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# Science & Agri-Science Standard 2

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**Self-Correcting Exercises  
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**pennacool.com Standard 2 Science**

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SAMPLE

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# 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.

## 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:

BONUS CONTENT



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 2 Science Workbook → Bonus Content

This icon represents an experiment that can be done.



EXPERIMENT

RESEARCH IT!



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

Indicates additional interesting information relating to the topic.



FUN FACT!

# 1. Classifying Animals

## Vertebrates and Invertebrates



We can group all animals into two main categories. These are **vertebrates** and **invertebrates**.

\_\_\_\_\_ is an animal  a backbone.  
(A vertebrate / An invertebrate)

\_\_\_\_\_ is an animal  a backbone.  
(A vertebrate / An invertebrate)

Circle the invertebrates below.



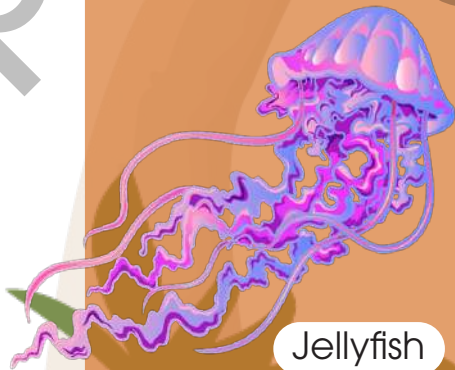
Parrot



Jaguar



Sea Slug



Jellyfish



Elephant

When we group animals based on similar characteristics, or things they have in common, this is called **classification**.

**Vertebrates** can be further classified into five groups:

1. Mammals
2. Birds
3. Reptiles
4. Fish
5. Amphibians



Ant



Child



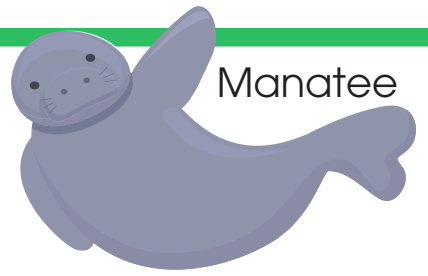
Place the animals below into their correct classifications by writing their names in the spaces provided.

You can cross off the animals you have already used as you go to help you keep track. The first one is done for you.

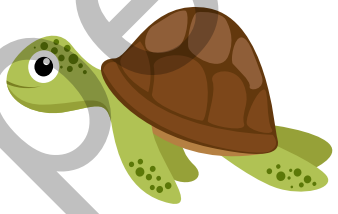
Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Red Fish				



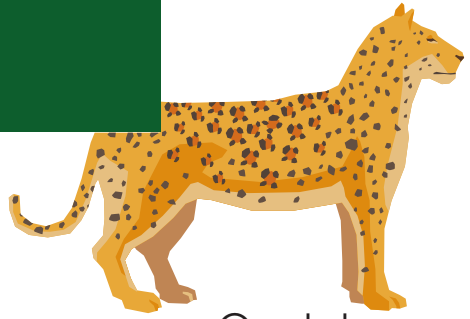
Salamand



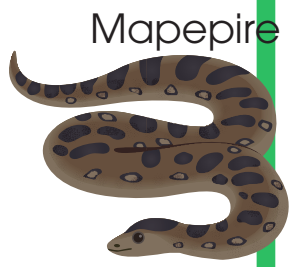
Manatee



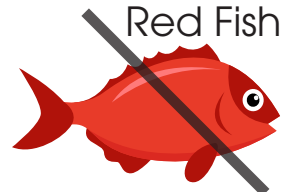
Turtle



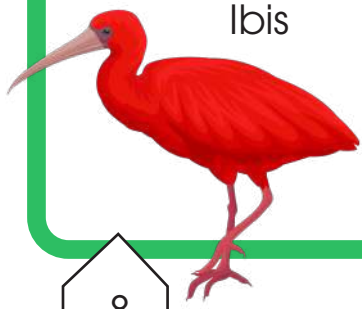
Ocelot



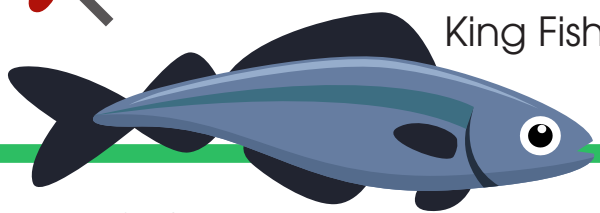
Mapepire



Red Fish



Scarlet Ibis



King Fish



Glass Frog








The five categories of vertebrates have many different characteristics.

Look at the given traits and put a tick  in the appropriate column.

If you have completed the previous exercise,

you can look at the pictures and their categories to help you out.





Characteristics	Fish	Amphibians	Reptiles	Birds	Mammals
Feathers					
Hair or fur					
Breathe air					
Produce milk					
Breathe under water					
Give birth to live young					
					
					
					
					
					



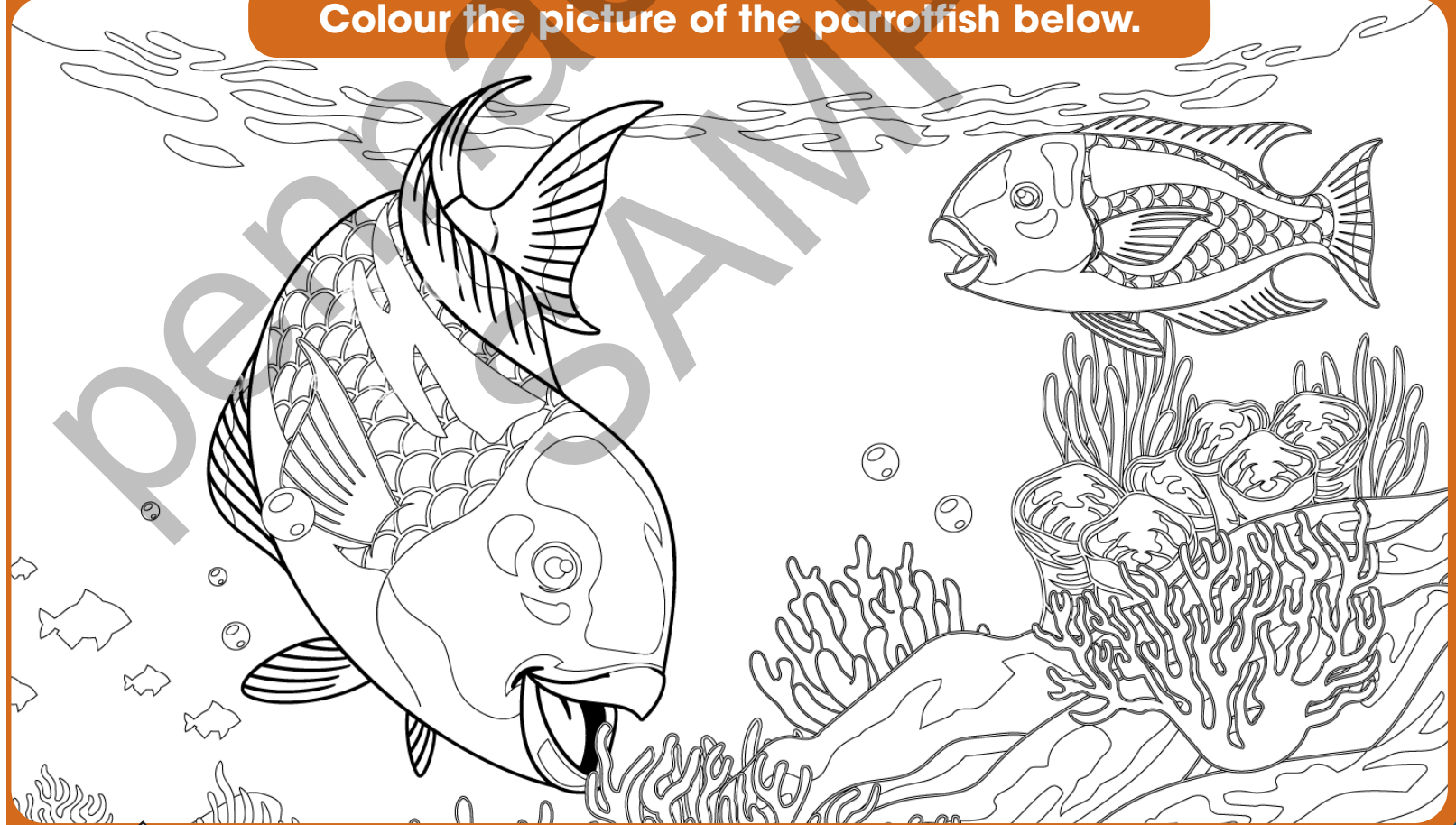
# Name that Fish

Name a fish that can be found in our local waters.

Fish name \_\_\_\_\_

	
	
Special characteristic 1	
Special characteristic 2	



Colour the picture of the parrotfish below.



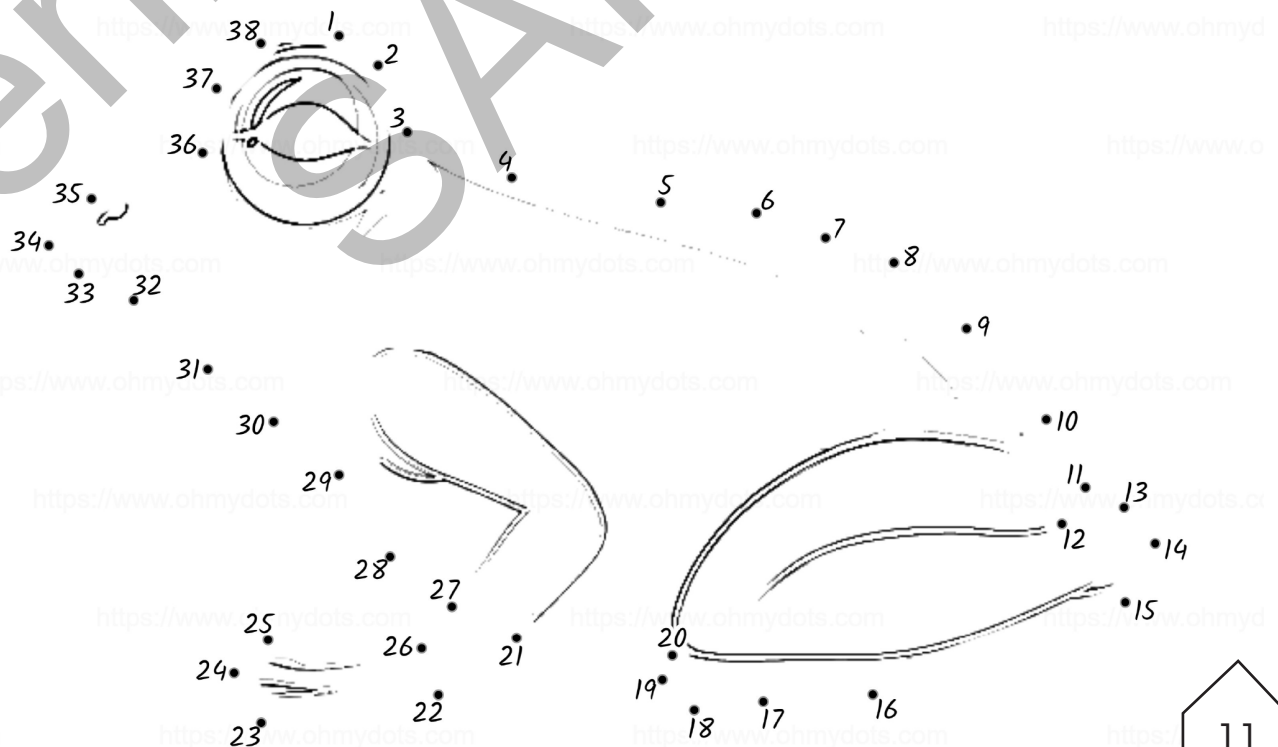
# Name that Amphibian

Name an amphibian that can be found locally.

Amphibian name \_\_\_\_\_

Where does it live?	
What does it eat?	
	
	



Connect the dots to draw your own Giant Tree Frog.



# Name that Reptile

Name a reptile that can be found locally.

Reptile name \_\_\_\_\_

Where does it live?	
	
	
Special characteristic 2	

Draw the other half of the caiman below.





## Name that Bird

Name a bird that can be found locally. Stick or draw a picture of the bird, in the box below and fill in the information in the table.



Bird Name \_\_\_\_\_

Special characteristic 1	
Special characteristic 2	

# Name that Mammal

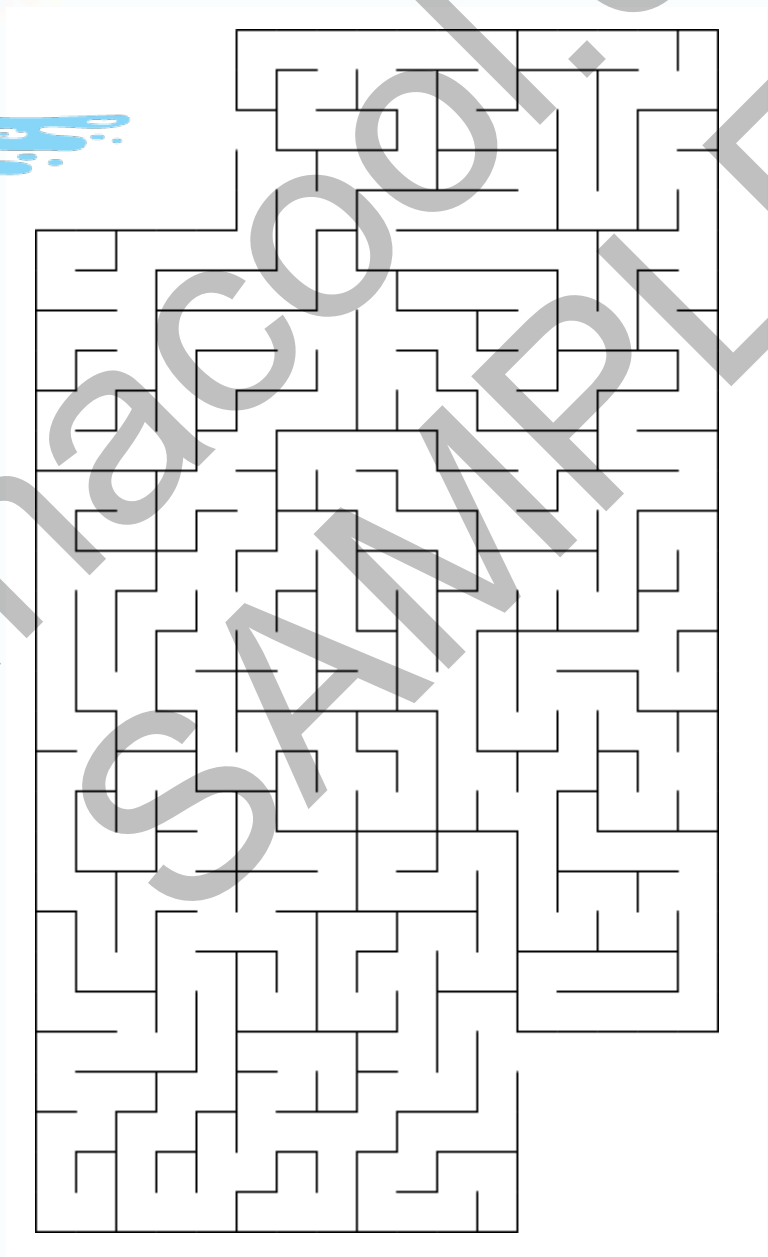
Name a mammal that can be found locally. Stick or draw a picture of the mammal, in the box below and fill in the information in the table.



Mammal Name \_\_\_\_\_

Where does it live?	
What does it eat?	
Special characteristic 1	
Special characteristic 2	

Activity: Uh oh! Maria the Manatee has gone too far up the Ortoire River! Can you help her find her way back to the river mouth?



# Wrong Party!

Uh oh! These animals found themselves at the wrong party! They need to be classified into groups before they leave.



