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Climate change and environmental sustainability module: Activity booklet

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CLIMATE CHANGE AND ENVIRONMENTAL SUSTAINABILITY MODULE

ACTIVITY BOOKLET

LUMS LEARNING INSTITUTE

Save The Earth

This activity booklet is designed alongside an information booklet to help teachers and parents engage students in tools relating to climate change and environmental sustainability.

The booklets are authored by Sara Hassan, Subhah Khan, and Dr. Fozia Parveen in a partnership funded by the LUMS Learning Institute (LLI).

The Ismaili CIVIC Pakistan will help in dissemination and outreach, while Aga Khan University's Institute for Educational Development (AKU-IED) will publish it in their resources and continue to work on similar interventions in the future.

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Please scan to download the module

Organisation of the Activity Booklet

Dear readers (teachers, parents, and students),

Thank you for accessing our activity booklet. The information booklet introduced concepts relating to climate change and environmental sustainability. In this booklet several cross cutting activities on various themes have been presented. The booklet contains ready-made activities containing but not limited to comic strips, experiments, conversations, writing, simple tag, cut and paste as well as research activities.

We hope you enjoy, adapt and implement these activities in your community.

The next two pages contain a general list of activities followed by a color index of the same activities (with recommended age groups). We feel that most activities are suitable for a diverse set of themes and are not restricted to a certain age or category. Please feel free to send us the output of the activities at fozia.es@gmail.com

Looking forward to your active engagement and feedback on this small intervention.

Best Wishes,
Fozia, Sara, and Subhah.

TABLE OF CONTENTS

Color Index

Age Group: 8 & above

Age Group: 12 & above

Age Group: 10 & above

Age Group: 14 & above

Age Group: 8 & above

WORD SEARCH

RULES

Two players will play this game simultaneously. There are 12 stickers indicating a cause and a solution for land pollution (6 each). Children will have to first find the cause of land pollution on a word search, and then the first child to find the cause will pick up its sticker immediately. The next step will be to find its solution and then pick up the corresponding sticker. This will continue until all of the stickers have been removed from the stack. If two people find the same cause, then the first to grab its sticker must also find the solution in the word search so that he can also take the corresponding sticker. If the player who found the cause is unable to find the solution till the end of the game, then the count down begins and the failure to find the solution within that timeframe will result in the solution and its corresponding cause card being awarded to the second player. The person with the highest number of stickers wins.

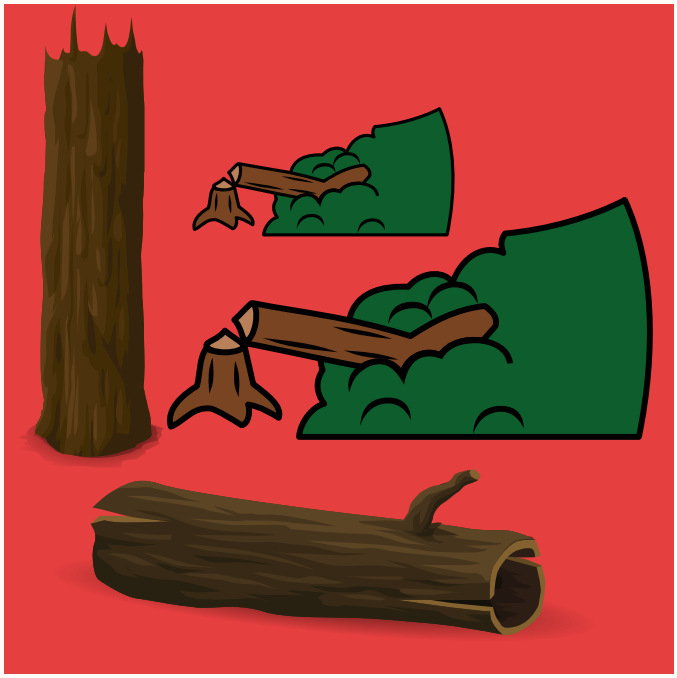
Land Pollution

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

Word Bank

Farming, PQNK, Industrial Waste, Waste Disposal, Fossil Mining, Renewable Energy, Deforestation, Reforestation, Littering, Recycling, Urbanization, Plantation

Note: PQNK stands for paedar qudrati nizame kashtkari and the details are presented in Sir Asif Sharif's story




TRASH


GLASS
PAPER
PLASTIC
BOTTLES

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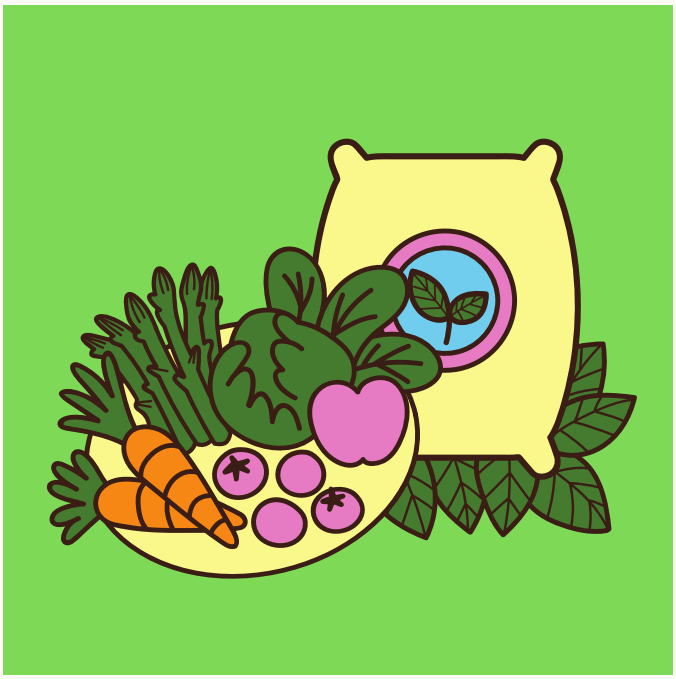
FERTILIZER



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Age Group: 8 & above

Add the stickers presented in their corresponding boxes below.
(Which activity results in water wastage or saves water?)

Using a bucket to wash a car

Closing the tap tightly

Reusing water

Fixing pipe leaks

Using the toilet to flush tissues

Taking long showers

Keeping the tap open while brushing

Washing half full laundry

SAVES WATER

WASTES WATER

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Age Group: 10 & above

LAND PROTECTION STARTS FROM HOME

RULES

Each student will be given one card to practice the activity outlined on the card at home. After a week, they will find the sticker on their card to mark their task.

Every week, a new card will be given until all students get a card at least once.

This activity has eight cards and will take eight weeks for one student to complete the activity by action.

Students can be encouraged to keep a green journal.


Natural

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Buy organic foods. Organic foods are grown without the use of pesticides. Select fruits and veggies that are certified organic to reduce chemical pesticide usage in the agriculture industry.

Dispose of toxic chemicals properly. Household cleaning products, paints, automotive fluids, and aerosols all contain toxic materials. Take the time to figure out how to dispose of them properly, as they may pollute the soil. Read the label on each container to figure out the best way to get rid of each type of chemical.

Plant trees. This will reduce land pollution. Planting trees increases biodiversity, stops soil erosion, reduces carbon monoxide buildup, and adds aesthetic value to the area. Plant as many trees as you can in your community.

Use less plastic and recycle as much as you can . Plastic waste is clogging up landfills (which is a major contributor to land pollution). Avoid buying and using plastic products. Also, instead of throwing away your waste, recycle as much as you can.




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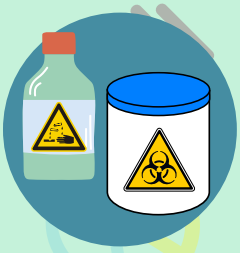
Reduce your electricity consumption. Burning fossil fuels to create electricity emits pollutants that are deposited onto the land. To reduce your electricity consumption, turn off and unplug devices and equipment that you aren't using.

Limit your consumption of material goods. It takes a lot of energy and raw materials to manufacture everyday items. To reduce the amount of waste you produce, don't buy extra things. Opt for buying used items and repairing things rather than purchasing new items.

Use renewable energy sources. Solar, and wind power are better for the environment than burning fossil fuels. Call your power company to see if you can purchase your electricity from renewable sources. Otherwise, get solar panels or a wind turbine installed to power your home.

Avoid using fertilizers in your garden. They leach into the soil and contaminate it. This contaminated soil does not support the growth of crops, leading to less land available for food production.



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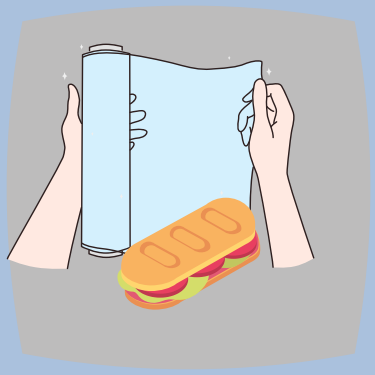
Age Group: 10 & above

REDUCING OUR CARBON FOOTPRINT

ACTIVITY

There are numerous ways for us to lessen our carbon footprint. Sort and arrange the activities listed below. Please note that the first one has already been completed for you (See page 13).



Use your own water bottle instead of a plastic water bottle.

Take your own bag to the market instead of taking plastic bags.

Use eco-friendly wraps for fruit, and avoid plastic cling wrap.

Buy a toothbrush that is eco-friendly and recyclable. Preferably, those made of wood.

Replace disposable cups with re-usable coffee or tea cups.

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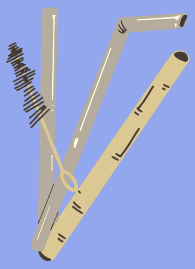


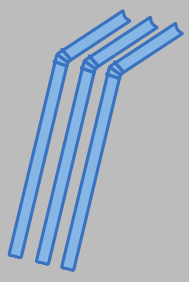
Use public transportation instead of your own vehicle when accessible .

Use minimal material for packing .

Take your mason jar to the Smoothie Bar and get it refilled instead of taking it in a disposable cup.

Replace plastic utensils with wooden utensils (or steel).

Replace plastic straws with metal straws. (Reusable)



Information source: https://www.bbc.com/news/science-environment-52719662

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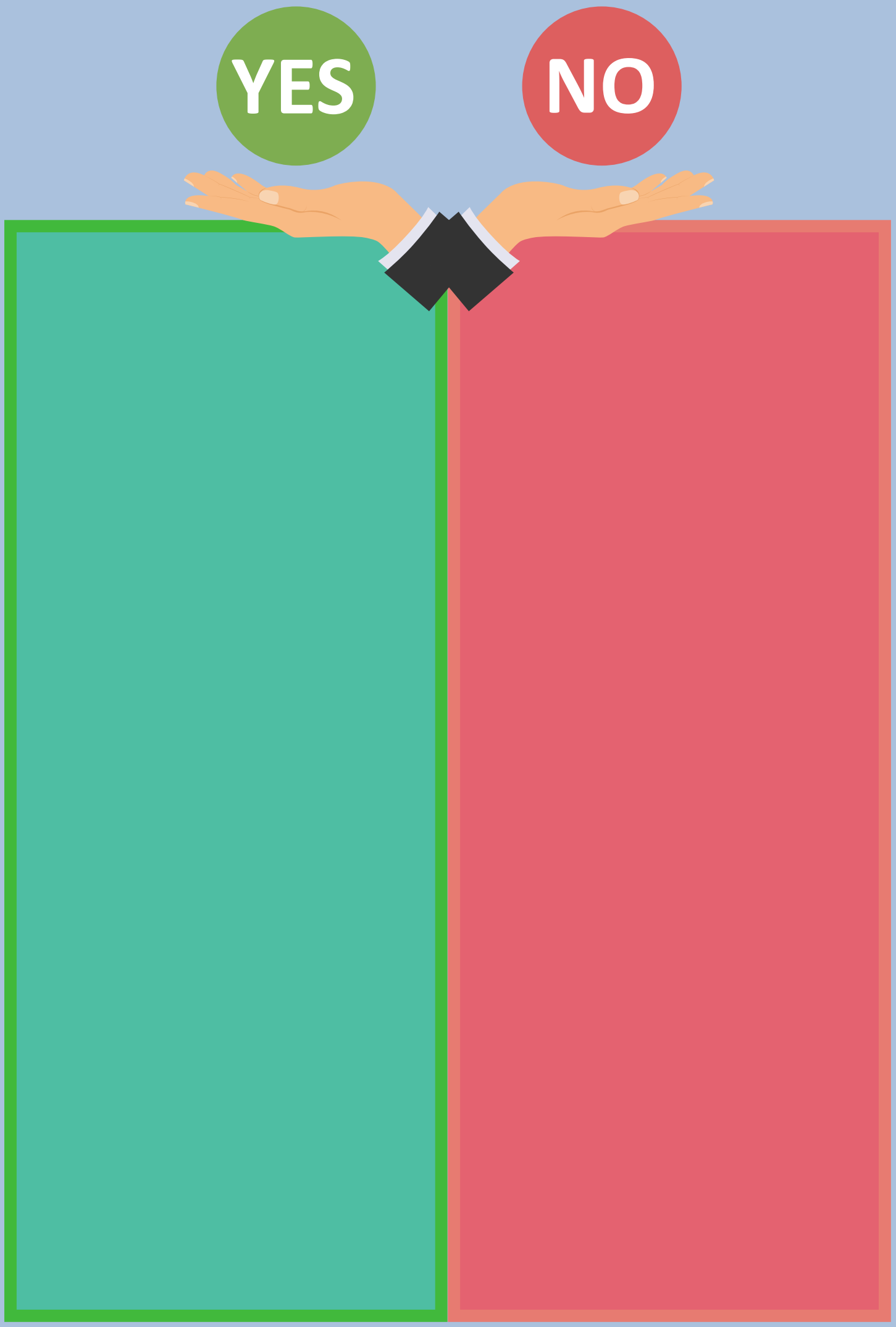
YES

NO

Take your own bag to the market instead of taking plastic bags.


YES
NO

Age Group: 10 & above

CARBON APOCALYPSE

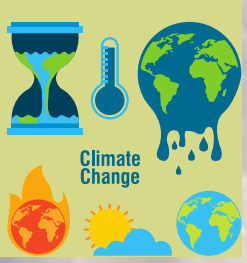
Can you calculate your carbon foot print?

Use the link given below to calculate your footprint and write your personal overshoot day. List down all the activities that release excessive carbon.

https://www.footprintcalculator.org/home/en

Discuss with your peers how an increase in carbon in the atmosphere is causing climate change and write it below

Imagine you're an animal who likes to live in cooler areas. How has climate change impacted your lifestyle?



How has climate change impacted food production?

Take home question:
Where do you buy your food from?
What are the advantages of growing and eating locally?

