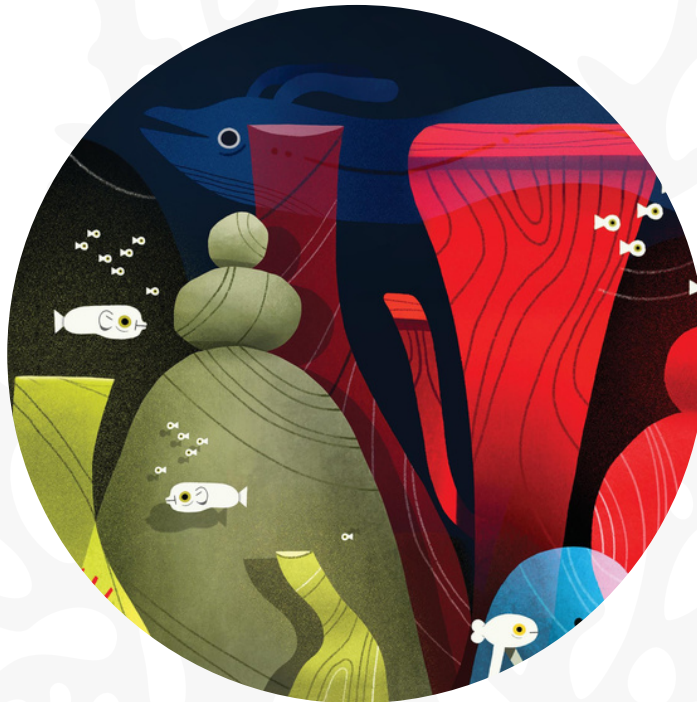


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ABOUT



Makers of Imaginary Worlds 'Undiscovered Island' installation explores a creative and imaginary response to the ecological challenges facing coral reefs.

This resource, created especially for primary school teachers, parents, and creative practitioners, is designed to inspire children's creative imagination and increase their connections to the natural world. Through different creative projects, students will explore how to:

- Invent and make their own Imaginary island.
- Apply sustainable creative practices that utilise the recycling and reuse of materials
- Write an adventure story about the island.
- Learn about the life cycle of corals and why they are colorful.

This resource also features cross-curricular links with Key Stages 1 & 2 syllabus including art & design, design & technology, science, and literacy subjects.

Makers of Imaginary Worlds is a Nottingham-based installation and performing arts company. We make dynamic spatial narrative experiences and sensory environments for performances, installations, and storytelling for children 0-10 years. We are passionate about developing quality interactive work and believe that all children have the right to art and culture.

You can learn more about us and 'The Undiscovered Island' by visiting our website www.makersofimaginaryworlds.com where you can also view installation images, videos, worksheets, and activities related to the installation.

Happy Creating!

Roma Patel & Rachel Ramchurn



MY IMAGINARY ISLAND

Creative activities

The aim of this learning resource is to nurture and stimulate children's imaginative thinking and exploration by involving them in inventing, building, drawing pictures, and writing stories about their own imaginary island.

The children will:

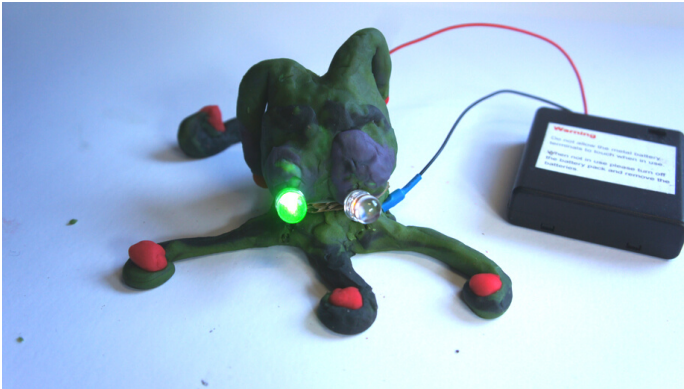
- invent and make a creature
- build a habitat from straws
- design and make a coral city
- write a story about their Island

Alongside the activities, children will learn about the ecology of coral reefs.

These activities cross into multiple curriculum areas including building structures, electricity, making circuits, selecting and understanding material properties, making mock-ups, sharing ideas, and writing narratives (See page five for the curriculum alignment).

Children will extend their practical skills and techniques in art, design, geometry, and literacy through the construction of their own imaginary Island.

CURRICULUM ALIGNMENT



Imaginary creature

Art & Design/Design and Technology

KS1: Art and Design: Use drawing, painting, and sculpture to develop and share their ideas, experiences, and imagination.

KS2: DT: Use electrical systems in their products, for example, series circuits incorporating switches, bulbs, buzzers and motors.



Habitat

Design & Technology/ Mathematics

KS1 & 2: Technical knowledge: Build structures, exploring how they can be made stronger, stiffer, and more stable.

KS1 Geometry: Compare and sort common 2-D and 3-D shapes and everyday objects.

KS2: Geometry: Make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them.



Coral City

Art & Design

KS1: To use a range of materials creatively to design and make products.

To use drawing, painting and sculpture to develop and share their ideas, experiences and imagination.

KS2: To improve their mastery of art and design techniques, including drawing, painting, and sculpture with a range of materials.



My Island's story

Literacy: Writing

Write clearly, accurately and coherently, adapting their language and style in and for a range of contexts, purposes and audiences.

KS1- writing narratives about personal experiences and those of others (real and fictional).

KS2-In narratives, describing settings, characters and atmosphere.



Adventure Awaits

Dear Explorer,

Are you ready to go on a fun adventure?
Your challenge is to invent and make your own
imaginary island. Think about what types of
creatures live on your island, how do they look, and
where do they sleep. Can you build a coral garden
for them to play in? Then write a story about the
strange exciting adventures that happen on the
island.

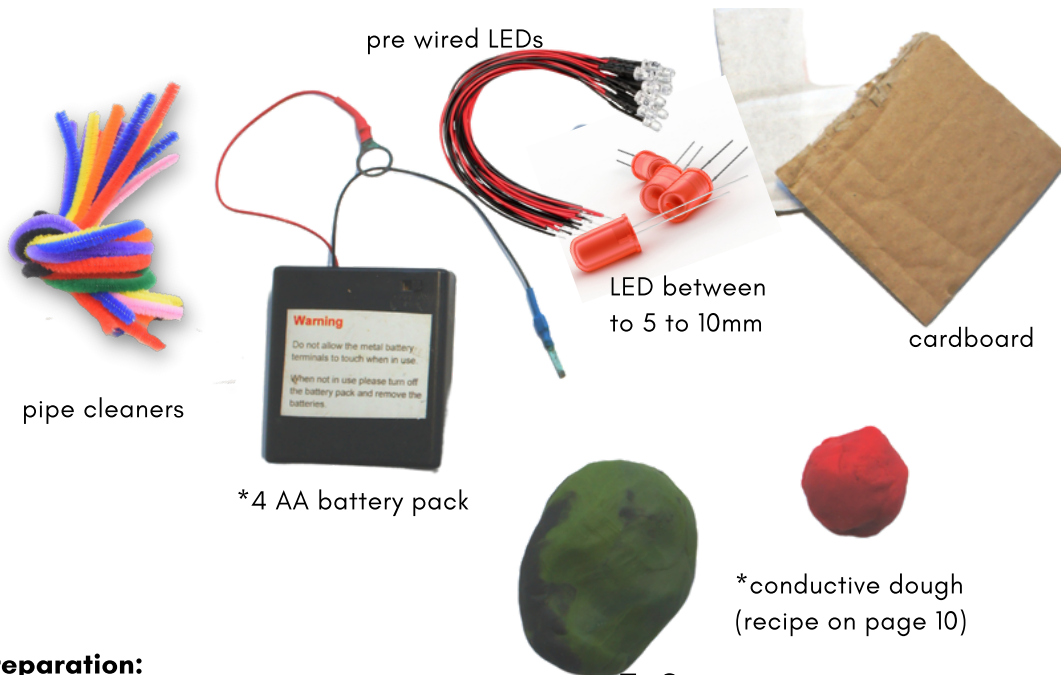
Happy Adventuring,



MAKE & LIGHT-UP A DOUGH CREATURE



Children will sculpt a conductive dough creature that lives on their island and learn how circuits work. Making the conductive dough is a great activity to do with children. For the recipe on page nine, the salt and water allow electricity to flow and bring your creature to life. This recipe is developed by the Squishy Circuit Company.



