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- ALIGNED

Leaders in Online Education

# Standard 3

## Science & Agri-Science

SAMPLE



**Name:** \_\_\_\_\_

**Teacher:** \_\_\_\_\_

**School:** \_\_\_\_\_

### **Bonus Offer Online**

This book gives you access to additional Science & Agri-Science videos, quizzes, games and prizes on pennacool.com.

Log onto pennacool.com and click on "Workbooks" to learn more!

Bonus Points Code: **SCIAGRS24**

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Design: Studio Curio

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Leaders in Online Education

# A Note to Parents & Teachers

At pennacool.com we strive to motivate students by making learning fun, exciting and rewarding. We produce high-quality content by partnering with teachers and graphic designers to create online and printed content for all primary school students — ensuring no child is left behind.

This book's layout, illustrations and other visual elements have been carefully selected with the student in mind to make learning more enjoyable.

## Key Features

### **Two Subjects, One Book (Science + Agri-Science)**

- Lighter load for students' bookbags
- More affordable for parents
- More convenient for teachers

### **Website Integration**

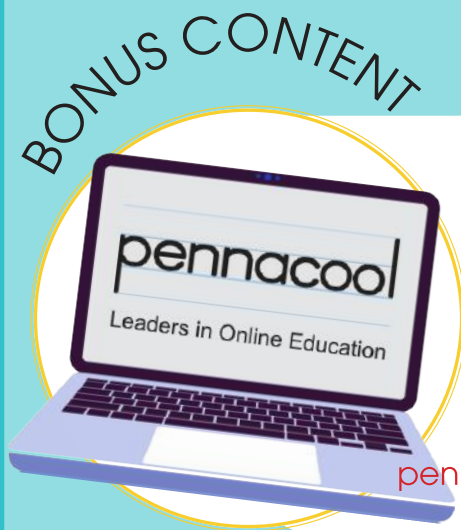
- Additional online videos, quizzes, and games available to students and teachers
- Gain points for a chance to win great prizes

### **Presentation**

- Curriculum-aligned content
- Easy-to-read font
- Gamified content, eye-catching and visually appealing to students



Throughout this book you may see the following icons. Here's what they mean:



Online content that can be found on pennacool.com like videos, quizzes and games. Teachers can also find printable worksheets that can be used in class. Follow the steps below to find the content as they appear in the book.

pennacool.com → Workbooks → Std 3 Science + Agri-Science → Bonus Content

This icon represents an experiment that can be done.



RESEARCH IT!



This icon lets you know that this activity requires you to do some research.

FUN FACT!

This icon indicates additional interesting information relating to the topic.



# 1. Animal Life Cycles

## A Life Cycle

All living things go through a series of stages from birth to death. This is called the **life cycle**. As humans, when we are born, we start as babies and develop into children, teenagers, adults and elderly adults.

Vertebrates such as mammals and some birds look like smaller versions of themselves. For example, a brown dove chick and its mother look almost identical. Puppies also grow into adult dogs with the same markings they were born with.



Stick pictures of yourself at the different ages below.  
Use a picture as close as possible to the age given.



months



years

What changes do you notice about yourself?

Lined area for writing answers.

# Metamorphosis

Many animals, such as mosquitoes, houseflies, butterflies and frogs, don't have young that look like the adults. These animals experience a **complete metamorphosis** or dramatic change in their form and appearance.

## Butterfly Life Cycle

Below is an example of the changes a Monarch butterfly goes through in its life cycle. Identify the phase in each picture presented and draw the arrows to show the correct sequence of events.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Using plane shapes only, draw an image of a  
[redacted] in the space below.



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SAMPLE



# Word Search

Can you find all the animals listed below?

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

agouti  
ant  
capuchin  
deer  
dove  
dragonfly  
human

jellyfish  
ladybug  
mantis  
moth  
newt  
pigeon  
rat

red howler  
squirrel  
star fish  
termites  
tiger  
toad

Now that you have found all the words, sort them into the categories below: those that undergo metamorphosis and those that do not.

Metamorphosis	No Metamorphosis

Go to [pennacool.com](https://pennacool.com) and complete the online exercises! Follow the steps at the start of the book



Animal Life Cycles

## 2. Variation and Adaptation

### Variation in Animals

Throughout the natural world, we can find plants and animals which all have important roles to play in each ecosystem. If you look outside your window, you will notice that there are a lot of variations in the animals around you. Even those that belong to the same classification group. You may notice these variations according to their different body parts and what they are used for. For example, a caiman has limbs while a snake does not, even though both are reptiles.

Look at the pictures of the keskidee and the hummingbird on the next page. Identify the similarities and differences you may notice and place them in the Venn diagram.



hummingbird



keskidee



similarities

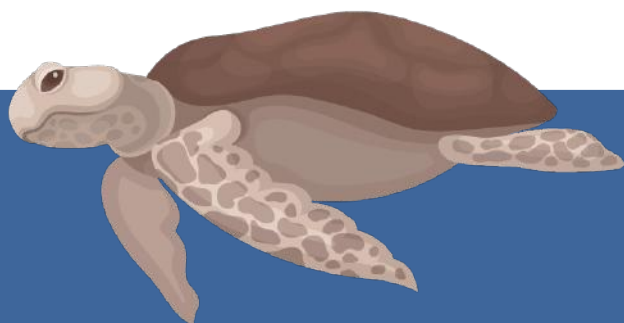
## RESEARCH IT!



Write in the correct word or phrase to complete the paragraph.



Leatherback turtles typically feed in the \_\_\_\_\_  
while hawksbill turtles feed on the \_\_\_\_\_. The  
leatherbacks love to eat \_\_\_\_\_  
sponges and invertebrates / jellyfish  
which typically live in the open ocean, while hawksbills love to eat  
\_\_\_\_\_. In the pictures above, you  
will notice that the leatherback has a \_\_\_\_\_ mouth  
while the hawksbill has a \_\_\_\_\_ mouth. The  
\_\_\_\_\_ mouth of the hawksbill allows it to bite into its prey  
effectively. The leatherback turtle has a \_\_\_\_\_ shell which  
can take the pressure of diving deep down in open water, while the  
hawksbill has a typical \_\_\_\_\_ shell.

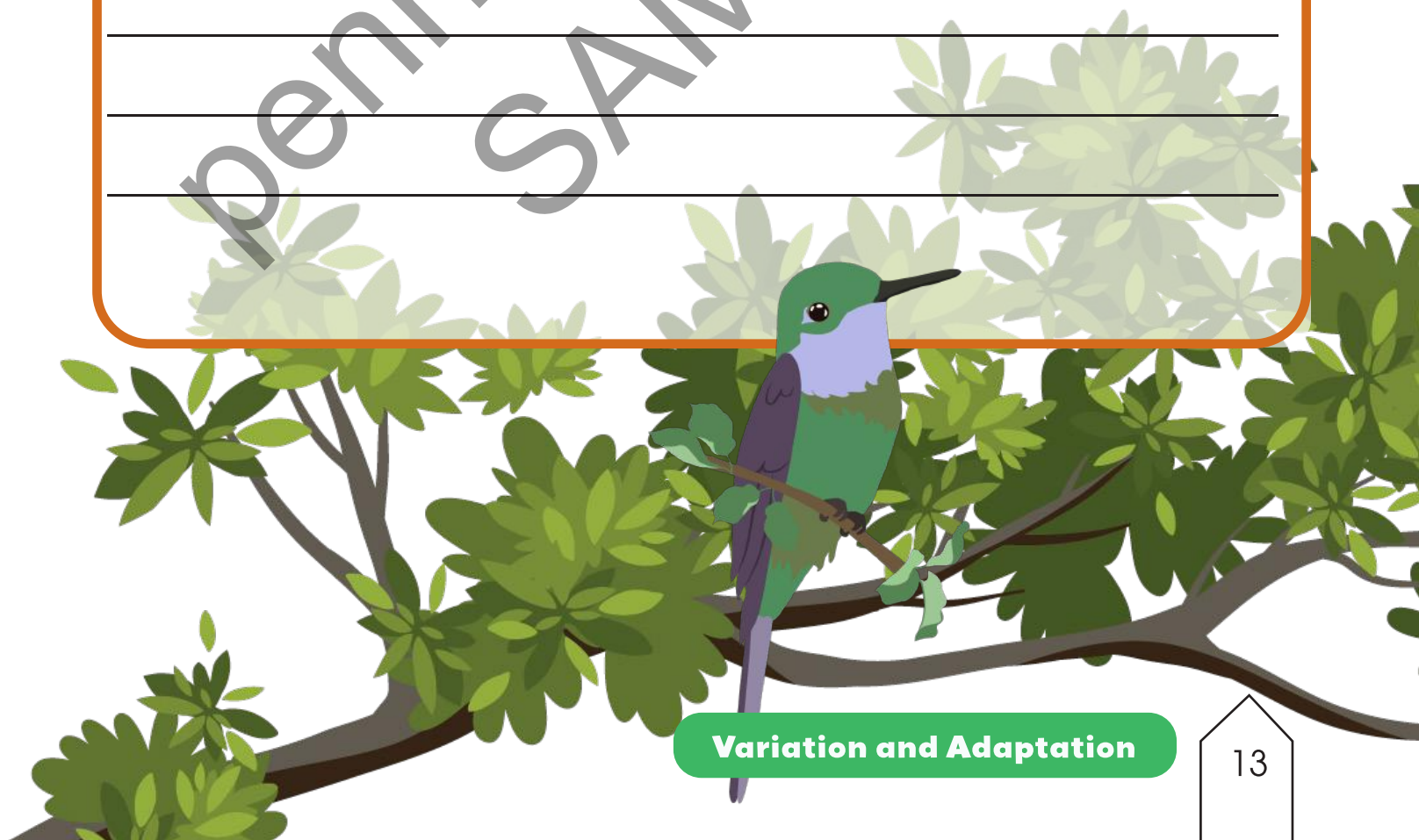




The variations that exist within animals of the same group are their way of **adapting** or modifying themselves so that they can function in their environment.

Now that you know how adaptations work, what is one adaptation that                      have and why?

pennacool.com  
SAMPLE



Identify the animal in camouflage.



There is a/an \_\_\_\_\_s in this picture.

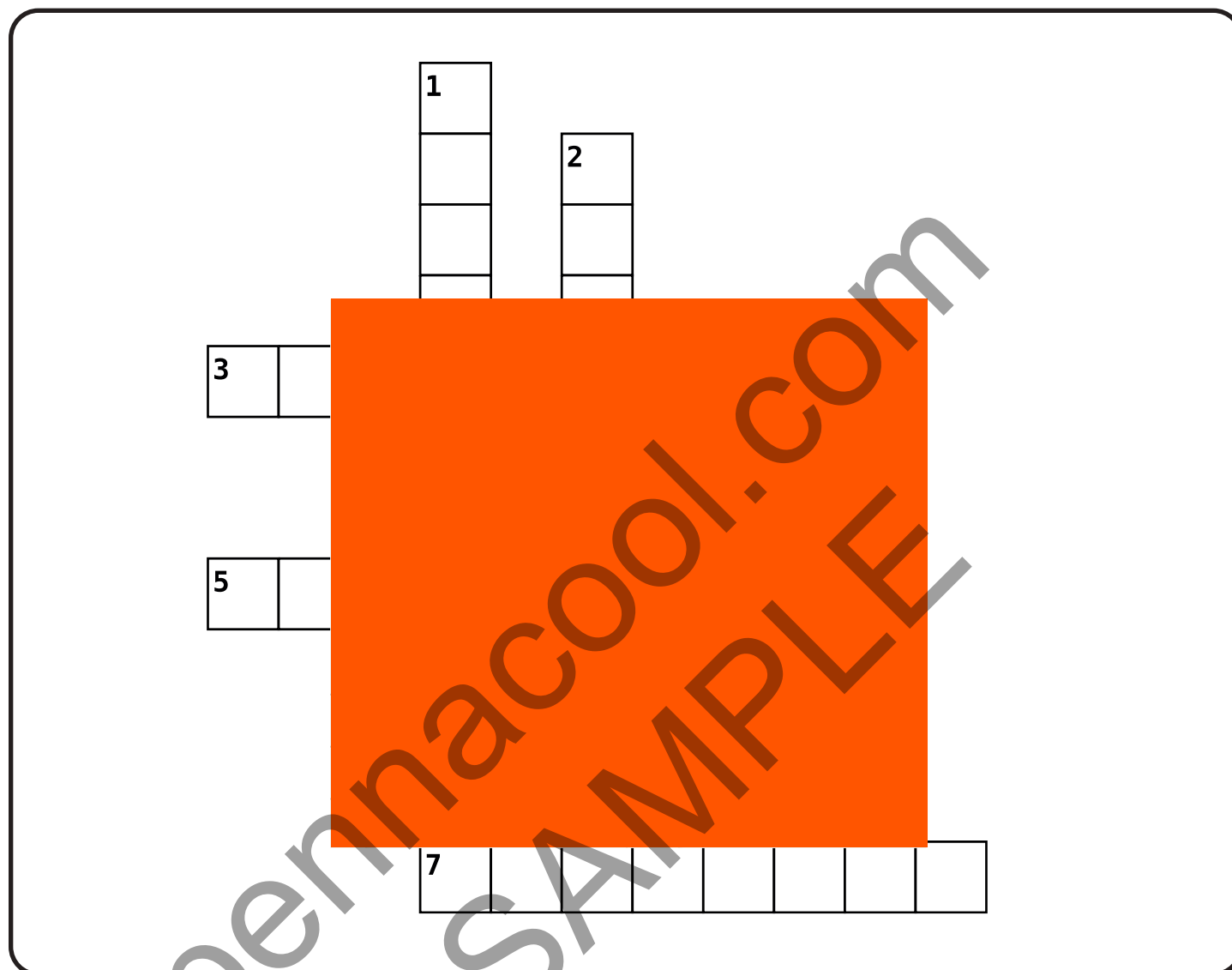
**Hint:** This animal camouflages itself in response to a threat.



There is a/an \_\_\_\_\_ in this picture.