Age Group: 10 & above

EARTH'S MOOD

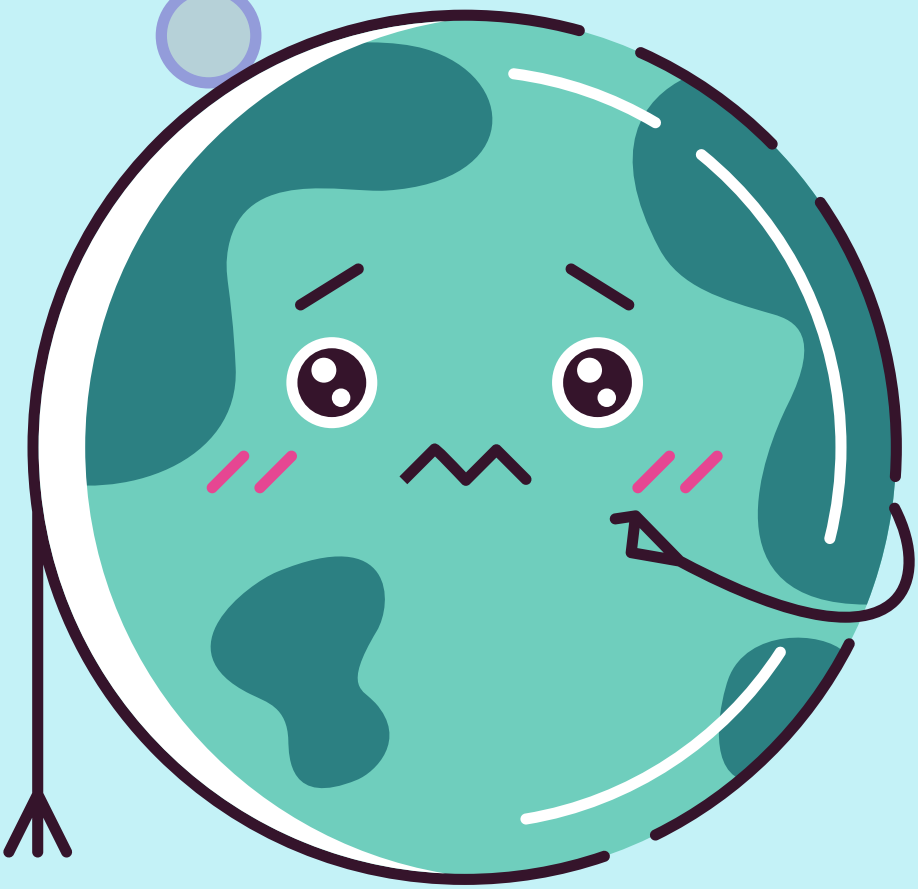
ACTIVITY

OUR ACTIONS CAN EITHER MAKE THE EARTH SAD OR HAPPY.

The activity contains stickers and tags for the stickers.
The students will stick a sticker to a relevant activity and then paste it on the happy earth or sad earth mood board.

MOOD BOARD 1

Which of your activities are making me sad?



MOOD BOARD 2

Use the stickers below to complete the activity.

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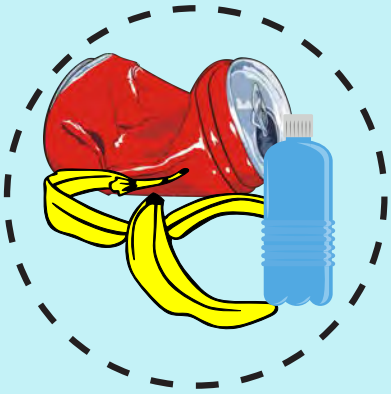
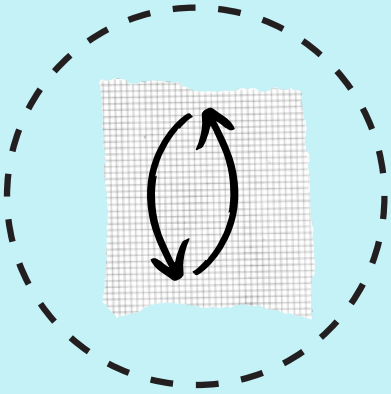
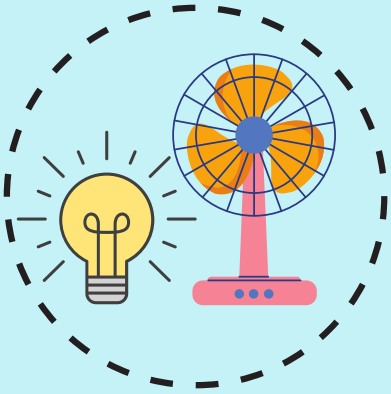
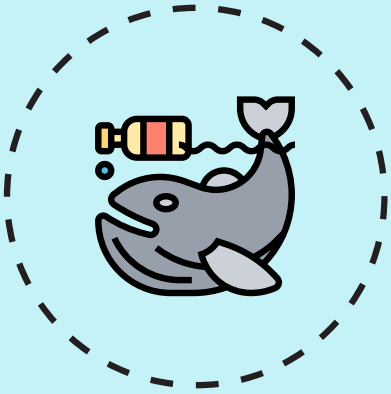
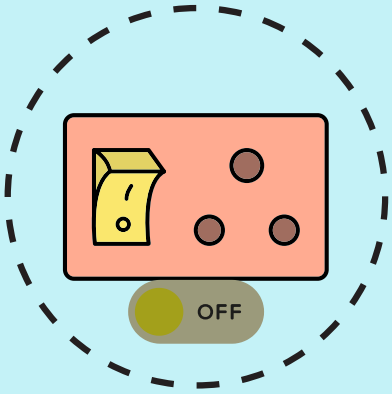







Cleaner




OFF


FERTILIZER

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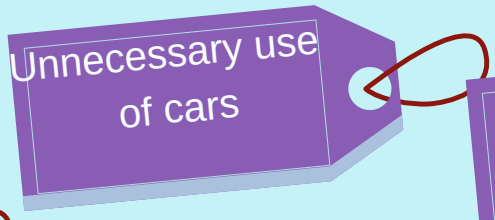
TAGS


Switch off appliances


Planting trees


Pollute oceans by throwing trash


Unnecessary use of cars


Mining


Using chemical cleaners

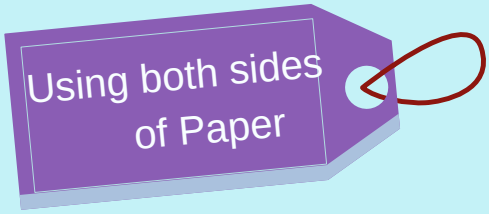

Acid Rain


Deforestation


Wasting Food


Using recyclable trash Bags


Cycling


Using both sides of Paper


Taking shorter Baths

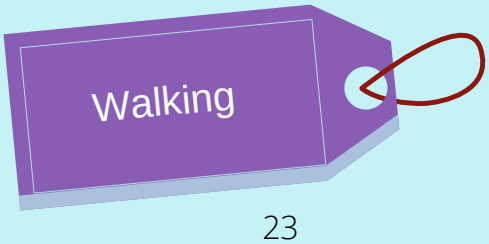

Fumes from factories


Properly dispose of trash


Recycling


Use of fertilizers


Littering


Walking


Congested cities

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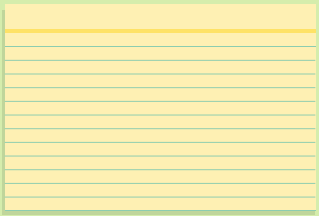
Age Group: 10 & above

INDOOR AND OUTDOOR AIR POLLUTION

Things Needed:



- Vaseline
- A set of index card

Method:

- Apply Vaseline on two index cards.
- Place one card in a living room or a bedroom.
- Place the other card outdoors in a safe spot
- Keep both cards in their places for an entire day and compare the results afterward.
- Make sure you place the cards in such a way that the side with Vaseline stays at the top.

Record your results on the next page:

- Which card looks more clean?
- What does this say about the air quality inside and outside your home?
- How is this impacting our health?
- How can the air quality be improved in both areas?

Source: Staake, Jill. 15 Meaningful and Hands-On Climate Change Activities For Kids. https://www.weareteachers.com/climate-change-activities/

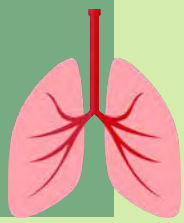
INDOOR AND OUTDOOR AIR POLLUTION

Write your observations about the cards.

What does this say about the air quality inside and outside your home?

INDOOR AND OUTDOOR AIR POLLUTION

How is this impacting our health?

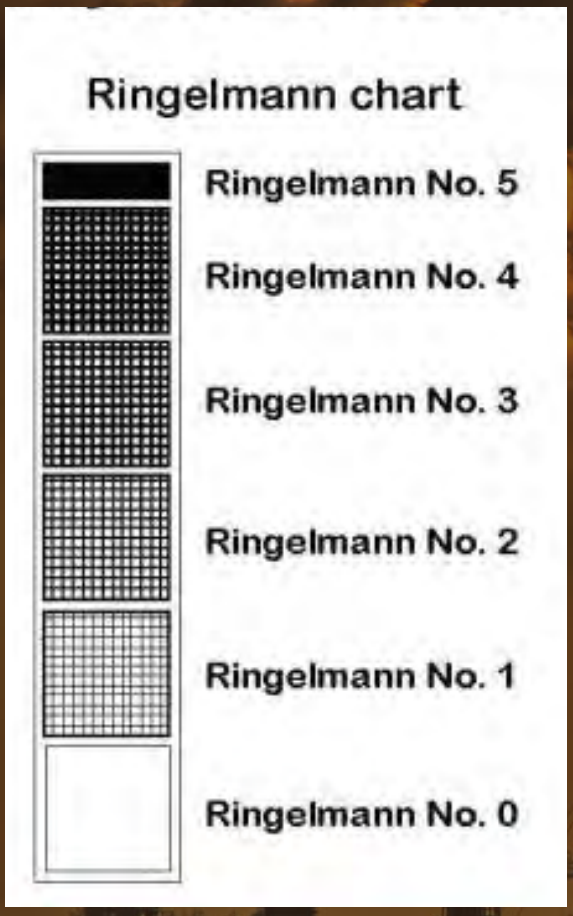


How can the air quality be improved in both areas?

Additional Information

How can we measure air pollution?

Have you ever wondered whether your surroundings are mildly or extremely polluted? Sometimes we may not be able to see how polluted our room or area is. For that, we use the Ringelmann Chart to see what the scale of pollution is.



HOW TO USE RINGELMANN CHART?

To use the chart, it is supported on a level with the eye, at such a distance from the observer that the lines on the chart merge into shades of gray, and the opacity allows them to rank it on the scale

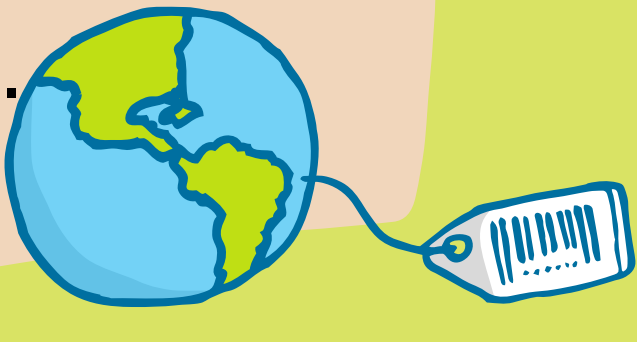
Source: RINGELMANN SMOKE CHART (Revision of IC 7718) By Staff, Bureau of Mines, UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF MINES https://www.cdc.gov/niosh/mining/userfiles/works/pdfs/ic8333.pdf

Age Group: 14 & above

FIGHTING CONSUMERISM

ACTIVITY

Below is a small conversation between a doctor and a consumerism patient. Let's help this patient take the right medicines so that he starts to live a healthy life again.



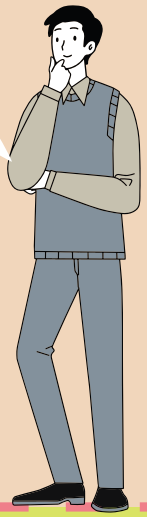

Doctor, I feel sick. I don't know what happened, but I know something is wrong.
Relax, Kid. We will sort things out. Tell me about your symptoms.


Doctor I really don't know. But this is certain: I always want to buy things.
Oh! I know where this is going.


Yes, doctor. This is exactly what is happening.
Okay, let me ask you a few questions:
• Do you buy more than you plan to?
• Do you run out of storage space for your stuff?
• Do you mistakenly buy things you already have?
• Do you constantly go over your budget?
• Do you regret your purchases?

This disease is called consumerism. It is spreading like wild fire but can be treated easily.

Oh. Is there something to worry about? Please help me.



Guys, we need to help this kid. I am prescribing one medicine. Below are other medicines that can be used for treatment. Select and add a tick sticker to those that may work best.

Make the buying process inconvenient by:

- Unsubscribing to all discount emails
- Deleting apps related to buying stuff.

Create an inventory and appreciate what you have

Extend the lifespan of your things by getting them repaired

Declutter and sort unnecessary things to donate to charity

Borrow or rent things instead of buying them.

Information source: https://www.theworldcounts.com/challenges/planet-earth/state-of-the-planet/number-ofi-consumers

Age Group: 12 & above

We Can Do It, Earth-kay?

Can you help Fatima make a cool shopping bag?

Things you'll need!

- ONE YARD OF LINING FABRIC
- ONE YARD OF AN OUTER FABRIC
- FABRIC MARKER
- RULER
- THREADS
- PINS
- SCISSORS
- IRON

Steps to follow!

- MEASURE AND CUT THE FABRIC
- MEASURE AND CUT TWO PIECES OF THE OUTER FABRIC THAT ARE 21 INCHES WIDE AND 20 INCHES LONG
- CUT TWO PIECES OF THE LINING THAT ARE ALSO 21 INCHES WIDE AND 20 INCHES LONG
- FOR THE HANDLES, CUT TWO PIECES THAT ARE 5 INCHES WIDE AND 22 INCHES LONG
- LINE UP THE TWO OUTER PIECES AND SEW THE BOTTOM
- NOW SEW THE SIDES OF THE PIECES
- TAKE THE INNER LINING AND REPEAT THE PROCESS
- FOLD THE HANDLE FABRIC IN HALF LENGTH WISE AND IRON
- SEW THE EDGES OF THE HANDLE THAT IS FOLDED IN HALF
- SEW THE HANDLES TO THE INNER LINING THAT YOU HAVE JUST TURNED INTO A BAG.
- INSERT THE LINING INTO THE OUTER FABRIC BAG AND SEW THE TOP EDGES OF THE LINING TO THE OUTER FABRIC.
- TA-DA! YOUR BAG IS DONE!

Adapted from: How to Make Reusable Shopping Bags, OnlineFabricStore. https://www.youtube.com/watch?v=BPsPoAzVv78

Questions!

On average, how many plastic bags does your family use every month for shopping or groceries?

Use the cloth bags that you have made for these shopping trips and record how many plastic bags you saved in a month?

Questions!

What do you think the impact on the environment would be if every household used cloth bags?

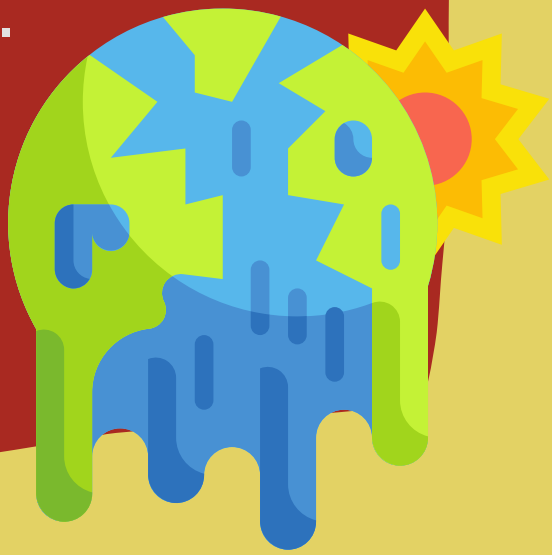
Why is plastic harmful for the environment?

Age Group: 14 & above

GREENHOUSE GASES & GLOBAL WARMING

ACTIVITY

Understand what global warming is and what causes it. Look around, observe and write about things that cause global warming.



GLOBAL WARMING

What is Global Warming ?