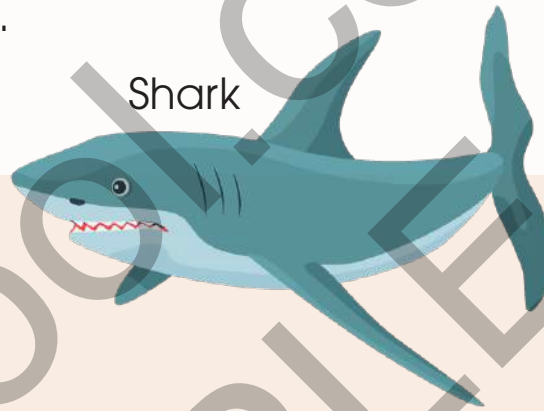
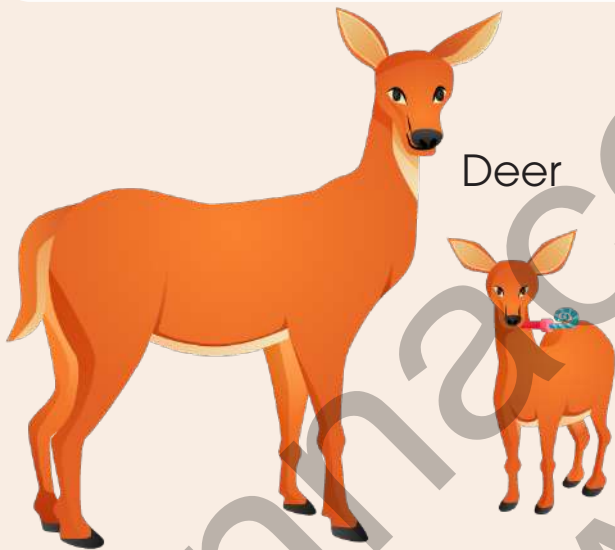
The first one is done for you.

Shark

Monkey

Deer

Salamander



1. Mammals	Deer	Monkey
2. Birds		
3. Reptiles		
4. Fish		
5. Amphibians		





Crocodile



Stingray



Hawk

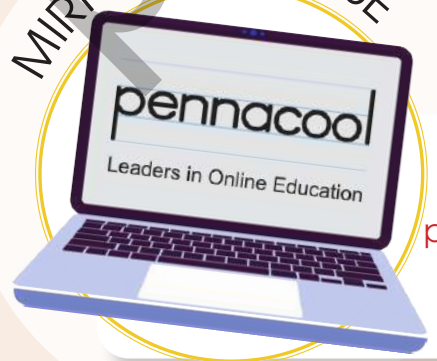


Toucan



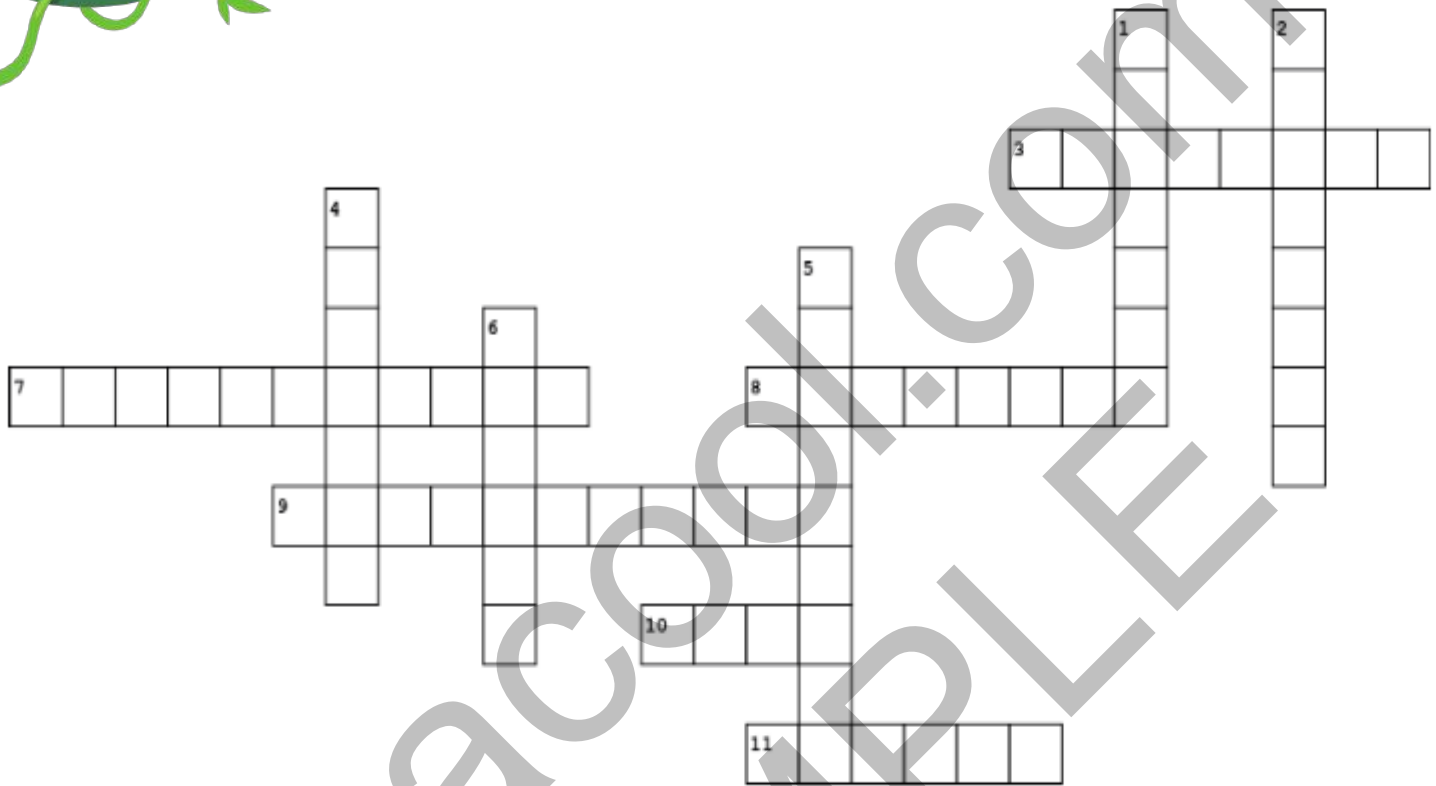
Iguana

MIRROR EXERCISE



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Let's recap. How many of these can you figure out?

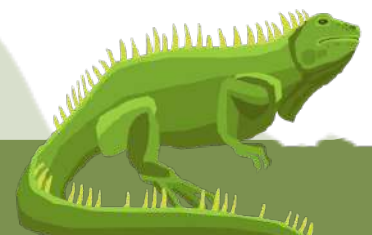


### Across

3. Scaly creature, can't breathe on land.
7. Largest sea turtle in the world.
8. Highly venomous reptile with no legs.
9. Bird that eats off the ground in swamp land.
10. Shy land mammal that camouflages in the forest.
11. Small to medium sized green reptile.

### Down

1. Almost extinct locally, a mammal found in rivers.
2. Odd-looking sea critter, almost diamond shaped.
4. Medium-sized brown bird.
5. Small amphibian, usually nocturnal.
6. Small cat, endemic to our region.



## 2. States of Matter

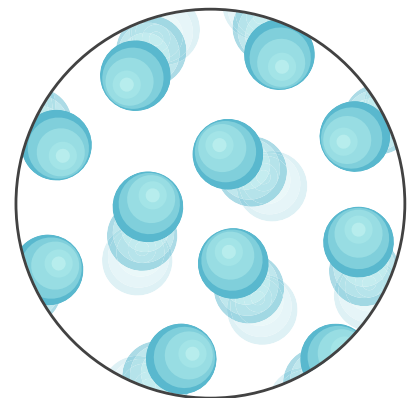
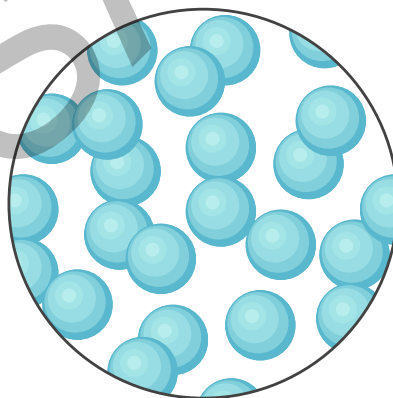
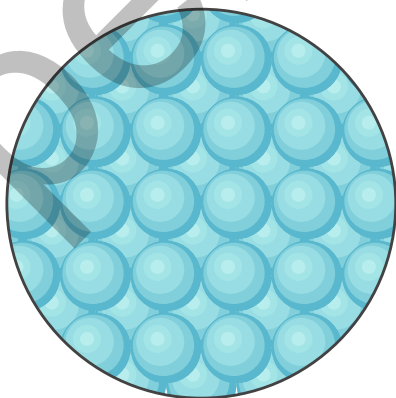


Any item that occupies space and has mass is called matter. The molecules of matter can either stay together in the same shape or they can move around freely.

Depending on the movement of the molecules, matter can be found in three forms: solid, liquid and gas.

Label the diagrams below using the states of matter in the box provided. Look carefully at the molecules to determine which state of matter is illustrated.

\_\_\_\_\_



\_\_\_\_\_

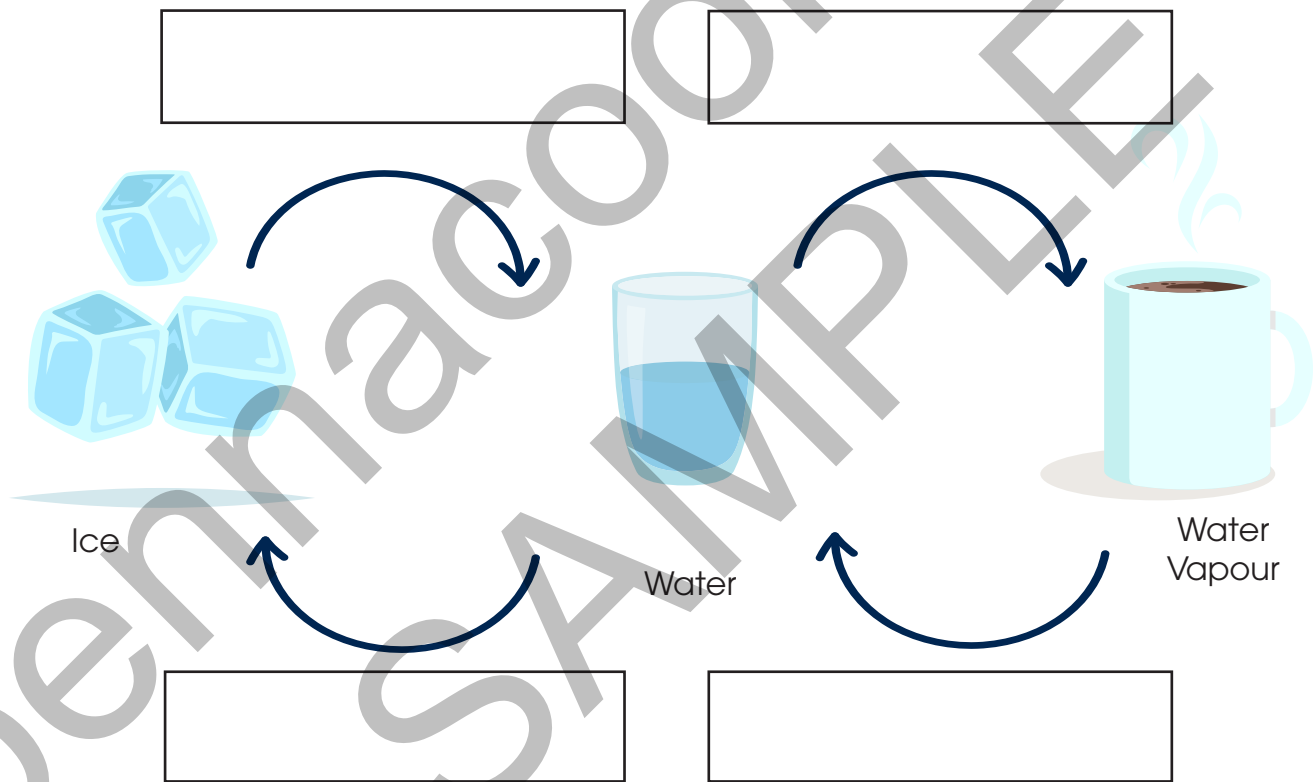
\_\_\_\_\_

\_\_\_\_\_

# Changes in State of Matter

All matter can change its state. These changes occur when there is a change in the temperature or the pressure applied to the matter.

Using the words provided in the box, fill in the blanks in the diagram below.



Melting

Condensation





Match each word with its correct definition.

Freezing

The change from a solid to a liquid



The change from a solid to a gas



The change from a liquid to a solid



The change from a gas to a liquid

Sublimation

The change of a liquid substance to a gas or vapour

BONUS VIDEO



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Here's a snippet of an online quiz on pennacool.com. See if you can answer the questions, then log onto penncaool.com to check your answers and see if you're right!

pennacool.com → Science → Topics → States of Matter

## States of Matter Level 1

Matter exists in  different forms.

True

False

Check

Freezing is when a liquid becomes a .

True

False

Check

Submit Answers...

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# 3. Separation of Mixtures

## Magnetism

Using the words provided in the boxes below, fill in the blanks to complete the paragraph.

A \_\_\_\_\_ is a rock or a piece of \_\_\_\_\_. It has an invisible magnetic field which attracts metals like iron, cobalt and nickel. This basic force of nature, like electricity and \_\_\_\_\_, is called \_\_\_\_\_. A magnet has a \_\_\_\_\_ and a South pole. When two North or two \_\_\_\_\_ Poles come close, they repel each other. When a North and South \_\_\_\_\_ come close they \_\_\_\_\_ each other. Magnetism works over a distance. This means that a magnet does not have to be \_\_\_\_\_ an object to pull it.

Attract

Pole

Magnet

Touching

Magnetism

South

**FUN FACT!**

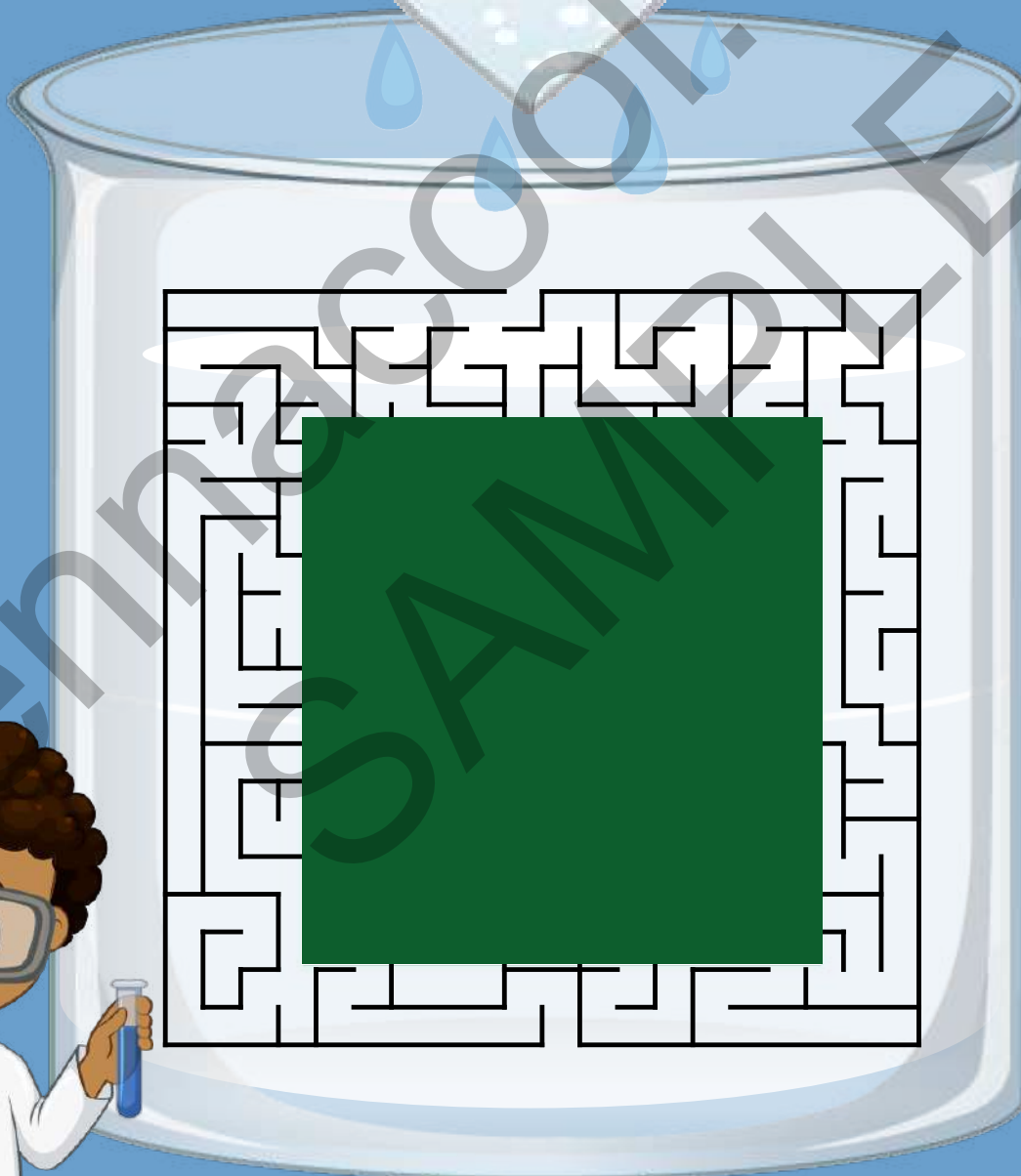


Magnetic rocks are called Lodestones. These were the first kinds of magnet humans ever used.