Preparation:

- Make the conductive dough. The dough can be stored in a refrigerator or frozen for months for longer shelf life.
- LEDs (Light Emitting Diodes) are available in various sizes between 3 to 10mm. The 10mm LEDs are better for younger children
- Metals, thermal wires, or paper clips can be added to battery pack wires.
- **Optional:** Pre-wired LEDs can be purchased or you can lengthen the LED legs by attaching them to pipe cleaners or metal paper clips using electrical tape or solder.

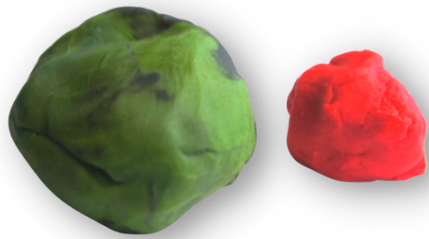
To Start:

- Introduce the children to circuits.
- Demonstrate how to make a simple circuit using the conductive dough.
- Use the step by set guide to making their creature. In order to light up the creature, it needs to be designed with two parts; one for negative and one for positive. Show a finished example.
- Complete the worksheet entitled "My Island Creature" on page 25.

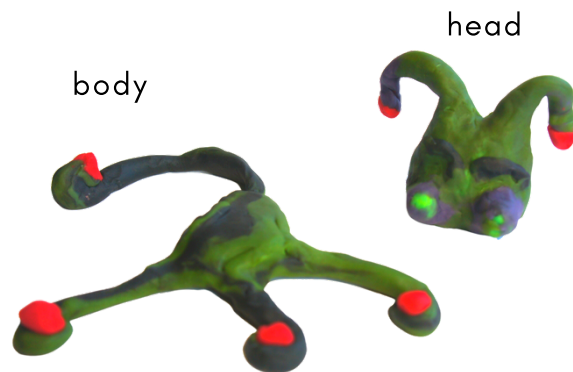


*These materials can be purchased at various shops, links are provided on page 31 to UK suppliers.

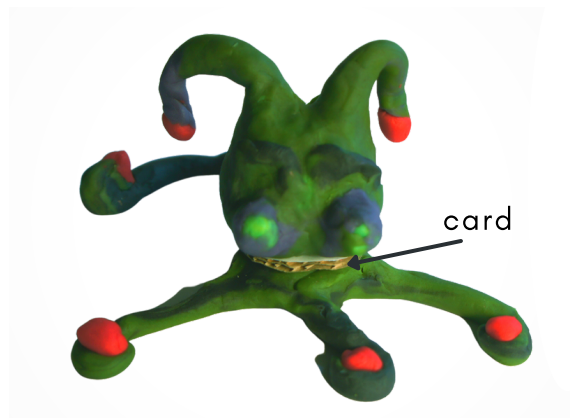
SOFT DOUGH CREATURE (4+)



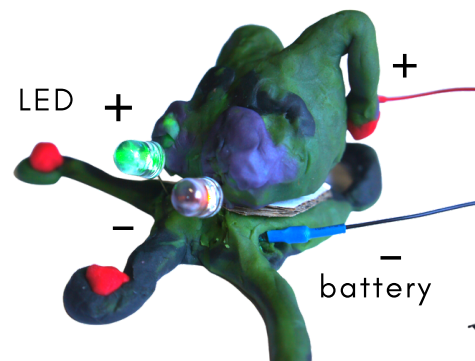
- 1 Using conductive dough make a creature that would live on your imaginary Island.



- 2 Think about what part of your creature would light up. Your creature needs to be in two parts. For example a body and head.



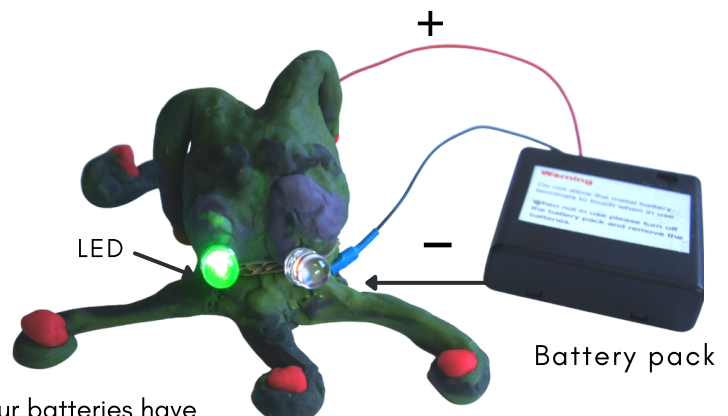
- 3 Cut a piece of card to put between the head and body. In order for the creature to light up, the two parts cannot touch as this will create a short circuit.



- 4 The long leg (+) of LED goes to the head and the short leg (-) goes into the body.

- 5
 - Attach the red positive wire (+) from the battery pack to the head.
 - Then the black negative wire to the creature's body.
 - Switch on the battery pack, the LEDs should light.

NOTE: If the LED doesn't light up 1) check your batteries have power 2) the head and body of your creature are not touching.



CONDUCTIVE DOUGH RECIPE



Ingredients

1 1/2 Cups (355 mL) Flour
1 Cup (237 mL) Water
1/4 Cup (59 mL) Salt
3 Tbsp. (44 mL) Cream of
Tartar*/or 9 Tbsp. (133 mL) of
Lemon Juice
1 Tbsp. (15 mL) Vegetable Oil
Optional: food coloring.



Video - How to make conductive dough

Squishy Circuits was developed in 2011 in the Playful Learning Lab at the University of St. Thomas in St. Paul, Minnesota.

<https://squishycircuits.com>

MAKE A MOVING CREATURE (7+)

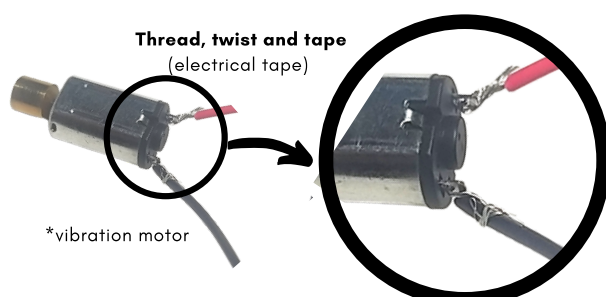
In this activity, children will invent and make a moving creature that lives on their island. They will learn how circuits work (see the circuit diagram on page 11).