**Hint:** When perched in a tree, this animal's camouflage works best.

## Crossword



### Down

- 1.** This word means to change in order to survive in a new environment or situation.
- 2.** My long curved beak helps me catch food in muddy water
- 4.** I come to the shores of Trinidad and Tobago to lay eggs.

### Across

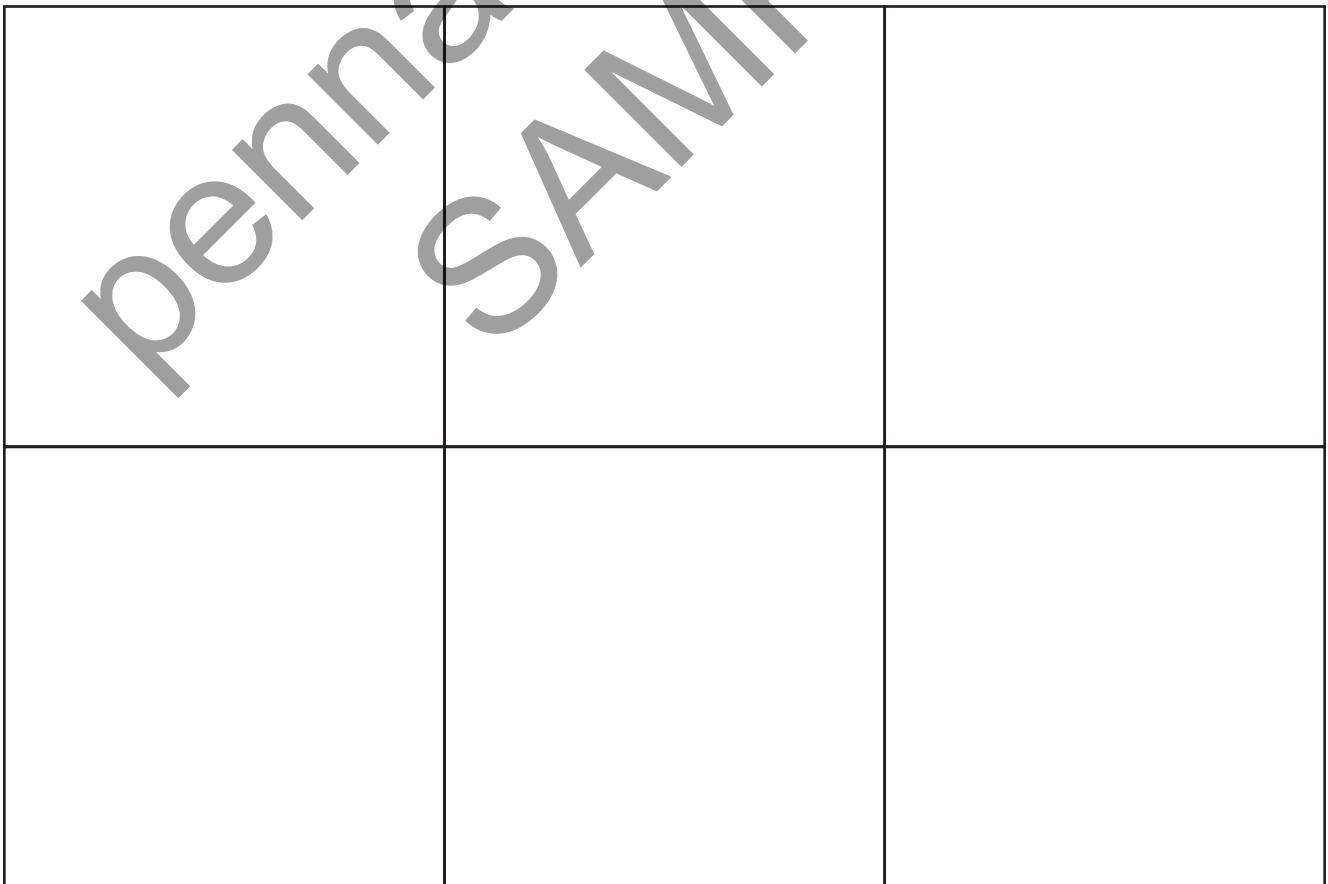
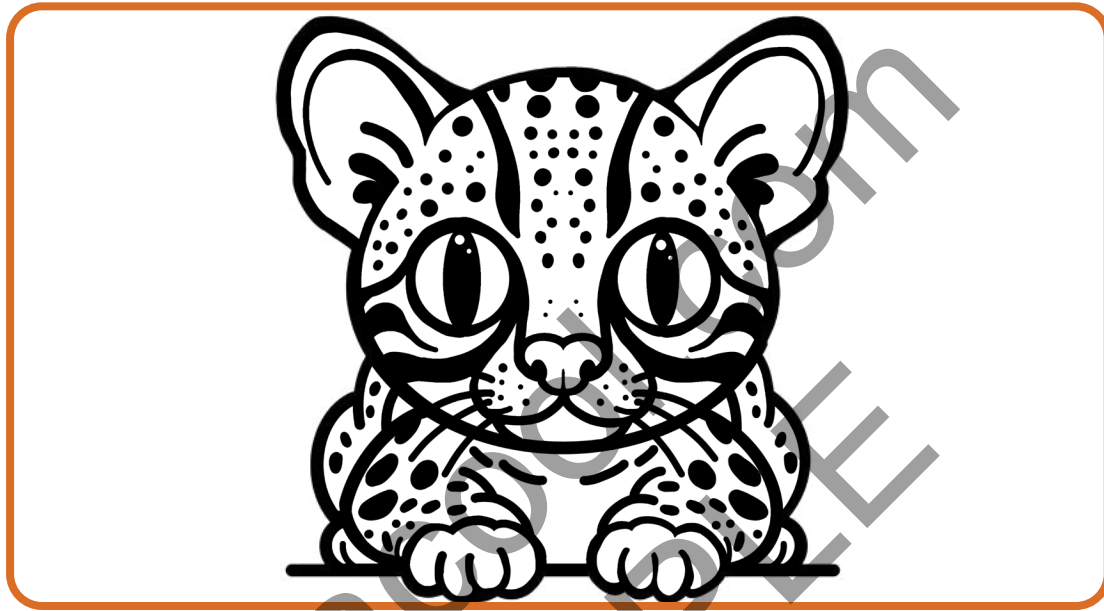
- 3.** This insect starts as a caterpillar and goes through a process called metamorphosis.
- 5.** My spotted coat helps me blend into the forest
- 6.** The natural environment where an organism lives, including the plants, animals, and physical surroundings.
- 7.** I have a yellow chest, brown wings and a black beak.



## Predator versus Prey

Many predators, such as the ocelot, have front-facing eyes with vertical slits. This allows them to properly observe their prey and increases their chance of successfully hunting.

Draw an ocelot using the grid below.



# Variations in Plants

Just like animals, various plant species have different characteristics that help them to survive in their environment.



RESEARCH IT!



Complete the table below with a description of each plant that you may find in your environment. Give your table a suitable title.



Title: \_\_\_\_\_

	Poui tree	 tree	 tree
Leaf shape			
Leaf colour			
Trunk circumference			
Bark colour			
Flower drawing			



Using the space provided below, write a paragraph comparing and



Handwriting practice lines consisting of 20 horizontal lines. A large, diagonal watermark reading "pennacool.com SAMPLE" is overlaid across the center of the page.



# Word Search

Find the fruits and plants in the word search below!

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

Mango  
Moringa  
Coconut

Dragon Fruit  
Mangrove  
Cactus

Discuss with your fellow students how these fruits and plants have adapted for their environments.

### 3. Separating Mixtures

## Measuring Temperature

**A thermometer** is an instrument used to measure temperature.

It measures how hot or cold something is.

Throughout the day, there are different types of thermometers we can see. These can be on the wall in our homes, in the oven, in the refrigerator, in our first aid kit, and in our cars. How many of these have you seen today?

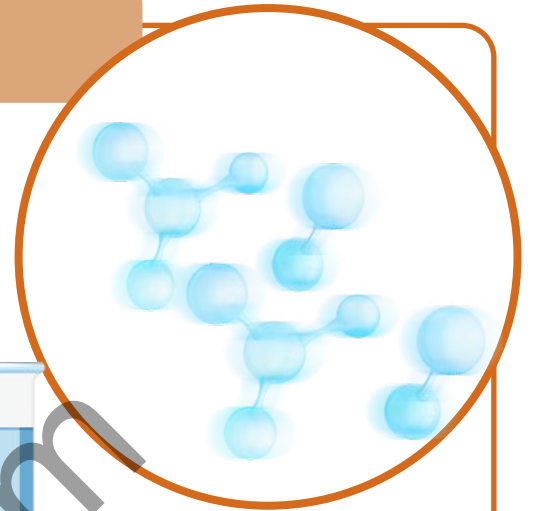
Discuss with a friend the uses of two of the thermometers named above. Do you think that they are important to have and why? Write your answer on the lines below.



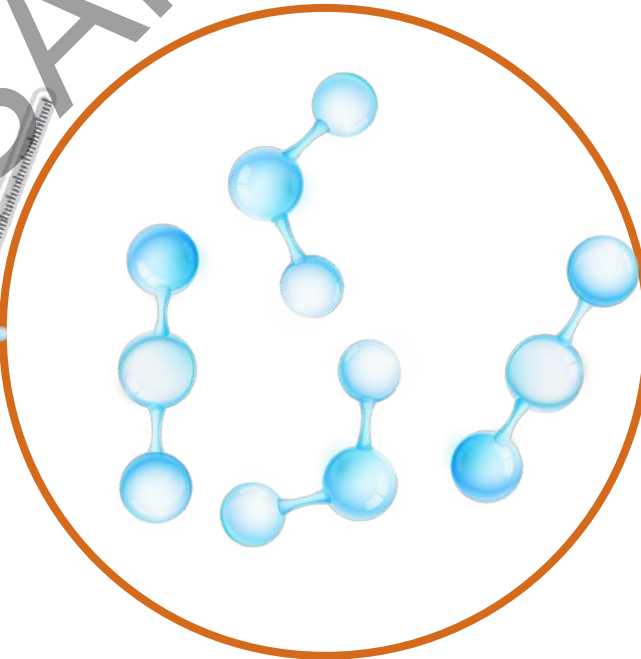
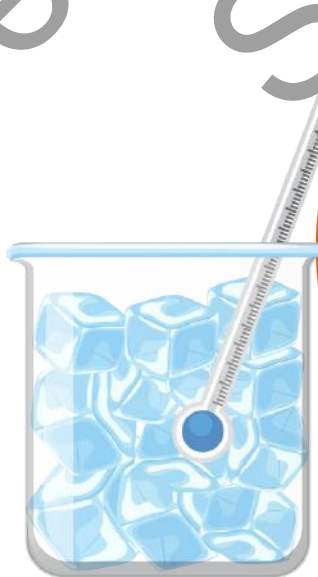
A large orange rectangular area for writing, surrounded by horizontal lines. The area is intended for students to write their answers to the questions above.

## How the Thermometer Works

When the temperature is hot, the liquid inside the bulb expands and rises up the tube. Think about when water boils on a stove. The molecules move quickly, causing the water to boil and 'jump' up. This is like when you run outside during recess and your body heats up.



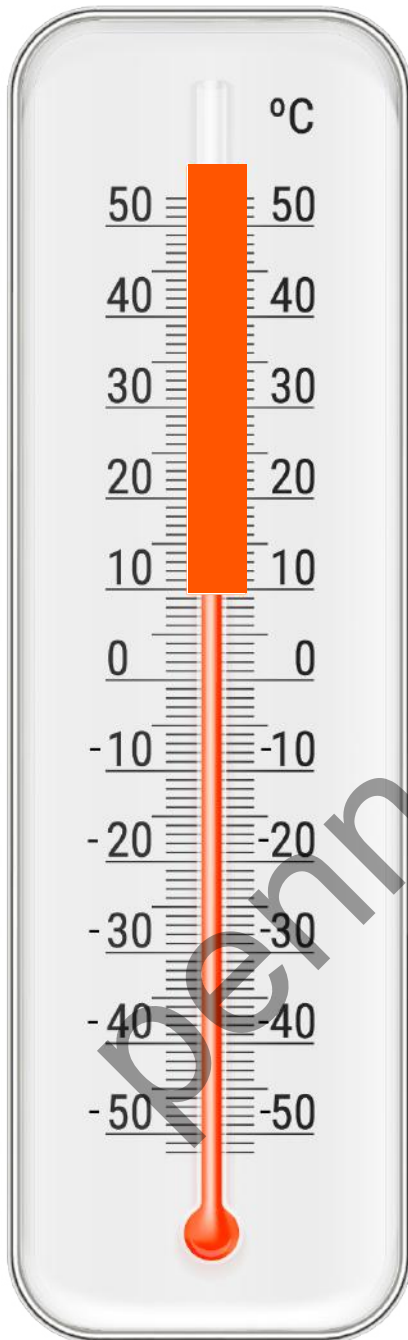
When the temperature is cool, the liquid contracts and moves downward through the tube. The molecules now move slowly. This is like you are sitting recess and your body temperature cools down.



## How to Read a Thermometer

In a glass thermometer, look at the liquid inside the tube. Read the level at which the liquid stops moving. In a digital thermometer, the display shows the temperature reading.

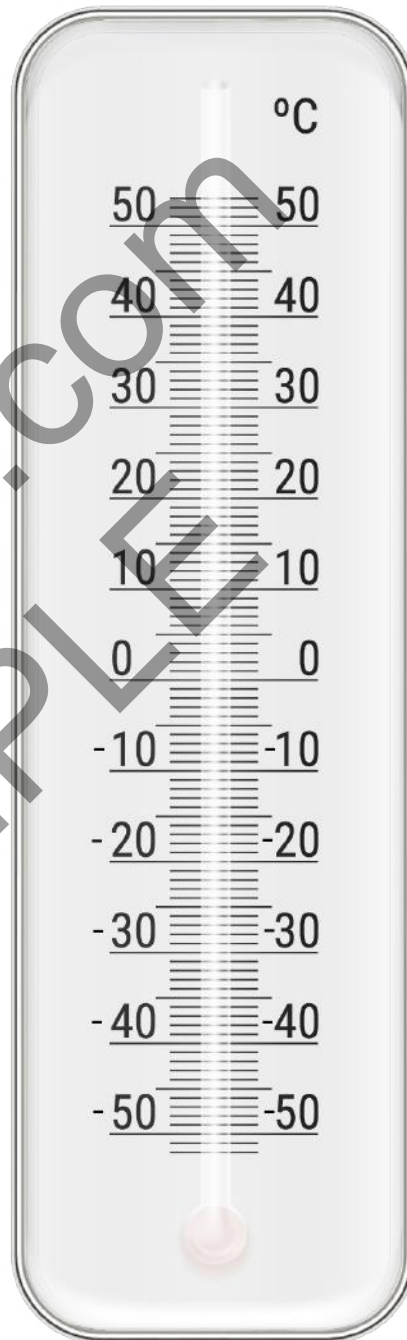
1.