## Filtration

**Filtration** is the process by which impurities or particles are removed from a liquid.

The liquid, or **feed**, is poured over a **filter** which catches the particles and allows the filtered liquid, or **filtrate**, to move through it



Help Jason filter the substance through the filter and into the beaker.



# World Wetlands Day

Wetlands are our Earth's natural water filters. They work by catching the water that runs down from rivers and filtering it before it goes back into the sea.

They also perform the important roles of protecting our coastlines from strong waves, [REDACTED] habitat for wildlife, such as the Scarlet Ibis.

Every year on February 2nd, the United Nations celebrates World Wetlands Day with a special theme that brings attention to the ways in which we need to protect our wetlands.

In Trinidad and Tobago, we have three major wetlands: the [REDACTED] Swamp and the Bon Accord Lagoon Complex.

Wetlands are under threat from human activities such as the clearing of land to build upon.

Clearing our wetlands can cause:

1. Flooding in coastal areas
2. [REDACTED]
3. Habitat loss for the animals that live there
4. Increased [REDACTED] and seas
5. More carbon to stay in the atmosphere, increasing [REDACTED]

Can you think of a different way in which humans can build without destroying wetlands?

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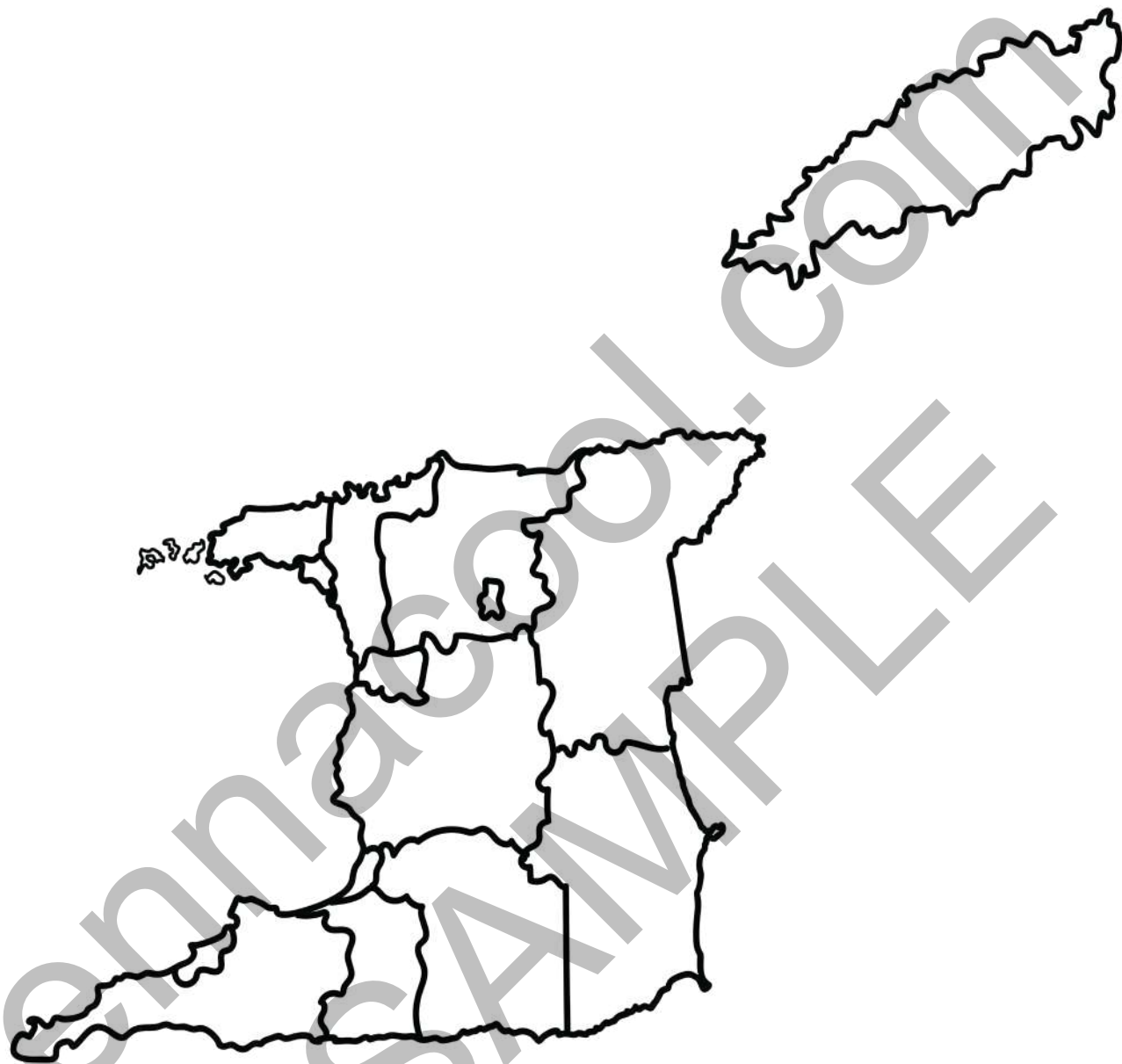
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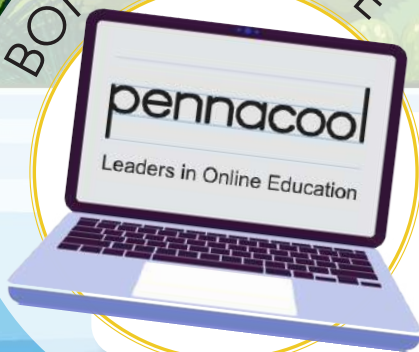
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Activity: Colour in the locations of the                       
in the map of Trinidad and Tobago.



BONUS EXERCISE



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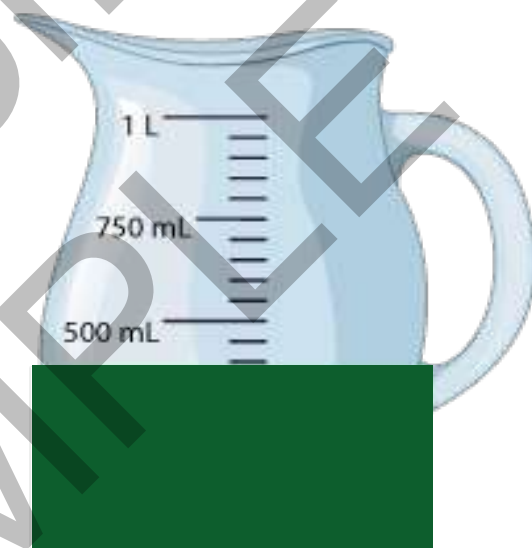
# 4. Dissolving Substances

**Capacity** or            is the quantity of space a substance occupies. Its measurement is in standard units.

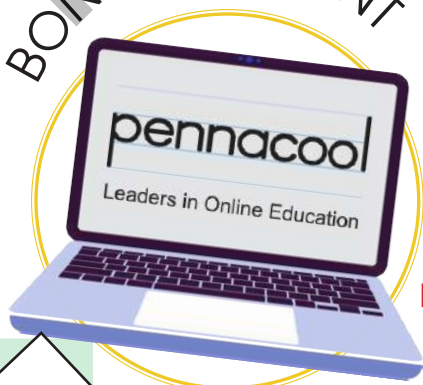
## Working with Volume

We measure the volume of water using a beaker or measuring cylinder.

Write the volume of liquid shown in each jug



BONUS CONTENT



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Colour the volume of the jugs shown below.



1000mL



750mL

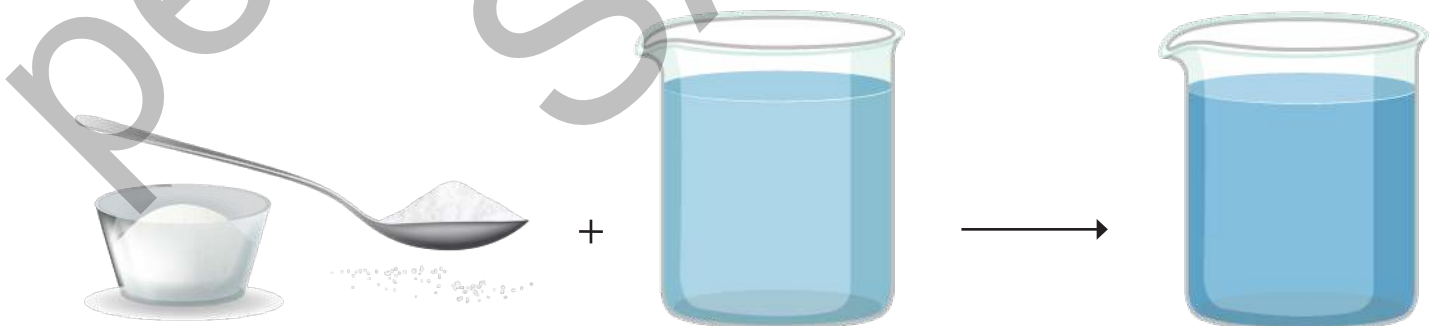
## Solutes, Solvents and Solutions

A **solution** is a mixture of two or more substances.

You cannot differentiate one substance from another within a solution. The substance which is dissolved is called a **solute**.

The substance in which the solute is dissolved is called a **solvent**.

Identify the solution, solute and solvent below



Salt

Water

Saltwater

## Substances that Dissolve in Water

Have you ever mixed or stirred something into a glass of water? What happened? Do you think that anything can mix with water? Let's do an experiment to find out!

### How to do an experiment

First, we need to know what the experiment process is like. Let's take a look. A good experiment always has these key sections, which allow you to repeat the process if you need to.

**Hypothesis:** This tells you what you assume will happen based on any observations you have made.

**Materials:** These are the tools and objects you will need to complete your experiment.

**Method:** Your method is the sequence of steps in which you will complete your experiment. It must be written in the correct order.

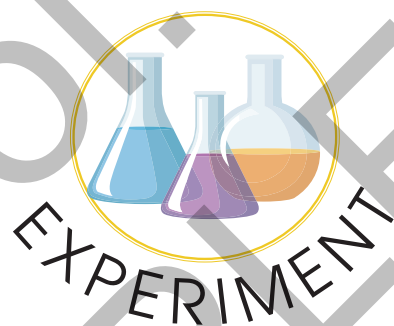


**Results:** Results show what happened in your experiment. They are usually presented in the form of a table, graph and/or picture.

**Discussion:** In this section, you discuss your results.

You answer questions such as:

- Was your experiment successful? Why or why not?
- Was your hypothesis true or false? Why or why not?
- How do you think you can improve your experiment?



Now that we know how to do an experiment, let's get started!

**Hypothesis:** Everything dissolves in water.

### Materials needed:

- Water
- Salt
- Sugar
- Food colouring
- 6 cups

## Method

1. Add approximately   mL of water to each of the six cups.



2. Mix   of a substance and add it into one of the cups of water. Stir until there is no more change in the mixture.




3. Observe the substance

4. Note what happened and record your observations on the next page. Repeat the process for each substance: salt, sugar, flour, oil, rice and food colouring





## Results

Substance	What you think will happen	What actually happened
Salt		
Sugar		
		
		
		
Food Colouring		

Discussion and Conclusion:

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---

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---

## 5. Movement of Water through Soil

There are three main types of soil:

1. **Sandy Soil** drains quickly because of its larger particles than other soil types.
2. **Silty Soil** holds more water than sandy soil. Its particles are smaller than  but bigger than .
3. **Clay Soil** does not drain well and can become waterlogged. The soil particles are  together with very little airspace.

### Bonus Soil!

4.   
  
 mixture of sand, silt and clay, and organic matter.




Write the soil types illustrated below.



### Let's Experiment!

Collect samples of various types of soil (this must be the same amount for each soil, e.g., two cups). Have three separate containers for these soils and label them. Draw your observations of the soil in the containers below.

Use colours to display the differences as well.

Sample 1	Sample 2	Sample 3
		

How does the soil feel when you rub it through your fingers?  
(Use adjectives such as fine, gritty, smooth, sticky etc.)

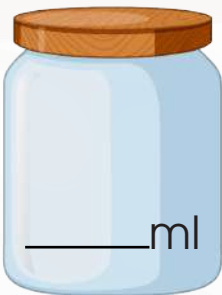

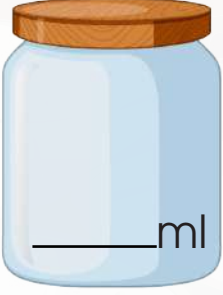
Write a full sentence, or two, describing how the soil felt.

Sample 1	Sample 2	Sample 3

Place the cloth over a glass jar and tie a rubber band around the top to hold the cloth in place.

Pour one cup of water over the cloth and allow it to run through the soil and into the jar.

Measure the amount of water in each jar using a measuring cup at the end of the five minutes. Write the results here.

Sample 1	Sample 2	Sample 3
		



# 6. The Importance of Minerals

Can you find all the minerals hidden in the wordsearch puzzle?

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

1. Aluminum
2. Asphalt
3. Copper
4. Gold
5. Gypsum
6. Iron
7. Lead



# Mineral Match-up

Minerals are used in our everyday lives.

Some of the uses are very surprising.

Can you match the mineral with its use in daily life?

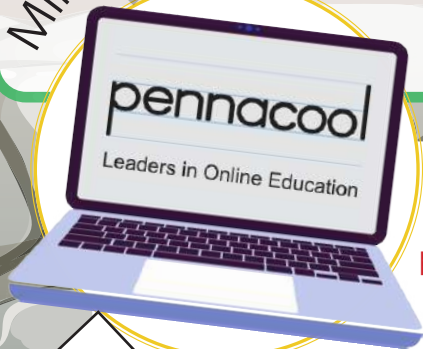
Asphalt



Gold



MIRROR EXERCISE



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# RESEARCH IT!



Identify one way in which each mineral is extracted. The first one has been done for you.

Mineral	Form of extraction
Gold	Sifting of silt and clay soils
Silver	
█	
█	

Are these methods of extraction █ to each other?

\_\_\_\_\_

What types of environments are these minerals usually found in?

\_\_\_\_\_

What are two ways in which the environment █ by the extraction of these minerals?

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

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

# RESEARCH IT!



Colour in the Caribbean countries according to the minerals that are extracted there.