What you need



Preparation

The motor is very small so an adult will need to lengthen the battery wires and thread it into the tab at bottom of the motor, especially for younger children. Then attach to cardboard and then to a battery pack (see next page).

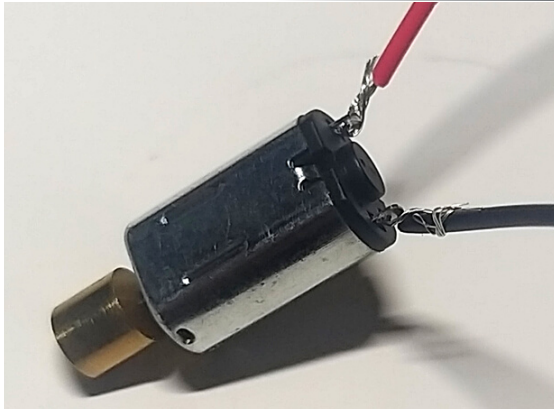


To Start:

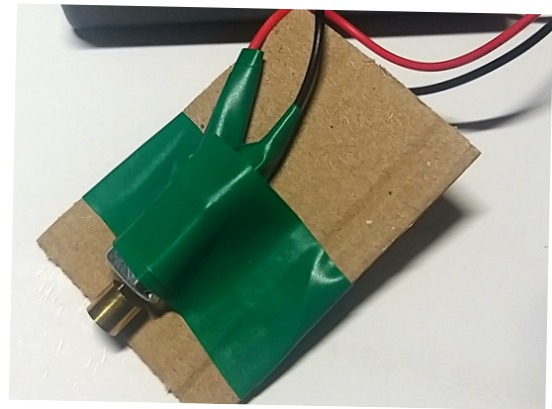
- Introduce the children to circuits.
- Demonstrate how to make a simple circuit using the conductive dough.
- Use the step by set guide to making their creature. In order to light up the creature, it needs to be designed with two parts; one for negative and one for positive. Show a finished example.
- Complete the worksheet entitled "My Island Creature" on page 25.

*The motor can be purchased at various shops links are provided on page 31 to UK suppliers.

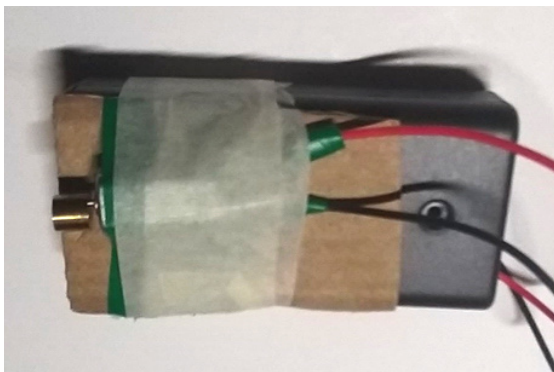
MOVING CREATURE



- 1** Thread the red and black battery wires into the tab on the bottom of the motor.



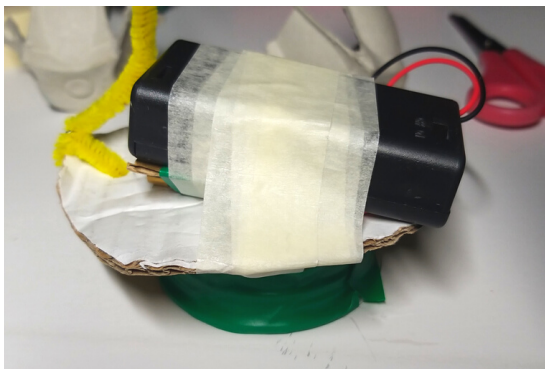
- 2** Cut a small rectangle from the card and attached it to the motor using electrical tape.



- 3** Attach the motor to the back of the battery pack. Make sure not to tape over the switch on the battery pack.



- 4** Cut a cardboard base for the creature and attach the battery pack and motor to it. Switch it on if it doesn't move, try moving things around.



- 5** Build the body and experiment with different legs for the creature. What will move best? How to make it less noisy?

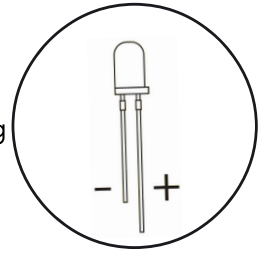


- 6** Think about what you can attach to your creature. Decorate with any art materials- paint, felt-tips tissue paper etc.

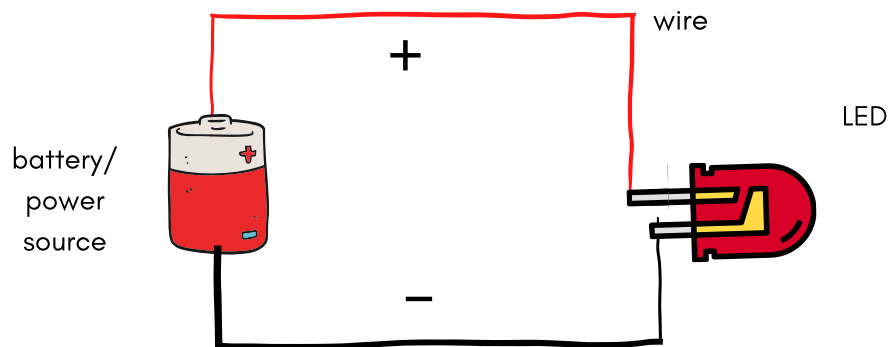
Electrical Circuits

An electrical circuit is a path that electricity flows through and it must have a battery or power source.

An LED (light-emitting diode) has one short and one long leg. When connecting to the battery pack, the short leg goes to (-) negative black wire, and the long leg attaches to the positive (+) red wire.

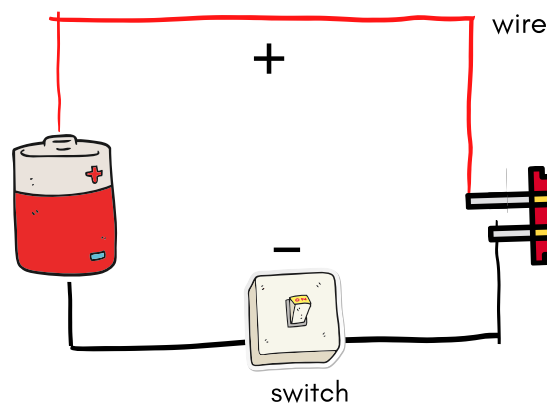


A simple circuit



The wire connects the power to the light.

A circuit with a switch



Try making a switch with foil, paper clip , copper tape or anything that is conductive .



BBC Bitesize video on circuits

HABITAT

Build a habitat for your creature using straws.

What you need



Preparation

- Make a straw habitat as an example.
- Paper straws can be flattened and reshaped. The step-by-step example demonstrates a simple geo dome using triangles but straws can be used to make any shaped habitat (see pic below).