\_\_\_\_\_ °C

Write the correct temperature.

2.

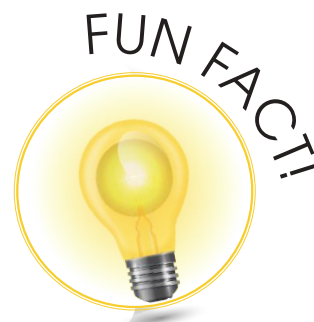


 °C

Colour in the temperature shown

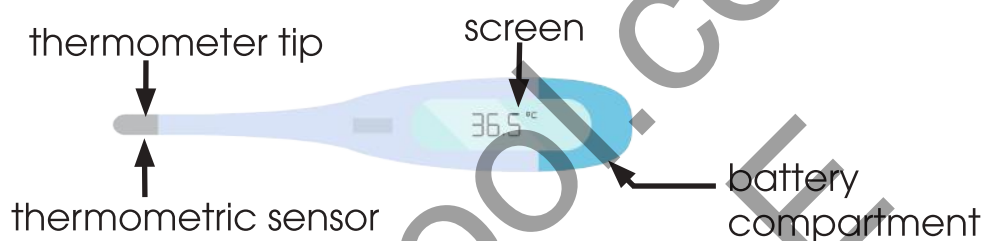


Daniel Gabriel Fahrenheit is considered to be the father of thermometers. He was a German physicist who dedicated his life to science and inventions. The modern mercury thermometer was invented by Fahrenheit. He is also credited for the invention of the mercury-in-glass thermometer.

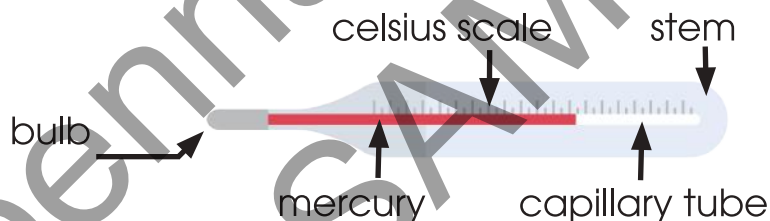


## Parts of a Thermometer

### Digital Thermometer



### Mercury Thermometer



There are different units to measure temperature, like Celsius ( $^{\circ}\text{C}$ ), Kelvin (K), and Fahrenheit ( $^{\circ}\text{F}$ ). In the Caribbean, we use Celsius ( $^{\circ}\text{C}$ ).

$0^{\circ}\text{C}$


$32^{\circ}\text{F}$

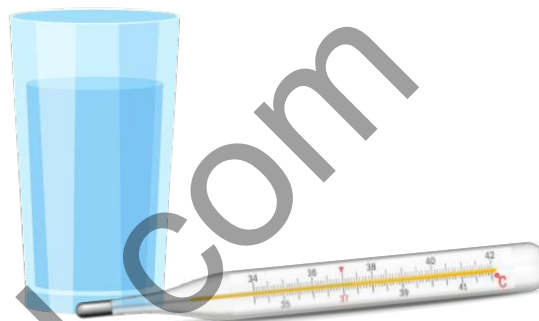
273 K



In this experiment, we will practise reading a thermometer.

### Materials Needed:


- 
- Hot water
- Cold Water
- Pencil



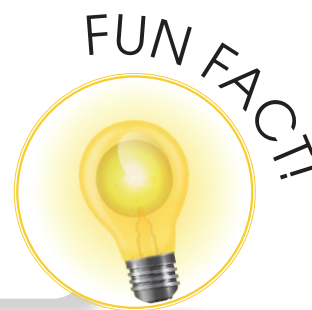
### Method:

1. Place the thermometer in hot water and take note of where the red liquid stops. Record it in the results table under "Hot Water."
2. Place the thermometer in cold water and take note of where the red liquid stops. Record it in the results table under "Cold Water."

### Results:

	Hot Water	Cold Water
Temperature in Celsius		

Absolute zero is the coldest possible temperature that any substance can reach. It is equal to 0 K (Kelvin) or  $-273.15^{\circ}\text{C}$  (Celsius). This is the point where the atoms in molecules stop moving, so they cannot get any colder!



# Solutes, Solvents and Solutions

Using the word bank provided, fill in the blanks to complete the sentences below. The words can be used more than once.

1. A \_\_\_\_\_ is a substance that dissolves a \_\_\_\_\_. It can be a liquid or a gas.

2. The substance being dissolved in the \_\_\_\_\_ is called the \_\_\_\_\_

3. An \_\_\_\_\_ substance is one that will not dissolve in a \_\_\_\_\_. An example of this is sand.

4. When a \_\_\_\_\_ dissolves in a \_\_\_\_\_ the mixture is known as a \_\_\_\_\_.

Word Bank



solution

insoluble

Go to [pennacool.com](http://pennacool.com) and complete the online exercises! Follow the steps at the start of the book



Separating Mixtures



In this experiment, we will determine which solutes are soluble and which are insoluble.

### Materials Needed:

- 1 tablespoon
- 1 tablespoon
- 1 tablespoon
- 1 tablespoon



- 1 tablespoon black pepper
- 1 tablespoon sugar
- 6 glasses (250 ml) of water

### Method:

1. In each glass, add the solute to the water, the solvent. Stir continuously for 3-5 minutes.
2. At the end of the time, observe the contents of the glass.

### My Hypothesis

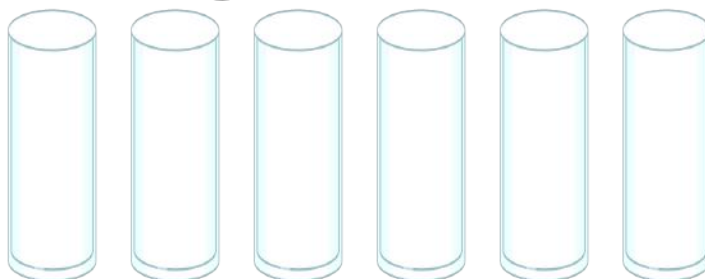
A hypothesis is an educated guess or belief that you make based on information you already know.

What is your hypothesis for the above experiment?  
What do you believe will happen?

I believe that

---

---



### Results:

Can you see bits and pieces of the solute in the liquid, or has it completely dissolved in the solvent?

In the table below, state your observations. Give your table a title.

**Title:** \_\_\_\_\_

Solute	Did it dissolve?

**Discussion and Conclusion:**

Based on your results, how many of your solutes were insoluble and how many were soluble? Name them.

**Soluble**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

**Insoluble**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

Name two other insoluble substances and one soluble substance that

**Soluble**

1. \_\_\_\_\_
2. \_\_\_\_\_

**Insoluble**

1. \_\_\_\_\_



# Temperature and Separating Solutions

Now that we know how to measure temperature, did you know that temperature can help separate mixtures? This is because different substances have different melting and boiling points. For example, the boiling point of water (the temperature it needs to turn from liquid to gas) is  $100^{\circ}\text{C}$ , whilst the boiling point of salt is  $1465^{\circ}\text{C}$ !

For this experiment, we will examine separating solutions using temperature.

## Materials Needed:



**PARENTAL  
SUPERVISION  
REQUIRED**

## Method:

1. Measure 2 cups of water and add them to the pot.
2. Measure out 1 cup of salt and add it to the water.
3. Using the spoon, stir the salt until it completely dissolves.
4. Place the pot on the stove and turn on the burner to medium-high heat.
5. Using the thermometer, measure and record the temperature of the water.
6. Once the water starts to boil, measure and record the temperature again.
7. Leave the water to boil until all has evaporated, then turn off the stove and remove the pot.
8. Carefully look inside the pot and record any observations.

## Results:

Write your results in the sentences below.

The temperature before boiling was \_\_\_\_\_.

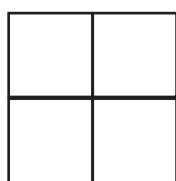
\_\_\_\_\_.

After all the water evaporated, there was \_\_\_\_\_.

# Surface Area and Separating Solutions

We should know that **area** is the measure of the size of a flat surface, or a two-dimensional object. **Surface area** on the other hand, measures the total surface of a **three-dimensional object**. They are both measured in **square units**.

How many square units are in this square? Count the smaller squares.



\_\_\_\_\_ square units

What is the **surface area** of this cube? **Hint:** Count all the squares that cover the cube, don't forget the sides of the cube you cannot see!



\_\_\_\_\_ square units

Depending on the shape of the object, the surface area can be large or small. Objects with a large surface area allow for faster evaporation than objects with a smaller surface area. This is because the liquid has more surface area to come into contact with the air.



For this experiment, we are going to examine the effects of surface area on the rate of evaporation of water.

**Materials Needed:**

- 
- 

**Method:**

1. Measure out 1 cup of water and pour it into the cup.
2. Measure out 1 cup of water and pour it into the bowl.
3. Place both the cup and the bowl outside in the sun.
- 4.
5. Pour out the water from the cup into the measuring cup, record the volume, then empty the water into some plants.
6. Pour out the water from the bowl into the measuring cup, record the volume, then empty the water into some plants.

**Results:**

Draw a diagram of your experiment set up below.

Diagram area for drawing the experiment set up.

The volume of water in the cup after 4 hours was \_\_\_\_\_.


The volume of water in the bowl after 4 hours was \_\_\_\_\_.

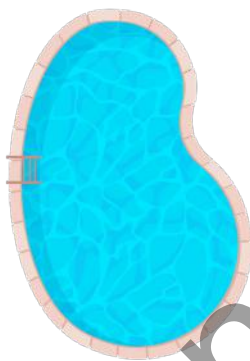
## Discussion and Conclusion:

Did the containers have different amounts or the same amount of water at the end of the experiment?

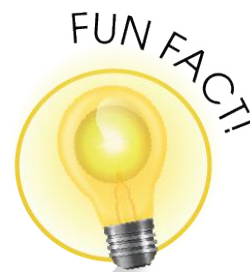
If there were different volumes of water, which container had the least?



If you were to collect rainwater in two containers, a water tank and a swimming pool, which container do you think the water would evaporate from the  and why?



Animals with a lot of surface area, such as elephants, can lose heat more easily than animals with less surface area, such as mice. This helps elephants to stay cool in hot environments.



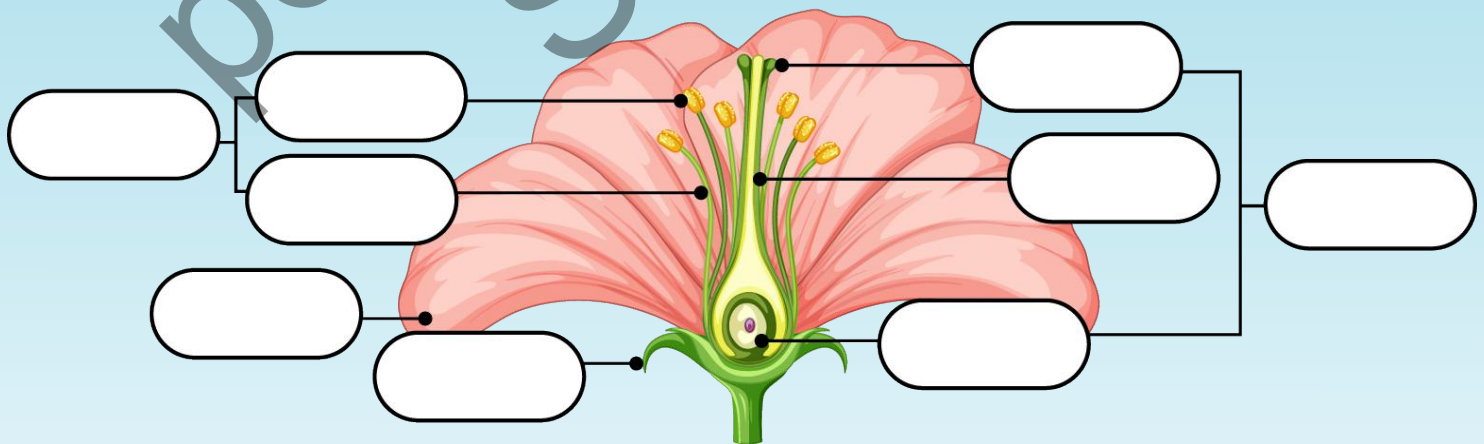
# 4. Parts of the Flower

RESEARCH IT!



Label the parts of the flower using the word bank below.

stigma	<input type="text"/>	anther
calyx/sepal	<input type="text"/>	pistil
style	<input type="text"/>	filament







Find a flower that you like and observe it carefully. In the space provided below, draw your flower and label it with the parts on the previous page.

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SAMPLE

This flower is a \_\_\_\_\_

Solve the colour codes to complete the colouring of the flower.