Name each country in the table below.



Mineral	Colour	Countries where it's found
Gold	Yellow	Puerto Rico, Dominican Republic
Silver	Blue	
Asphalt	Black	
Limestone	Green	

It is important for us to use our minerals conservatively because eventually, they may run out.

Complete the crossword below to determine how best we can conserve the minerals we use in everyday life.



**Across**

3. A metal used in jewellery

5. \_\_\_\_\_ the number of products you buy

6. All metals can be \_\_\_\_\_

**Down**

1. A metal found in phones

2. Used to build roads

4. Devices should be \_\_\_\_\_ when broken



Here's a snippet of an online quiz on pennacool.com. See if you can answer the questions, then log onto penncaool.com to check your answers and see if you're right!

pennacool.com → Science → Topics → Importance of Minerals

## Minerals Level II

Inorganic means that the item was living and is now dead.

True

False

✓ Check

Fill in the missing words

We should \_\_\_\_\_ minerals so there will be enough for the future.

✓ Check

Submit Answers...

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# 7. Needs of Plants



The sun provides energy for plants to grow. Let's experiment and see to what extent plants need light to grow.

Remember the experimenting process!

## **Hypothesis:**

Plants exposed to sunlight will grow faster than plants left in the dark.

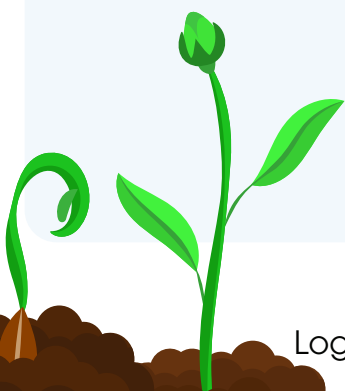
## **Materials:**



## **Method:**

Step 1. Label your  1 and 2.

Step 2. Using a ruler, measure the height of each seedling and write it in the Results Table. Count the number of leaves and note the colour of them for each seedling in the Results Table.



Step 3. Gently water each seedling with

minutes to ensure all the excess water has drained out.

Step 4. Place both seedlings on in an area where they will receive sunlight.





Step 5. Cover seedling 2 with . Wrap the bag tightly to make sure that no light can get in.

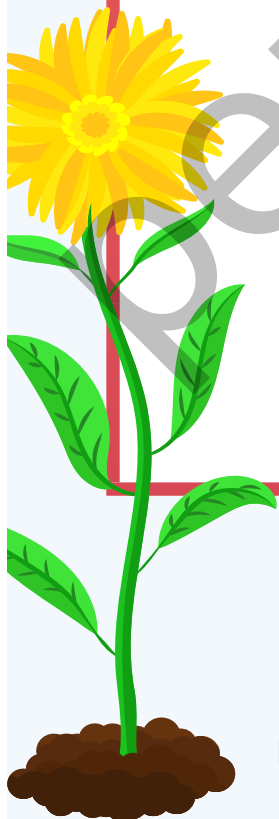
Step 6. Leave your seedlings in place for . If the soil dries out, water as needed.

Step 7. At the end of the week, uncover . Measure the of both seedlings and count the number of leaves. Record your results in the results table.



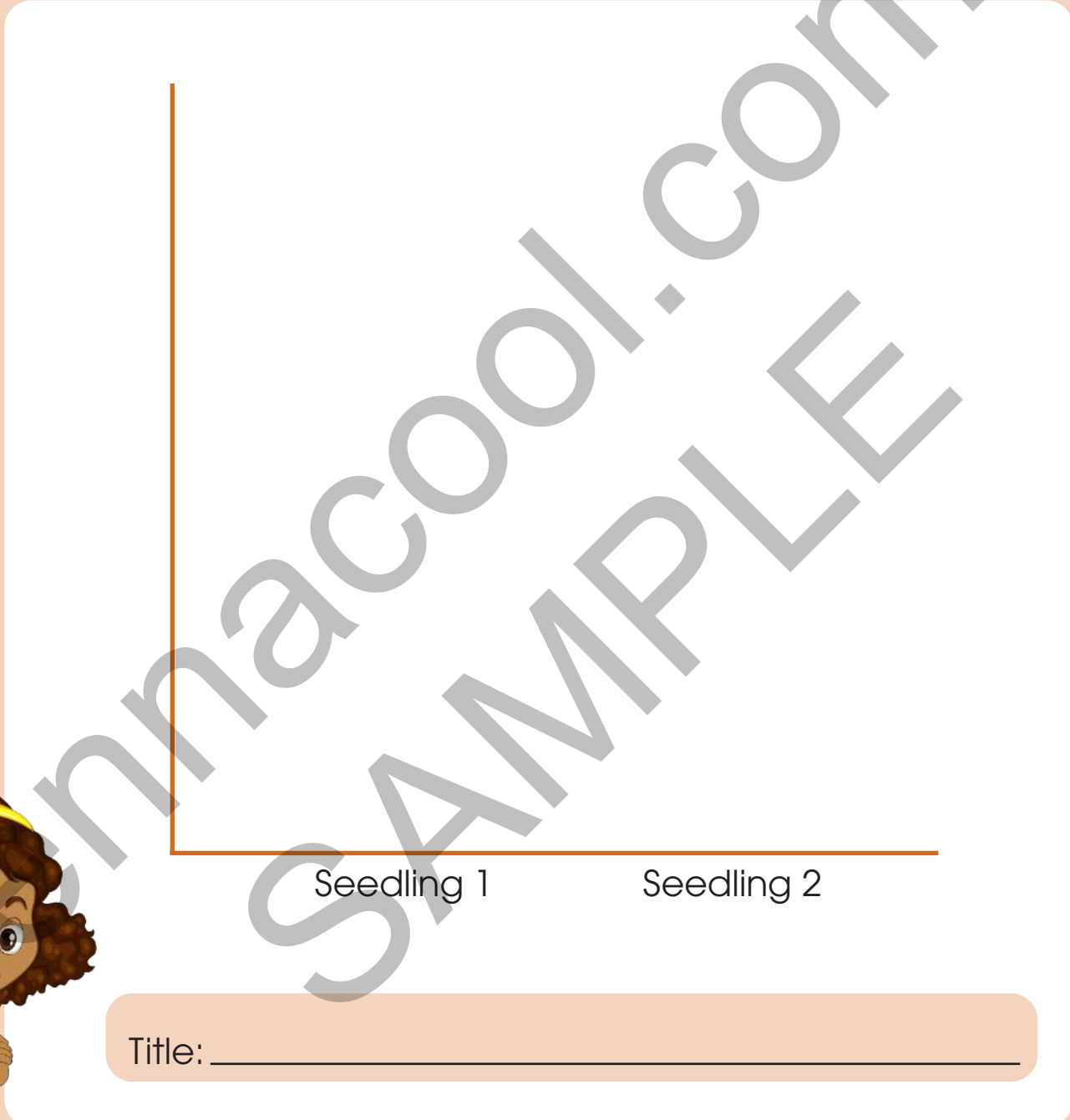
# Results

Seedling #	Day 1		Change
Seedling 1.	Leaf length _____cm	Leaf length _____cm	Leaf length change _____cm
	Number of leaves _____ leaves	Number of leaves _____ leaves	Change in number of leaves _____ leaves
	Leaf appearance	Leaf appearance	
Seedling 2.	 _____cm	 _____cm	 _____cm
	Number of leaves _____ leaves	Number of leaves _____ leaves	Change in number of leaves _____ leaves
	Leaf appearance	Leaf appearance	



Using an appropriate scale, draw a bar chart comparing the                      on both seedlings at the end of the experiment to represent your results.

Give your chart a name.





Draw a diagram of both seedlings at the end of the experiment.  
Label them correctly.

Label: \_\_\_\_\_

Label: \_\_\_\_\_

## Discussion and Conclusion

Which seedling was        at the end of the experiment?  
Which was       ?

Write the values in the line below with the name of the seedling under the line.

\_\_\_\_\_ cm > \_\_\_\_\_ cm

Did the results of your experiment prove your hypothesis to be true or false? Support your answer with a reason.

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Here's a snippet of an online quiz on pennacool.com. See if you can answer the questions, then log onto penncaool.com to check your answers and see if you're right!

pennacool.com → Science → Topics → Needs of Plants

## Needs of Plants Level II

Plants need water for photosynthesis.

True

False

Check

Drag the words into the correct boxes.

The green colour we see in plants is called .

This chemical allows  to absorb light energy. The plant uses this energy to make its food,

.

Check

Submit Answers...

Go Back

◀ Previous Topic

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Next Topic ▶

# 8. The Water Cycle

Fill in the blanks with the correct words from the word bank.

\_\_\_\_\_ is the process of the water on the Earth's surface turning into water vapour.

When the water vapour starts to cool it turns back into water droplets. This process is called \_\_\_\_\_.

When the water droplets get too heavy to remain in the sky, they fall back to the Earth in a process called \_\_\_\_\_.



Label the parts of the water cycle shown in the diagram using the words in the box below. The first one has been done for you.



Collection

Key

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Complete the Wordsearch to discover the parts of the water cycle

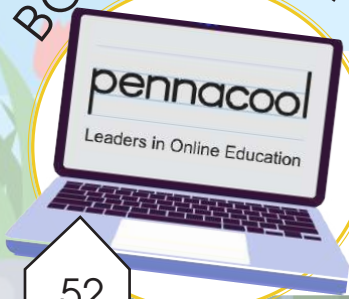


Clouds  
Condensation  
Droplets  
Earth

Oceans  
Precipitation  
Rainfall  
Rivers

Trees  
Water Vapour  
Evaporation  
Transpiration

BONUS GAME



pennacool.com → Workbooks → Std 2 Science Workbook → Bonus Content

# Water Conservation

When water precipitates from the sky, we know this to be [REDACTED]

One way we can conserve our water and live more sustainably is by collecting the rainwater and using it in our gardens or other outdoor activities.

Draw a design of a [REDACTED] that you can use at home.

Penhacoool.com SAMPLE

## 9. The Impact of Fossil Fuels

### What are fossil fuels?

Have you ever wondered where electricity comes from or what plastics are made of? If so, you may have stumbled on the words

Both of these resources actually come from \_\_\_\_\_ and because they are used to \_\_\_\_\_) various machines, they are called fossil fuels.

### How are fossil fuels made?

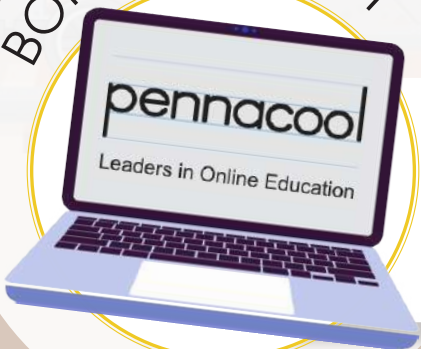
Fossils are \_\_\_\_\_ from millions of years ago. After these \_\_\_\_\_, their bodies decomposed and compacted under many layers of earth over time.

Eventually, humans were able to dig them up and extract them from inside the earth as coal (a solid), natural gas (a gas) and petroleum (a liquid).

Match the fossil fuel to its picture below.



BONUS CONTENT



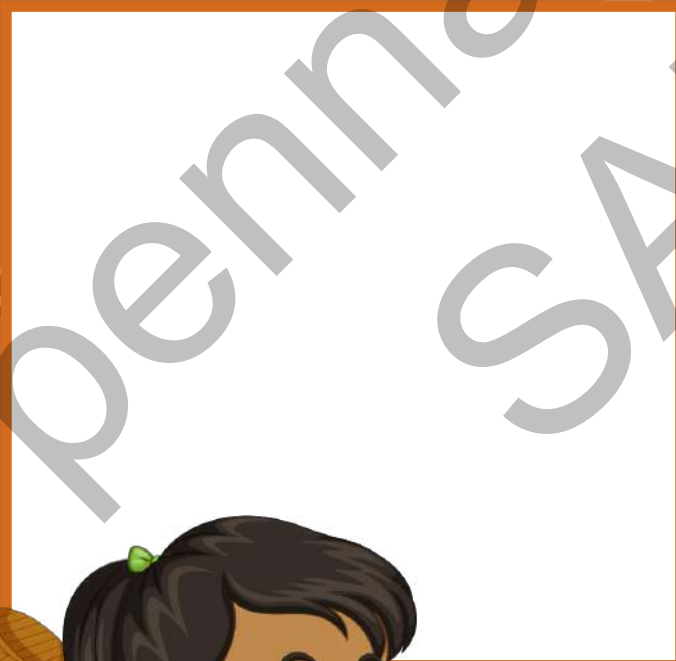
[pennacool.com](http://pennacool.com) → Workbooks → Std 2 Science Workbook → Bonus Content

Many of the products we use on a daily basis are in fact made from various forms of fossil fuels.

RESEARCH IT!



Complete the chart below with pictures of products made from the identified fossil fuel.





[Redacted]

[Blank box]

[Blank box]

[Redacted]

[Blank box]

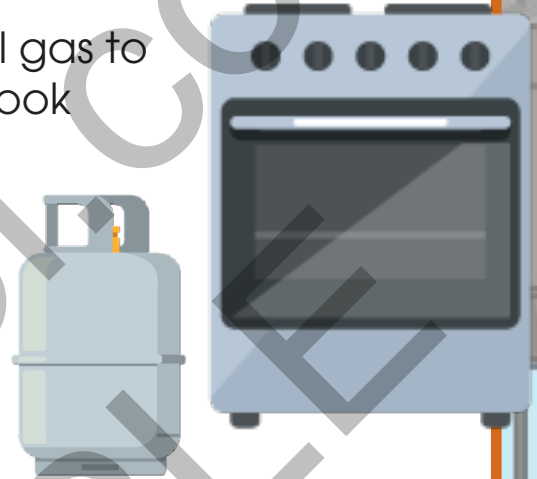
[Blank box]

# Fossil Fuels in Everyday Life

Everyday we use energy to power our lives.

Energy comes in various forms, including:

1. Natural gas to help us cook



2. 



3. The electricity to give us lights at night.

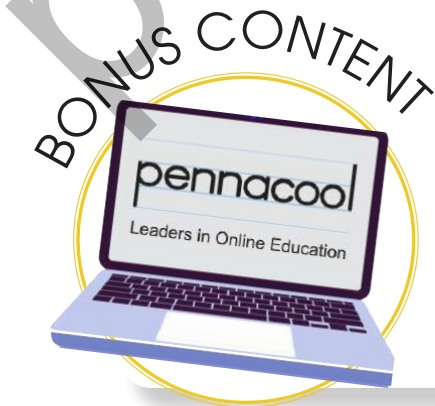


4.  to help us light a fire



Map your daily routine, from the minute you wake up to when you go to sleep. Note whether you have used a fossil fuel for energy or as a product (e.g, plastic) and write it in the space provided.

Activity	Fossil Fuel Used



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## Fossil Fuels and Their Effects

Although our fossil fuels have been very useful over the years, they are also very damaging to the environment and to humans.

This damage occurs in two main ways, [REDACTED]

The products of fossil fuels, such as those made from petroleum, [REDACTED]. That means that after they are dumped, [REDACTED] material that can be reabsorbed by the environment. In fact, some materials can become very tiny particles that eventually end up in our drinking water and even the air we breathe.

A popular example is XXXXXXXXXX This is any plastic that is less than 5mm in length.

Name one plastic material that you use.

---

It is important to remember that when we throw away plastic materials, they will still be around 10, 20, 50 and even 400 years from now. That's why we should always try to **reduce** the amount of plastic we use, **reuse** as much of it as possible and **recycle** as much as we can.

List three ways that you can XX.

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



# Global Warming



The smoke given off by the burning of fossil fuels causes too many gases to remain in the atmosphere.

These gases, carbon dioxide and methane, are also called greenhouse gases, because they cause a greenhouse effect in the atmosphere.

## The Greenhouse Effect





Atmosphere

Most radiation is absorbed by the Earth's surface and warms it.

Earth's Surface

Number the sequence of events of the greenhouse effect.