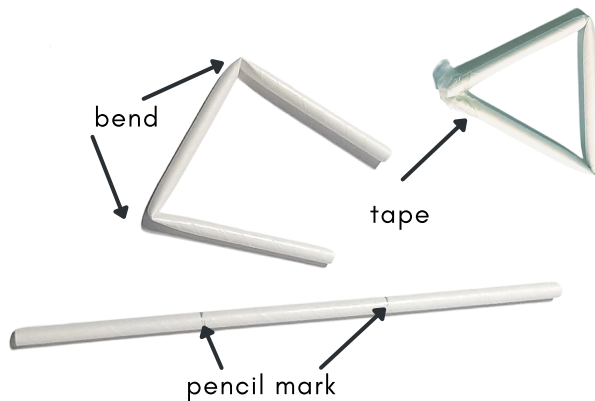
To Start:

- Introduce the children to different geometric shapes and how they can be used to construct buildings.
- Demonstrate how straws can be connected. Using tape, slotted into each other, straws can be flattened and reshaped



- Use the step by set guide to making a dome or let children explore their own shape habitat.
- After completing the dome - KS2 can complete the worksheet 'Visual factions' on page 27.

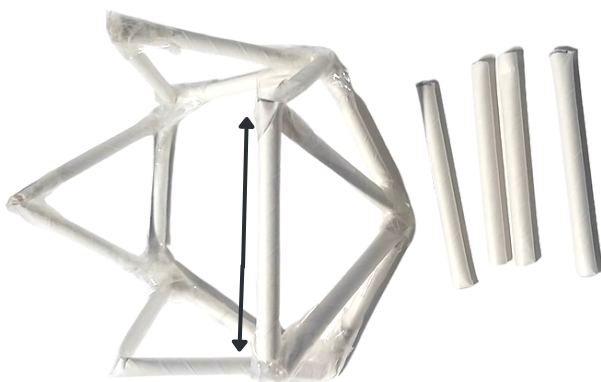
HABITAT DOME



- 1** Make a triangle- using a pencil, mark the straw at 7cm and 14cm. Then bend the straw at the pencil marks. Join the ends and tape into a triangle. Make 5 triangles.



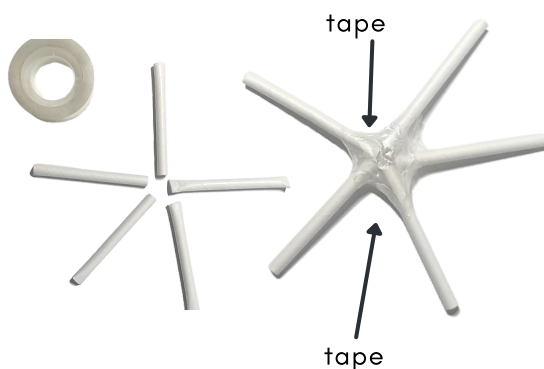
- 2** Join the triangles together with tape to make the base.



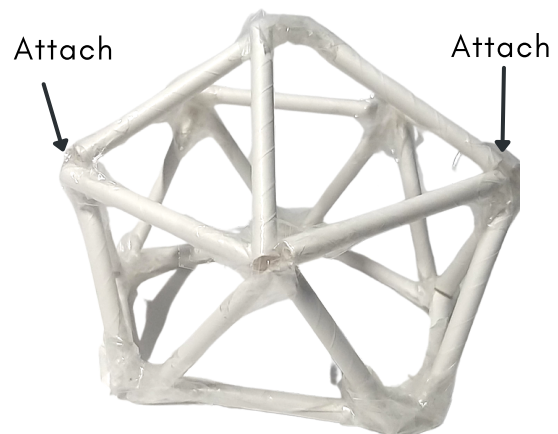
- 3** Cut three straws into 7cm lengths.



- 4** Using tape attach five of the cut straws pieces between each triangle.



- 5** Using 7cm length straws make a star and attach by taping the centre.



- 6** Attach the star to the top of the model to finish the dome. Tape each corner.

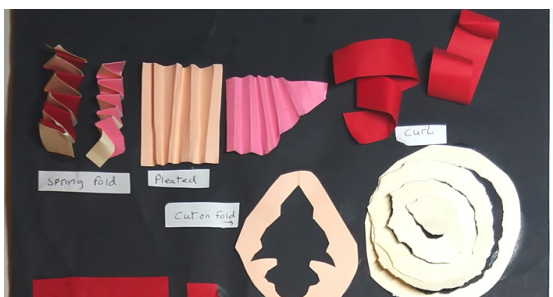
MAKE A CORAL GARDEN

Design and build a habitat for your creature using the different cardboard attachment techniques and recycled materials.



Preparation

- Collect cardboard boxes and containers.
- Optional: Make your own cardboard attachment board, see pages 32 & 33 for examples.



To Start:

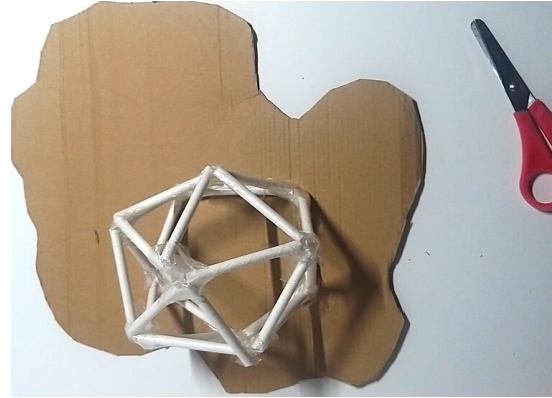
- Complete the worksheet 'My imaginary Island' on page 24.
- Introduce the child/children to the different techniques that can be used to attach cardboard pieces.
- Demonstrate a few techniques live.
- Use the step by set guide to help them make their island.

KS2 extension- Write a story about their island see worksheet on page 26.

CORAL GARDEN



- 1** Find a flat sheet of cardboard. Draw and cut the shape of your island. Make sure your habitat can fit.



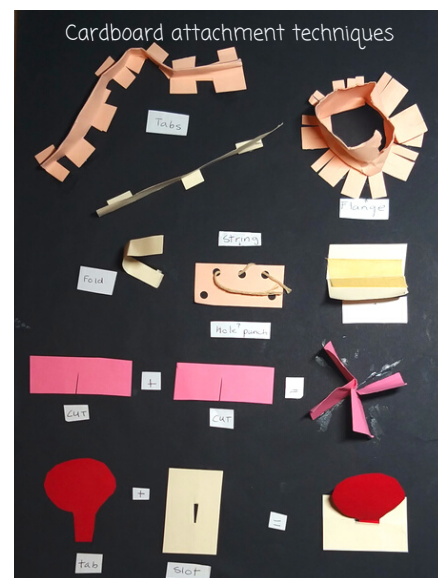
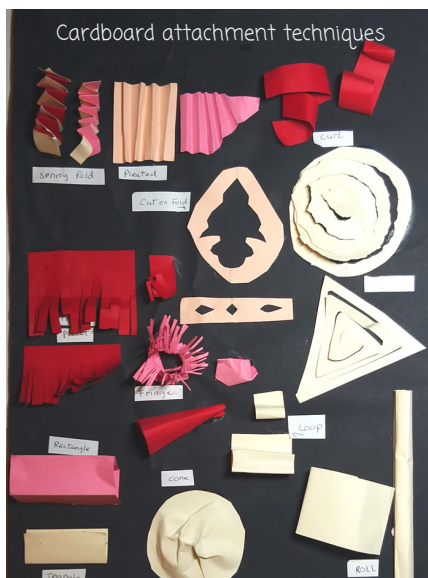
- 2** Place your habitat on your island. Thinking about your design find your materials.



- 3** Using the cardboard attachment techniques, make your coral island. See pages 32 & 33 for a large version of the images below.



- 4** Once you are happy with your design stick everything down. Decorate with whatever art materials you have, ie. paints, felt tips, crayons, etc.