1. A primary colour. \_ e \_ l \_ w
2. This  has only 3 letters. \_ \_ \_
3. This colour is a mixture of yellow and blue. \_ \_ \_ \_ n
4. This colour is a mixture of 



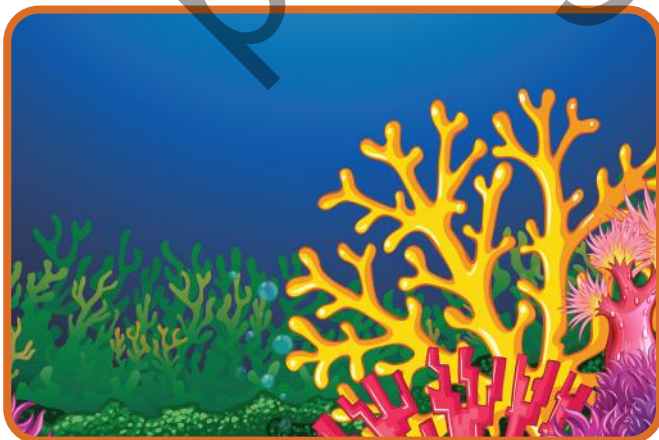
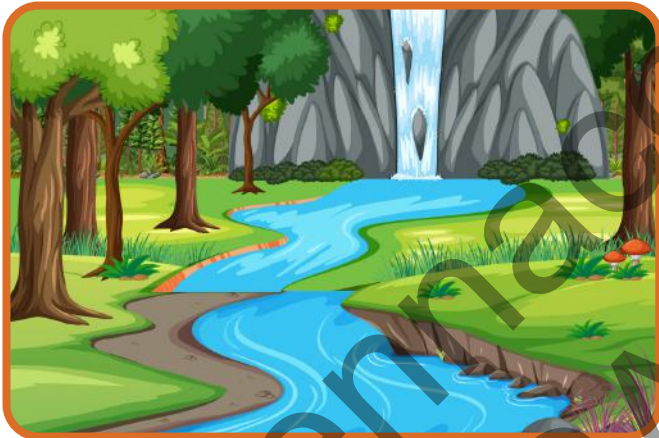
## 5. Aquatic Habitats and their Threats

### Aquatic Habitats

Aquatic habitats are ecosystems on Earth that are mostly filled with water. These include rivers, ponds, swamps and marine environments such as reefs and the deep sea.

One of the biggest differences among aquatic habitats is the amount of salt they contain, which is known as salinity. Freshwater habitats have very low salinity whilst saltwater or marine habitats have very high salinity.

Look at the pictures below and identify whether they are **freshwater** or **saltwater** habitats.



Identify one animal that lives on a Caribbean coral reef.  
Draw and colour your animal in the box below.



## Spot the Lionfish

Lionfish are an invasive species. We can help do our part to protect our reefs by catching the lionfish. There are  lionfish hidden in the picture, can you find them all? Be sure to cross them out!





## World Oceans Day

On June 8th every year, the world celebrates World Oceans Day. On this day, issues affecting the oceans, mostly due to human activities, are brought to attention and solutions to these problems are encouraged.

**The theme for World Oceans Day this year is:**

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Draw and colour a picture depicting one way in which you can

pennacool.com  
SAMPLE

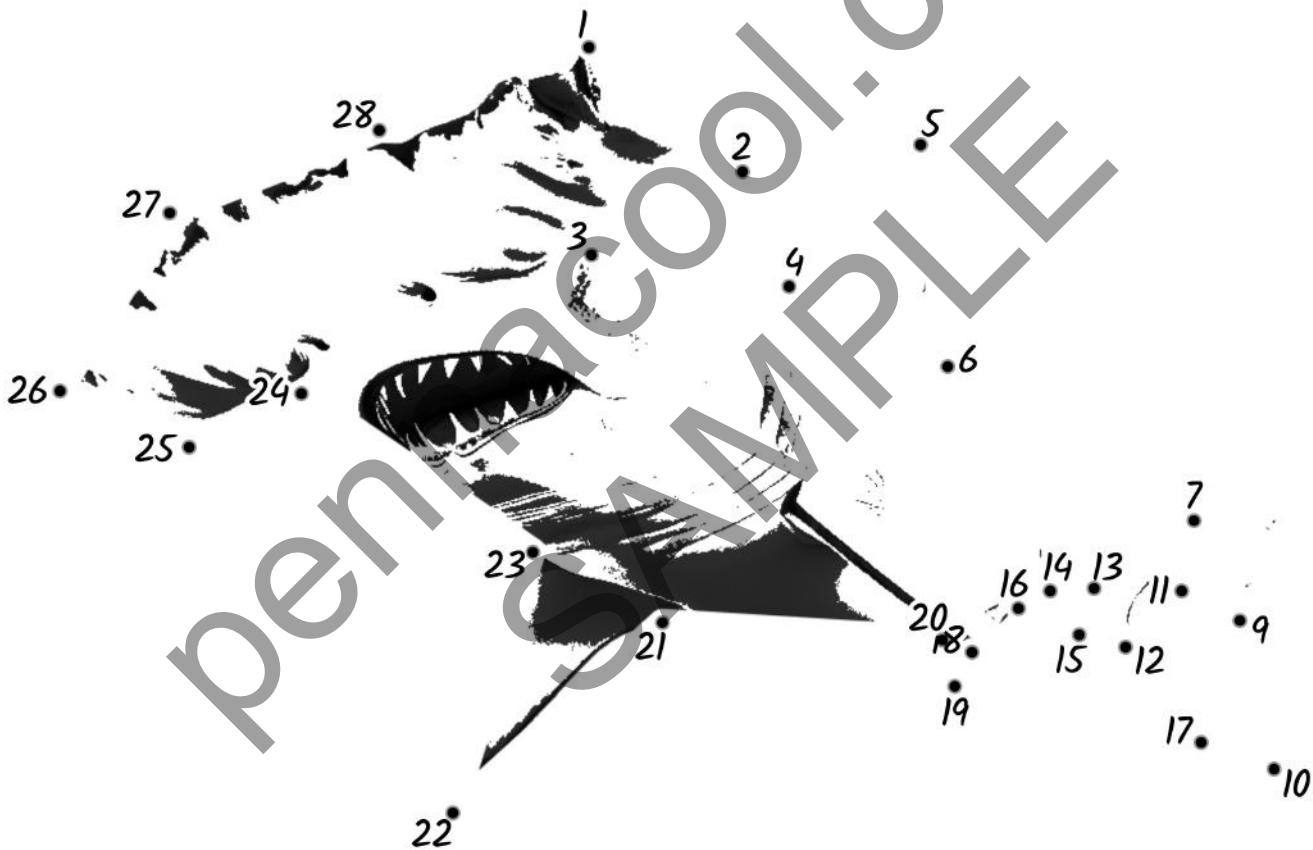
Coastal wetlands such as mangrove forests and marshes have both saltwater from the ocean and freshwater from land. Due to the mixing of these waters, they are known as **brackish** environments.



FUN FACT!



Complete the drawing below to determine which critically endangered animal can be found in Trinidad and Tobago's marine environment.



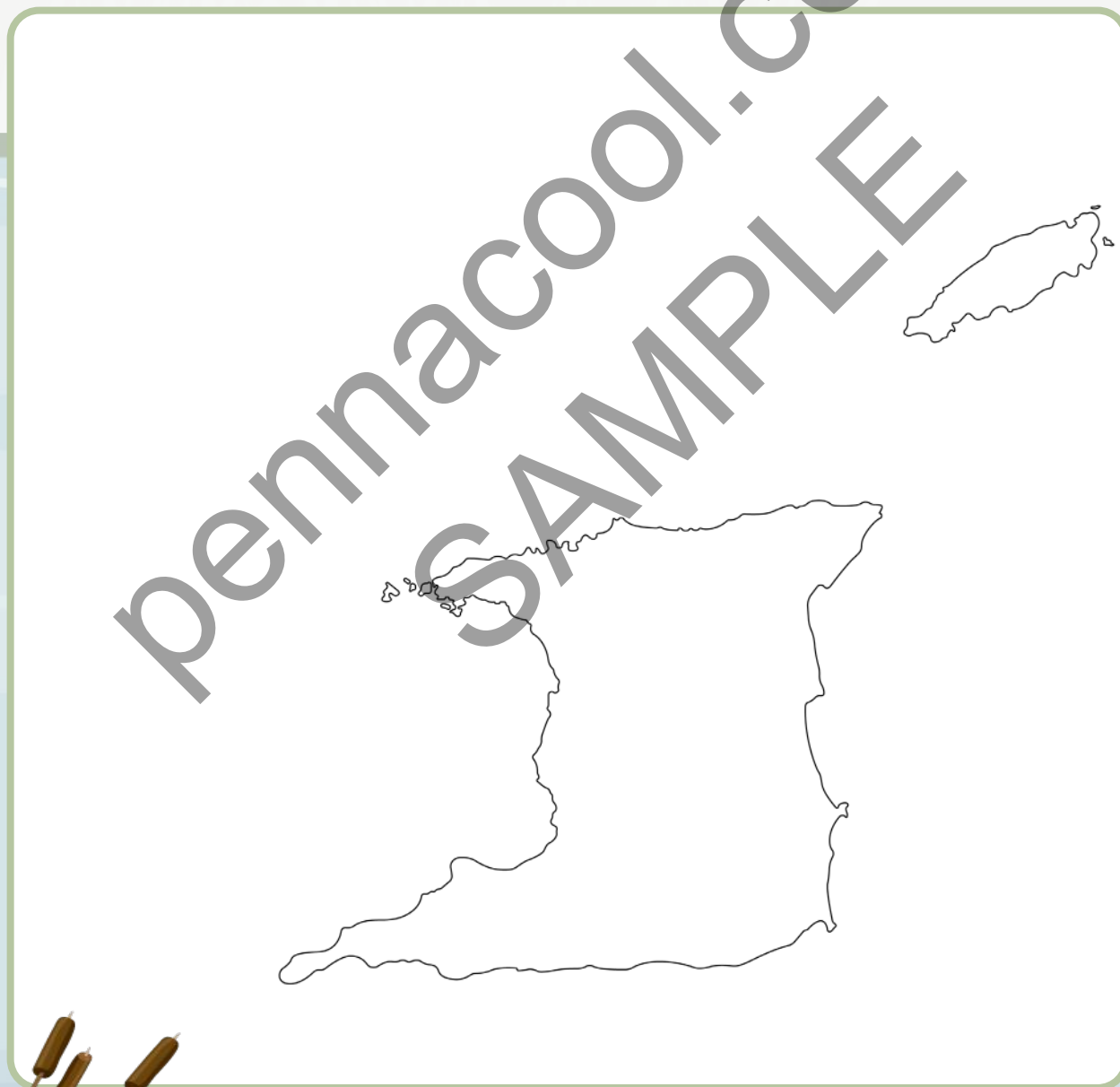
The \_\_\_\_\_ is critically endangered and should be protected.

# Wetlands

Wetlands are areas of land that are covered with water either permanently or seasonally. In Trinidad and Tobago, we have three wetlands of international importance; the

Swamp and Nariva Swamp.

Use the map below to draw in the location of the in Trinidad and Tobago. Be sure to include your title, appropriate symbols.



## A Letter to the Environmental Management Authority (EMA)

Oh no! Someone is cutting down trees and shrubs in the Nariva Swamp. The cuttings are getting into the river and clogging the flow of water. Many of the animals living in the area are forced to flee.

Write a letter to the EMA informing them of the situation and identify **three reasons** why this particular wetland should remain protected. Be sure to include specific examples of what plants and animals can be found in the area.

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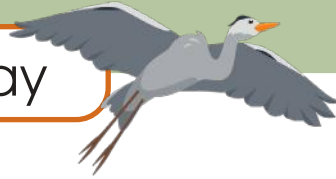
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## World Wetlands Day



Every year on [REDACTED] the world celebrates World Wetlands Day. This is an important day where people around the world bring attention to the importance of wetlands and the issues that affect them due to human activity.

The theme for World Wetlands Day this year is:

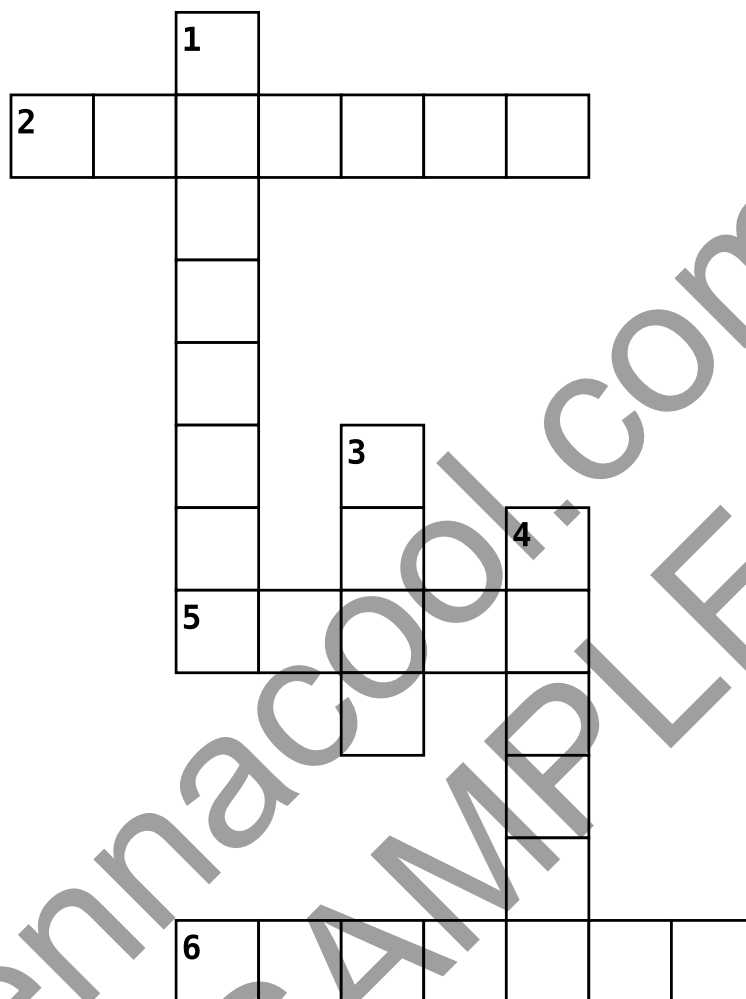
---

Draw and colour a picture depicting what you have learned about this year's theme.

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SAMPLE



Complete the crossword below to find out why wetlands are important



Wetlands are important because they...