	
	
	The rest of the radiation leaves the atmosphere and goes back into space.
	In the atmosphere, greenhouse gases help distribute radiation all over the Earth which warms the Earth even more.

Some of the infrared radiation passes through the atmosphere. Some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the Earth's surface and the lower atmosphere.



# Climate Change

Humans have overused fossil fuels. There are now too many greenhouse gases in the atmosphere. They are trapping more and more of the sun's radiation, which is causing the Earth to get hotter in a very short period of time. The effects of this are causing changes in the Earth's climate as we know it.

These changes can be seen in:

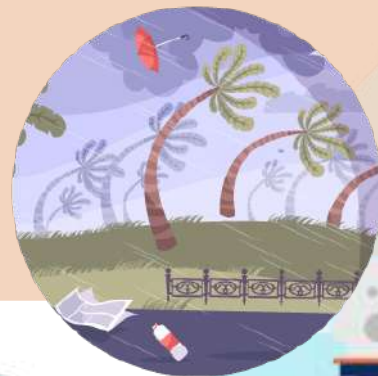
1. 

2. Rising sea levels which cause coastal erosion and coastal flooding

3. 

4. 

5. Stronger hurricanes and storms



Write a letter to your minister stating why   


Use the correct format for letter writing.

pennacool.com  
SAMPLE

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Here's a snippet of an online quiz on pennacool.com. See if you can answer the questions, then log onto penncaool.com to check your answers and see if you're right!

[pennacool.com](#) → [Science](#) → [Topics](#) → [Fossil Fuels](#)



## Fossil Fuels Level II

Crayons and sneakers are made from petroleum.

True

False

✓ Check

Choose the right word in brackets and type it into the box provided.

Most cars use which type of fossil fuel?

(  )

✓ Check

Submit Answers...

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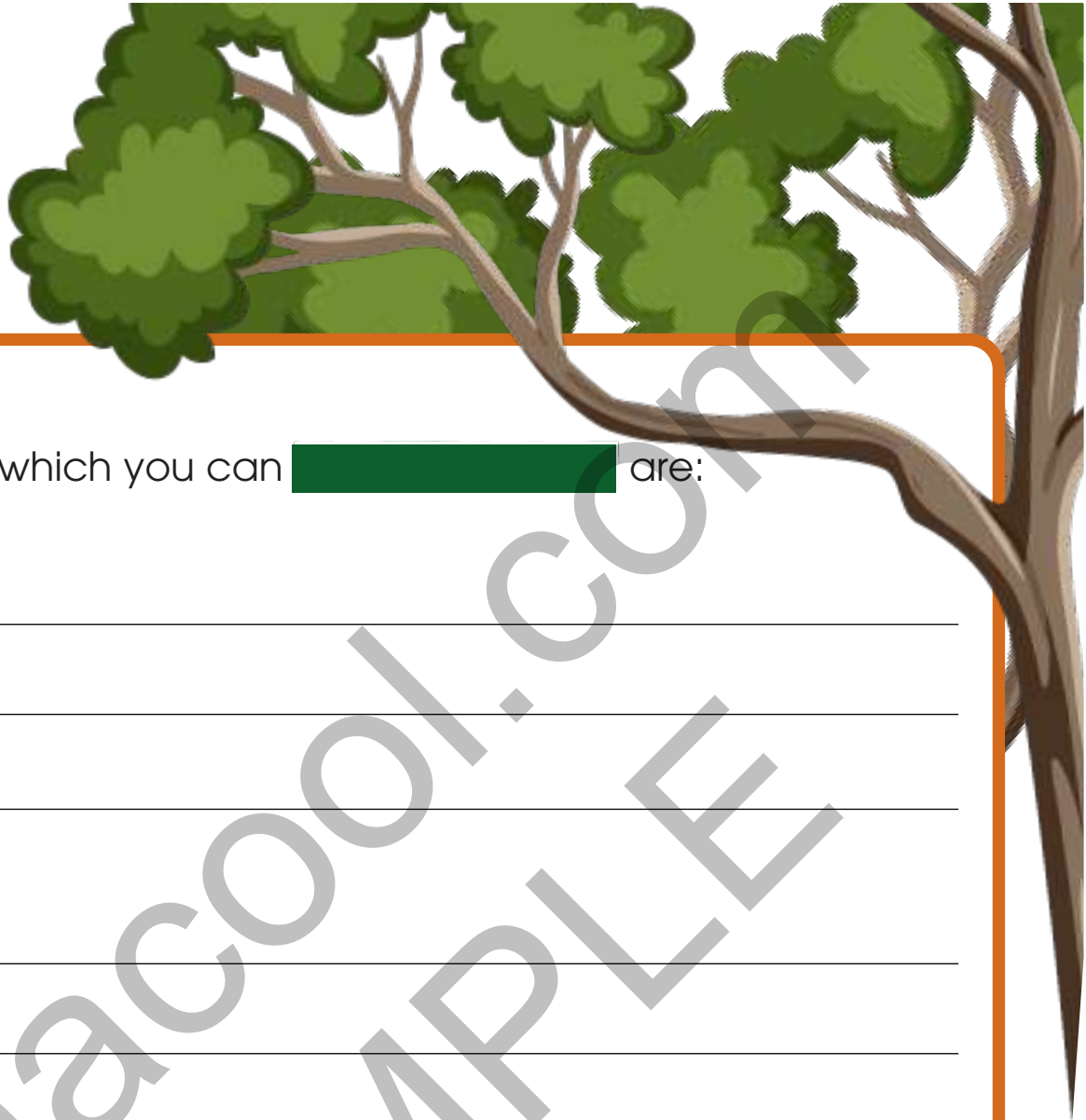
# Conservation and Sustainability

Some of the words are missing from the passage below. Find them at the bottom of the page and put them back where they belong.

Fossil fuels are non-renewable \_\_\_\_\_. They take \_\_\_\_\_ of years to form. If we use too many in a short space of time, we will run out. We have a \_\_\_\_\_ supply of fossil fuels. Since fossil fuels are running out and are causing terrible \_\_\_\_\_ to our \_\_\_\_\_ we should look to \_\_\_\_\_ our use of them. \_\_\_\_\_ is the act of protecting resources so that they can be used by current and \_\_\_\_\_ generations. We conserve by using only what we need, when we need it. \_\_\_\_\_ is the act of living in \_\_\_\_\_ with our environment, meeting our daily \_\_\_\_\_ and ensuring that there are enough resources for the future \_\_\_\_\_.

To live sustainably means that we must practice conservation.

conservation      limit      needs      resources      balance  
environment



Three ways in which you can                      are:

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

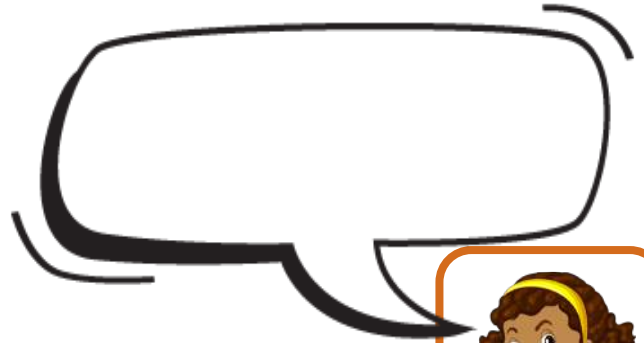
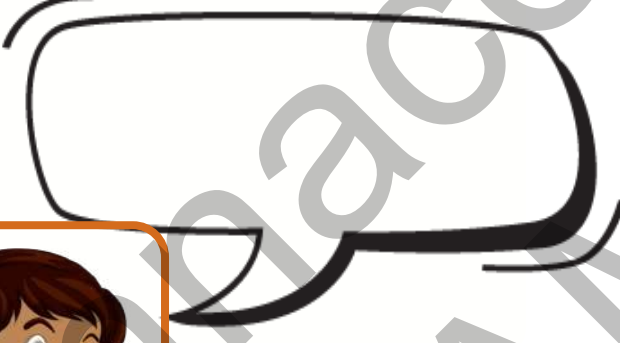
2. \_\_\_\_\_  
\_\_\_\_\_

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



## Complete the dialogue

Over the weekend you notice your sister keeps leaving the lights on even when she's not using them. Complete the dialogue below showing how you would approach your sister about her actions.



# Renewable Resources

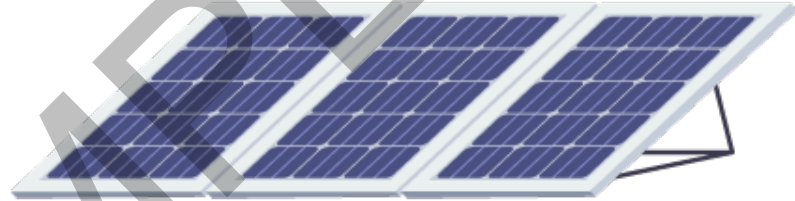
One way that humans can live more sustainably is by transitioning from fossil fuels to \_\_\_\_\_, such as \_\_\_\_\_.

## Solar Energy

The sun is the powerhouse of planet Earth. Technology has allowed humans to harness the sun's energy to use it as an alternative to fossil fuels. This is done through \_\_\_\_\_.

When many solar cells are put together, they form a **solar panel**.

Solar panels can also be brought together to form a \_\_\_\_\_. Solar parks are used to power large buildings, like factories and airports as well as small towns and villages.



Name one industrial area in Trinidad or Tobago that could use a solar park.

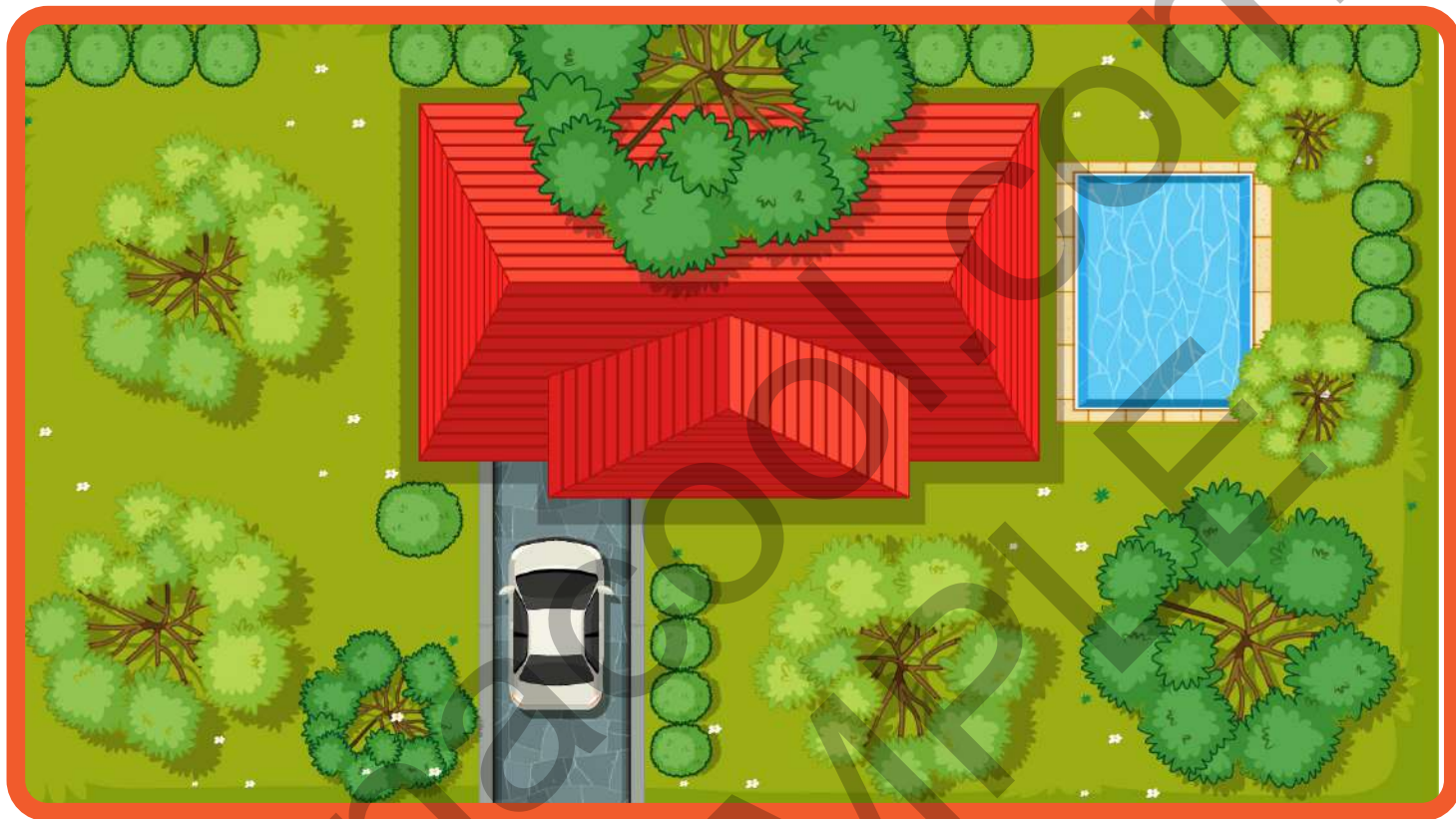
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Name one village in Trinidad or Tobago that could use a solar park.

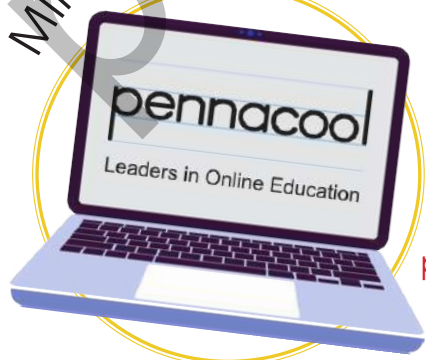
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Look at the picture carefully. Which side of this home would be the best place to put solar panels?

Draw them in the correct place.



MIRROR EXERCISE



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# Wind Energy

Another alternative source of energy comes from wind.

This is done through **wind turbines**. When the wind blows, 

.

The stronger the wind, the faster they turn.

Inside the turbine, special gears work to convert the movement of the blades into electricity.

Similar to solar panels, when multiple wind turbines are placed in the same area, this is called a **wind farm**.



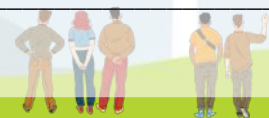
Identify one negative impact that wind turbines can have on the environment.

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A wind turbine can generate  MW (megawatts) of energy. This is enough to power 1500 homes! If there are 45 wind turbines on a wind farm, how much energy can they generate?

Calculate the total height of the wind turbine based on the picture below.