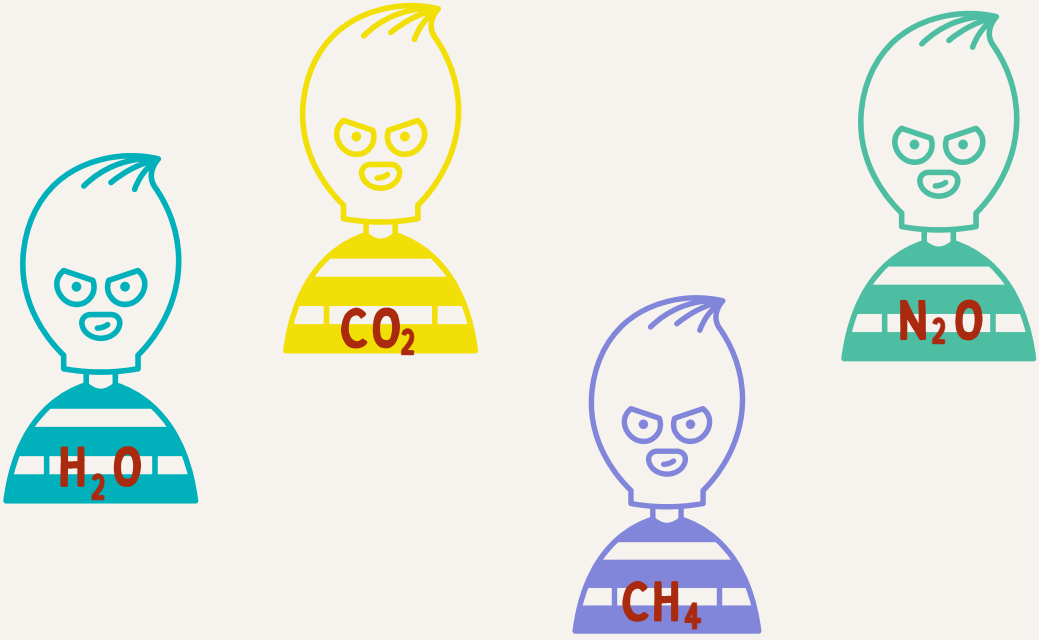
Global warming is an aspect of climate change, referring to the long-term rise in the planet's temperatures.

CAUSES

An increased concentration of

Greenhouse Gases

Greenhouse Gases



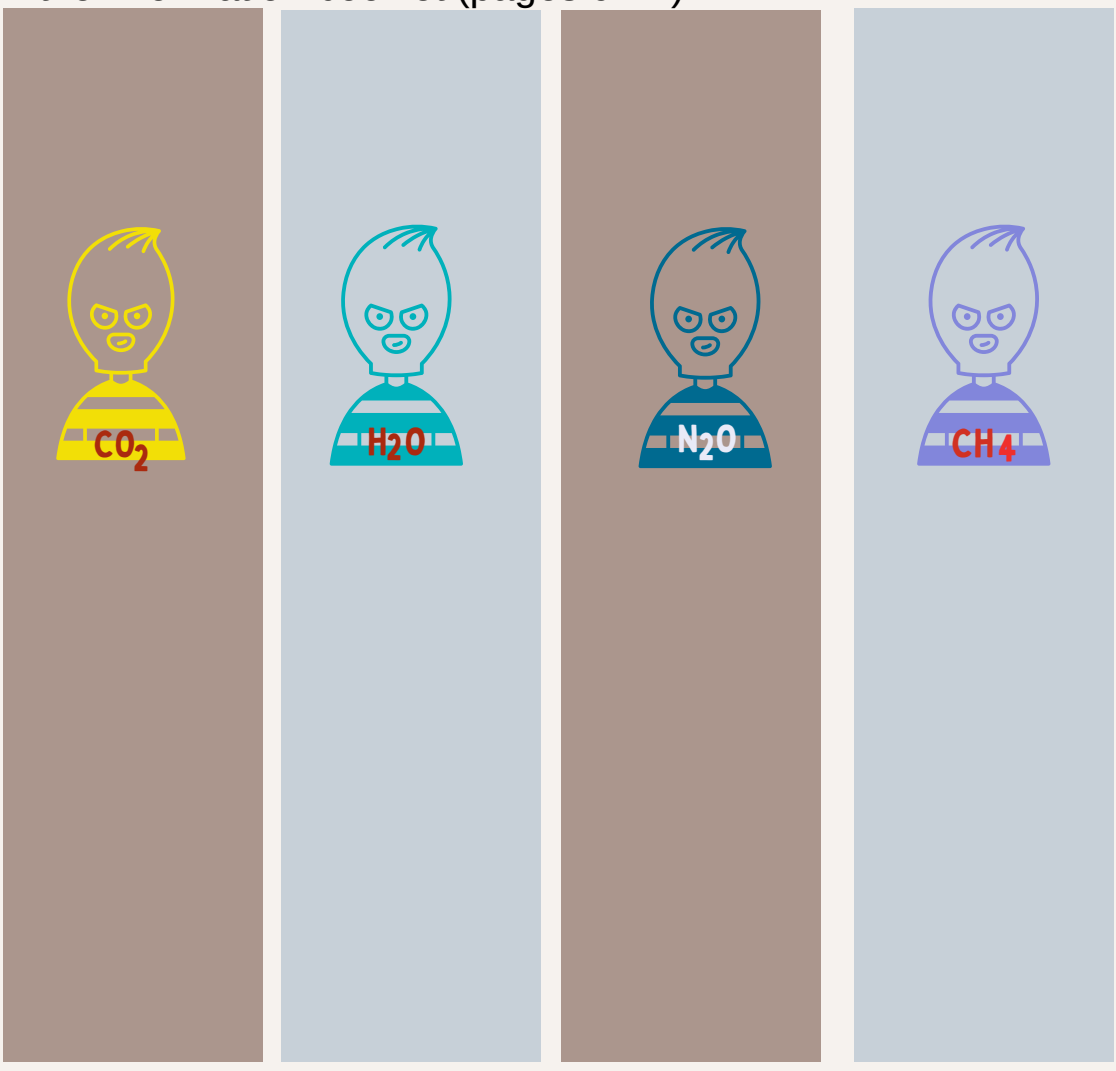
Greenhouse Gases

Greenhouse gases are gases in the Earth's atmosphere that trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. The main greenhouse gases are:

- Water vapor
- Carbon dioxide
- Methane
- Nitrous oxide

Overall, greenhouse gases are a good thing. Without them, our planet would be too cold and life as we know it would not exist. But there can be too much of a good thing. Scientists are worried that human activities are adding too much of these gases to the atmosphere.

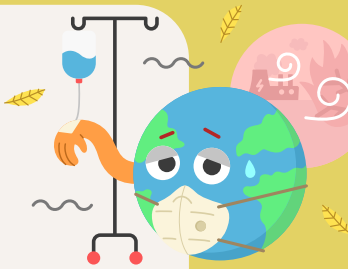
Explain the harmful effects of the following GHGs using the information booklet (pages 9-11).

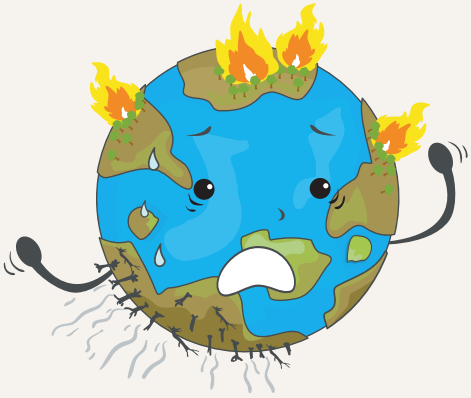


Source: NASA

According to you, which greenhouse gas is the most dangerous? Draw a character for it and explain why you made it?

Which human activities are causing global warming?





BURNING FOSSIL FUELS

Burning fossil fuels like coal and gas to create electricity or power our cars releases carbon dioxide and water vapors into the atmosphere, causing pollution in the atmosphere.

DEFORESTATION

Trees play an important role in regulating the climate as they absorb carbon dioxide from the air and release oxygen back into it. Deforestation increases the carbon dioxide concentration.

AGRICULTURE & FARMING

Methane, a greenhouse gas, is produced by livestock. Nitrogen-rich fertilizer leads to the release of nitrous oxide.

Look around and identify activities that are increasing greenhouse gases and causing global warming.

Conversation with the elderly in the family

Age Group: 8 & above

What was your house like as a child? (e.g. design, size, material, etc.)	
What did the closest market to your place look like? Was there a physical market?	
What did the meals look like and what were the ingredients?	
What was the drinking water source and how has its quality changed over time?	
Were you able to see stars clearly as a child, and has the air quality changed over time?	
What was the mode of transportation in your childhood?	

Conversation with the elderly in the family

How many cars did you have?

How far was your office?

How many electric appliances did you have?

How many farm animals did you have?

How often did you go shopping?

How often did you buy clothes?

Did you have a fridge?

Are there any animal species that you don't see as often?

How many dishes were served at the wedding?

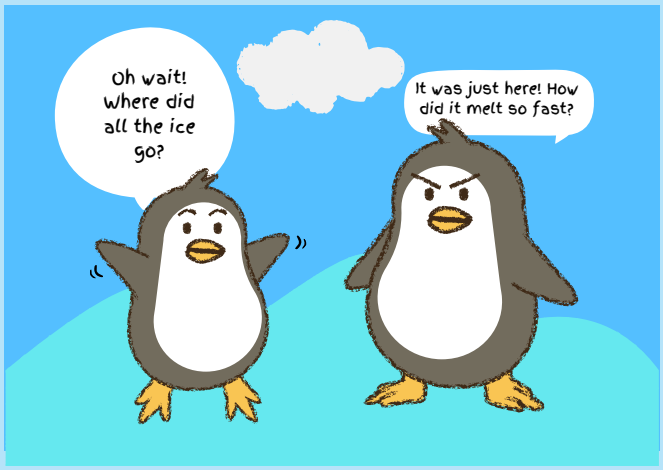
Was there electricity in your childhood?

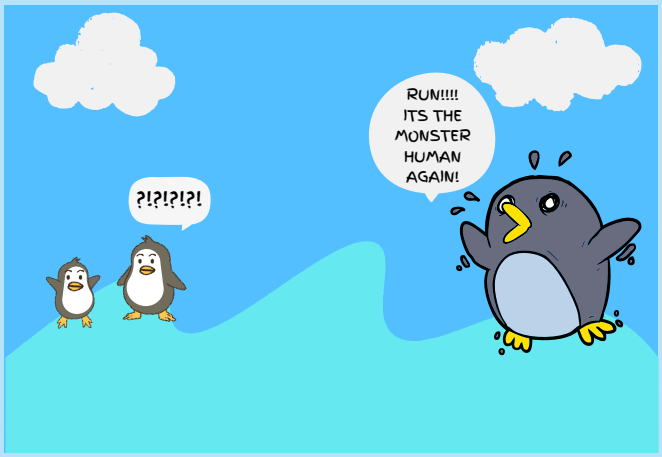
How many clothes did you own?

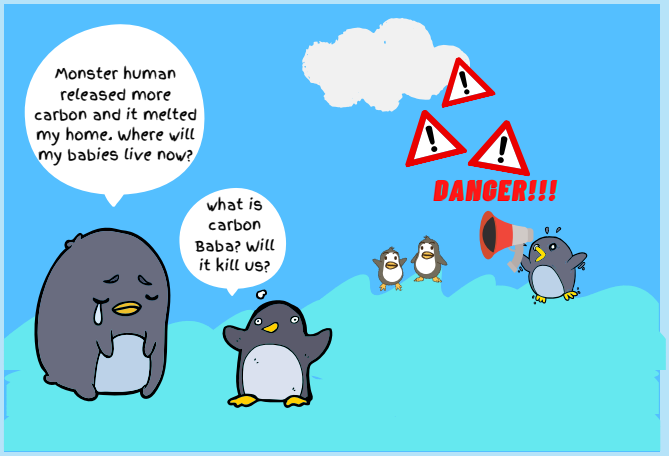
Was there a stream of water nearby? if yes then how has the volume changed over time?

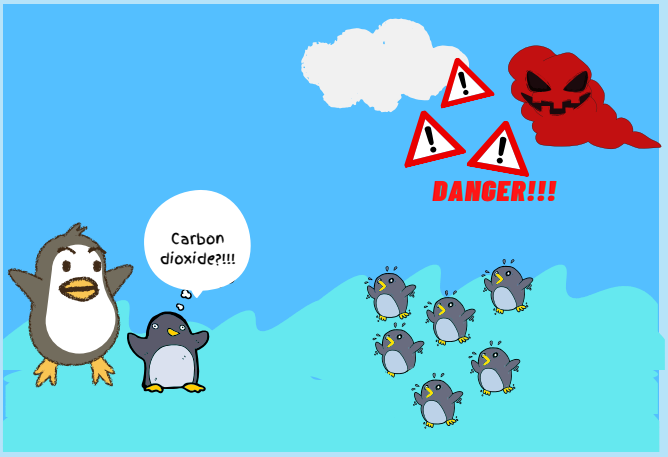
Age Group: 10 & above

A Different Kind of Flying









COMICSTRIPCOMICSTRIPCOMICSTRIPCOMICS
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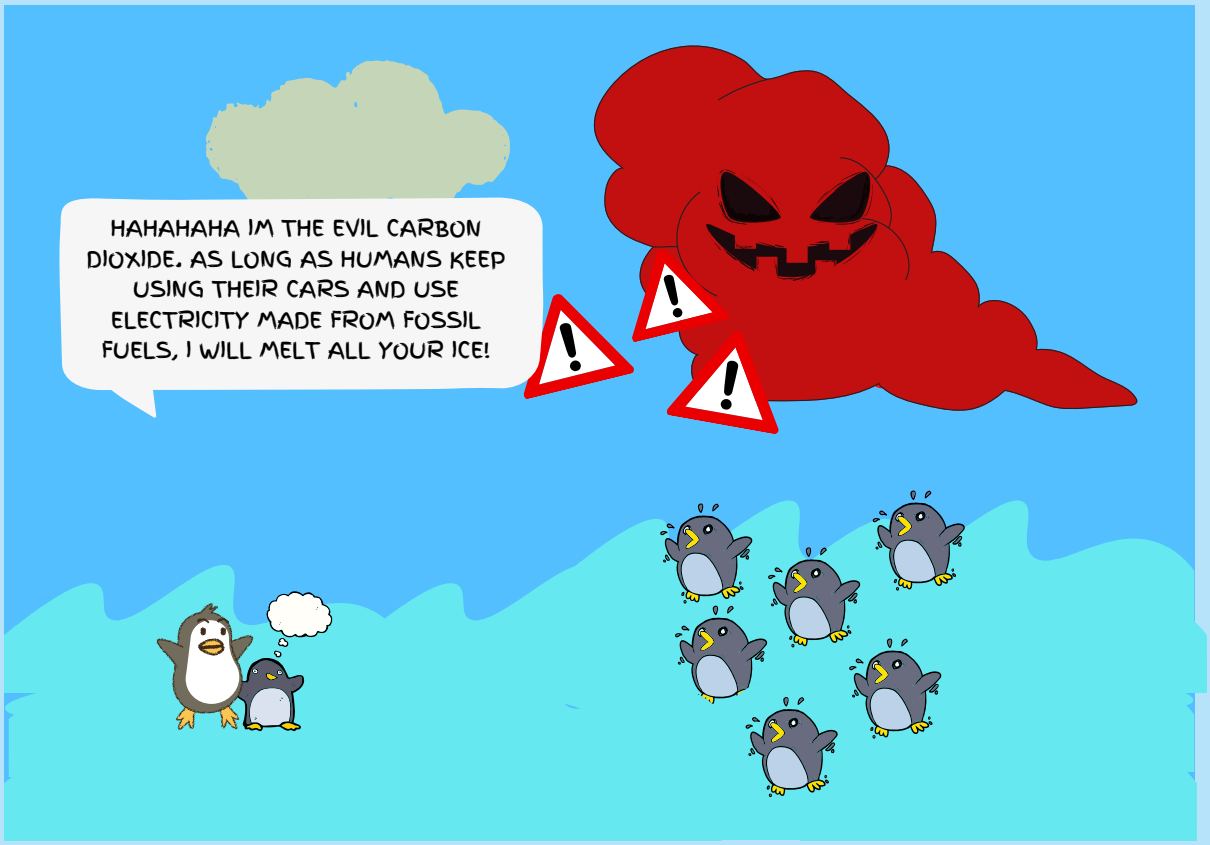

HAHAHAHA IM THE EVIL CARBON DIOXIDE. AS LONG AS HUMANS KEEP USING THEIR CARS AND USE ELECTRICITY MADE FROM FOSSIL FUELS, I WILL MELT ALL YOUR ICE!

Can you help penguins save their home?

If you were displaced from your home, what would you do and how would you feel?

Make a list of the number of activities that you do daily that release carbon dioxide gas.