THOUSANDS OF YEARS IN THE MAKING

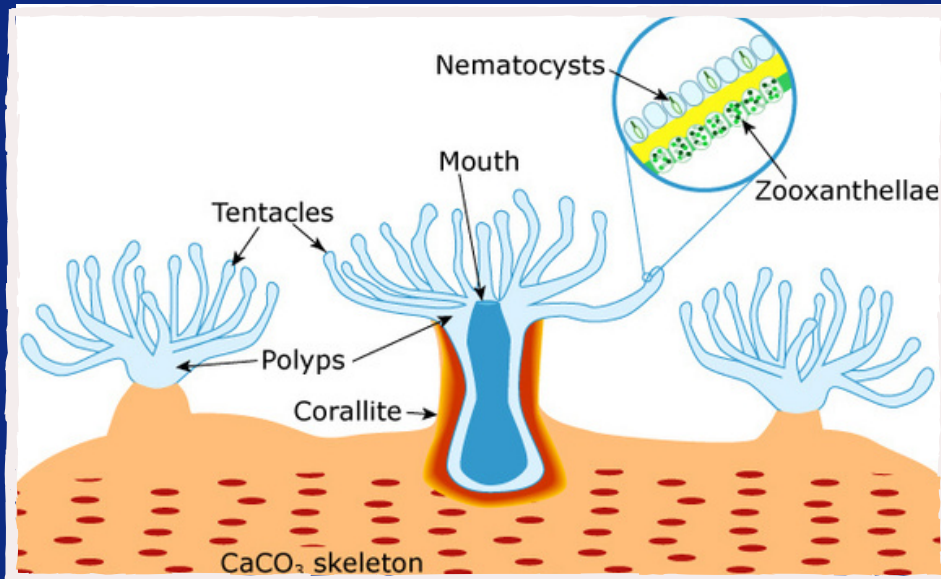
THE CITY OF THE SEA



This section is all about the corals; it covers their life cycle, where they can be found, how they get their color, and why they are losing their color. It is accompanied by videos, links from cold & warm water reefs, a story about the reefs, and a BBC news report on page 31. There are several worksheets relating to corals; 'find a word', 'I can help the corals' and 'label a coral' on pages 28 to 30.

What is a coral?

A Coral may look like a plant or a flower but it is an animal & can be found in oceans across the globe. They are from the Cnidaria family and are related to sea anemones and jellyfish.



Anatomy of a Coral Polyp

Corals don't have a brain, or a head – but they do have a mouth and stomach! Their bodies are made up of tiny polyps.

They are predators, using their tentacles to catch tiny animals and plankton to eat.

Large Corals grow very slowly, around 2 centimetres a year.

Where do corals live?

Corals live in both warm and cold waters and are found in many regions of the world. Tropical reef cover 0.07% of the planet, but hosts about 25% of all marine species. There are also cold water reefs: these are less famous, less spectacular, and often found deep in the sea – for example, off the coast of Scotland. Most cold-water corals live at depths between 200 and 1000 meters and some are even found at 6000 meters.

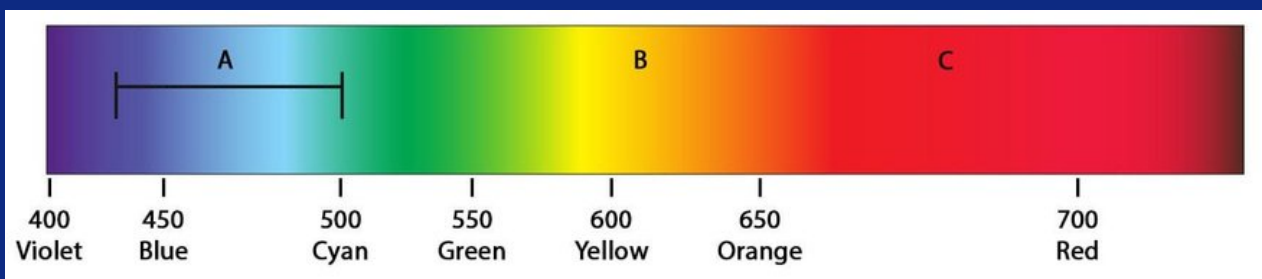


UK SEAS ARE HOME TO SOME AMAZING COLD-WATER CORALS THAT FORM REEFS ON THE SEA BED OVER 400M DEEP.

The Colourful Corals



The algae cells give corals much of their colour. Coral reefs are underwater and have limited amounts of light for photosynthesis. Each colour absorbs light at a slightly different wavelength. By having a wide range of colour pigments, the algae are able to absorb all the available light. The corals that live on the shallow depths of a reef are more colourful than those that live deeper in the ocean and in cold waters. Coral reefs are beautiful, but they are also extremely delicate.



Spectral bandwidths (colors)

The Tiny Algae in the Corals



Stony coral, Pocillopora species, expanded polyps and symbiotic zooxanthellae, Great Barrier Reef, Oxford Scientific

The main source of energy for tropical corals is not food. Instead, they form symbiotic relationships with *Symbiodinium* – a group of **dinoflagellate algae**.

These algae, sometimes known as **zooxanthellae**, are able to use photosynthesis to capture sunlight and carbon dioxide and convert it into sugars. This is the same process which trees and plants use to obtain energy.

The *Symbiodinium* cells live within the coral, forming a relationship which is beneficial to both coral and algae.

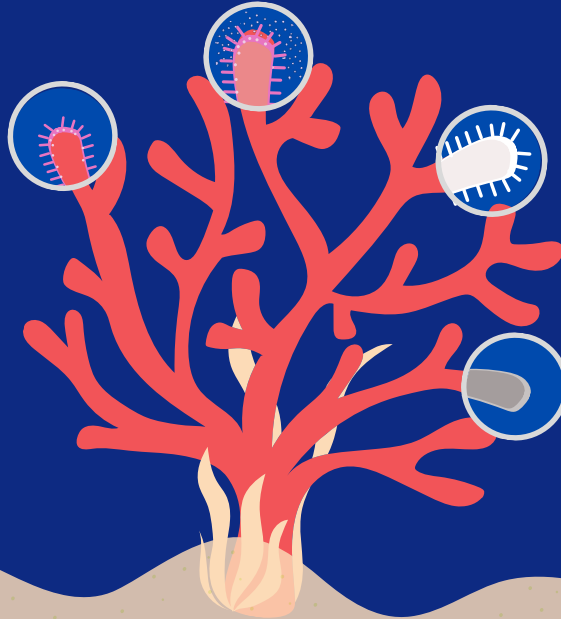
Why are Corals losing their colour?

2. The Coral under stress

Algae is very sensitive to high temperatures, over about 30C. During periods of stress, the algae is expelled from the coral.

1. Healthy Coral

A healthy coral living with dinoflagellate algae.



3. The Coral loses colour

With the algae gone the coral lose their main source of food and colour leading to a process known as coral bleaching.

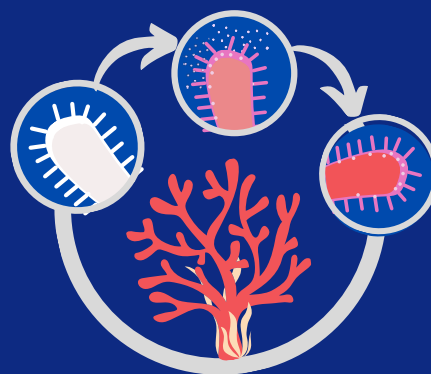
4. The Coral dies

If the sea water stays hot for too long, the coral dies.