Blade length =

Turbine height = 336 m

Total height = \_\_\_\_\_

# Hydroelectric Energy

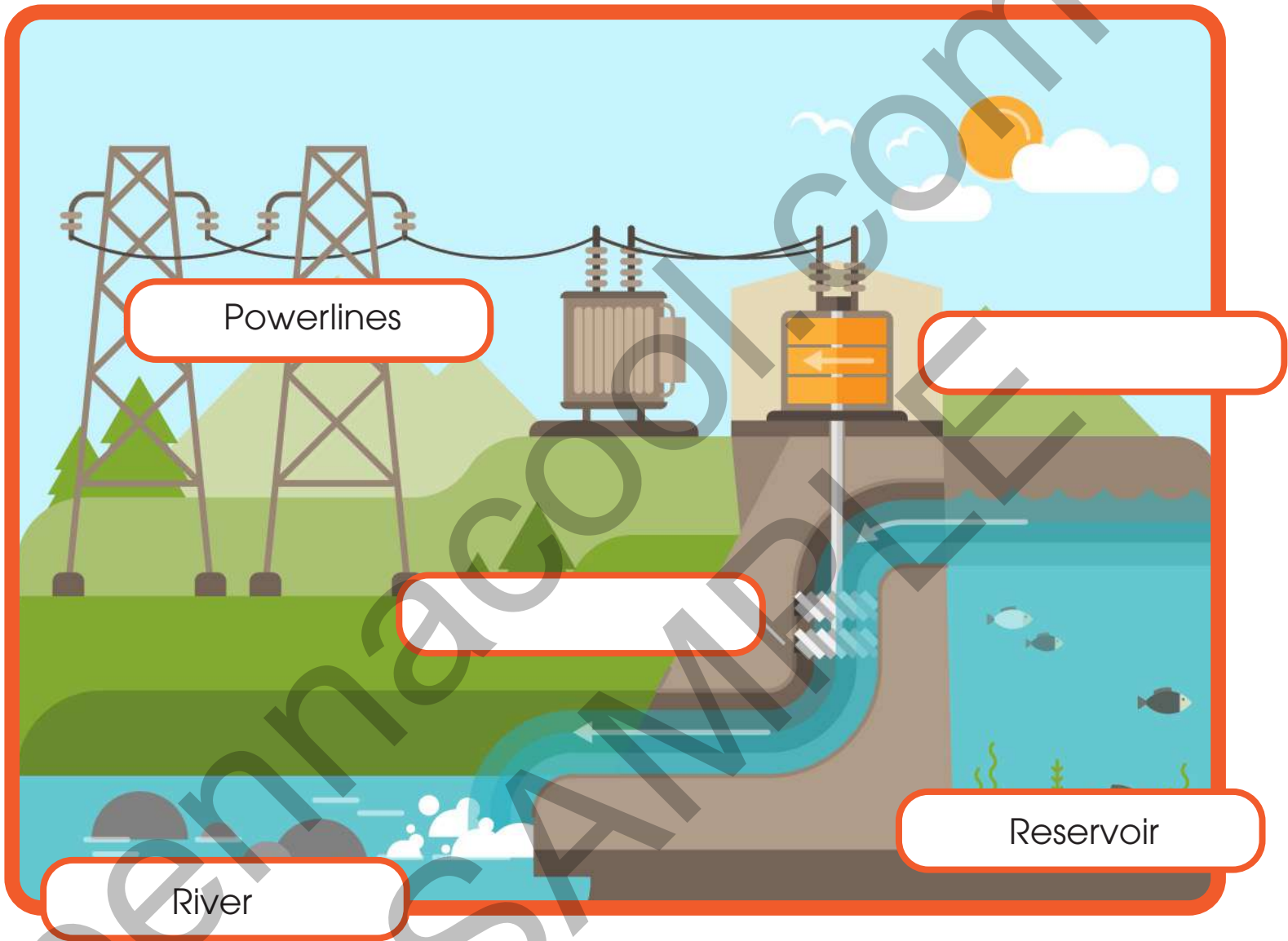
**Hydro** means [REDACTED] and **hydroelectricity** is electricity that is generated from the movement of [REDACTED]

One way humans produce hydroelectricity is through dams. Dams are blockages across rivers that help to collect water in [REDACTED]. As the water is released from the dam, it falls into pipes that have [REDACTED] at the bottom.

The force of the water pushes the turbines, which are connected to an [REDACTED]. The generator converts the energy of the movement of the water into electrical energy.



Fill in the labels for the missing parts of the hydroelectric dam.



# Word Search

Can you find the words we've learned in this lesson?

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




Energy  
Fossil Fuels  
Greenhouse Gas  
Hydroelectric  
Solar

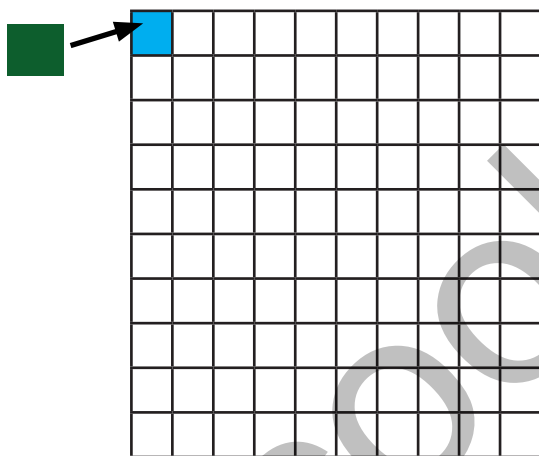
Methane  
Natural Gas  
Petroleum  
Plastic  
Renewable





# 10. Potable Water and Conservation

Less than  of the Earth's water is potable, or safe to drink. This image gives a representation of what 1% looks like. That's not a lot.



This means that all humans have very little water available in the ground to use for our daily needs. We therefore need to conserve our water supply.

Let's experiment.

## Hypothesis:

Leaving the tap open while brushing your teeth uses more water than closing the tap and using a cup of water.

## Materials:

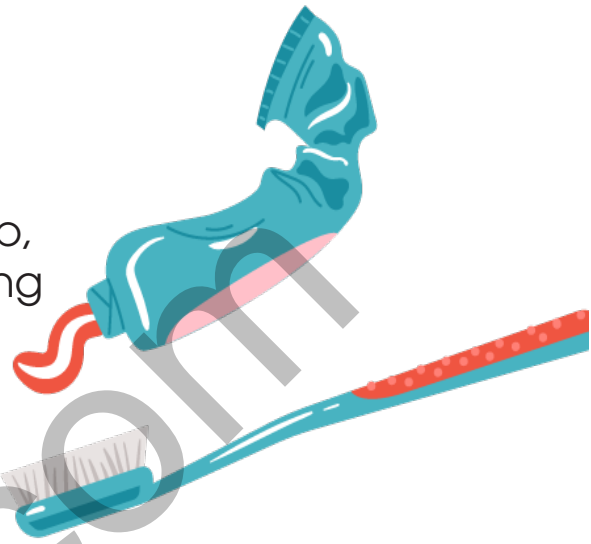
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## Method:

Step 1. Prepare your toothbrush for brushing.

Step 2. Place the measuring cup under the tap, start the timer, open the tap and begin brushing your teeth.



Step 3. [REDACTED], [REDACTED]  
In the results Table 1, write down the volume of water collected in [REDACTED] seconds.

Step 4. Continue to brush your teeth for the remaining of the [REDACTED]. Rinse and clean your mouth.

Step 5. You will now repeat this exercise again but this time [REDACTED]  
[REDACTED] In Table 2, write down the volume [REDACTED]  
Pour the water into the normal cup to fill it.

Step 6. [REDACTED]  
prepare your toothbrush and brush your teeth for two minutes.



Step 7. When you are finished, use only the [REDACTED].

Step 8. If there is any water left in the smaller cup, pour it back into the measuring cup. In Results Table 2, write down how much water you have left in the measuring cup.

## Results

Table 1. Tap open experiment




	_____ ml
Total volume of water used if tap was left open for two minutes  Hint:  then multiply that by 2.	In 10s, I collected _____ mL  In 60s, I will collect _____ mL  In 2 minutes (120s), I will collect _____ mL

Table 2. Tap closed experiment

Volume of water in measuring cup at start of experiment	_____ mL
	_____ mL
Total volume of water used	_____ mL

Using an appropriate scale, draw a bar chart to show how much water was used in each instance. Label your bars 'tap open' and 'tap closed.'



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

## Discussion and Conclusion

Which volume of water was greater, and which was lesser? Write them in the equation below.

\_\_\_\_\_ mL > \_\_\_\_\_ mL

Did the results of your experiment prove your hypothesis to be true or false?

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Now that you have seen first-hand how water can be wasted, write a short poem stating ways in which we can conserve water.

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# World Oceans Day

Planet Earth is made up of 71% Water. The majority of that water is saltwater found in our oceans.

Every year on June 8th, the world celebrates World Oceans Day.

The oceans provide us with \_\_\_\_\_ that ends up in our atmosphere. This can help us tackle climate change.

RESEARCH IT!



The theme this year for World Oceans Day is:

\_\_\_\_\_

Here's a snippet of an online quiz on pennacool.com. See if you can answer the questions, then log onto penncaool.com to check your answers and see if you're right!

pennacool.com → Science → Topics → Potable Water

## Potable Water II

Potable water is

True

False

Check

Water must be treated before you drink it.

True

False

Check

Submit Answers...

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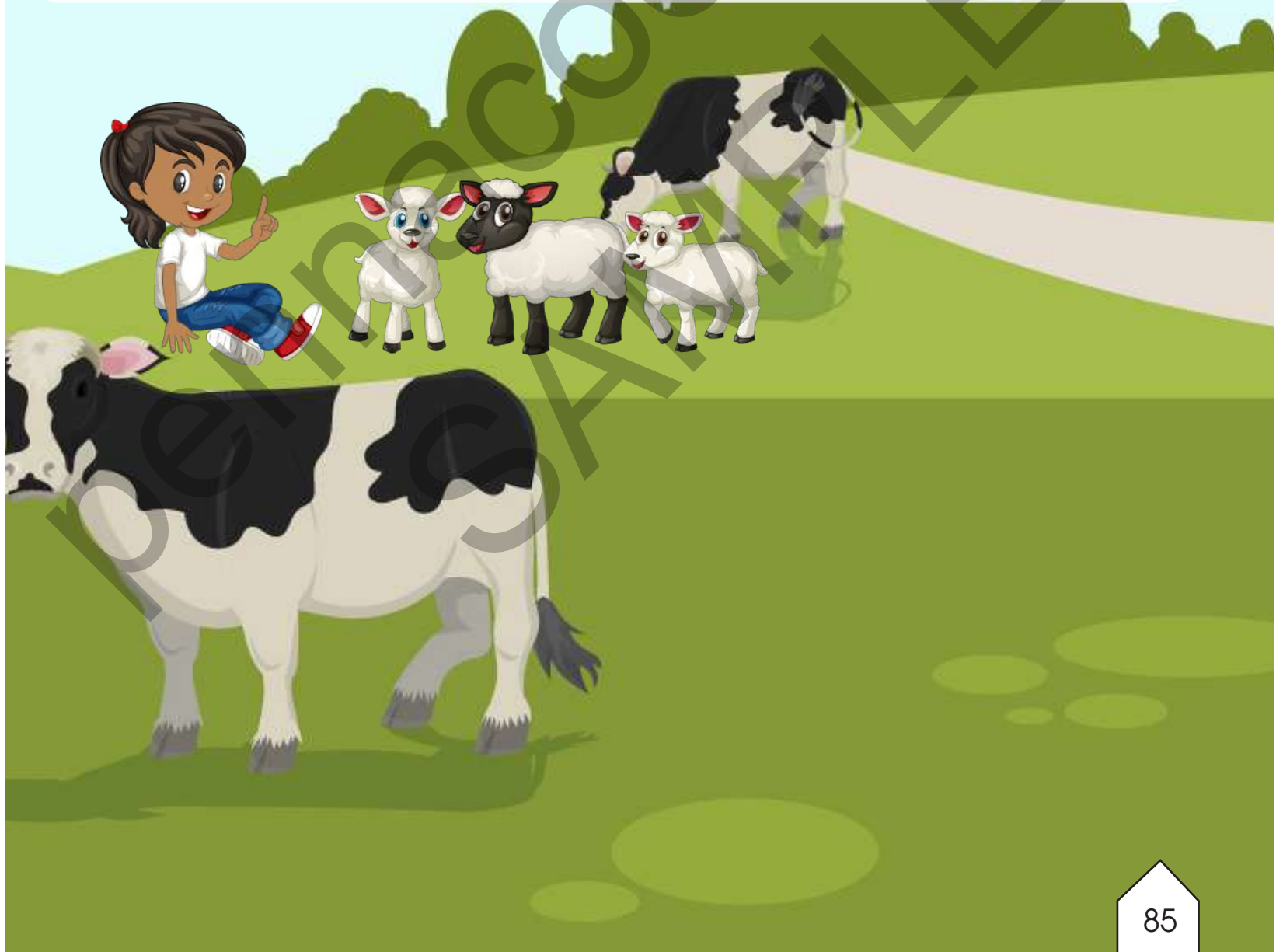
# AGRI- SCIENCE



# 1. What is Agri-Science?

**Agricultural Science** is the study of the growth of crops and the rearing of animals for human use.

Humans use animal and plant products in a variety of ways. For example, sheep can be eaten as food and their wool can be used to make clothing.



For each plant or animal listed below,  in which each can be used by humans.

Pineapple





Do you know of any other plants or animals used by humans?

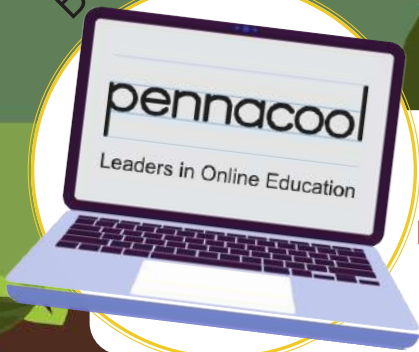
List them in the lines below.

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

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

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

BONUS QUIZ



[pennacool.com](http://pennacool.com) → [Workbooks](#) → [Std 2 Science Workbook](#) → [Bonus Content](#)

## Does it Grow Here?

Many of the foods we eat regularly are not grown locally. Let's take a look at some of our very juicy locally grown fruits and vegetables. How many of these have you eaten?



Cassava  
Cocoa  
Cucumber

Ochro  
Paw Paw  
Pimento

I have eaten \_\_\_\_\_ of these fruits and vegetables.

## 2. Growing a Plant



Step 1: Determine the [REDACTED].

See Chapter 5 in the Science section to determine which soil type you have available for your plants.

Step 2: Clear the area.

Clear the selected area of everything you don't need.

Circle the environmentally friendly ways of clearing land below.



### Step 3: Prepare the planting area

Prepare the planting area to ensure [redacted] and space. Plants should be given enough space for optimum growth. Not all plants can survive in waterlogged areas or small spaces.

#### Garden Bed

[redacted] be moulded into beds so that the water is able to run off and away from the roots [redacted].



#### Container Garden

Containers and pots that we prepare to hold plants also need to have [redacted]. We also need to ensure that plants have enough space to grow.



## It's Planting Time!

To complete the next three steps, you will need to get your garden gear ready for planting. Consider what you have learned in the first three steps. Examine and prepare your soil for planting.

You can choose to do so in your school's garden, home kitchen garden or in a container garden. Follow steps 4, 5 and 6 using easy-to-grow options like pigeon peas, lettuce, pimento or other produce.



### Step 4: Choose how to plant your produce.

Determine if you are planting in beds, containers or individual holes.

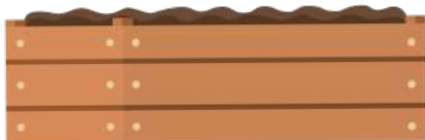
#### Beds

- Prepare the planting area by tilling, or loosening the soil.




#### Containers or pots

- Ensure the pots have holes beneath
- [REDACTED]
- Choose a space to place your container





## Individual Holes

- 
- Add and mix sharp sand, organic matter and limestone to the soil you have removed from the planting hole.
- Place the mixture in the planting hole.



## Step 5: Get to planting!

Plant your seeds, seedling or sapling



## Caring for your Plant

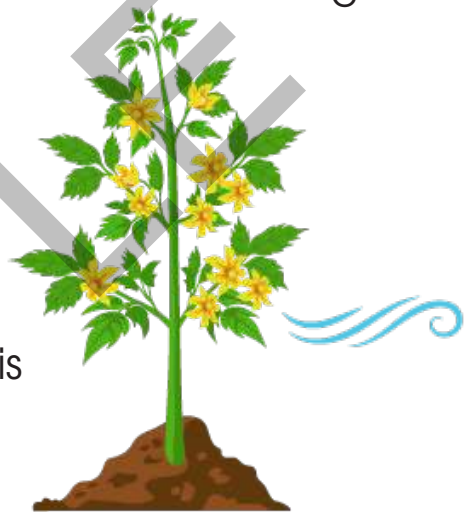
Now that your seedlings have emerged, you must care for them in order to reap a good harvest. Let's review!

To grow healthy, plants need the following resources

### 1. Sunlight

Adequate sunlight allows plants to photosynthesize and make their own food, which helps them grow, just like you!