Can you help penguins save their home?

What can you do as an alternative to help prevent the release of carbon dioxide?

Speak to your family and friends about the climate crisis and tell us how you will help them in reducing carbon dioxide emissions.

Age Group: 12 & above

THE GREENHOUSE EFFECT

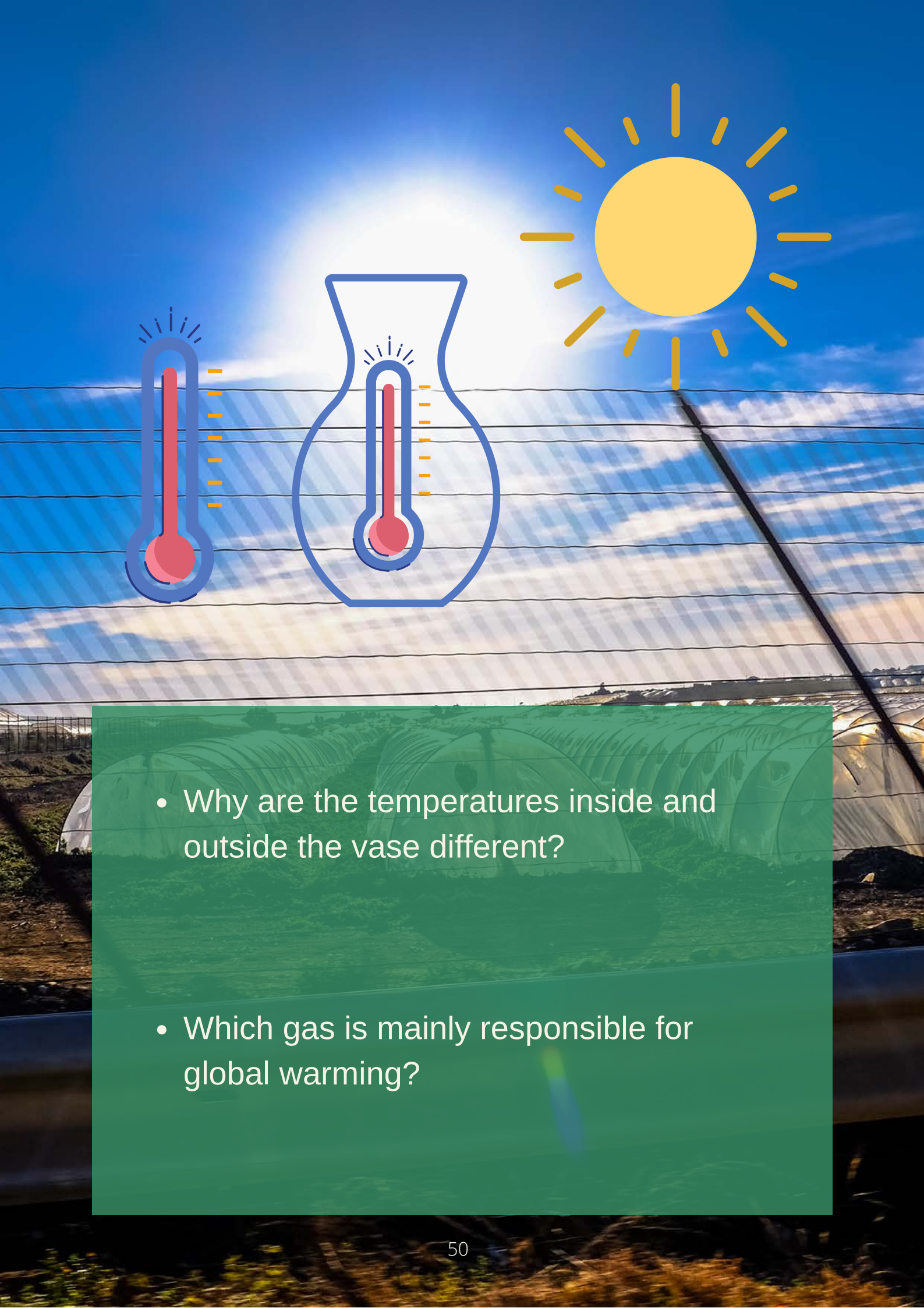
Things needed:

- Two thermometers
- A clear bowl, jar, or vase and something to cover it

Method:

- Lay both thermometers for a few minutes outside in a sunny area.
- Mark down the time and the temperatures of both thermometers on your record sheet.
- Place a vase in the sun with a thermometer in it. Cover it with plastic wrap or a dark t-shirt.
- Place the second thermometer next to the bowl (not in the shade).
- Record the temperatures on both thermometers every 5-10 minutes.

Source: Staake, Jill. 15 Meaningful and Hands-On Climate Change Activities For Kids. https://www.weareteachers.com/climate-change-activities/



- Why are the temperatures inside and outside the vase different?

- Which gas is mainly responsible for global warming?

What have you learned about global warming from this activity?

KNOW THE DIFFERENCE!

CLIMATE

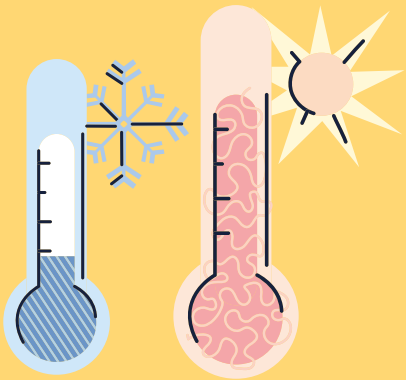
It is what you expect

Example: A desert may get only a few centimeters of rain each year, so the desert has a **dry climate**

Climate describes the typical weather conditions in a particular region for 30 years or more.

Due to a warm climate of the Earth, ice in Antarctica is melting, which causes the ocean levels to rise.

Climate changes over a hundred or thousands of years



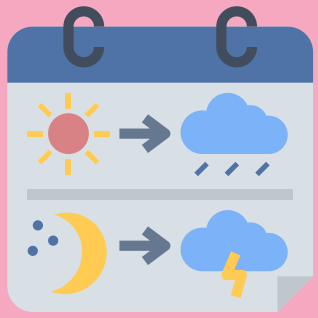
WEATHER

It is what you get

Example: A desert may experience rainy weather one day and dry weather the next.

Take a look outside your window and note what the weather is like. Is it sunny? Is it rainy or snowy? Will the weather be the same tomorrow as it is today? No, it will not because the weather is temporary. We transition from winter to spring to summer every year.

Weather can change in a minute



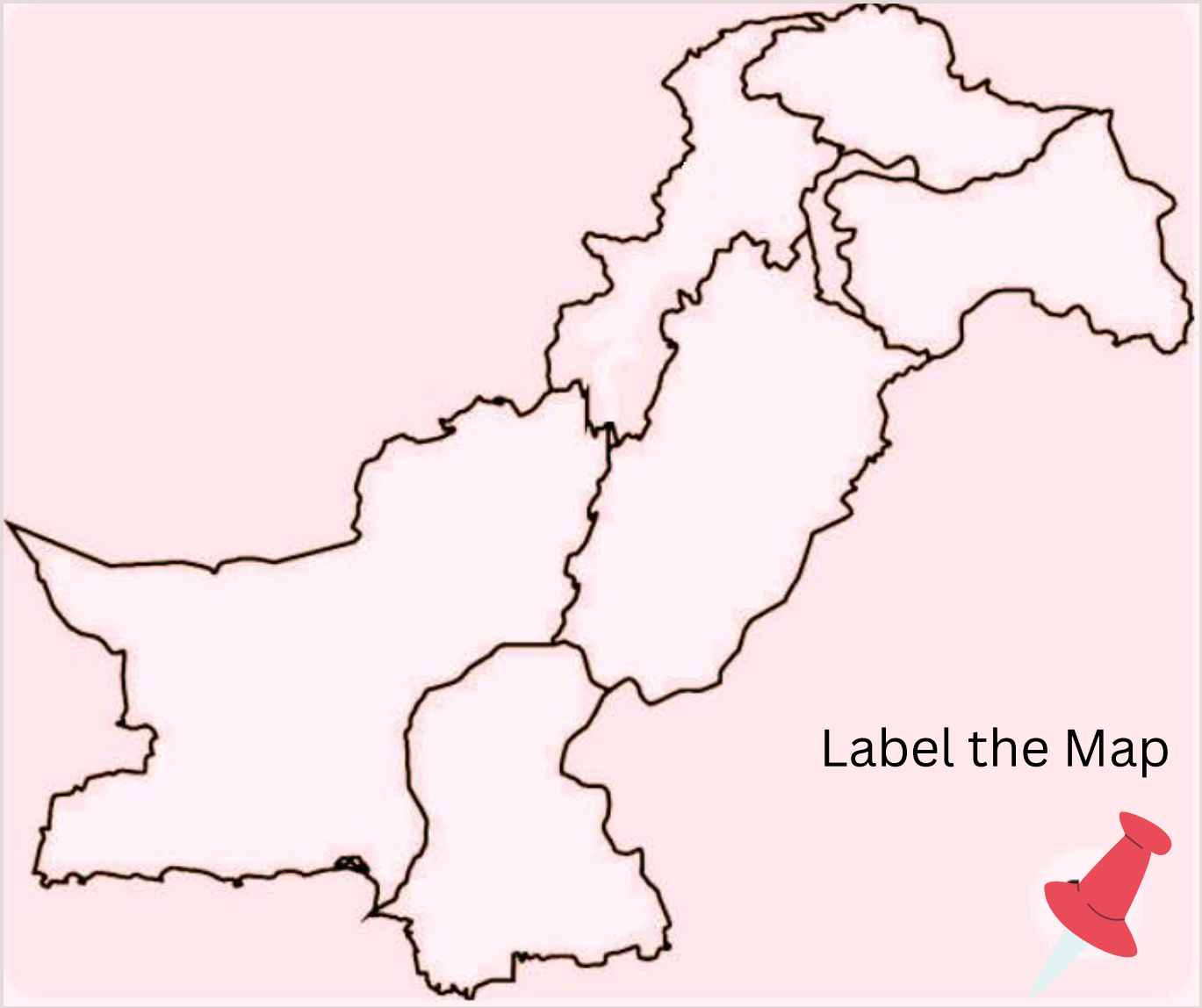
Source: Staake, Jill. 15 Meaningful and Hands-On Climate Change Activities For Kids. https://www.weareteachers.com/climate-change-activities/

Age Group: 14 & above

CITIES & ENVIORNMENTAL ISSUES

ACTIVITY

Pin each tag on the map as to identify the location of each city. Then, based on the news, from the stack of cards, identify an issue you feel is most related to a city. Think of solutions for these environmental problems and write them down in each box.



Lahore

Peshawar

Faisalabad

Islamabad

Quetta

Karachi


SMOG
AIR POLLUTION
TEXTILE INDUSTRY WASTE
WATER POLLUTION
WASTE DUMP
WATER POLLUTION
WATER SCARCITY
WATER POLLUTION
URBANIZATION
LAND POLLUTION
SOLID WASTE
LAND POLLUTION

Solutions

Lahore	Faisalabad
Islamabad	Quetta
Peshawar	Karachi

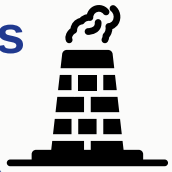
Age Group: 12 & above

SMOG (SMOKE+FOG)

ACTIVITY

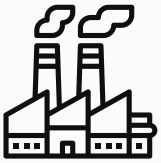
Smog is becoming a serious issue for Punjab. To come up with a controlling mechanism, we first need to identify the activities that cause smog. Below are five activities that increase smog in Pakistan (Lahore). Determine ways through which these activities produce less air pollution.

Brick Kilns



A lot of black smoke containing particles and carbon dioxide are produced as waste.

Industries



Industrial manufacturing releases harmful gases into the atmosphere as a waste.

Transportation

The combustion of fuel in vehicle engines produces greenhouse gases.

Trans-boundry

Straw stubble is set on fire in many parts of India, which flows into Pakistan. It produces a lot of smoke and carbon dioxide.

Rice stubble burning

Straw stubble, which is left after harvesting grain, is set on fire. It produces a lot of smoke and carbon dioxide.

Rice stubble burning:

Trans-boundary:

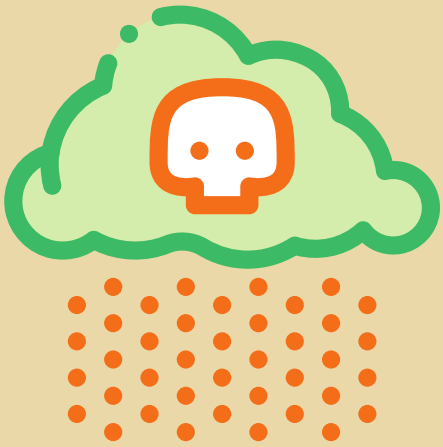
Transportation:

Brick Kilns:

Industries:

Age Group: 12 & above

THE TALE OF ACID RAIN



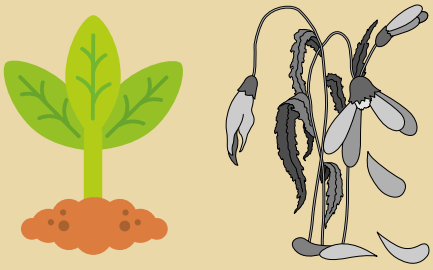
Things needed

- 3x1-quart jars with lids
- Measuring cup
- 3 small potted green plants
- Vinegar or lemon juice
- 6 labels or strips of masking tape
- Pen or marker
- Spiral or composition notebook
- Pencil Crayons

Note: Sulfur dioxide and nitrous oxide can react with water droplets in the atmosphere to form sulfuric acid and nitric acid, which can corrode buildings and wash nutrients from soil away due to their acidic nature. Their quantities in the atmosphere increase due to the use of fossil fuels

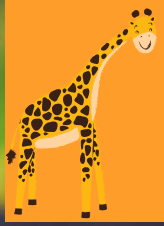
Procedure:

- Use your pen and the labels or masking tape to label each jar and each plant. Label the first plant and jar “a little acid”. Label the next plant and jar “a lot of acids.” Finally, label the third jar and plant, “plain water.”
- Mix the water for the plant that will get “a little acid” by measuring ¼ cup of vinegar or lemon juice and placing it into the jar labeled “a little acid” and fill the rest of the jar with tap water.
- For the plant receiving “a lot of acids”, pour 1 cup of the vinegar or lemon juice into the jar and fill the rest with tap water.
- Fill the third jar, labelled “plain water”, with tap water.
- Water each plant (being sure to use only about a 1/4 of the jar each time at the most) with the water from the corresponding jar containing either a lot of acids, a little acid, or plain water. Every two or three days continue to water the three plants using the water from the original jars.
- Water and observe the plants for at least one week.



Source: Staake, Jill. 15 Meaningful and Hands-On Climate Change Activities For Kids. https://www.weareteachers.com/climate-change-activities/

How do you think acid rain impacts our animals, trees, and us?

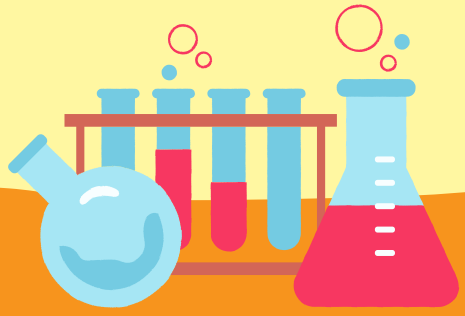


What do you think causes acid rain?

Can you think of ways to prevent acid rain?

Age Group: 12 & above

Activity designed by Maryam Malik



Smog Experiment

This experiment will help you observe smog more closely and should be carried out under adult supervision

Materials Required:

- **Glass jar**
- **Aluminum foil**
- **Ice cubes 3-4**
- **Piece of paper**
- **Matches (strictly monitored by the teacher due to associated health and safety risks)**

1. Fold the length of paper in half and twist it.

2. Shape a piece of aluminum foil over the open end of the glass jar to make a lid. Take away the foil and put it aside.

3. Put some water in the jar. Swirl it around so the interior walls of the jar are wet.

4. Pour out the water.

5. Place 3 ice cubes on top of the foil to make it cold.

6. Ask an adult to light the strip of paper. Drop it and the match into the damp jar.

7. Quickly put the foil lid on the jar and seal it tightly. Keep the ice cubes on top of the foil in the middle.

8. Record your observations in the space below:

Source: www.exploringnature.org

DID YOU KNOW?