Coral bleaching can also be caused by anything which stresses the algae such as:

- Changes in the pH of the water
- Increased nutrient availability (fertilisers)
- Run-off of herbicides from farming
- Chemicals in some types of sunscreens

Recovery



If conditions change the bleached corals can recover and become healthy again.

The first Genetically modified Dinoflagellates

The University of Nottingham, is carrying out research to help save the coral reefs. Together with their colleagues at the University of Cambridge, They have established the first methods to genetically engineer dinoflagellate algae.

They are now using this tool to examine how the algae are stressed. By adding stress-sensing proteins to the algae, we can discover when the algae are unhappy, and make changes before they die. Longer-term, we hope to develop this into an early-warning system for coral bleaching.

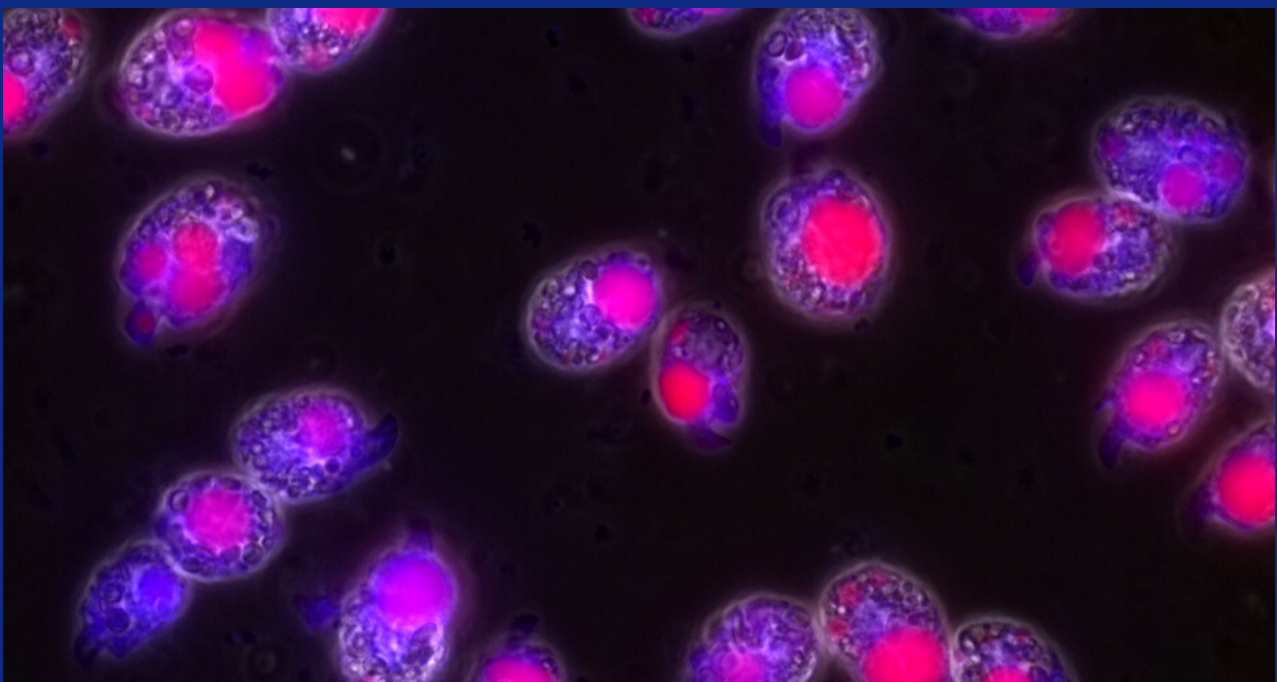


Photo credit: Isabel Nimmo, University of Cambridge & Ellen Nisbet, University of Nottingham.

Species: *Amphidinium carterae*

The red colour comes from the autofluorescence, while the blue colour labels the introduced protein. So the purple is where they overlap.

Other research teams around the world are trying to save the coral reefs by :

Introducing *Symbiodinium* strains that are more heat-sensitive: such strains already exist in the Red Sea.

3D-printed corals, which would allow the fish and other marine animals to survive.

Playing the sounds of a healthy coral reef in a dying reef to encourage sea life.

RESOURCES

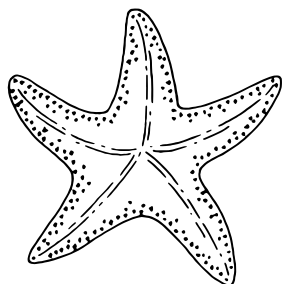
Links to
printable
worksheets and
resources.



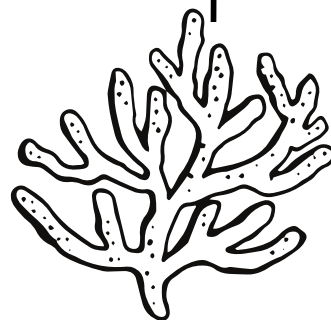
NAME: _____

DATE: _____

MY IMAGINARY ISLAND



Create a drawing of your imaginary island on the worksheet below.



Tell us a little bit about your imaginary island .

Who lives on your island?

What can you do on your island?

My Island Creature

Name of ceature: _____

Drawing (please label)

Habitat

Diet

Fun fact

NAME: _____

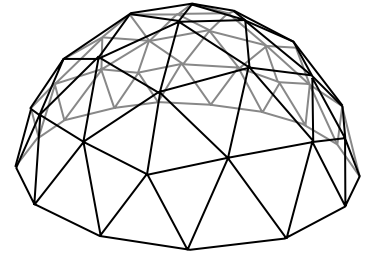
Story Title:

Let your imagination run wild with a story!

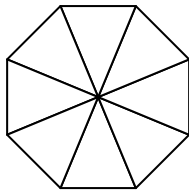
Once upon an island far, far away

Name: _____

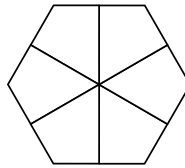
Visual Fractions



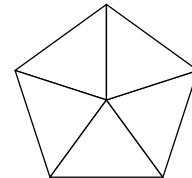
Using the diagrams provided, color in the sections to show the fraction clue provided. When finished write out the fraction in words.



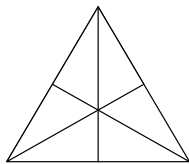
$$\frac{1}{2}$$



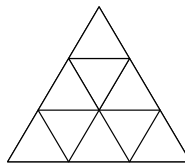
$$\frac{1}{3}$$



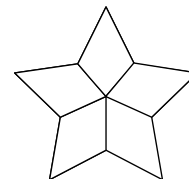
$$\frac{3}{5}$$



$$\frac{2}{3}$$

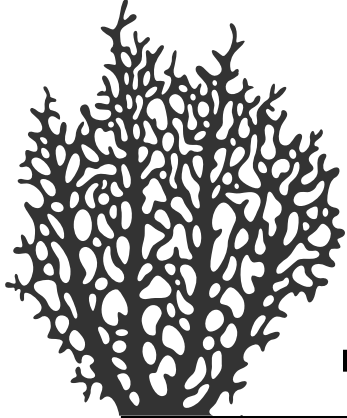


$$\frac{2}{9}$$



$$\frac{4}{5}$$

Draw and name which of the above shapes you can find in your dome habitat?