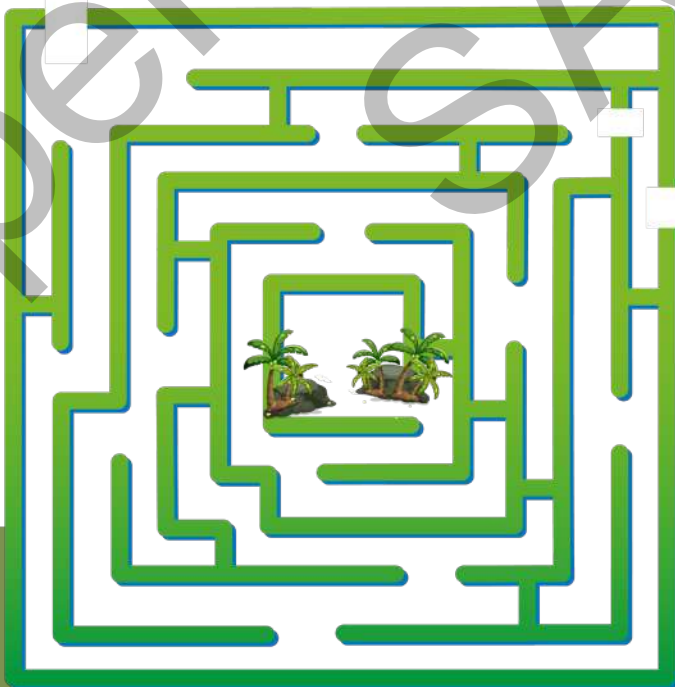
Remember, [REDACTED], so make sure your plants aren't getting too much or too little sunlight.



### 2. Air

[REDACTED] and eventually kill them. Make sure your plant is in a well ventilated area.

Help circulate the air around the room!



### 3. Nutrients

Plants grown in soil take up their nutrients from the soil. There are different types of nutrients that we can add to the soil for our plants.

The most important of these are **nitrogen**, **phosphorus** and **potassium (NPK)**.

#### Sean's Yellow Tomato Leaves

Sean has been watching his tomato seedling grow for the last four weeks. It has a good, sturdy stalk and many leaves.

He notices, however, that the leaves are turning yellow!

Which nutrient do you think Sean's plant is in need of?  
Circle your answer.



**Nitrogen**

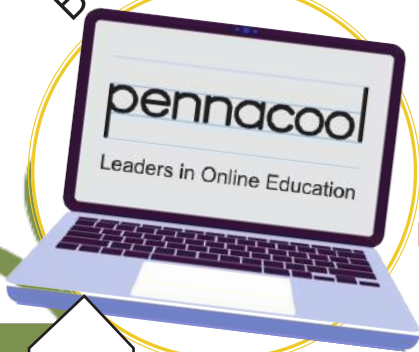


**Phosphorus**



**Potassium**

BONUS QUIZ

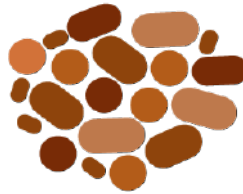


pennacool.com → Workbooks → Std 2 Science Workbook → Bonus Content

## Fertilization

When we apply nutrients to our plants, we are **fertilizing** them.

- a. Fertilizers come in different states such as **solids and liquids**.



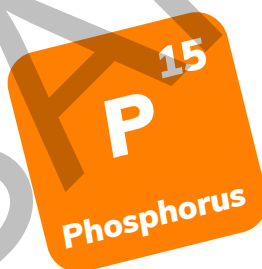
- b. Some fertilizers can dissolve slowly in water, and some quickly.



- c. Some are made in a factory, while others can be made right at home using food scraps and dead plant matter. This is called **compost**.



- d. \_\_\_\_\_ ;  
nitrogen, phosphorus and potassium.



Which fertilizer did you use to help your plant grow?  
Give details, using the points a to d above to help you.

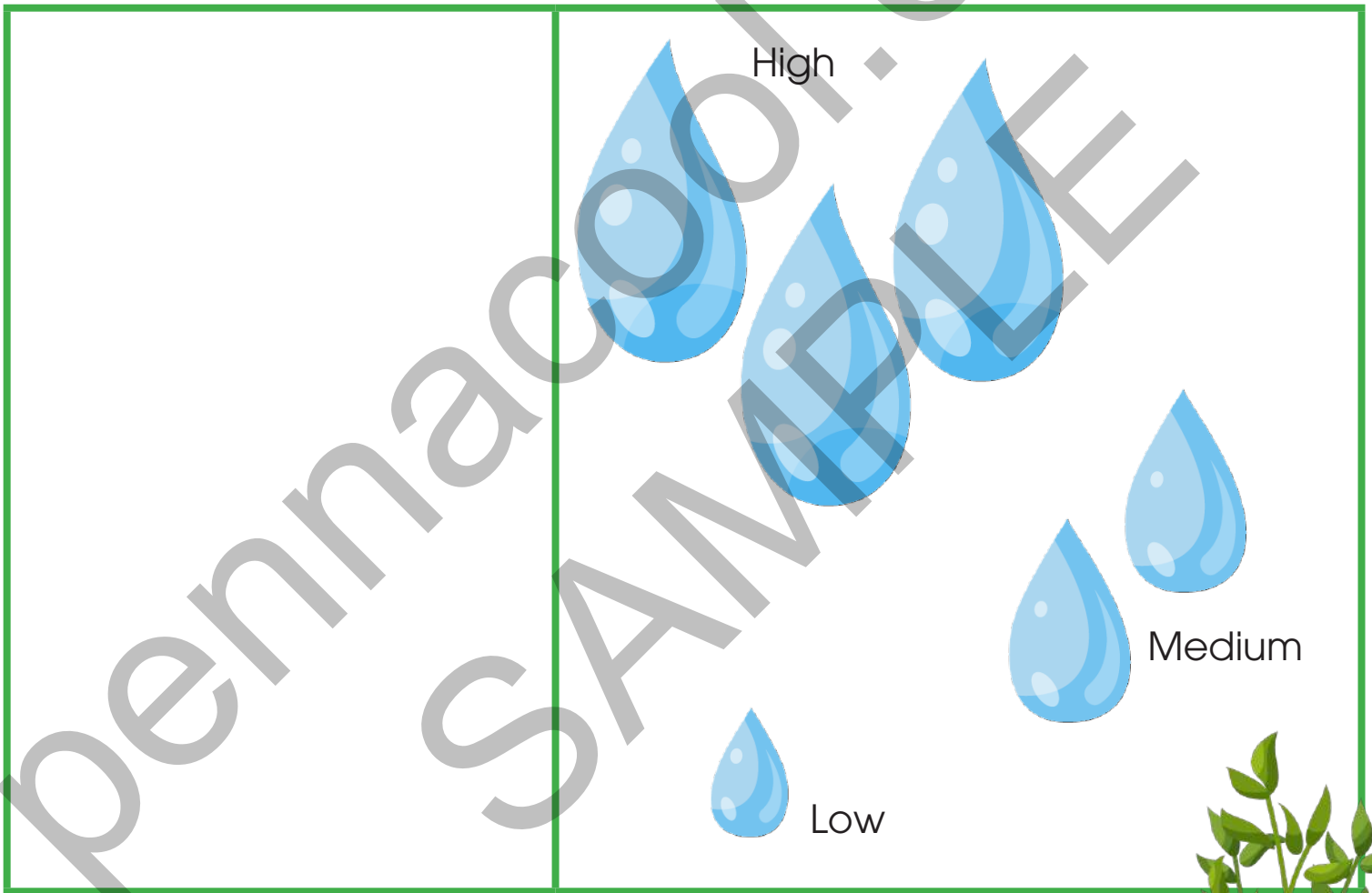
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## 4. Water

Without water, plants won't be able to take up nutrients in the soil through their roots. Water also helps keep plants hydrated.

Draw a picture of your plant and circle the amount of water it needs.



# Stages of Plant Growth

Now, watch your plant grow! There are six stages we can identify that most plants grow through.

Match each growth stage to the correct image.

Stage 1



Stage 2  
Seedling

Stage 3  
Vegetative

Stage 4



Stage 5



Stage 6





# 3. Aquaculture

\_\_\_\_\_ is called **aquaculture**.  
Similar to plants, fish can be grown under different conditions.  
These include:

In aquaria



In tanks (indoor or outdoor)



In the sea



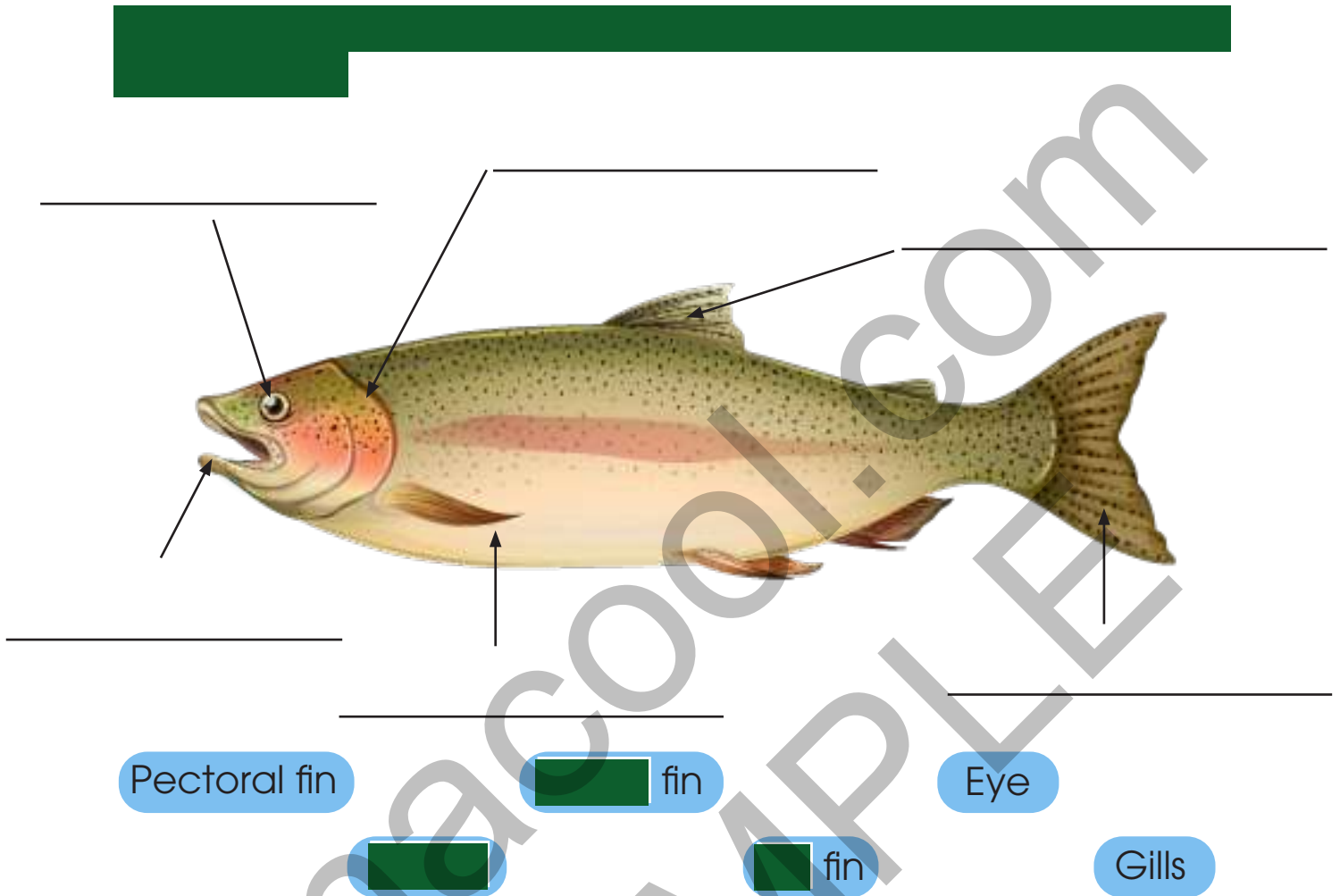
In the ground as ponds



People raise fish for many different reasons.  
List three reasons why people raise fish.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_

As water-dwelling vertebrates, fish have a different anatomy from land dwelling vertebrates.



## Are you ready to rear a fish? Let's get started!

### Step 1.

The first step in rearing a fish is deciding what you are going to do with your fish. Choose one of the reasons you stated on the previous page for the purpose of your fish farm.

I am rearing my fish because:

---

## Step 2.

There are many species of fish that are reared for different reasons. For example, tilapia is a commonly grown food-fish while goldfish are common pets.

Name three species of fish and stick or draw a picture of each that can be reared for the purpose you want.

Fish Species	Picture
1.	
2.	
3.	

### Step 3.

Now we are ready to prepare our space. [REDACTED]. Use the following checklist as a guide.

In the ground	In a tank	In an aquarium
<ul style="list-style-type: none"><li><input type="checkbox"/> The ground is flat.</li><li><input type="checkbox"/> There is good water supply to keep the pond full.</li><li><input type="checkbox"/> There is good drainage to change out the water.</li><li><input type="checkbox"/> [REDACTED]</li><li><input type="checkbox"/> There is enough airflow into the pond.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> The tank has been cleaned properly.</li><li><input type="checkbox"/> [REDACTED]</li><li><input type="checkbox"/> The tank water drains out into a safe place.</li><li><input type="checkbox"/> If outside, the tank has a screen to keep away birds.</li><li><input type="checkbox"/> There is enough airflow into the tank.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> [REDACTED]</li><li><input type="checkbox"/> There is a sufficient water filter to keep the water clean.</li><li><input type="checkbox"/> The tank is away from direct sunlight to prevent algae growth.</li><li><input type="checkbox"/> There is enough airflow into the tank.</li></ul>



## Step 4.

Once your space is prepared for your fish, it's time to introduce them to their new environment.

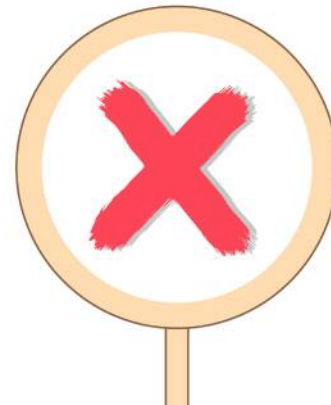
The species of fish I chose is \_\_\_\_\_.

## Step 5.

\_\_\_\_\_.

Here are some do's and don'ts for feeding your fish:

Do	Don't
Feed your fish on a regular schedule.	_____.
_____	Feed your fish if you still see food in the tank.
Feed your fish appropriate fish food.	_____
Feed your fish small amounts throughout the day.	Feed your fish one large amount once a day.



## My Feeding Schedule

Using the timetable below, create a feeding schedule for your fishes.

Time of Day	Feeding Number	Amount of Food Given (Teaspoons)
	1	
	2	
	3	

Step 6.

Clean fish are happy fish.

. Leaving your fish in dirty water can make them sick, and can eventually kill them.



## Tank Refill

Danielle needs to change out some of the water in her freshwater aquarium.

The capacity of the aquarium is  She only uses  to prevent the fish from jumping out.

Danielle empties 25 L of water from the tank. How much freshwater does she need to add in to refill the tank?