Smog is a mix of natural fog - tiny droplets of water in the air- and smoke. It forms a thick, dirty, smelly atmosphere (a layer).

Age Group: 12 & above

THE MYSTERIOUS CASE OF SOIL EROSION

Adapted from: Erosion and Soil, funsciencedemos, https://www.youtube.com/watch?v=im4HVXMGI68&t=17s

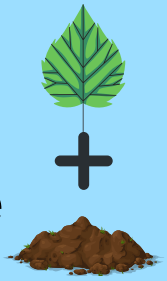
EXPERIMENT!

Method:

Take three used plastic bottles. 

Cut the top part of the bottles in such a manner that you can place soil in them. (see the picture on the previous page for reference)

Add soil in the first bottle only. 

Add soil and dead leaves in the second bottle 

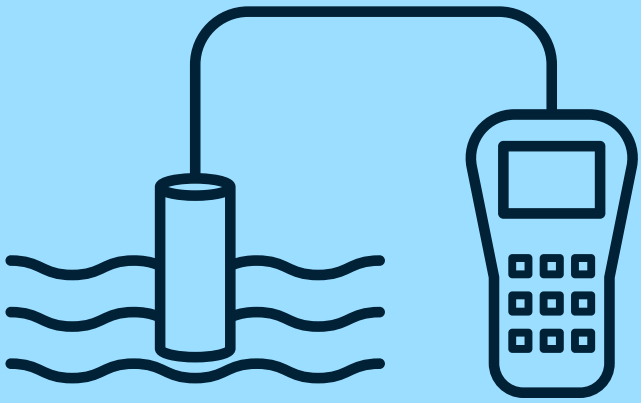
Add soil and grown grass in the third bottle.

Hang small containers to the neck of the bottle which you have placed horizontally. 

Use a pitcher to pour water in each bottle and keep pouring until water fills the small containers. 

Now compare the water in each small container.

HOW DOES THE WATER IN EACH CONTAINER VARY?



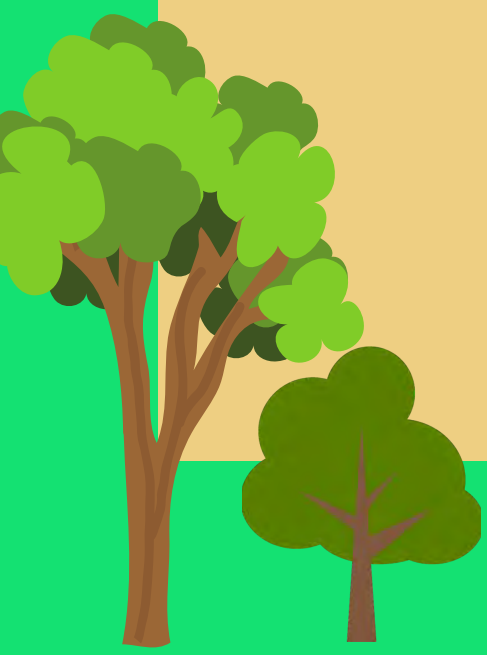
Age Group: 10 & above

FLORA & FONA

ACTIVITY

CLOSELY OBSERVE THE DIFFERENT TYPES OF PLANTS AND TREES GROWING IN YOUR SCHOOL. IF THERE ARE NO TREES IN YOUR SCHOOL, THEN THROUGH THIS ACTIVITY YOU CAN PLANT A TREE AND NAME IT ACCORDING TO YOUR LIKING.

LOOK AROUND YOUR SCHOOL AND IDENTIFY DIFFERENT PLANTS & TREES.



WRITE ABOUT YOUR PROVINCE. DESCRIBE THE CLIMATE, LANDSCAPE, RAIN PATTERNS AND WATER AVAILABILITY.

SINDH

IF YOU LIVE IN SINDH, YOU CAN GROW

- Timar
- Sohangna
- Kikar
- Beri
- Date palm
- Mango
- Pipal
- Siras
- Toot
- Bargad
- Jantar

BALOCHISTAN

IF YOU LIVE IN BALOCHISTAN, YOU CAN GROW

- JUNIPER
- CHIL
- CHILGOZA
- TIMAR
- KIKAR
- APPLE
- BER
- POMEGRANATE
- CHIKU
- SIRIS

KPK

IF YOU LIVE IN KPK, YOU CAN GROW

- CHIL
- KAIL
- DEODAR
- JUNIPER
- MAPLE
- CHILGOZA
- POLAR
- EUCYPTUS
- ZAITOON
- SHISHM
- KIKAR

GILGIT BALTISTAN

IF YOU LIVE IN GILGIT BALTISTAN, YOU CAN GROW

- CHIL
- CHILGOZA
- KAIL
- DEOAR
- MAPLE
- POPLAR
- EUCALYPTUS
- TOOT
- BERI
- GRAPES

PUNJAB

IF YOU LIVE IN PUNJAB, YOU CAN GROW

- GUAVAS
- CITRUS
- PEACHES
- JAMAN
- BANANA
- SHISHAM
- MULLBERRY
- KIKAR
- MAMGO
- NEEM
- BANYAAN
- BABOOL
- SAGON
- EUCALYPTUS

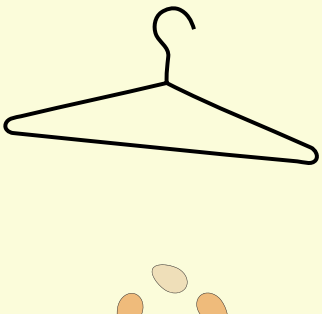
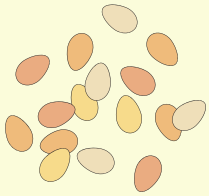
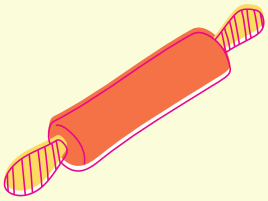
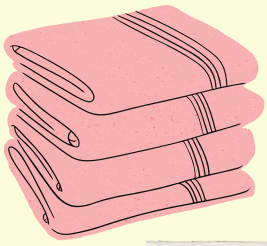
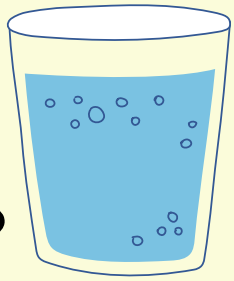
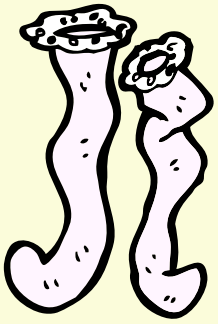
Source: Dr Masood Quraishi

Age Group: 12 & above

Make your own paper and grow it into a plant!

Things you need:

1. Used paper (newspapers, old notebooks, etc.)
2. Nylon Stockings
3. A wire hanger
4. Water
5. Old towel
6. Plant seeds
7. Rolling pin
8. Blender

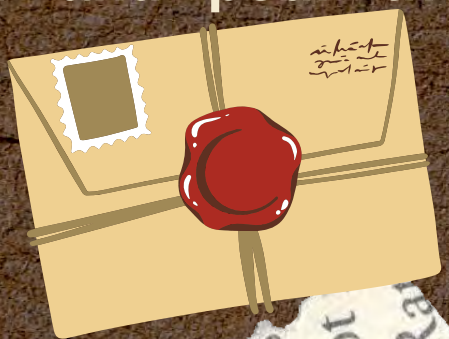








Source: DIY Paper-making for Sustainable Kids! Boston Children's Museum, https://www.youtube.com/watch?v=wVIyhgZI-X0

HOW?

Method:

1. **Take the hanger and bend it into a diamond shape. Stretch the nylon stocking over it to create a thin sieve and a stocking screen.**
2. **Take your paper and rip it up into small pieces**
3. **Add paper to your blender and add a little bit of water from time to time.**
4. **Blend the mixture until you get a nice soupy pulp**
5. **Now add the flower or plant seeds to your mixture and press blend once more for 7 seconds.**
6. **Put your stocking screen on top of a bowl or a container and pour the blended mixture over it.**



7. Spread it out with your fingers and make it slightly even.
8. Leave it alone for at least 30 minutes and wait for the water to evaporate.
9. Take a towel and gently press it onto the pulp to drain out the remaining water
10. Place the towel on a counter and flip the screen on the towel. Now, using another towel, press on it lightly and wait for it to dry.
11. Use a rolling pin to press over the towel
Now, wait for the paper to dry.
12. After the paper has dried, you can write a letter on it to a friend or family member, telling them the importance of environmental conservation and then ask them to participate in the conservation movement by ripping up the paper and planting it in soil
13. Since the paper contains plant or flower seeds, a beautiful plant will grow out of it!

Age Group: 8 & above

SORT & RECYCLE

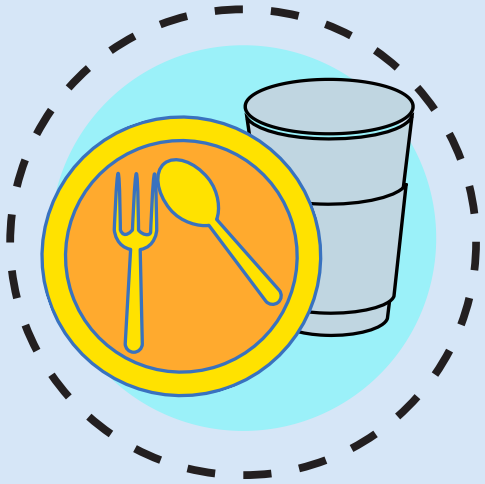
RULES

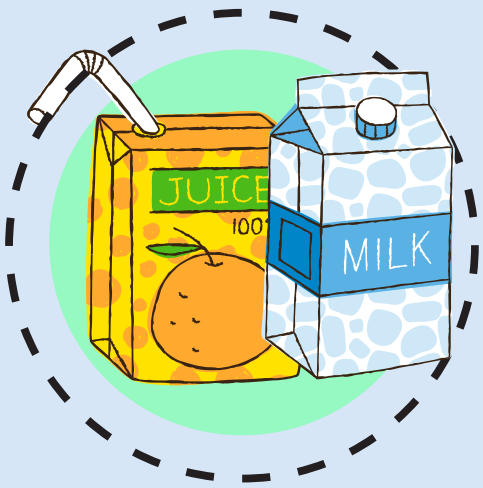
Did you know recycling reduces the need for extracting, refining, and processing raw materials? Recycling saves energy and it also reduces greenhouse gas emissions, which helps to tackle climate change.

In the following activity, you will:

- Cut the stickers out and sort the trash according to its bin (paper, plastic, glass, steel) so that it can be recycled.
- In the second section of this activity, you will identify how trash collected differs from place to place and how it is managed.


NEWS
D
G
F




JUICE
MILK


SUPER
MARKET
SUPER
MARKET


Cola
Limo

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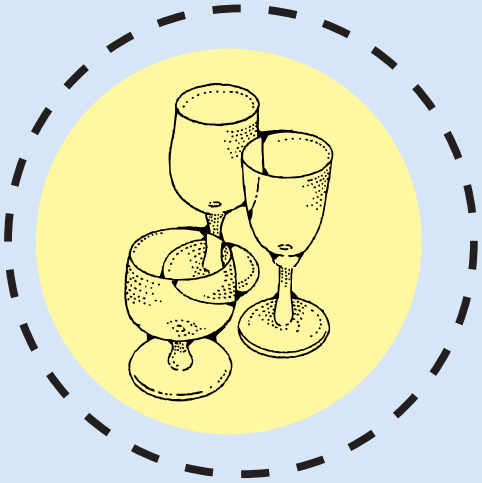


Berr's
Danish Style
Butter Cookies
SARDINES


MAPLE
SYRUP
SRIRACHA
SAUCE


GLASS


PLASTIC


PAPER


METAL

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In your home, identify things that become part of the trash.

In your school, identify things that become part of trash.

In your town, identify things that become part of trash.

How is trash managed after it leaves your home?

How is trash managed after it leaves your school?

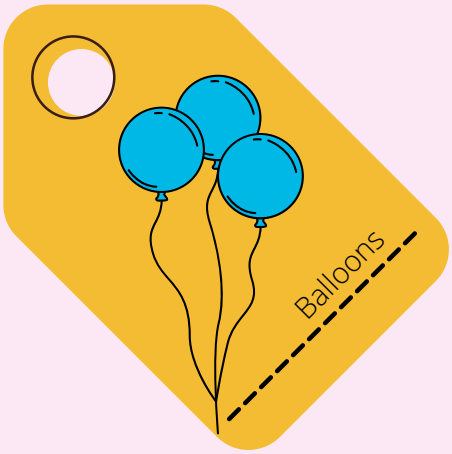
How is trash managed after it leaves your town?

Age Group: 12 & above

WASTE TIMELINE

ACTIVITY

Manmade products take a long time to decompose. Because of how convenient plastic is, we see plastic everywhere. It has now become an important part of our day to day lives. These items take so long to decompose that when we get old, that same plastic product we used years ago is still part of our environment. Below are some tags. Guess the time they take to decompose and tie them with time tags.



Source: https://www.wwf.org.au/news/blogs/the-lifecycle-of-plastics

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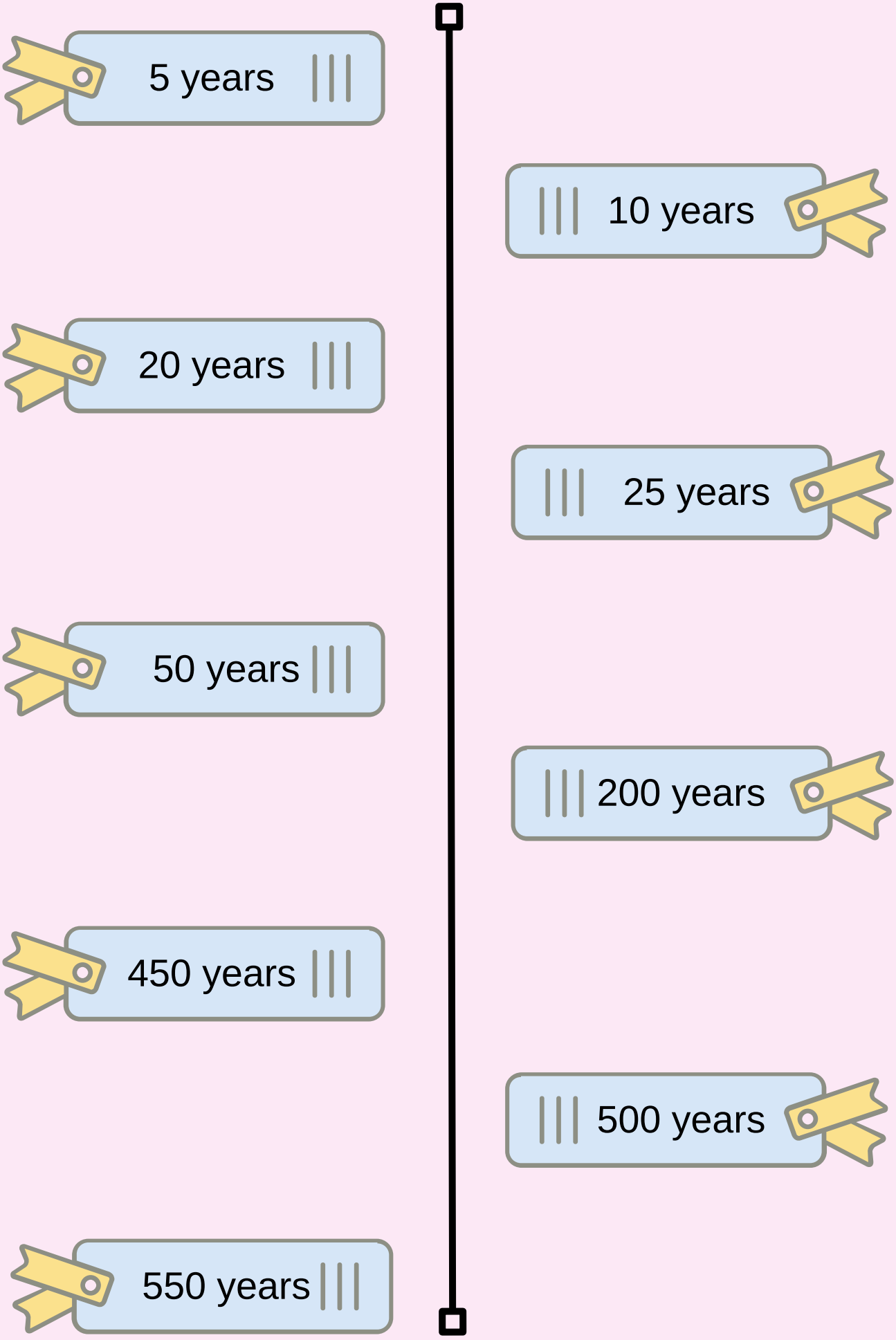
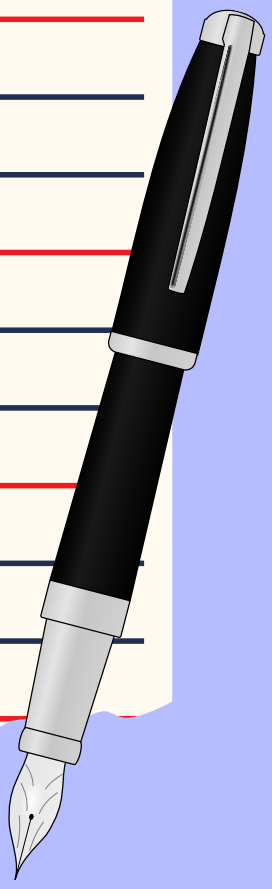