Find-a-word

THE COLD WATER CORAL REEFS

DID YOU KNOW THAT THERE ARE CORAL REEFS IN THE UK?

S	E	H	A	B	I	T	A	T	I	C
M	A	R	I	N	E	G	M	N	O	D
A	R	R	E	G	M	F	S	L	F	P
R	E	E	F	S	O	N	D	S	I	O
K	A	A	O	S	I	W	L	E	S	L
R	T	T	O	H	A	G	T	L	H	Y
I	E	S	D	T	E	N	E	A	L	P
L	R	L	E	I	R	D	R	R	L	S
L	O	R	S	E	N	D	T	U	E	A
D	S	T	M	S	I	N	A	G	R	O
S	C	O	T	L	A	N	D	A	N	C

Instructions: Find the underlined words in the above word search.

"UK seas are home to some amazing cold-water corals that form reefs on the seabed over 400m deep. In the UK, cold-water coral reefs are found on the seabed off the coast of Scotland. The reefs are a living organism built of thousands of individual polyps, anemone-like creatures that share a hard skeleton. These reefs develop over many hundreds of years. The polyps feed by extending their stinging tentacles into the water column to catch plankton, krill and other small crustaceans. The reef creates a habitat for other marine life, with many deep-sea species depending on them for food and shelter." (Text from The Wildlife Trust website.)

Name: _____

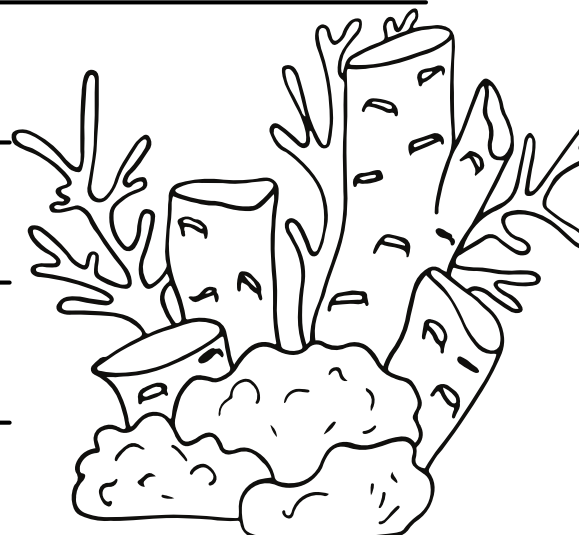


I CAN HELP THE CORALS

Draw a picture in the box below showing how you might help the corals and then complete the sentence below.

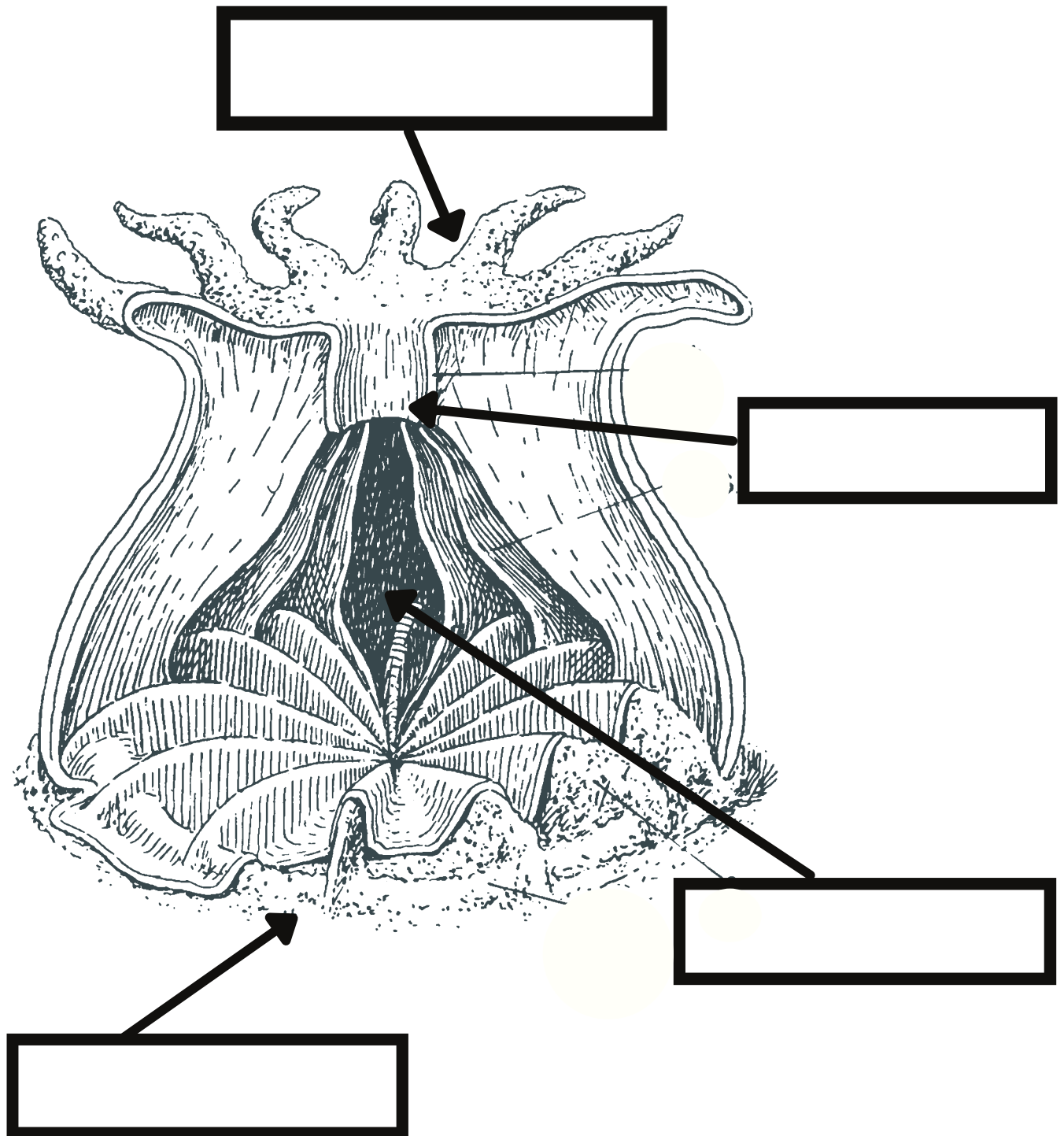
A large, empty rectangular box with a thick green border, intended for a child to draw a picture showing how they might help the corals.

I can help the corals by: _____



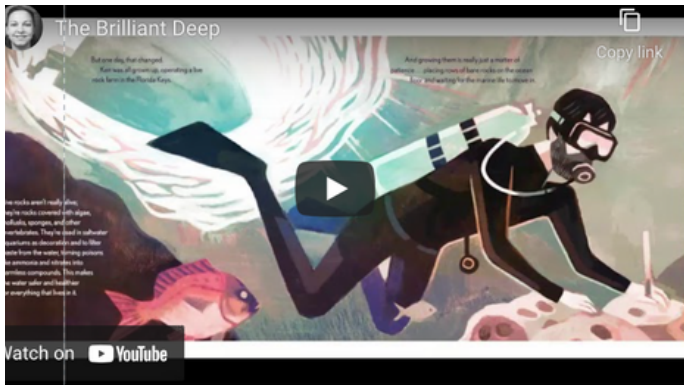
LABEL THE CORAL

A coral may look like a plant or a flower but it is an animal.