### Down

**1.** provide \_\_\_\_\_ for endangered animals.

**4.** \_\_\_\_\_ carbon dioxide from the atmosphere and store it.

### Across

**5.** \_\_\_\_\_ water which prevents flooding.

**6.** \_\_\_\_\_ coastal areas from erosion.



# Natural Threats to Aquatic Habitats.

## Climate versus Weather

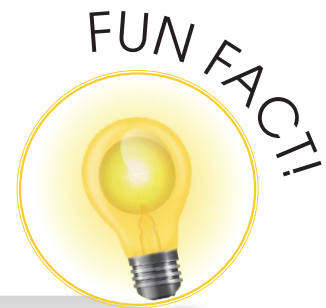
**Climate** is a pattern of weather in a specific area over a long period of time, such as 30 years or more. For instance, the climate in the Caribbean is tropical whilst in Alaska it is polar.

**Weather**, on the other hand, describes the conditions in the atmosphere at a particular time of day, days or sometimes weeks. Today it might be sunny in the morning but rainy in the afternoon. These are different types of weather.



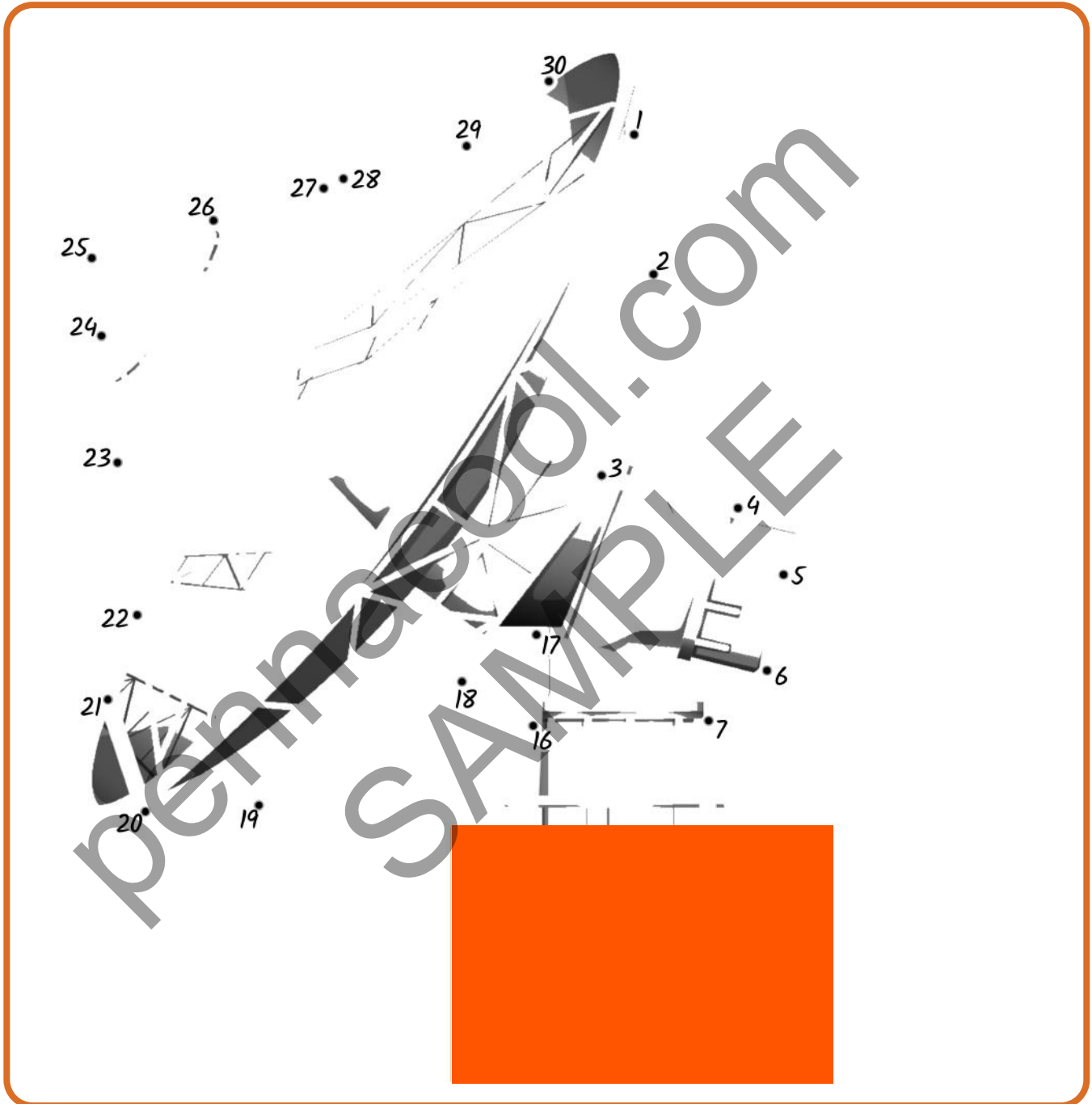
Longitude and latitude lines are imaginary lines that divide the Earth. The lines of latitude help us to determine the different  
sunlight they receive.

From the Churruca's Observatory on Observatory Street, Belmont, the first accurate meridian in the new world was drawn. These are the **lines of longitude**.



## Weather Technology

Weather and climate have become easier to track due to advances in technology. Connect the dots to show what invention helped fast track the prediction of climate and weather.



Did you know that the satellite tracking station in Chaguaramas held great importance in space explorations? It was built to track and communicate with satellites that orbit the Earth. By receiving signals from various satellites, scientists and engineers are able to gather data about space and weather patterns and even help predict natural disasters.

## Rapid Climate Change

Fill in the blanks with words from the word bank.

Humans have been emitting \_\_\_\_\_ amounts of \_\_\_\_\_ gases, which are causing the Earth to warm

\_\_\_\_\_ and \_\_\_\_\_.

The higher temperatures are causing \_\_\_\_\_ patterns to change, leading to heavier rainfall, drier dry seasons and \_\_\_\_\_ storms. If these changes aren't slowed down, the \_\_\_\_\_ will change rapidly, creating several \_\_\_\_\_ for life on Earth, such as \_\_\_\_\_, \_\_\_\_\_, flooding and sea level rise.

### Word Bank

hazards  
hotter  
climate  
faster  
drought  
cars  
greenhouse

deforestation  
weather  
wildfires  
copious  
animal farms  
stronger

Match the cause with the effect and write a sentence using both.

**Cause**

**Effect**



Sea Level Rise

Death and property destruction



Hotter Temperatures

Coastal flooding

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_
4. \_\_\_\_\_  
\_\_\_\_\_

# Man-made Threats to Aquatic Environments

Human activity has not only affected the way our climate works, but it has also caused damage to our aquatic environments, affecting all living things within them. Let's have a look at three different threats.

## 1. Oil Spills



On the evening news, the reporter broadcasts that a major oil spill has occurred on Tobago's south-western coast. Oil spills can occur on both land and in the sea and are usually accidents with very long lasting effects.

### Materials Needed:

- ☐
- ☐
- ☐
- ☐
- ☐





- ☐ 1 roll of paper towels
- ☐ 1-2 medicine droppers
- ☐ 1 bottle of dish soap
- ☐ Plastic sea animals (optional)

### Method:

1. Fill your container halfway with water. Add your plastic animals to the water (if you have).
2. Slowly pour some of the cooking oil into the water. Observe what happens to the oil.
3. Using the cotton ball, paper towels and medicine dropper try to remove the oil from the water and the plastic animals, if you have. Take note of how well each method works in your results table.
4. Now add a bit of dish soap to the water and your plastic animals. Observe what happens. Take note of your observation in your results table.



**Results:**

Material	Observation
	
	
Medicine Dropper	
Dish Soap	



## Discussion:

1. What did you notice about the oil when you added it to the water?

---

---

2. Of the materials you used, which was the **most** effective in removing the oil? Why do you think so?

---

---

---

3. Of the materials you used, which was the **least** effective in removing the oil? Why do you think so?

---

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## Conclusion:

What are some of the things you have learnt about oil spills from this experiment?

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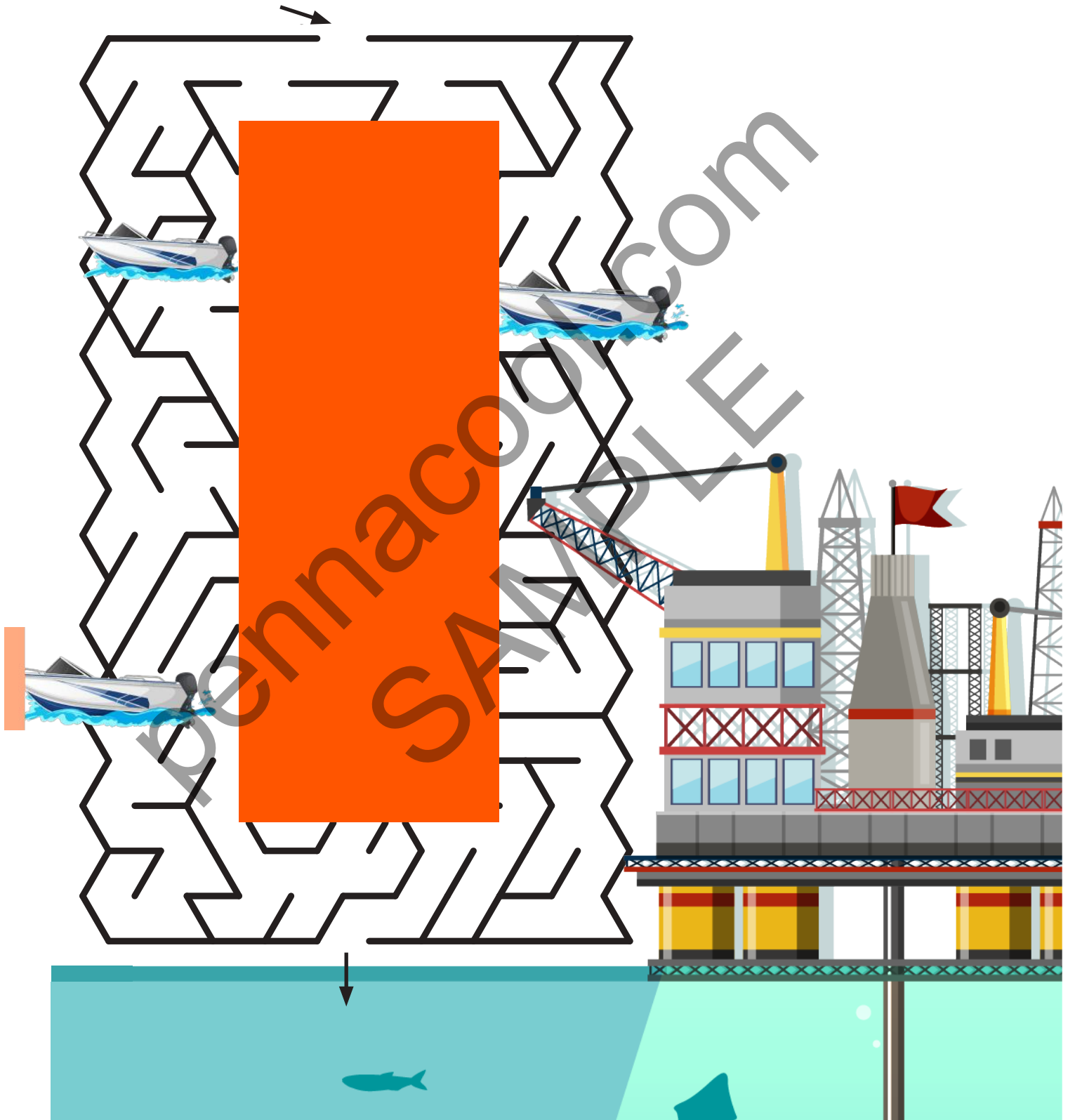
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## Tobago Oil Spill

Oh no! The Tobago Emergency Management Agency (TEMA) just received reports of an oil spill off the coast of Tobago. The team has to get to the overturned ship to investigate the spill. Guide the team through the maze to the spill so they can start their investigation.



## 2. Plastics

Plastic is a non-renewable and non-biodegradable material. This means that it does not add back to the environment the same way a leaf or dead tree does. Every plastic item that is thrown away will stay in the environment for hundreds of years! We produce millions of tonnes of

oceans. This plastic is then broken down into microplastics, which are smaller pieces of plastic that can't be seen by the human eye.

To prevent this from happening, we need to practise the four R's: **Refuse, Reduce, Reuse** and **Recycle**.

List 4 different products or materials made from plastic:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

How do you think aquatic habitats would be affected by this plastic infestation?

---

---

---

---

---

### 3. Overfishing

As the human population grows, and with advancements in technology, securing food has become easier and faster. Unfortunately, this has led to humans taking more than they need and faster than it can be replaced.

In our aquatic environments, overfishing is a huge

\_\_\_\_\_ webs and habitats.

Look at the picture. Each fisherman can catch 25 fish in a day. Each fish represents 10 fishes.



If the fishermen fish on the reef today, how many fish will be left over, assuming they catch as many fish as they can.

---

If the fishermen come back tomorrow, will there be enough fish for them to fill their quota?

---

## Overfishing Awareness Poster

Make a poster that can be placed in coastal communities to discourage  
Use pictures and words that describe the negative

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SAMPLE



## WORD SEARCH

Complete the word search below to identify some common words used throughout this lesson.

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

aquatic  
destruction  
nonbiodegradable  
nonrenewable

oil spills  
overfishing  
plastics  
recycle

reduce  
refuse  
reuse

PLASTIC

GLASS

PAPER

METAL

MIXED

E-WASTE

ORGANIC






## 6. Plant and Animal Relationships

### Plant and Animal Interdependence

Every ecosystem has its own set of plants and animals that work together to make the ecosystem healthy.

For example, in a forest ecosystem, trees make the oxygen that animals breathe, and animals produce the carbon dioxide that plants need to grow.

Name one reason  butterflies and birds.

---

Name one reason not previously mentioned why rabbits and deer may need .

---

These plants and animals are working **interdependently** with one another. One way we can see this interdependence in nature is by creating **food webs**.