5 years
10 years
20 years
25 years
50 years
200 years
450 years
500 years
550 years

Age Group: 12 & above

LETTER WRITTING

ACTIVITY

Write a letter to the District Commissioner's Office about an environmental issue. Whether it is the issue of large trash dumps, illegal burning of trash, illegal clearing of land for construction or anything else of concern. Inform the officer about the seriousness of the issue and suggest solutions for the problem.



Age Group: 8 & above

Terrarium

Background

This terrarium, or glass garden, is enclosed within a sealed container for the purpose of scientific observation and is meant to record changes observed over time. This experiment can be conducted over a span of two weeks.

Material used

- Plastic/glass container with lid
- Pebbles
- Plastic sheet
- Soil
- Plants
- Water

Method

1. Take a plastic or glass container with a lid and add a layer of small pebbles. This layer is wide enough to hold access water so that roots don't rot.
2. Next, place the plastic sheet with holes so that water can easily penetrate to the bottom.
3. Then add soil. The ratio of pebbles to soil should be 1:2, which means that soil is twice as much as the pebbles.
4. Then place your plant in the soil and cover its roots with more soil.
5. After that, add water for the soil to absorb it. It should be just enough to damp the soil and not drown the plant.
6. Then close the jar with the lid.

Experiment (Results observed over time)

Use the space below to write what you observe

Source: Daniels, Erica. How to Make a Terrarium in 5 Easy Steps. https://www.proflowers.com/blog/how-to-make-a-terrarium/

Conclusion

Keeping the results of the activity in mind, do you think that inputs such as fertilisers are necessary for the growth of plants or crops? Discuss

Conclusion

Before the experiment, what did you expect would happen to the plant?

Conclusion

How was your observation different from what you had predicted earlier?

Conclusion

What have you learned from this experiment?

Age Group: 10 & above

STORY OF PLASTIC BOTTLES

ACTIVITY

At every grocery store, you see plastic water bottles. But do you have any idea where they come from? From the refining of crude oil to our throwing bottles in the trash, these bottles have a long journey. Sort the cards below into the right order to identify each step these plastic bottles go through.

OIL EXTRACTION

BARREL OF OIL

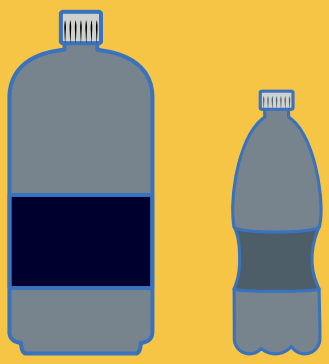
RECYCLING BIN

OIL CONVERTED TO PELLETS

PALLETS MELTED TO BOTTLES

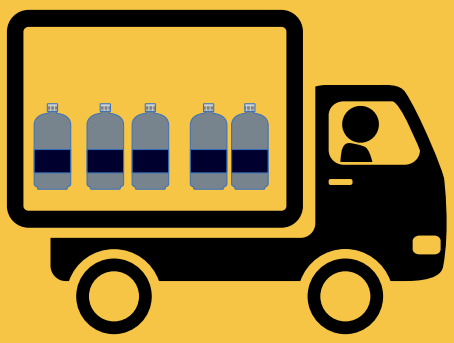
FILLING BOTTLES WITH WATER

LABELLING BOTTLES



BOTTLES RESTOCKED IN STORES

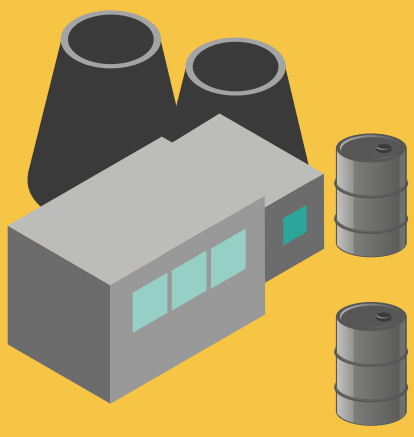
BOTTLES TRANSPORTED TO STORES



BOTTLES THROWN IN TRASH

WASTE THROWN IN TRASH

OIL REFINERY PLANT



Source: Lifecycle-of-a-Plastic-Bottle_Poster_Updated-2016_1482230366%20(3).pdf

Age Group: 10 & above

JOURNEY TO LANDFILL

ACTIVITY

Try tracking the journey of your everyday trash. Identify each stop your trash takes and then attach a sticky note on the path below.


GLASS
PAPER
PLASTIC
BOTTLES

After trash is sorted, recyclable trash goes to the recycling unit to reduce waste going to the landfill.

Waste that is left after sorting goes to the landfill.

Trucks then dump this waste into large trash bins.

Waste is dumped into large trash bins.

Waste is collected by trucks from your home.

Source: https://www.learnz.org.nz/katevalley194/bg-easy-f/the-journey%3A-lollipop-to-landfill

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Age Group: 12 & above

BINGO

Rules: Teachers are required to read out each activity in each section aloud weekly, and the students, depending upon whether they carried out that activity, will cross it out. The first student to have completed all the activities in all rows, columns, and diagonals will win the first prize, followed by the students who have completed at least two rows, two columns, or two diagonals (second prize). For the third prize, any student who has completed at least one row, one column, or one diagonal will qualify. For the first prize, the student will get a badge titled 'I am my city's superhero!' while others will only get recognition every week in the form of the chart of stars given below.

BINGO

Name	1st	2nd	3rd

BINGO

Use the stars below to assign them on the chart:

1. The first position will get a golden star
2. The second position holder will get a blue star
3. The third position holder will get a white star

BINGO

Have you taken care of our Earth this week?

 Turned off unnecessary lights & plugs	 Used bucket to shower	 Didn't waste food	 Gave my old toys to someone instead of throwing them away
 I only buy limited clothes	 I dont keep the tap running while brushing my teeth	 Reused my old clothes to make sustainable bags	 Planted a tree
 Spread awareness regarding environmental conservation	 Used a water can to water plants instead of using a hose	 Disposed off trash properly	 Participated in a cleanlines drive

Age Group: 8 & above

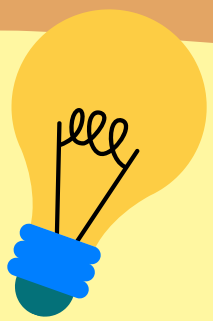
START FROM SCHOOL

ACTIVITY

Reducing pollution makes the Earth happy. Identify how these activities will make Earth happy?

Things You Can Do About Climate Change when in School

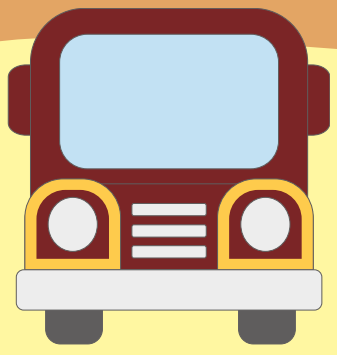
Bring your own water bottle from home



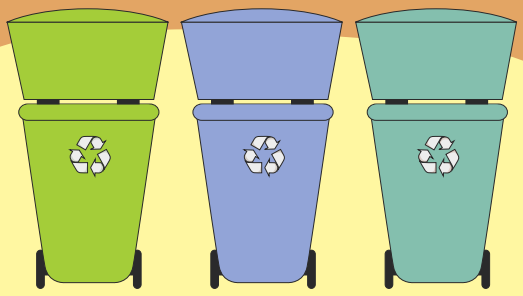
Switch off lights when not in class

Plant something in your ground

Close tap when applying soap



Use school bus to get to school



Throw trash according to labels on the bin

Reduces air and noise Pollution.

Saves energy needed to recycle

Reduces plastic pollution

Reduces energy required for producing electricity

Reduces air pollution

Reduces energy required to pump water (to taps).

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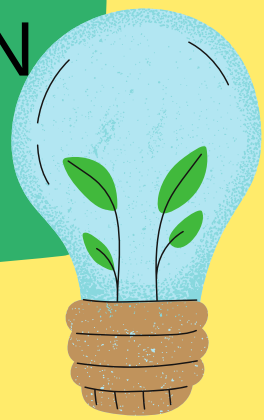
Age Group: 8 & above

ENERGY SAVING

ACTIVITY

THINGS WHICH YOU CAN DO TO SAVE ENERGY ARE LISTED BELOW, BUT WE NEED TO SORT THEM SO THAT WE CAN PRACTICE THEM IN SCHOOL AS WELL AS AT HOME. IDENTIFY THEM AND WRITE THEM DOWN ON THE NOTES PAGE BELOW.



SAVING ENERGY IS YOUR RESPONSIBILITY. BECOME THE ENERGY HERO

1. Turn off lights when not necessary

2. Unplug chargers after charging

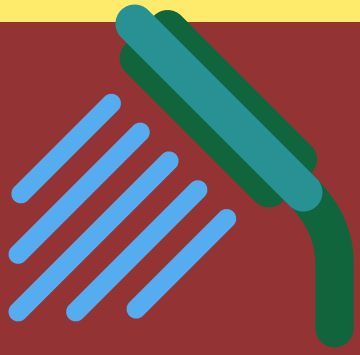
3. Always cook with a lid

4. Wash clothes in cold water

SAVING ENERGY IS YOUR RESPONSIBILITY. BECOME THE ENERGY HERO

5 Unplug unnecessary appliances

6 Take shorter showers



7 Fix leaky Faucets

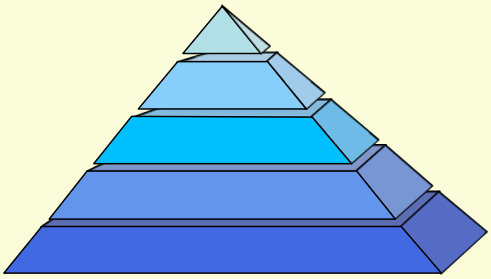
8 Air dry laundry


Home

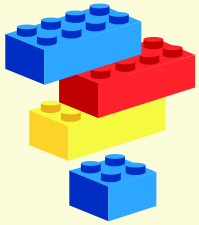

School

Age Group: 8 & above

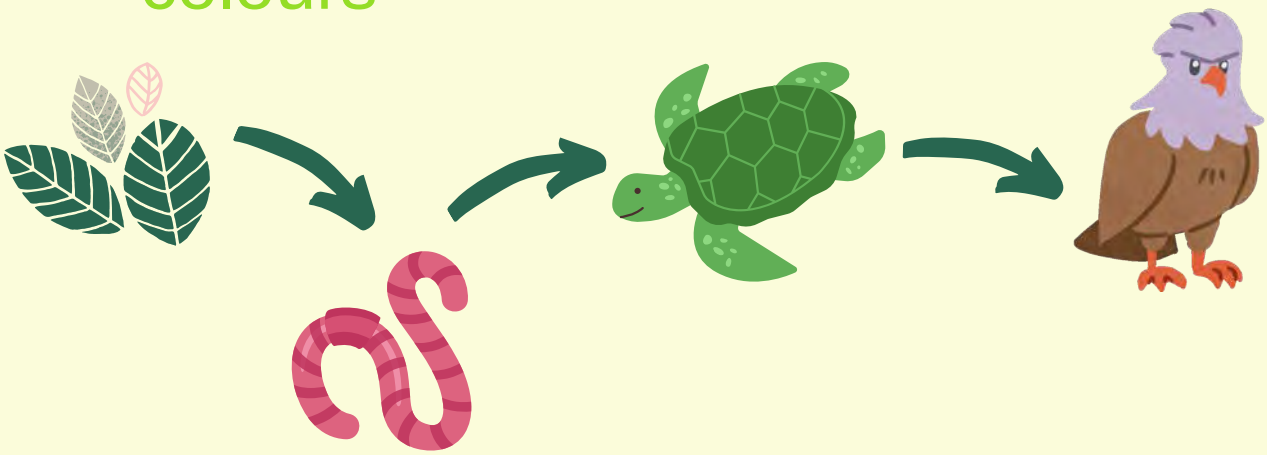
THE TOWER MUST NEVER FALL



Things Needed:

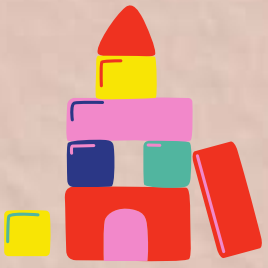


- Rectangular Blocks of different colours



Source: Developing an Extra-Curricular Curriculum on ‘Environmental Sustainability’ for Higher Education Students by Haseeb Asif Bajwa, Faisal Saleh Raza, Misbah Najiullah, Maria Jabeen Awwal.

THE TOWER MUST NEVER FALL



Method:

- Colour code each block in terms of different animals
- The base block will be labelled as "plants"
- The block on top will be labelled as "worms"
- The block on top of the previous one will be labelled as turtles and the topmost block will be labelled as "eagles".
- Children shall be required to stack them in this order and try to remove each block without disturbing the order of the others.

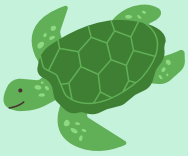
QUESTIONS!

Were you able to remove each block without breaking the tower?

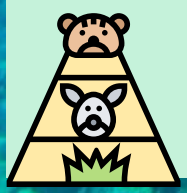
What is happening to turtles due to global warming?

QUESTIONS!

What do you think will happen if turtles become extinct?



Make a food chain using some other animals and write down how global warming is impacting them.



Age Group: 12 & above

BIODIVERSITY

THE TERM BIODIVERSITY ORIGINALLY COMES FROM THE WORD “BIOLOGICAL DIVERSITY. IT REFERS TO THE VARIETY OF LIFE ON EARTH. THE VARIETY OF SPECIES AND HOW THEY EVOLVE AND ADAPT, ALL COME UNDER THE CATEGORY OF BIODIVERSITY. IN THIS ACTIVITY, WE ENCOURAGE YOU TO TAKE REGULAR WALKS IN YOUR NEIGHBORHOOD, SCHOOL, PARK, GREEN SPACES...