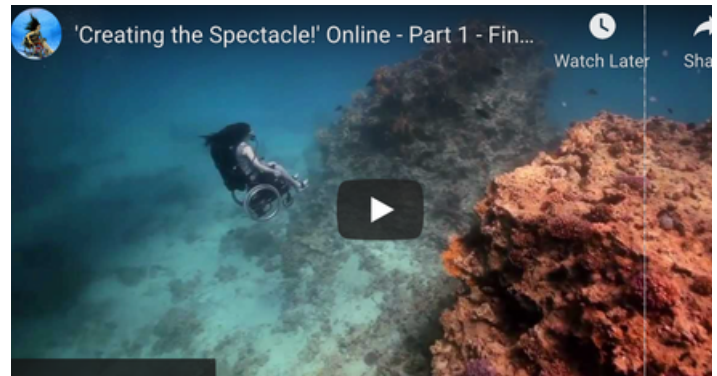
CORAL REEF STORIES & VIDEOS

"The Brilliant Deep: Rebuilding the World's Coral Reefs"



The story is written by Kate Messner and read to you by Ms. Menges.

'Creating the Spectacle!' 360 Degrees



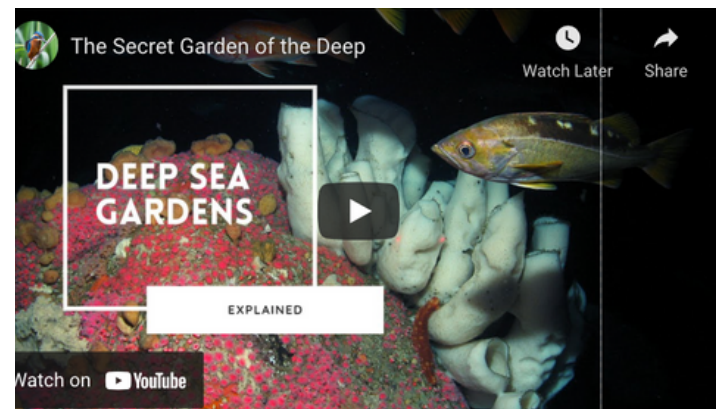
Sue Austin is a multimedia, performance and installation artist create a film about the wonder of the warm coral reefs on her adapted wheelchair.

Can Lego help save Singapore's coral reefs?



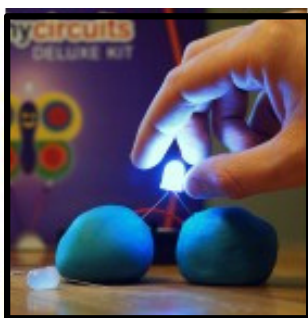
BBC News shows how Lego is used to create coral nurseries.

The Secret Garden of the Deep reef



Exploration of the cold water reef in the deep.

LINKS TO SUPPLIERS



Conductive dough, battery packs LED etc.



ScrapStore directory for recycle materials for craft



Battery Packs 2AA with switch

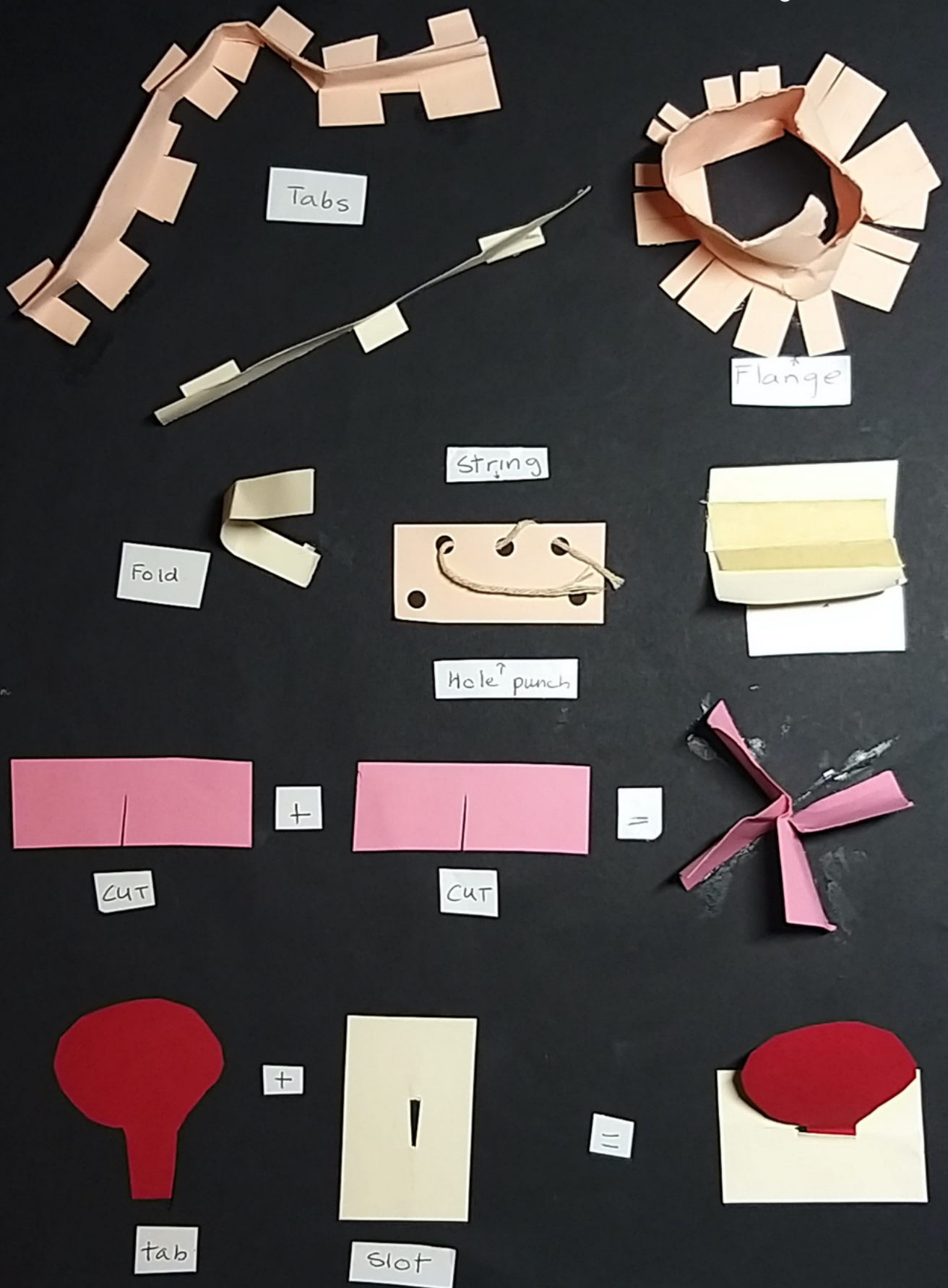


Vibration motors. 1.5 to 3v

Cardboard attachment techniques



Cardboard attachment techniques





How can you help the corals keep their colour.

Try using the 6 Rs



RECYCLE

Can you make amazing things using recycled materials.



REUSE

Can the things you have be used again in another way.

REPAIR

If something gets broken, can it be fixed instead of thrown away?

REDUCE

Can you use less new things and materials.



RETHINK

What can you do differently?



REFUSE

Are there new materials we should try and not make?