## Food Webs

Animals and plants interact with each other through feeding relationships. These are easy to track in a food chain. Many **food chains** interlinked with each other become a **food web**.

Using the animal bank below, construct a **terrestrial food web** in the space provided.

mango tree  
agouti  
ocelot



blackbird  
dried leaves  
earthworm

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SAMPLE

Using the animal bank below, construct an **aquatic food web** in the space provided.

Hawksbill turtle

sea sponge

lionfish

green turtle

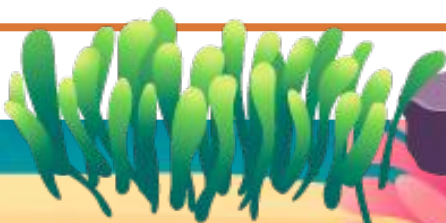
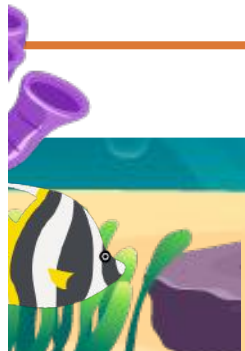


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SAMPLE





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SAMPLE





# Disruption of a Healthy Ecosystem

Sometimes natural or human influences can disrupt an ecosystem, such as when a foreign species is introduced. This can cause declining populations in the native species as the new species preys on them uncontrolled.

## The Invasive Lion Fish

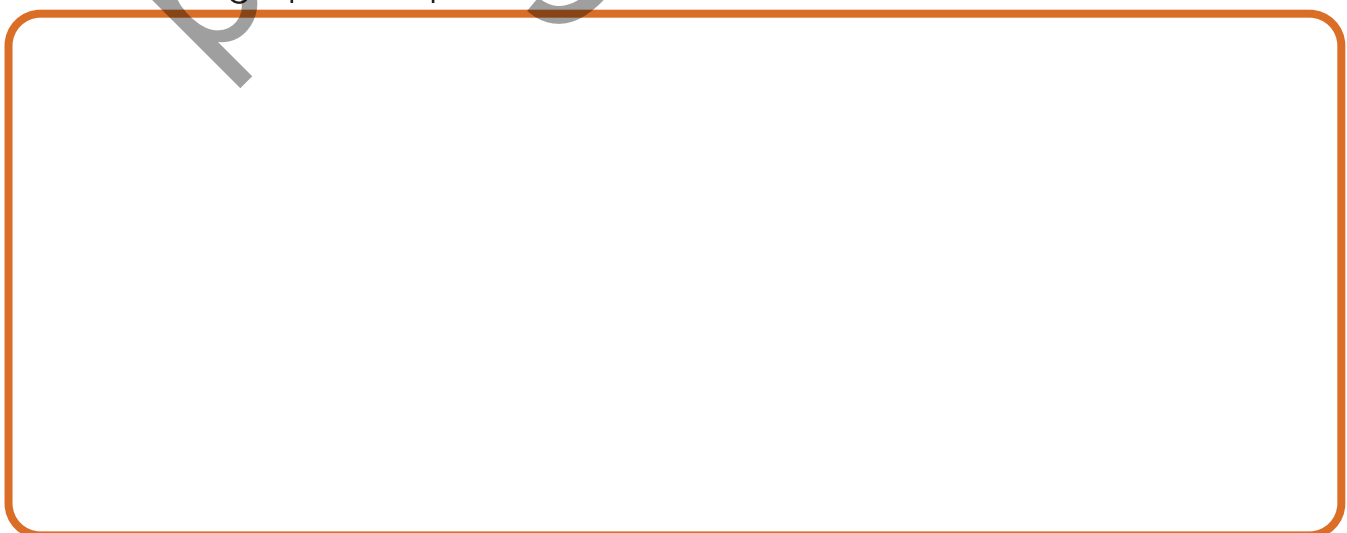
The following exercise will take you through the example of the invasive (non-native) lionfish in the Caribbean Sea ecosystem.

The table below shows the population of juvenile **yellow snappers** in the Buccoo Reef over a period of 10 years.

Year	Yellow Snapper Population
2013	
2015	
2017	
2019	
2021	
2023	100

**Table 1:** Yellow Snapper population in Buccoo Reef over a period of 10 years

Draw a bar graph to represent the data in Table 1.



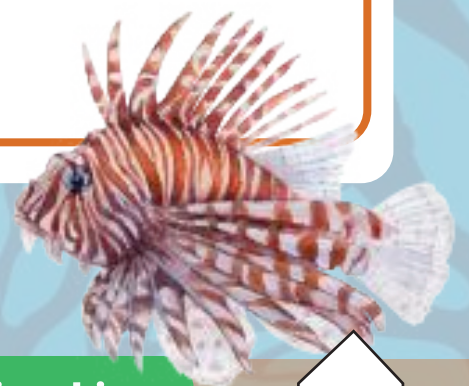


The table below shows the population of **lionfish** in the Buccoo Reef over a period of 10 years.

Year	Lionfish Population
2013	100
2015	
2017	
2019	
2021	
2023	

**Table 2:** Lionfish population in Buccoo Reef over a period of 10 years

Draw a bar graph to represent the data in the Table 2.



What do you notice about each population during the given time period?

---

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---

---

What conclusion can you draw about the relationship between the two populations?

---

---

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---

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SAMPLE

Go to **pennacool.com** and complete the online exercises! Follow the steps at the start of the book



# 7. Alternative Energy

**Energy** is the power needed to provide light and heat and to move machines.

In Trinidad and Tobago, this energy is derived mostly from the burning of fossil fuels such as petroleum and natural gas.

**Fossil fuels** are the decomposed remnants of plants and animals that lived millions of years ago. When they are burnt, they release greenhouse gases into the atmosphere. The more energy we use from burning fossil fuels, the more carbon dioxide and methane we put into our atmosphere. This increases the warming effect on the planet, contributing to rapid climate change.

Complete the image to show an alternative source of energy to fossil fuels. Use the line of symmetry as your guide.



Fill in the blanks using the word bank to determine why energy from the sun is a good alternative for us in Trinidad and Tobago.

emitted  
renewable  
twelve  
solar

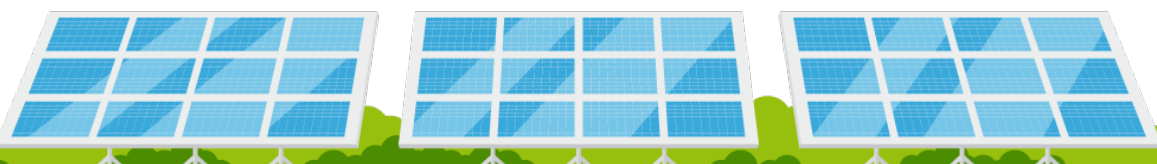
climate  
Caribbean  
sunlight  
alternatives

repeatedly  
device  
solar  
greenhouse

depleted  
sourced

\_\_\_\_\_ energy is one of the best \_\_\_\_\_  
to fossil fuels. It is a \_\_\_\_\_ form of energy. That is, it  
can be used \_\_\_\_\_ without being \_\_\_\_\_.

\_\_\_\_\_ every day. When we use a \_\_\_\_\_  
that is powered by \_\_\_\_\_ energy, no  
\_\_\_\_\_ gases are \_\_\_\_\_. This means that  
we will not be contributing to rapid \_\_\_\_\_ change.



Complete the table with pictures or drawings of some of the ways in which solar energy can be used.

Description	Picture
	
	
	
Photosynthesis	
Drying clothes	

Let's get cooking!

One of the easiest ways we can use solar energy is to heat up our food. To do this, we are going to make a solar oven.

### Materials Needed:

- A box with a lid, such as a pizza or shoe box
- 1 roll of foil
- 
- 
- 
- 
- 

**PARENTAL  
SUPERVISION  
REQUIRED**

### Instructions:

1. On the lid of the box, trace out a square or rectangle, leaving about 3cm between the sides of your shape and the edge of the box.
2. Use a knife or scissors to cut out 3 of the sides of your shape, leaving the side closest to the back of the box uncut. This will leave you with a flap in your lid that can be opened and closed.
3. Open the entire lid of the box and line the bottom and sides of your box with foil. Use the same foil to line the underside of the flap that you cut out, ensuring the foil lays smooth with minimal wrinkles. Use tape to hold everything in place.
4. On the underside of the lid, cover the opening with plastic wrap, pulling it taut and securing with tape. The plastic will trap the heat in the box.
5. Use a wooden stick or skewer to prop open the lid flap when the lid is closed.
6. Test out your oven!





**Complete the questions below about your solar oven.**

What did you make with your oven?

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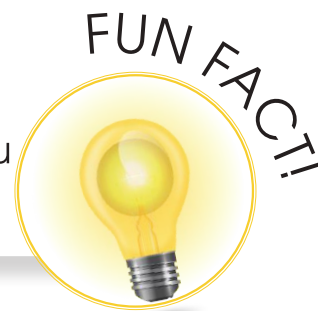
Why do you think you put foil on the lid flap?

---

What are some of the other things you can cook in your solar oven?

---

In some places, the temperatures heat up so high that you can cook an egg on the sidewalk!



## WORD SEARCH

Let's review some of the terms we learnt this lesson.

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

climate  
conservation  
depleted  
electric  
energy  
fossil fuels  
heat  
photosynthesis

power  
renewable  
solar  
source  
sun  
sunlight  
sustainable

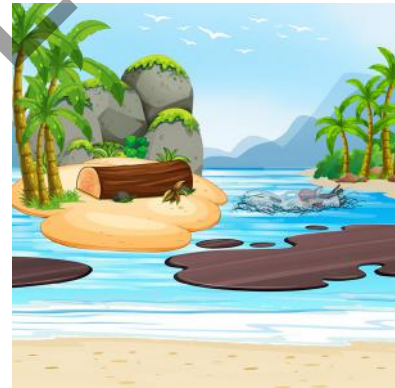
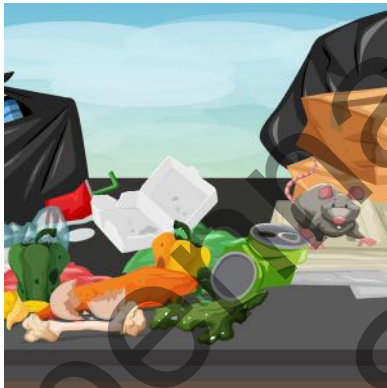
## 8. Pollution

Pollution is the contamination of an environment with substances that can cause harm. There are three major types of pollution: **land**, **air** and **water**.

### Land Pollution


**Land pollution** occurs when areas on the Earth's surface are polluted with items or substances that should be disposed of in a landfill.

Circle the sources



# Causes and Effects of Land Pollution

Match the causes of land pollution with its effects. Then, on the lines provided, write the sentence created after matching.

Cause	Effect
Plastic water bottle	Increases soil erosion and destroys habitats for animals and plants
Excessive pesticide and fertilizer use	Can harbour mosquitoes and is dangerous to animals. Never breaks down.
	Destroys soil quality

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# Water Pollution

**Water pollution** occurs when aquatic areas are polluted with items or substances that can cause harm to the environment.

Circle the sources of



# Causes and Effects of Water Pollution

Match the causes of water pollution with its effects. Then, on the lines provided, write the sentence created after matching.

## Cause

## Effect



Excessive pesticide  
and fertilizer use

Plastic waste

Reduces water quality and  
can make humans and  
animals sick

Spread quickly and can trap  
and choke wildlife.

Poisons the water for humans  
and animals and is difficult to  
fully clean up.

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_

\_\_\_\_\_

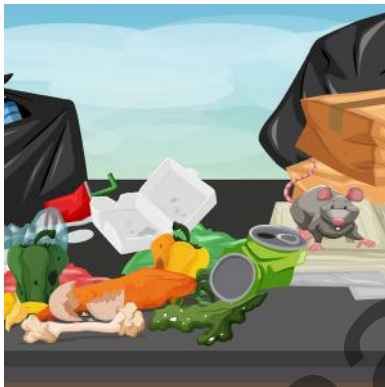
\_\_\_\_\_



# Air Pollution

**Air pollution** occurs when the atmosphere is polluted with excessive harmful chemicals to the extent that it causes harm to living things in the environment.

Circle the sources of



# Cause and Effect of Air Pollution

Match the causes of air pollution with its effects. Then, on the lines provided, write the sentence created after matching.

## Cause

Burning fossil fuels



Volcanic eruptions

## Effect

Releases harmful smoke that causes respiratory problems

Adds greenhouse gases to the atmosphere, leading to global warming

Releases harmful gases, like sulphur dioxide, which contribute to acid rain

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Time Traveller

You jump in a time machine and visit the year 2050. Air, land and water pollution in Trinidad and Tobago has skyrocketed. Write an emergency letter to send back to the present day. Describe your environment, how you feel and what needs to be done now to prevent that future from happening.

Handwriting practice lines for writing the emergency letter.

## Spot the Difference

Spot the differences in the pictures below.