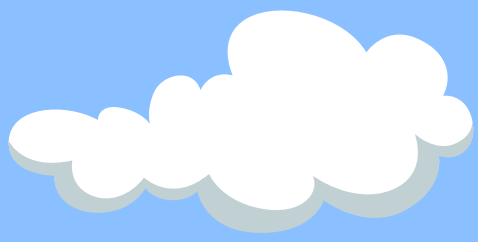
BIODIVERSITY WALK

IT'S TIME TO PHOTO-DOCUMENT ALL THE SPECIES IN YOUR ENVIRONMENT. TAKE PICTURES OF EACH ANIMAL/BIRD/INSECT YOU SEE AROUND YOU AND THEN PASTE THEM IN THE SPACE BELOW OR DISPLAY THEM IN YOUR SCHOOL

WHILE YOU DOCUMENT THE SPECIES, THINK OF THE ROLE THEY MIGHT PLAY ON THE PLANET

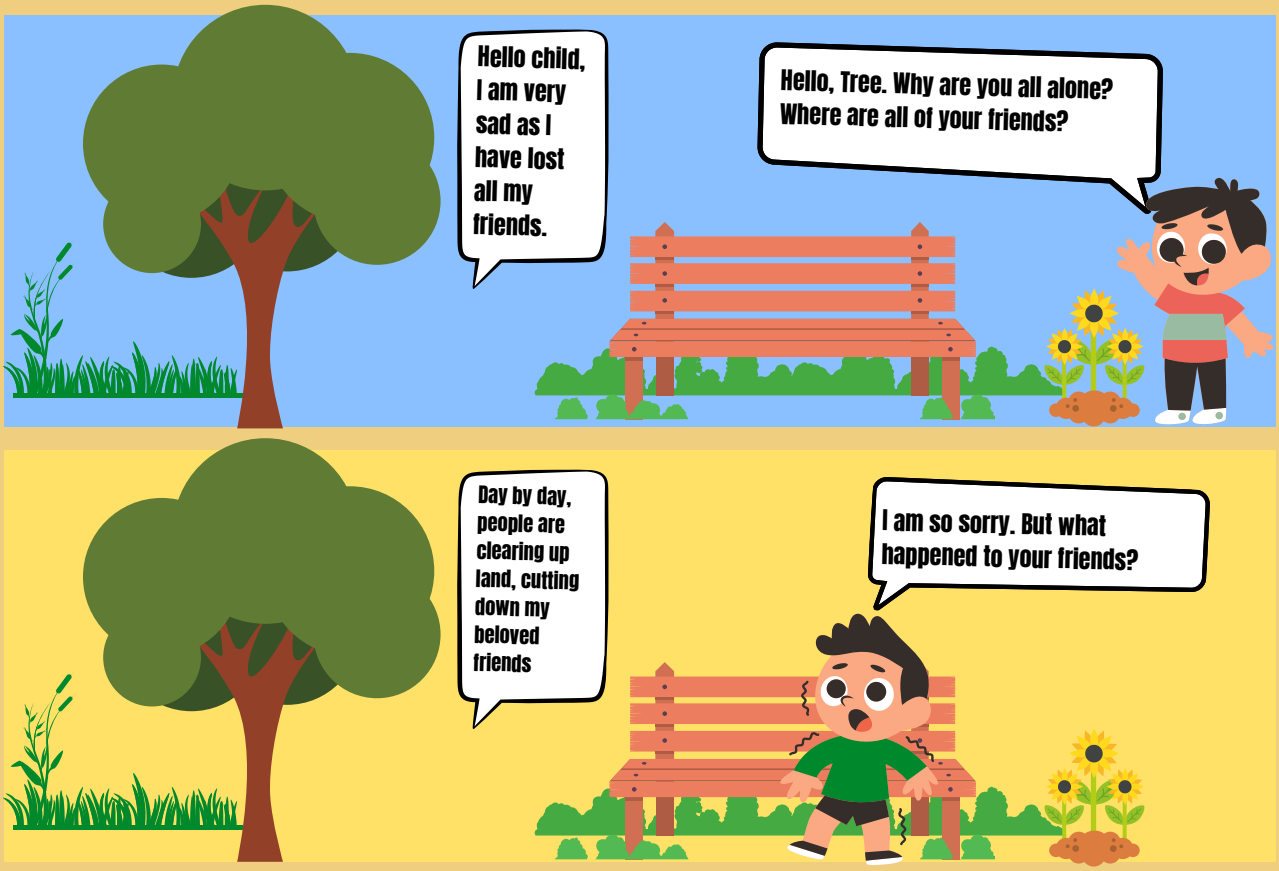
DISCUSS WITH YOUR PEERS AND TEACHERS

Source: https://www.worldwildlife.org/pages/what-is-biodiversity



Age Group: 8 & above

Trees have feelings



Adil is confused and worried about tree cutting.

Help him by searching for the meaning of

DEFORESTATION

either on the internet or using a dictionary.

Write it in the space below.

Humans are clearing up forests for :

1. **Building houses and Infrastructure**
2. **Producing furniture and manufacturing wooden products**
3. **Setting up an industry**
4. **Agricultural activities**
5. **Animal grazing**
6. **Obtain wood for fuel**

Look around and identify which activities lead to deforestation in your area?

Adil's grandmother once told him about the importance of trees. The benefits he can recall include :

- Oxygen provider
- Air purification
- Natural coolant
- Source of food and nutrition
- A primary Source of energy
- Help conserve energy
- Provides shelter to different species

Adil knows the importance of trees; hence, he is determined to plant more trees. Go to a nursery and buy a plant for your garden. Then look around and write about the significance of trees in your community.

Source: https://www.teachingbanyan.com/10-lines/10-lines-on-benefits-of-planting-trees/

Come And Plant A Tree

Poem by: *By Aunt Mary*

Plant a tree to save the world,
Plant a tree to save the earth!
Tree provides shelter and food,
Cleans up the air and makes it good.
Tree saves us from hot sun rays,
Cools up the ground and cools up the ways.
Trees bring clouds and trees bring rain,
Let them flourish on our land.
Tree adds beauty to our place,
With its goodness and its grace!

Come dear children, where have you been?
Plant a tree and just go green!

Source:
https://easyway1234.blogspot.com/2013/03/come-and-plant-tree.html

Write a poem or story about your experience with trees and how they are important for you and your community

Age Group: 8 & above

Write a review

If you recently read something (a poem, a story, a book) or watched a film that made you think about climate change and environmental sustainability, can you write a review about it?

Write a review

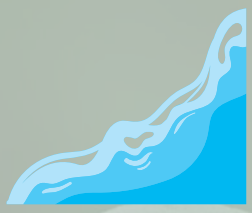
Age Group: 12 & above

Local Heroes: Sir Asif Sharif

We often hear about various inspirational environmental leaders who stand resilient in the face of widespread ignorance and oblivion in a world that is blind to several environmental red alerts. However, our local heroes are often not only unappreciated but also unknown. Today you will learn about Pakistan's applaudable local hero who used the fact that Pakistan is largely an agrarian economy to come up with ways that can prevent ecosystem loss from agricultural practices.

Sir Asif's story begins long ago in 2008 when he went to visit a friend in Brazil. Brazil is most famous for its rich culture, eye-catching infrastructure, and is simply a great place for tourism. What attracted Sir Asif the most was the Amazon Forest. This huge forest, also known as the lungs of the earth, is every environmentalist's dream ecosystem and for Sir Asif, the moment he set his eyes on the forest, it became a turning point in his life. As he gazed upon the beauty of the forest, there was one pertinent question that stuck with him throughout his visit: how was a forest 10 times bigger than even the size of Pakistan thriving for the past 400 million years without any external intervention? It was truly a wonder to witness, and left sir Asif awestruck but at that moment as he appreciated the glory of the Amazon rainforest, his curiosity regarding its self-sustenance drove Sir Asif to find empirical reasons to see how the forest was maintained. And behold! This visit, which was merely for leisure, turned into a life-altering moment in which Sir Asif founded the four most important principles of sustainable agriculture. Before we delve into what they were, it is important to mention that in Pakistan, conventional or industrial agriculture was heavily dependent upon the use of fertilizers and pesticides. However, while inspecting the Amazon Rainforest, Sir Asif understood that these inorganic agriculture methods are what disrupt the natural algorithms of soil fertility leading to a number of issues that will be addressed later in the story.

The four heroic principles that changed Sir Asif's perspective on sustainable agriculture are not some extraordinary magic spells that can fix any problem with the swing of a wand. When we think about the main solution to all problems, we often tend to associate surrealist imagination with it. However, these four principles are nothing out of the ordinary. They are not magical in nature in any way, nor are they a set of principles that humankind has not heard of before. Throughout the process of development, we have become so engrossed in the industrial process that we often forget that sometimes things work the best when they are dealt with simply. Agriculture, in a similar fashion, does not need any external intervention, and to prove this, Sir Asif put forth the simplest yet life-altering principles. While inspecting the Amazon, Sir Asif noticed that in areas where there was vegetation, there was no water and in areas where there was water, there was no vegetation. This observation birthed the first principle: Plants (vegetation) and soil should never be inundated. In light of this eye-opening discovery, Sir Asif introduced the concept of raised bed or what is known as high land and low land. This concept stresses the importance of segregating water from vegetation and only giving water access to the roots of the crops instead of fully submerging the crops in water as we usually see on most farms, particularly in rice fields.



Seeing how the soil was undisturbed, Sir Asif understood that tillage agriculture in Pakistan is the culprit of ruined soil chemistry and structure. He then founded the second principle: soil must never be disturbed, and to implement this, he developed machinery that could be used in plantations without disturbing the soil. Another fascinating observation was how every single inch of soil was covered in organic mulch and vegetation in the Amazon. Based upon this fascinating sight, Sir Asif concluded the third principle: the soil must never be naked. Although this may seem a little absurd, it is of utmost significance to understand why this principle is important. In old historic times, the only barren areas were the deserts, where the absorption of the sun's radiation prevented the growth of any vegetation. However, as a result of human intervention, even areas that weren't earlier barren became barren because they were left uncovered. As soil is naked, the sun's radiation is absorbed into the soil, increasing the soil's temperature, and making it unfavorable for crop or plant growth. An added disadvantage is that it also increases the Earth's temperature since soil absorbs the radiation that should have been reflected and this becomes one of the causes of global warming. Sir Asif's enlightening observations were not only limited to the soil. The last observation that fascinated him was the coexistence of various plants in the Amazon. This biodiversity was truly an incredible sight to watch particularly because he came from a country where farmers believed that for crops to flourish, only a single species of a plant or crop should be planted in one region. However, as he saw so many different types of plants in the same region, Sir Asif founded his last insightful principle: you can plant all types of crops in the same region.
Asif sir calls this system of farming PQNK i.e. Paedar Qudrati Nizam-e-kashtkari

Using these four principles, Sir Asif embarked on a mission to revolutionize agriculture and create awareness regarding industrial practices. Today, he uses his insights, talents, and skills to train local farmers and convince them to follow sustainable practices. You might be wondering why this is so important to learn. We often take such small opportunities to contribute to sustainability for granted but their impact is always overarching and deep. These renewed agriculture practices based on the four principles not only do wonders to preserve the environment but also play a major role in our health. When we consume this organic produce, we obtain nutrition that is far more sufficient than nutrition obtained through inorganic farming methods. It helps us to build strong immunity and protects us from diseases. But more than that what Sir Asif's story teaches us is that the power to change the world for the better lies within us. As we appreciate our heroes and admire them for their contribution, we shall never forget that it is our responsibility to uphold their legacy and with small changes in our own lifestyle we can be the heroes of our future and heroes of a better world that we all are collectively striving for.

Age Group: 12 & above

DOCUMENT A LOCAL HERO

CAN YOU THINK OF A LOCAL HERO WHO IS INSPIRING OTHERS TO MAKE A SUSTAINABLE CHANGE? INVITE THEM TO YOUR SCHOOL OR CLASS AND WRITE DOWN ABOUT THEM AND THEIR CAUSE IN THE FOLLOWING BOXES

Age Group: 12 & above

Age Group: 14 & above

COMPOST MAKING

ACTIVITY

Composting is the natural process of recycling organic matter to produce valuable fertilizer. All natural products decompose, and through composting we can simply speed up the process by providing an ideal environment for decomposers to do their work. Just follow the steps ahead and you will be reducing the waste by recycling it.

Choose a location

A dry, shady area near a water source is the best place to put your compost basket.

Add Ingredients

Add brown materials to produce carbon and add green materials. Large items must be shredded.

- BROWN MATERIALS (DEAD LEAVES, BRANCHES)
- GREEN MATERIALS (GRASS, LEAVES, VEGETABLE, FRUIT SCRAPINGS).

Add water

Make sure ingredients are kept moist as it helps fasten the process of decomposition.

Mixing

Occasionally turn the ingredients to add air to the mix. It will prevent the mix from being smelly.

Wait

Let nature do its job. Bacteria will start the process and decomposition will take place.

Mix gets warm

Steam and heat give an indication that compost is in the making.

Final Product

When mix becomes dry, brown and crumbly the compost is ready to be used. Total duration of this process is 6-10 weeks.

Source: https://learn.eartheasy.com/guides/composting/

Age Group: 12 & above

PLASTIC TYPES

ACTIVITY

THERE ARE 6 TYPES OF PLASTIC, EACH WITH DISTINCT PROPERTIES. MENTIONED BELOW ARE THE PROPERTIES OF EACH PLASTIC TYPE. FOLLOWING THE TEXT, ATTACH THE STICKERS OF LOGO TO EACH PICTURE.

PETE (Polyethylene Terephthalate) has good gas and moisture barrier, high heat resistance, is clear, hard, tough and solvent resistant
It is mostly recycled.

HDPE (High-Density Polyethylene) has excellent moisture barrier properties, excellent chemical resistance, hard to semi-flexible and strong Soft waxy surface, permeable to gas, HDPE films crinkle to the touch, pigmented bottles and stress resistant.
It is commonly recycled.

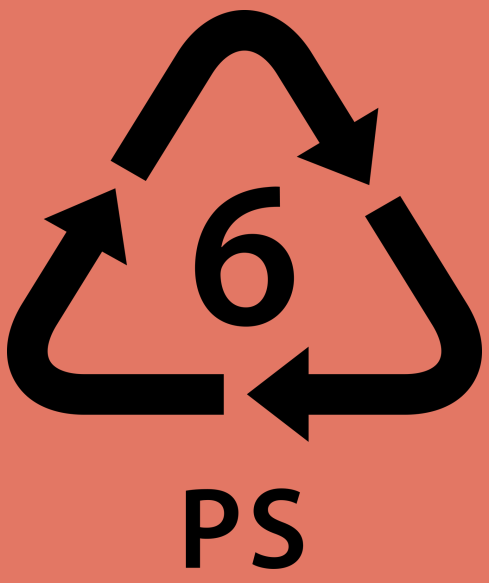
PVC (Polyvinyl Chloride) has excellent transparency, is hard, rigid, has good chemical resistance, long term stability, good weathering ability, stable electrical properties and low gas permeability.
It is sometimes recycled.

Source: https://plasticoceans.org/7-types-of-plastic/

LDPE (Low-Density Polyethylene) is tough hand flexible, waxy surface, soft – scratches easily, good transparency, low melting point, stable electrical properties, good moisture barrier properties.
It is sometimes recycled.

PP (Polypropylene) has excellent chemical resistance, high melting point, hard but flexible, waxy surface, translucent, strong.
It is occasionally recycled.

PS (Polystyrene) has clear to opaque glassy surface rigid or foamed hard, brittle, high clarity, affected by fats and solvents
It is commonly recycled.




02
HDPE


1
PETE


03
PVC


6
PS


5
PP


04
LDPE

Age Group: 14 & above

CARD GAME

RULES

There are a total of thirty-five cards, out of which five cards will be counted as deck one, and deck two will comprise of thoroughly shuffled deck. Deck one will have the cards containing sources of water pollution only. The remaining twenty cards will be given to two players through an equal division of ten and ten. To begin the game, the first player will pick one card from the deck and turn it upside down for the other player to see. Depending on which source of pollution the card indicates, the two players will initiate the game by throwing step by step solutions of the source. In case player two does not have the first step of the solution, they will pick another card from deck two. This will continue until all six steps of solution for one source are completed and then the first round of the game will end. The other rounds will involve picking up other sources of pollution from deck one. The player who finished their cards first will win.