Tank capacity =

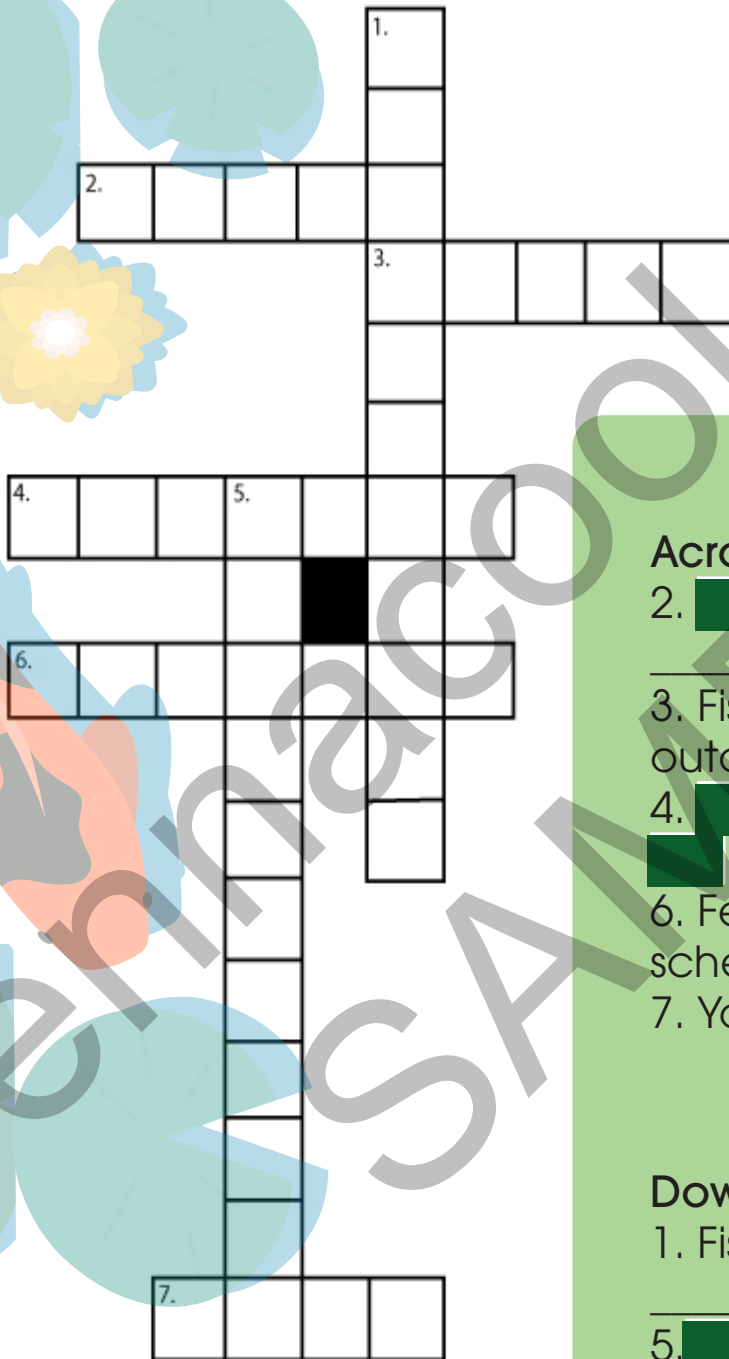
Original volume of water = \_\_\_\_\_

Volume of water removed = \_\_\_\_\_

Volume of water to be replaced = \_\_\_\_\_

## Crossword Puzzle

Rearing fish is a big responsibility. They need lots of care and attention.  
Let's recap what we have learned.



### Across

2. \_\_\_\_\_  
\_\_\_\_\_.
3. Fish can be reared indoors or outdoor \_\_\_\_\_.
4. \_\_\_\_\_
6. Feed your fish on a \_\_\_\_\_ schedule
7. You should \_\_\_\_\_ your fish.

### Down

1. Fish wastewater must not \_\_\_\_\_ drinking water
5. \_\_\_\_\_  
\_\_\_\_\_.

# 4. Value-Added Agricultural Products

When agricultural crops are grown, they can be used by humans in their raw form or they can be further processed into something else.

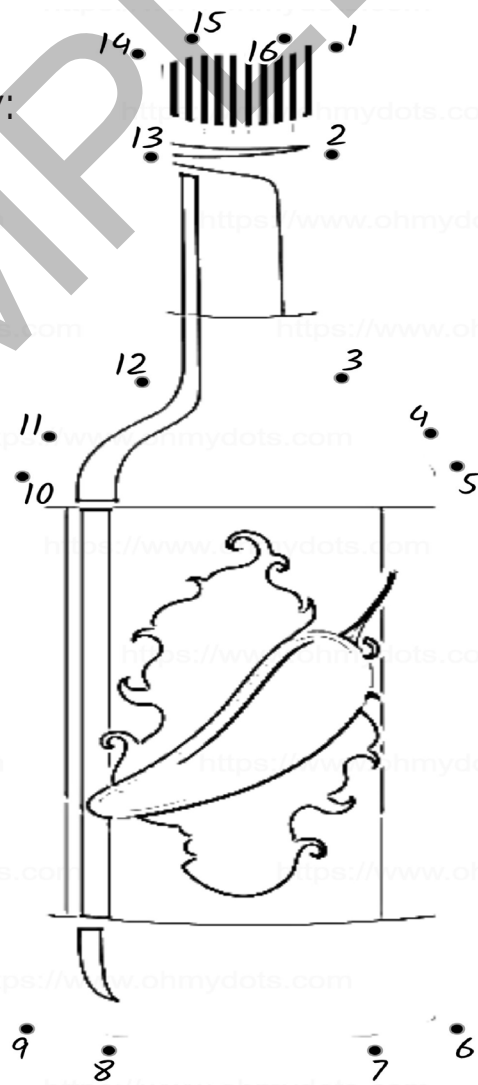
\_\_\_\_\_ that is then used by humans.

These products are known as \_\_\_\_\_ and they look different to the original raw material.

Using all or part of the original product, value-added products can be made by:

1. Processing
2. Packaging
3. Cooling
4. Drying
5. Extracting

Connect the dots to see what value-added product Shanice made from the peppers she harvested from her kitchen garden.



When we put in work and make something new out of raw materials, we add value to the final product. [REDACTED]

Our economy benefits from value-added products because:

1. [REDACTED]
2. They reduce the amount of money that is spent on importing similar products.
3. They provide jobs for people.

Unscramble the letters to see what value-added products are made from each of the raw materials below



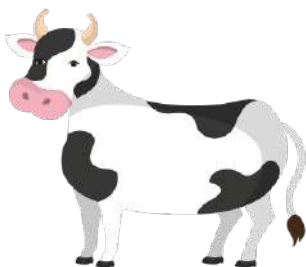
[REDACTED]

\_\_\_\_\_



[REDACTED]

\_\_\_\_\_



[REDACTED]

\_\_\_\_\_

## The Cocoa Estate

Jabari's father has a cocoa estate in Central Trinidad where they grow cocoa and harvest the beans. A few years ago, Jabari's mom started a cocoa processing factory which makes bars of chocolate.

Their products are sold in grocery stores throughout the country and they have recently started exporting to other countries.

Jabari's dad was only able to sell  of beans for

His mom was able to sell three bars which took the same  of beans for  each.

How much money was Jabari's mom able to sell all three bars for?

---

How much more value did the chocolate bar add to the original product?

---





# Cocoa Solve

Value-added products help provide employment for many different persons. These cocoa beans need help getting to the chocolate factory.

On their way, they have to be helped by the farmer, the truck driver and the factory worker. See if you can help them find their way by solving the equations correctly.



1. Pick cocoa pods

2. Dry cocoa beans

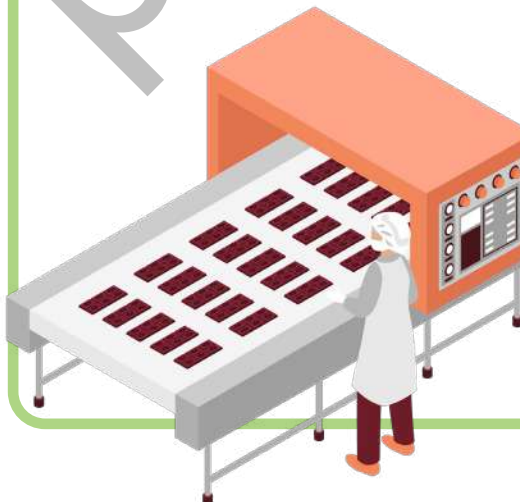


$$56 \times \blacksquare =$$



3. Transport the beans

$$\blacksquare \text{ divided by } 4 =$$



$$500 + \blacksquare =$$

4. Process the beans into chocolate

5. Package the chocolate!

$$478 - \blacksquare =$$





# Local Chefs

Can you make a value-added agricultural product?

This product must be made from locally-sourced ingredients grown in either Trinidad or Tobago.

Some examples include



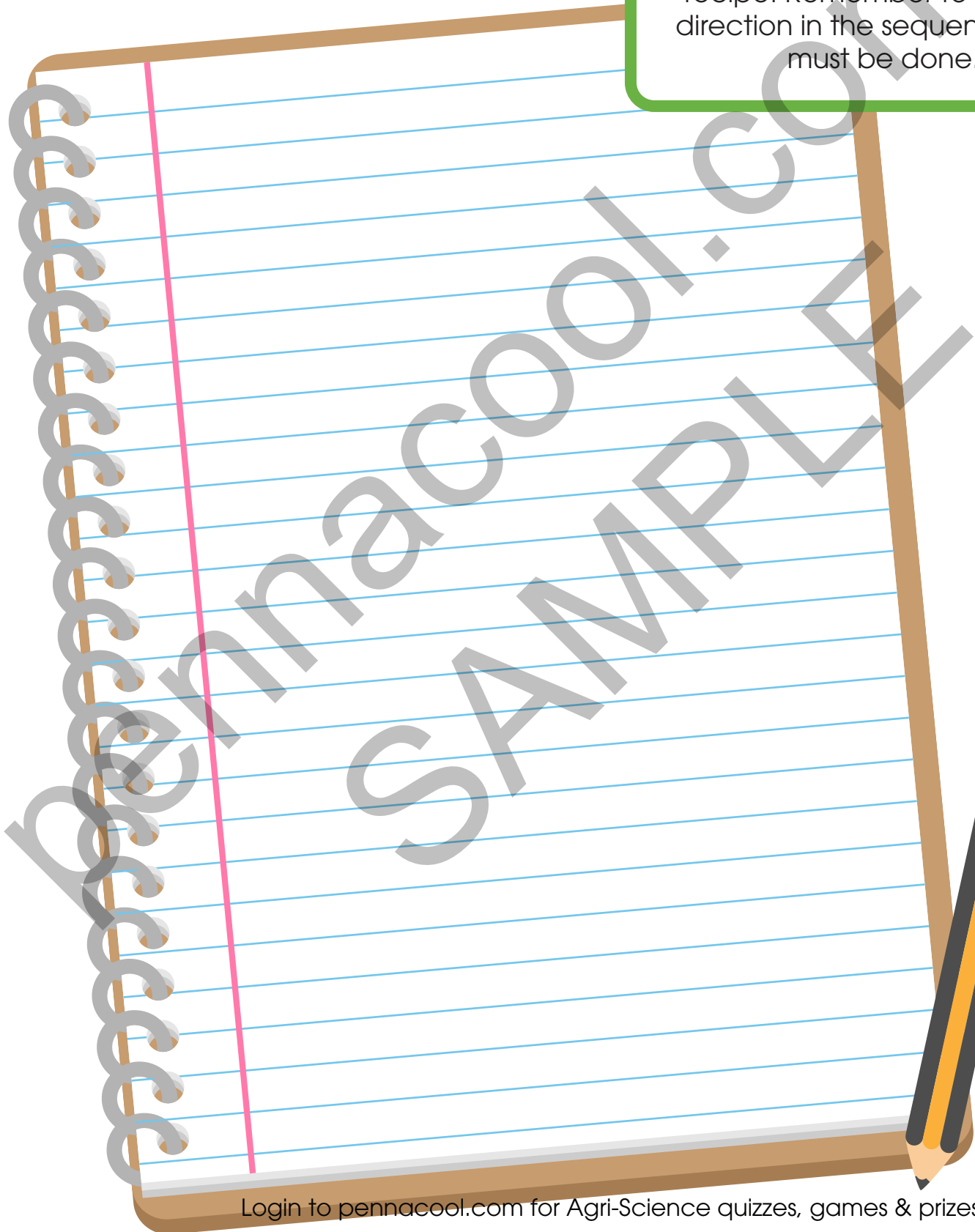
After all, it's never too early to become an awesome chef!

Write the list of ingredients for your value-added agricultural product, including the measurement for each one.



Name of Product \_\_\_\_\_

Write the directions for your recipe. Remember to write the direction in the sequence that it must be done.



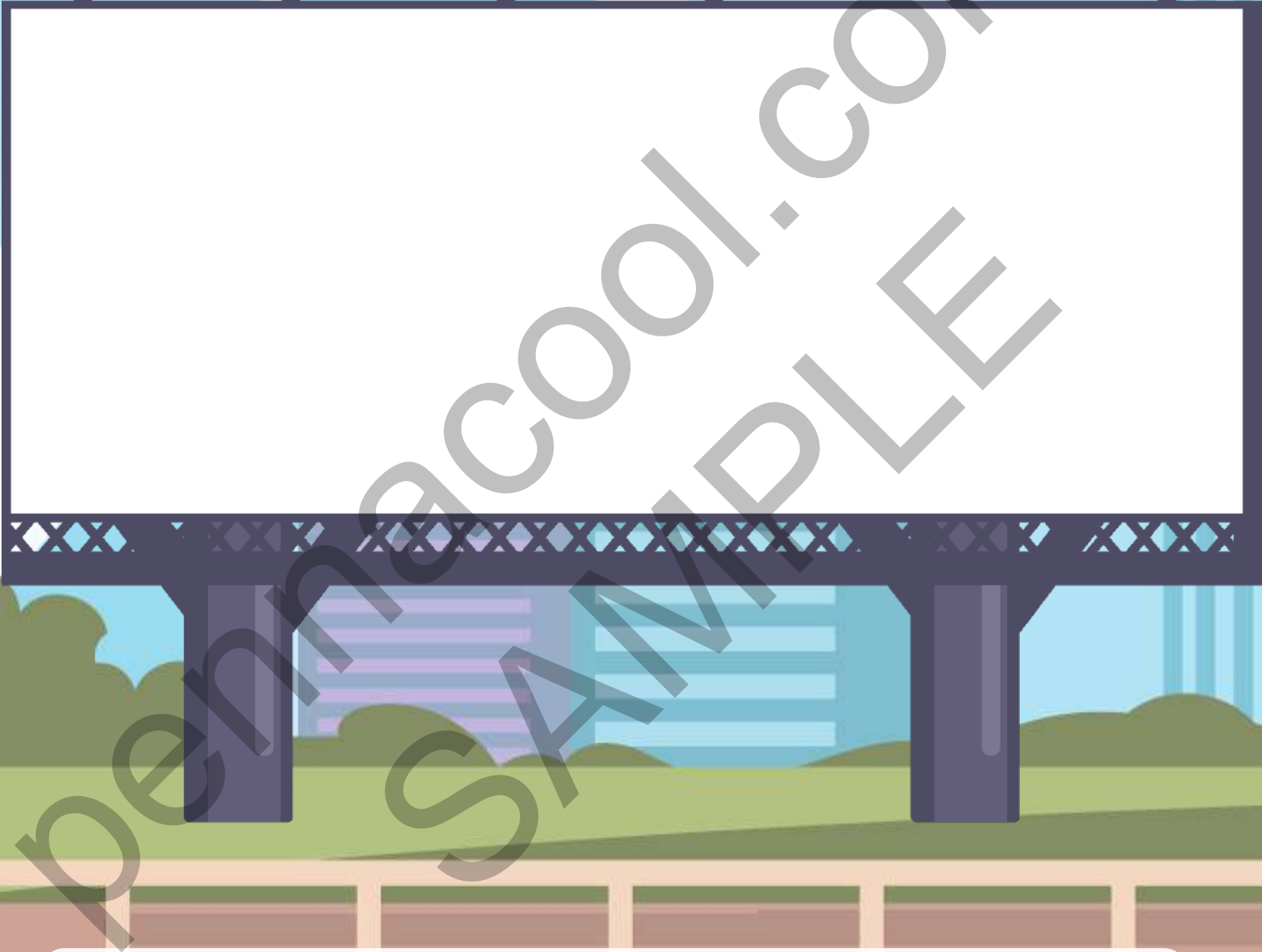
## Made in T&T

Use any drawing medium to produce a label for your locally produced item from page 110.

Use our national colours or the shape of the country, Trinidad and Tobago, in your label to show national pride.



Now that you've made and labelled your food product,  
it's time to advertise!



Make sure your poster has \_\_\_\_\_ that  
\_\_\_\_\_ will make people want to buy it.