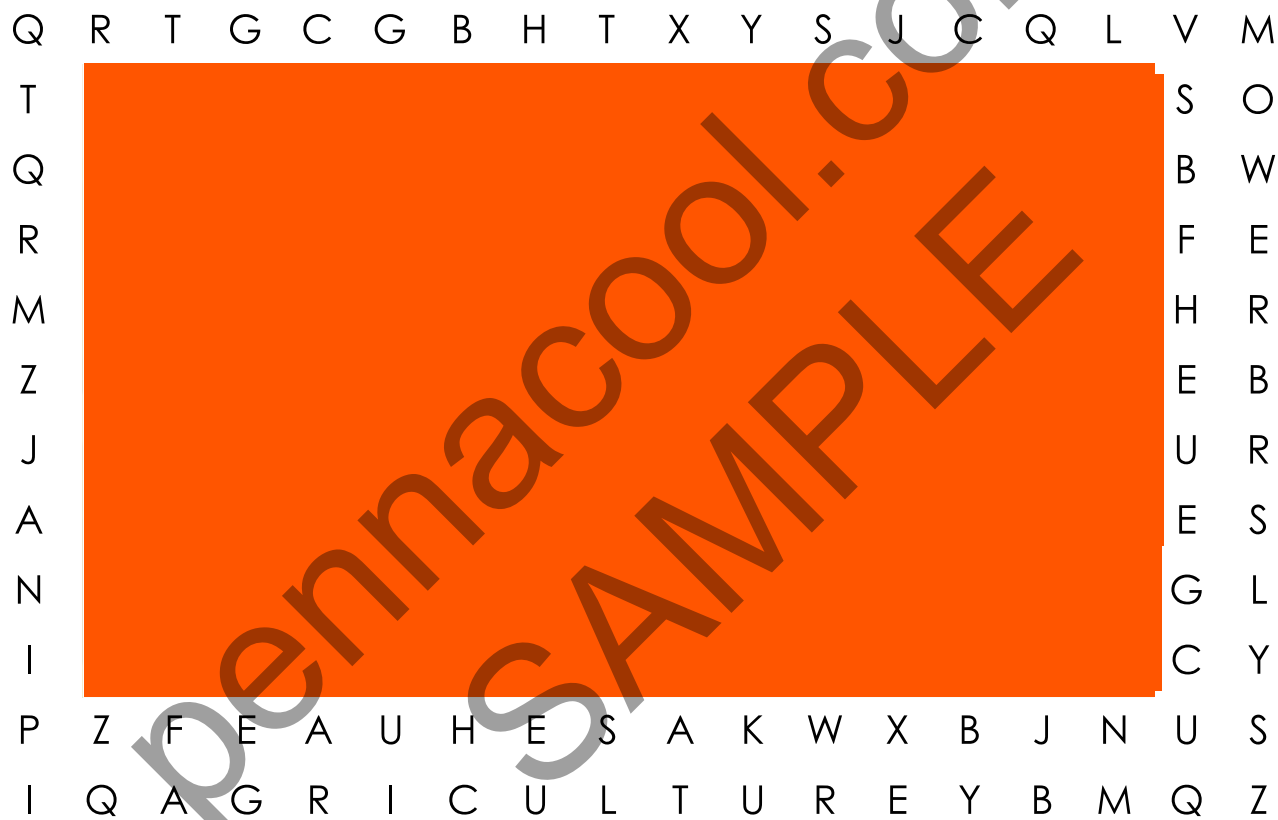


# AGRI- SCIENCE



## 9. Agricultural Technology and Animals

**Agricultural technology**, or agri-tech, is the techniques, machinery and other equipment used in agriculture that make farming easier. It helps farmers grow more food, keep it healthy, and make sure we have plenty to eat.



AGRICULTURE  
AQUAPONICS  
COMBINE  
CULTIVATOR

GREENHOUSE  
HARVESTER  
HYDROPONICS  
MOWER

PLANTER  
SPRAYER  
TECHNOLOGY  
TRACTOR



RESEARCH IT!



Name one agricultural technology used to raise livestock.



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## Chicken Technology

Chickens are by far the largest single source of poultry meat and eggs in most countries. To rear chickens, we can use various agricultural technologies. Agricultural technologies are used in the rearing of animals to monitor their health and ensure the best end product is obtained.

RESEARCH IT!



Complete the KWL chart about rearing chickens. Write what you know in the first column. In the second column, write what you would like to learn about. Research the information. In the last column, write what you have learnt.

<b>K</b> What I know		<b>L</b> What I learnt



### Protect the chickens!

Joshua lives in Delaford, Tobago. His granny has a small chicken farm. Name 3 possible predators that may attack the chickens.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

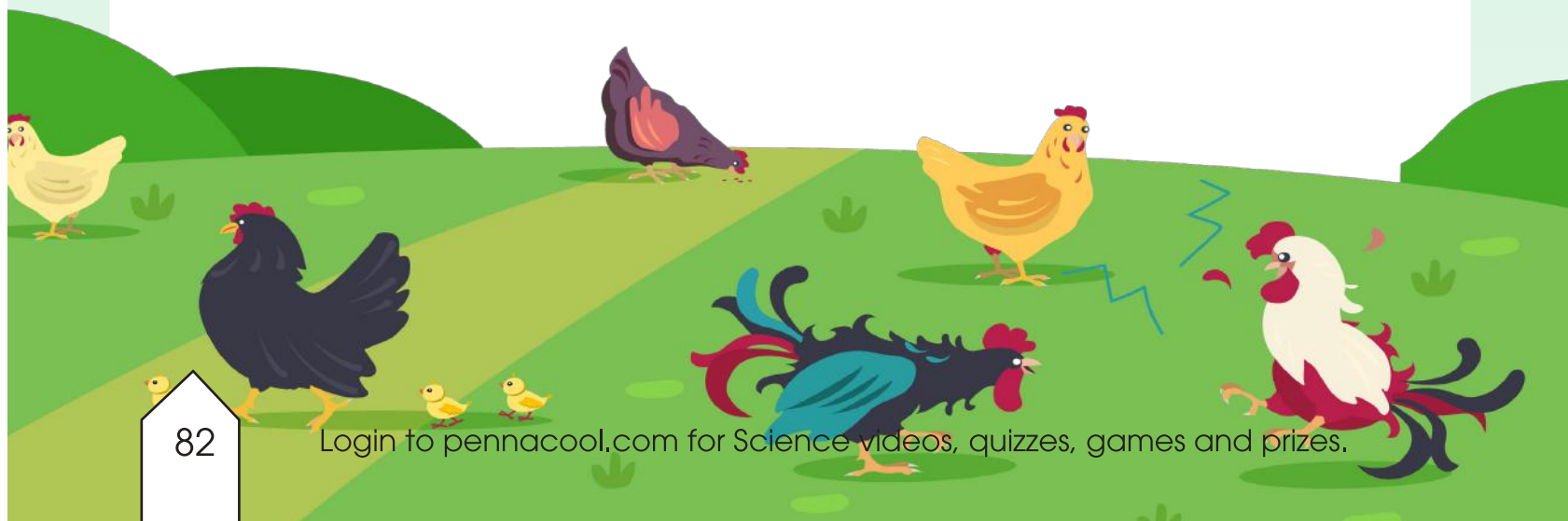
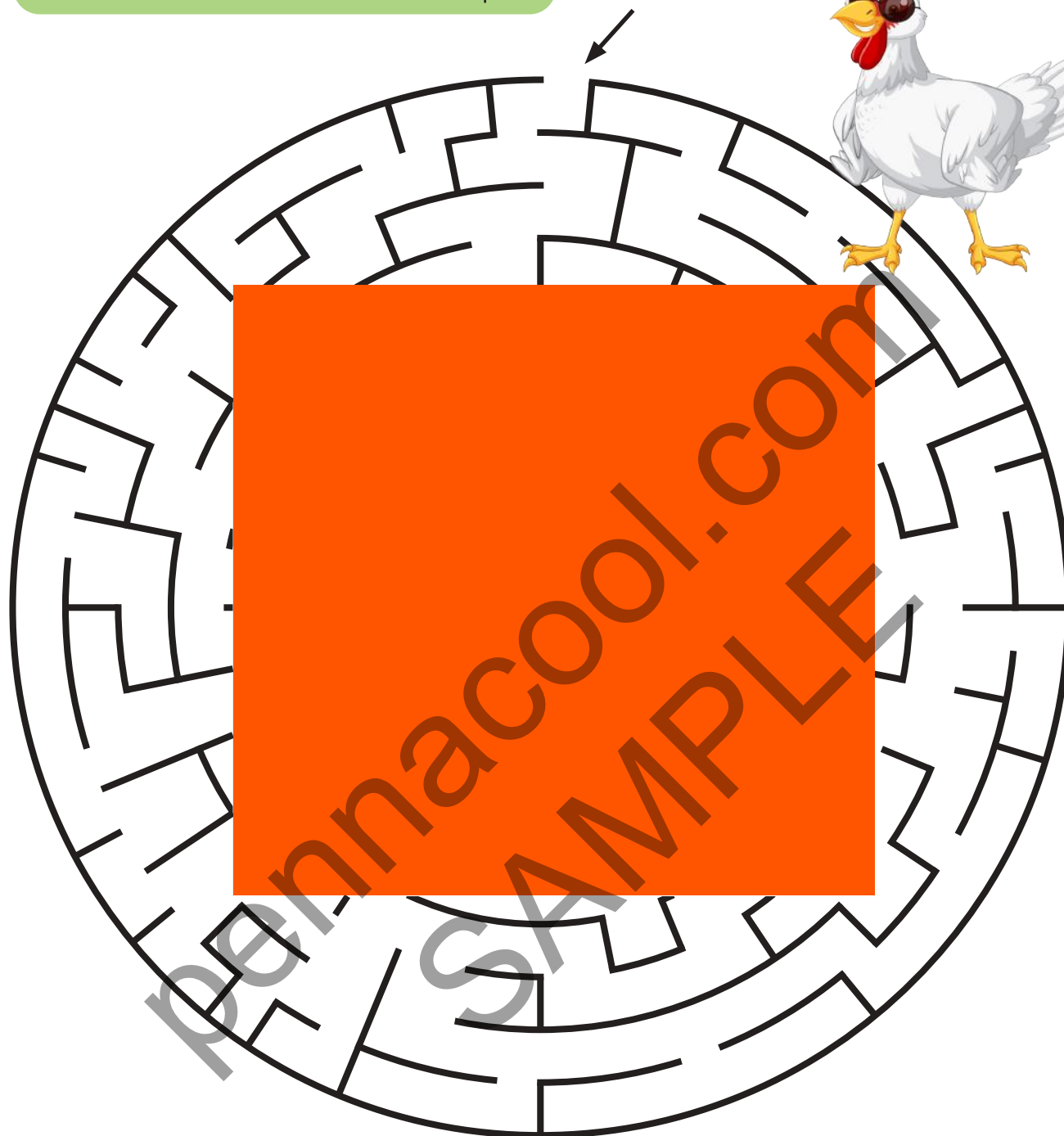
For any of the predators named above, give one possible solution to protect the chickens.

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

Draw a schema showing your own chicken farm set up.  
(Note: \_\_\_\_\_)



Guide the rooster into the coop.



## The Class Pet

Kiera's teacher got a class pet. It is a beautiful brown rabbit that came in a cardboard box. Write three (3) items \_\_\_\_\_ rabbit in the classroom.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

Draw a map of your classroom. Label the most ideal place to keep your rabbit.



Discuss 2 reasons why this is the most \_\_\_\_\_

1. \_\_\_\_\_

2. \_\_\_\_\_

## Animal Care

1. Be safe when working with animals.
2. Do not put your fingers into an animal's mouth, ears or eyes.
3. Never hit or squeeze an animal.
4. Do not pull on ears, tails, feet or fur.
5. Don't do anything to purposely annoy or tease your pet.
6. Stay away from animals while they are eating or playing with their toys.
7. Only play with pets under adult supervision.





## Tekani and Her Puppy

Tekani got a puppy, Brownie, for her birthday last year. She loves playing with him. She pulls his tail and thinks it's cute when he bites her fingers. One day while Brownie is eating, Tekani puts her hand on his head to rub his ears. Brownie quickly turns around and snaps at her. His teeth graze her hand and give her small scratches. She jumps back and runs off to tell her mother.

What rules did Tekani not follow?

---

---

Using plane shapes only, draw a picture of Brownie.

# 10. Agricultural Technology and Plants

Have you ever considered making a school garden? What if you found a way to create a garden that grows on walls? How about a garden that needs no soil? What about a garden that contains fish? These are all possible.

Agricultural technologies allow us to grow our food in new,  
look at some technologies we can use.

## 1. Controlled Agriculture

Controlled agriculture is the practice of growing plants in a controlled environment where plants will not be affected by the weather outside.

Self-watering grow boxes and hydroponic systems are two types of controlled agriculture systems that can be used in indoor settings. We will focus on these two systems later in the chapter.



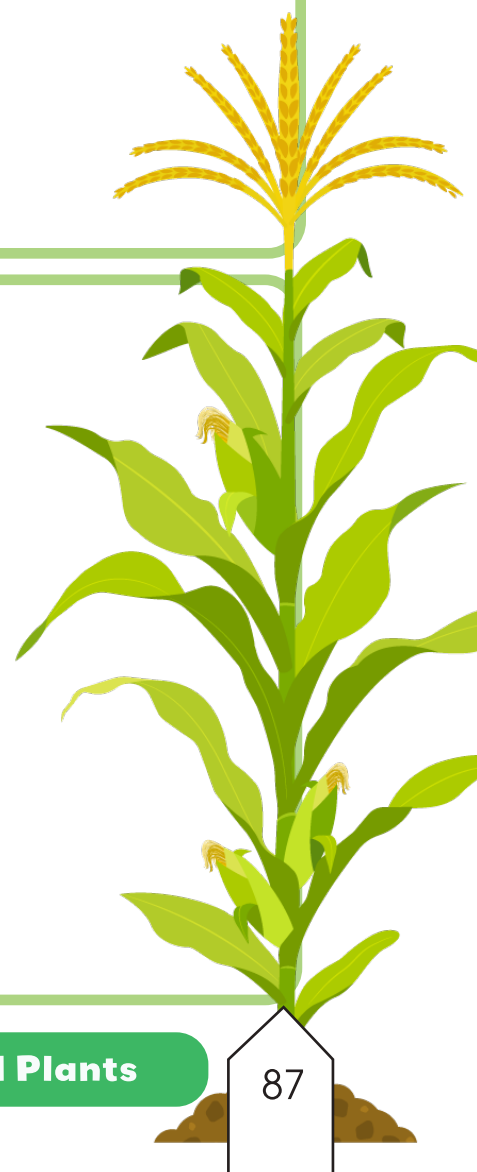
RESEARCH IT!



Gabriel has recently learnt about controlled agriculture in school. He is interested in setting up his own system to provide some food for his family and to sell the surplus.

**Research two types of controlled agriculture not previously mentioned that Gabriel should consider.**

Two large rectangular boxes with green borders, intended for research notes. The top box is partially obscured by a large diagonal watermark reading "pennacool.com SAMPLE".



## 2. Self-Watering Grow Boxes (SWGB)

RESEARCH IT!



The answers to the following questions will need to be researched.

What is a self-watering grow box?

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What are some disadvantages of a self-watering grow box?

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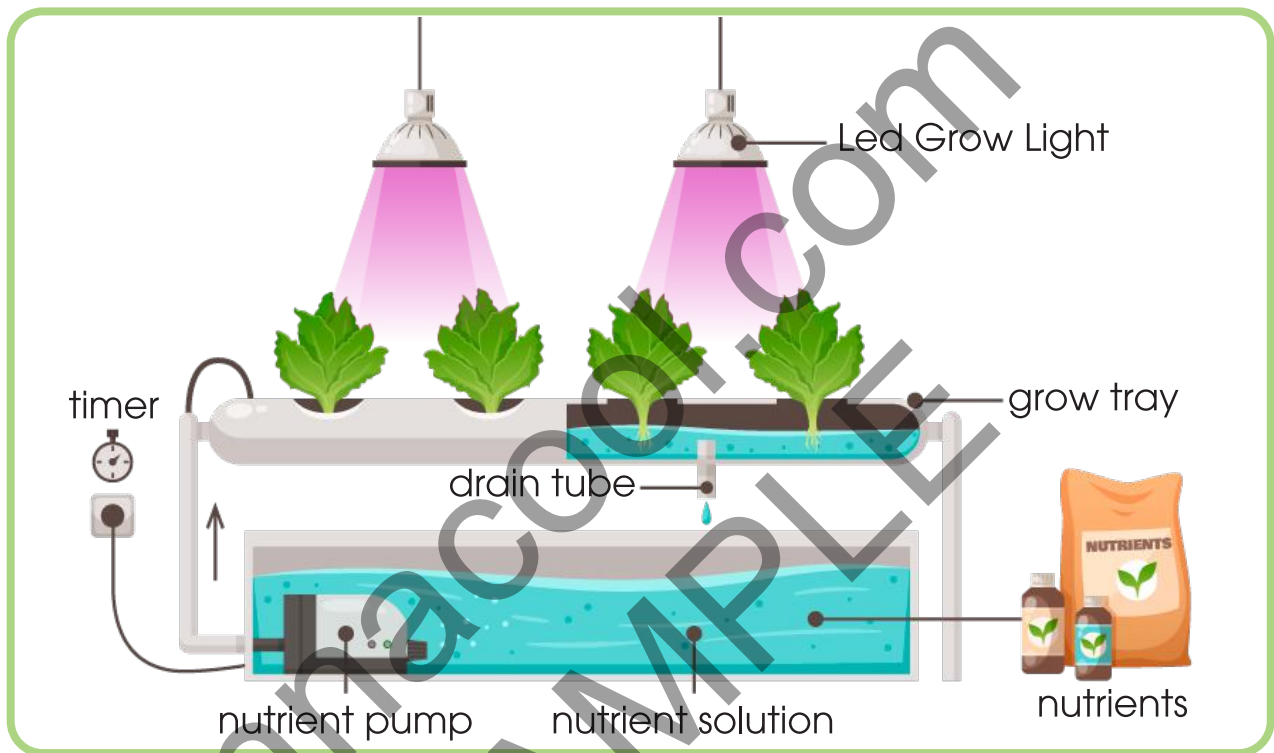
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### 3. Hydroponics

Hydroponics is the technique of growing plants in a water-only environment. The only medium needed is material to provide support to roots. This material can be anything from gravel to perlite to coconut coir. There are two main types of hydroponics: active and passive. Active types use pumps to deliver nutrients to plants, while passive types provide nutrients to plants through the growing medium.



What are some [redacted] of hydroponic systems?

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---

What are some [redacted] of hydroponic systems?

---

---

---

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## Let's Use Agri-tech!

Now that you know about different agricultural growing technologies, choose a technology to try out for 2 months.

Draw a diagram of the technique you will use

Diagram area for drawing the technique. A large watermark "pennacool.com SAMPLE" is visible across the area.

This is my \_\_\_\_\_ set-up.

What are the best plants

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

After two months of growing, what are some of the challenges and successes you have had?

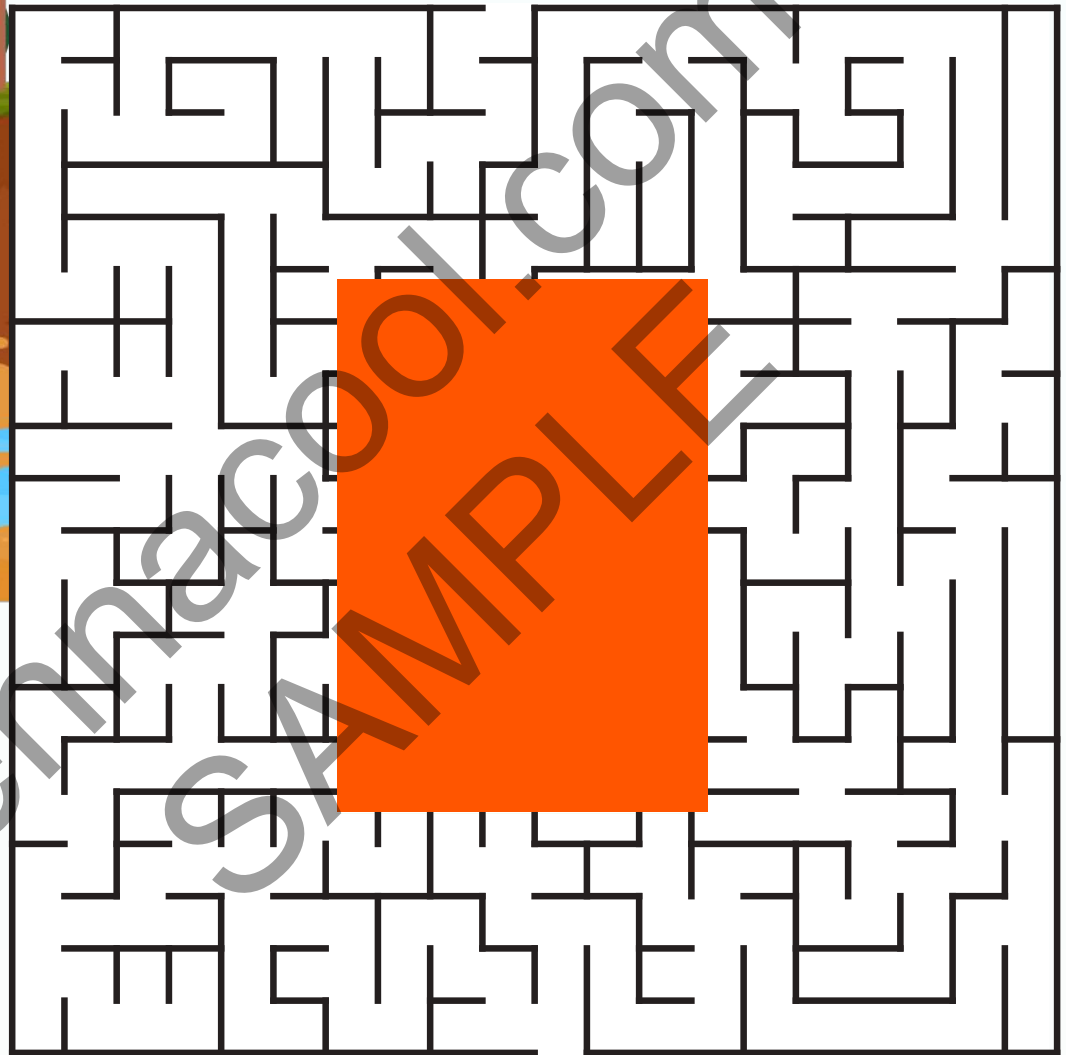
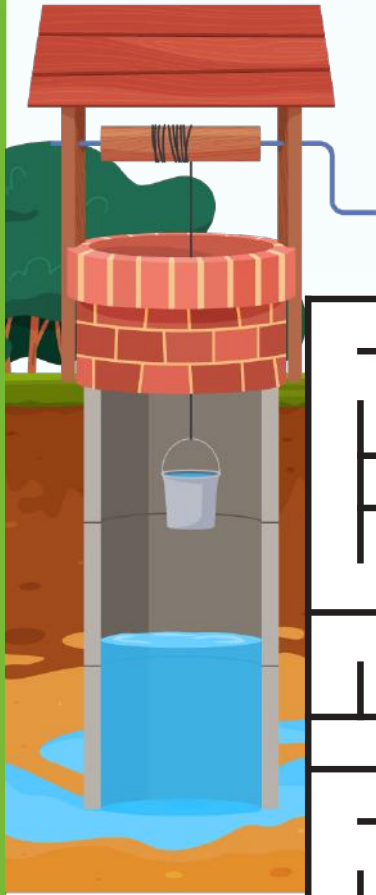
\_\_\_\_\_

\_\_\_\_\_



### Water From the Well

Can you get the water from the well to the plants in time? You have 1 minute.



# 11. Caribbean Cuisine

**Local food** is food that is grown or raised in the same region or community where it is consumed. **Local cuisine** is food that is prepared using local ingredients such as vegetables, fruits, provision, fish and livestock.

Make a list of locally grown foods.

**Example:** corn, 

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

Look at the list you created. Can you think of local dishes that use these ingredients?

**Example:** roasted corn, 

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_



RESEARCH IT!



Research pictures of local dishes in old magazines, books or online. Choose one you like

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SAMPLE

Examine the pictures your classmates have chosen. Discuss in groups why someone would want to travel from overseas to taste the foods that you have chosen.

On the next page, write a paragraph that gives rich descriptions of this food using your sensory details (sight, smell, taste, touch and sound).

Habeeba visited her best friend Lexi in Trinidad. Lexi's mom had prepared dhal and rice with curry mango for lunch. The smell of the dish lightly floated in the air and tickled their nostrils. "This smells delicious!" Habeeba remarked. They both sat at the table and slowly ate the hot food. The little clouds danced like genies above each of their plates. Each spoonful slowly spun satisfyingly on their tongue, despite the burn from the steam

Write your paragraph here:

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## Food Tourism



"They told me to come to Trinidad and Tobago for the food."

"We are not even off the plane

"Wait, on the beach? We're on the beach!"

"The food is great everywhere in this country! I am so glad we came."



"Wow! The street food is awesome!"

"And we get to eat with our hands!"



If you were to showcase a local food visitors would love to eat, what would it be?

---

Food?

---

Who would be your target audience (adults, seniors, children, nature or business tourists, etc.)?

---

Create a three-frame comic strip using the information you provided.  
You can use coloured pencils, paints, or even a computer to create your images and print and stick them in the spaces provided.

A large rectangular box divided into three horizontal panels, intended for a comic strip. A large, light gray watermark reading 'pennacool.com SAMPLE' is oriented diagonally from the bottom-left to the top-right, spanning across all three panels.



**Food tourism** offers activities that allow people to experience and appreciate the local food and drinks of a place. It emphasises the values, history, culture and environment of a region.

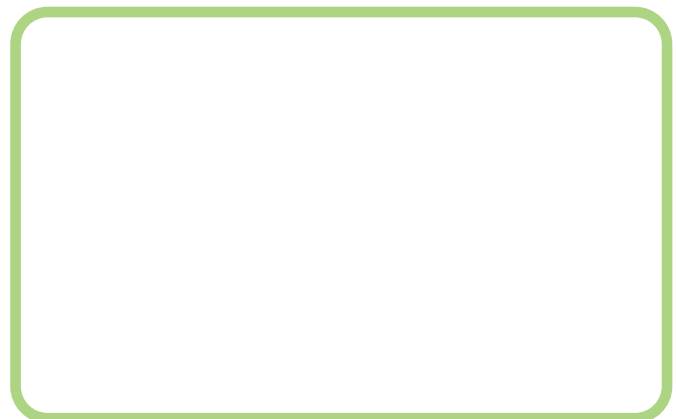
What food would you serve to foreigners for the following celebrations?



Eid



Emancipation Day



Using one of the festivals previously mentioned, create an advertisement inviting foreigners to the festival, [redacted] and encouraging food tourism in Trinidad and Tobago.

You can format your advertisement as:

1. A two-minute video
2. A poster
3. A post for social media \*


**\* (Create only with adult consent and guidance)**






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## National Dishes

Food brings people together. Every person knows of one special dish that they eat with their family either weekly or for a special occasion. In the same way, each country also has a national dish that it is known for.

**Can you match the country with its national dish?**



Country	National Dish
Antigua & Barbuda	
	Fungee & Pepperpot
Grenada	Ackee & Saltfish
	Cou-Cou and Flying Fish
Guyana	Pepperpot
	Roasted Breadfruit and Fried Jackfish
Jamaica	Callaloo Soup
Saint Lucia	
Saint Vincent & the Grenadines	Griots with Rice & Beans
Trinidad & Tobago	Green Fig & Saltfish



# Caribbean Festivals

Many islands of the Caribbean have different festivals. Throughout time, food has always played a major part in these festivals. Locally, we prepare certain foods, especially for these festivals.

Draw a line from the festival to the food associated with it.

## Festival

## Food

Carnival

Provision and Saltfish



Blue Food Festival

Pelau

Draw or stick pictures of your favourite foods from these festivals below.

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Go to [pennacool.com](https://pennacool.com) and complete the online exercises! Follow the steps at the start of the book



**Caribbean Cuisine**

101

# RESEARCH IT!



Regionally, many islands of the Caribbean have certain foods they prepare specially for specific festivals. Look at the table showcasing festivals and their respective foods. Write in the countries in the spaces provided.



Island	Festival	Food
Tobago	Blue food festival	Provision and saltfish
		Fish cakes and fried flying fish
	Spice Mas	
	Nine Morning Festival	Ducana
		Green fig and saltfish
	Bastille Day	



## Caribbean Restaurant Menu

You and your classmates decide to open a restaurant for local delicacies  
these delicacies.

*Menu*

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## Caribbean Restaurant Advertisement

Create a poster/flyer displaying your restaurant's signature dish. Remember, it must represent the local cuisine. The design must include

foreigners to want to come to Trinidad and Tobago to try the food.

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