Source: https://www.iwapublishing.com/news/industrial-wastewater-treatment#:~:text=Methods%20include%20Advanced%20Oxidation%20Processing,wastewater%20treatment%20can%20be%20used.


INDUSTRIAL
WASTE


SEWAGE
WATER


OIL
SPILLS


FERTLISERS
&
PESTICIDES


MARINE
DUMPING

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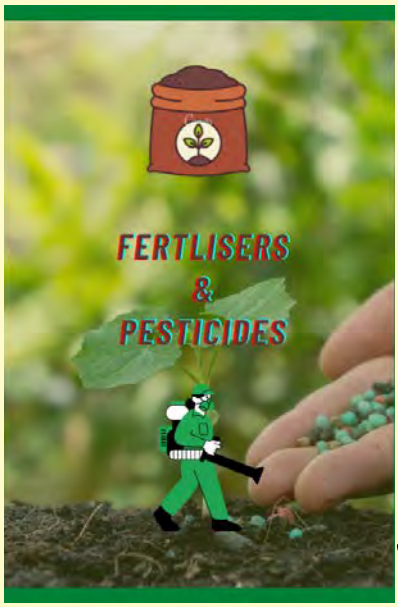
INDUSTRIAL
WASTE


SEWAGE
WATER


MARINE
DUMPING


OIL
SPILLS


FERTLISERS
&
PESTICIDES

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STEP 1

SCREENING TO REMOVE LARGE ITEMS

STEP 2

PRIMARY CLARIFICATION TO SEPARATE SOLID ORGANIC MATTER

STEP 3

AERATION TO ENCOURAGE CONVERSION OF NH_3 TO NO_3 AND PROVIDE OXYGEN FOR BACTERIA TO GROW

STEP 4

SECONDARY CLARIFICATION TO ALLOW REMAINING ORGANIC SEDIMENT TO SETTLE

STEP 5

DISINFECTION USING CHLORINATION, UV, OR OTHER METHODS

STEP 6

DISCHARGE OF THE WATER AND DISPOSAL OF SOLIDS

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STEP 1
SCREENING TO REMOVE LARGE SUBSTANCES


STEP 2
COMMINUTION TO FILTER FINE PARTICLES


STEP 3
REMOVAL OF GRIT


STEP 4
USING TRICKLING FILTER TO REMOVE RAW SLUDGE


STEP 5
USING AERATION TANK TO BREAK DOWN THE REMAINING SLUDGE


STEP 6
ADDING DISINFECTANT TO THE REMAINING SOLUTION & DISCHARGING INTO SURFACE WATER

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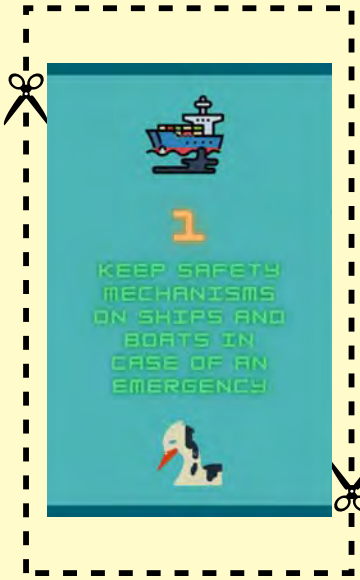
1
KEEP SAFETY MECHANISMS ON SHIPS AND BOATS IN CASE OF AN EMERGENCY


2
USE FLOATING DEVICES TO CONTAIN OIL SPREAD


3
USE SKIMMERS TO REMOVE OIL FROM WATER


4
DISPERSANTS TO BREAK OIL APART AND ALLOW IT TO MIX WITH WATER


5
USE FERTILISERS TO INTRODUCE BIOLOGICAL AGENTS TO BREAK DOWN OIL


6

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1
GROW ORGANIC CROPS


2
AVOID APPLICATION OF EXCESSIVE FERTILISERS AND PESTICIDES


3
PRACTICE CROP ROTATION TO ENSURE THAT ALL SOIL NUTRIENTS AREN'T USED UP


4
PRACTICE CONTOUR FARMING TO REDUCE SEDIMENT RUN OFF AND PREVENT WATER CONTAMINATION


5
PRACTICE STRIP CROPPING TO CREATE NATURAL DAMS FOR WATER AND PRESERVE SOIL STRENGTH


6
ENVOURAGE ZERO TILLAGE SYSTEM TO KEEP THE SOIL INTACT AND REDUCE THE NEED FOR FERTILIZERS

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1
CONSERVE WATER TO PREVENT RUNOFF OF WASTE WATER INTO THE WATER BODIES


2
COMPOSTING OF FOOD WASTE


3
PROPER DISPOSAL OF SOLID WASTE IN DUSTBINS


4
RECYCLING PLASTIC WASTE


5
RESPONSIBLE WATER RECREATION


6
AVOID CONSTRUCTION NEAR WATER SITES.

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Age Group: 10 & above

INKY PINKY PONKY

This game will help children understand various facts about why water conservation is essential and what the consequences will be of poor choices in terms of the amount of water lost and the number of people affected as a result of them. It is a great way to get them thinking about their responsibility towards water conservation!

See the images below for a step by step guide on how to create one!

INKY PINKY PONKY

1

Take a squared piece of paper

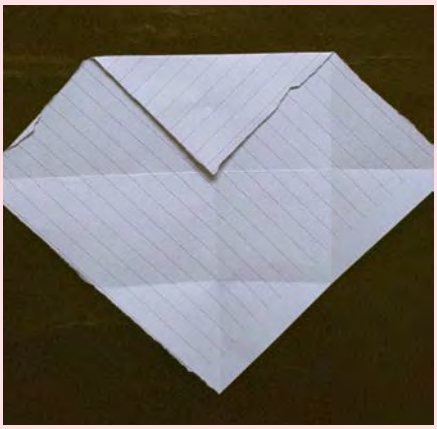
2

Fold it into half diagonally

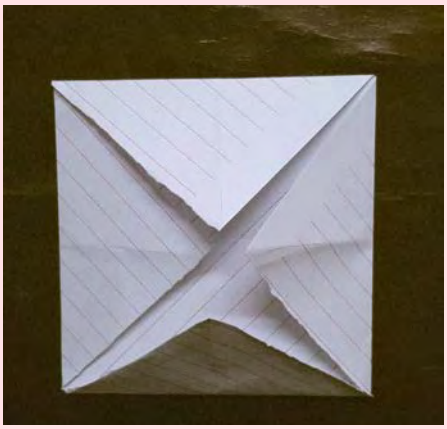
3

Repeat Step 2 with the other side

INKY PINKY PONKY



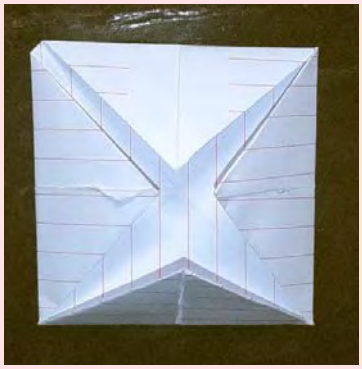
Take the top corner and fold it till the half line of the paper



Repeat the process with all four sides

Flip the paper

Take the top corner and fold it till mid point of the flipped square.



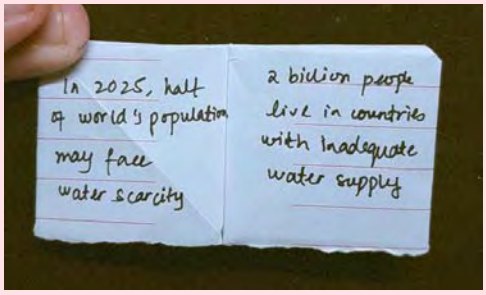
Repeat the process with all four sides

Fold the square in half. It should look like this.

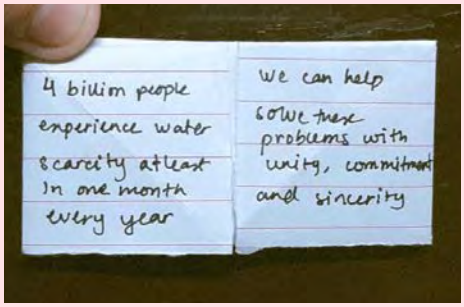
INKY PINKY PONKY

Hold the folded square like this.

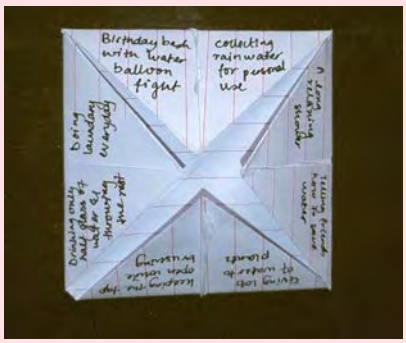
Now you can play the game using both hands.



Start writing these essential facts on the outside.



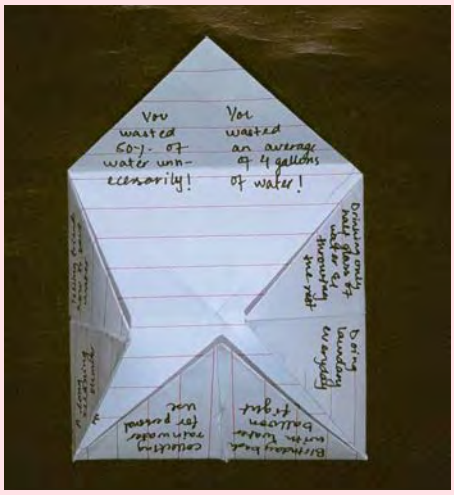
Start writing these essential facts on the outside.

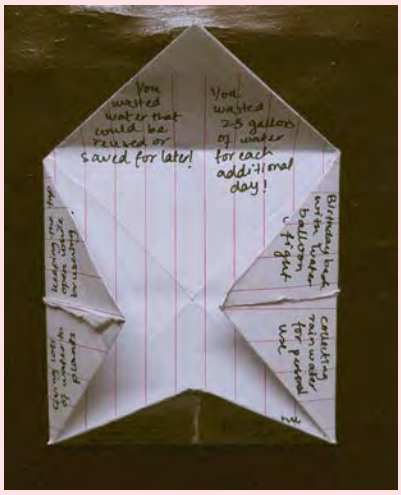


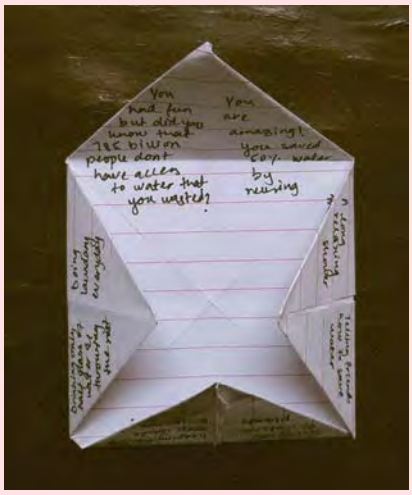
The scenarios on the inner triangles will lead to a consequence so choose wisele!

Each scenario has a consequence written in the inner most part of the game. This shows how much water you wasted or saved based on your actions

INKY PINKY PONKY







Have Fun playing a remember, Your contribution matters! So be careful and use the water available to you wisely

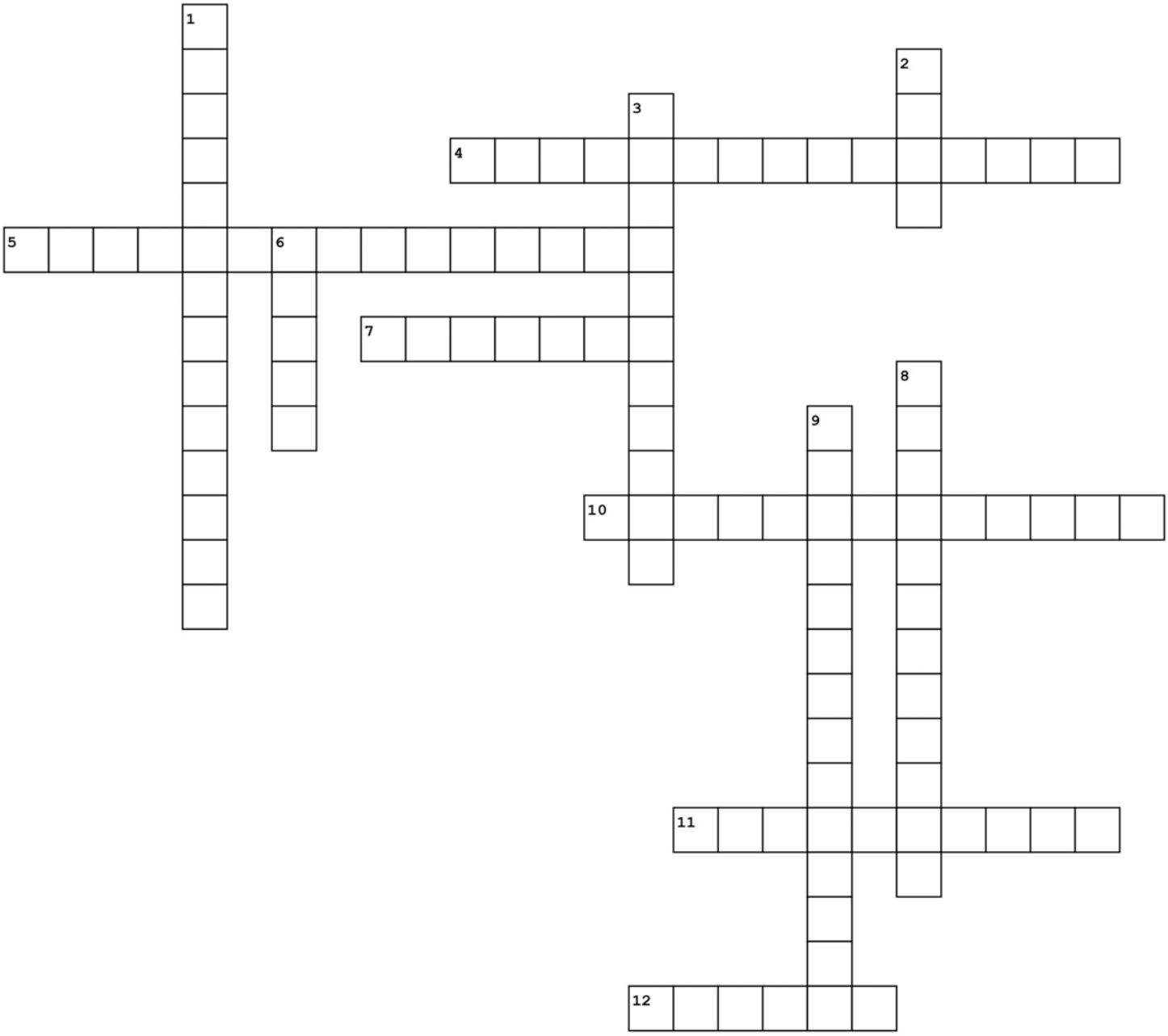
Age Group: 10 & above

Activity designed and created by
Maryam Malik

Crossword Puzzle Word Bank

Ozone
Smog
Carpool
Atmosphere
Global warming
Sulphur dioxide
Greenhouse gases
Oxygen
Carbon monoxide
Fossil fuel
Nitrogen dioxide
Polar ice caps

Air Pollution Crossword Puzzle



Across

4. gas found in combustion engines that causes lung irritation

5. major cause of global warming

7. don't ride in the car alone, do this instead

10. gradual increase in the Earth's temperature

11. air surrounding Earth

12. essential to combustion

Down

1. produced on incomplete combustion of fuels

2. mixture of fog and smoke?

3. carbon containing compounds that formed millions of years ago from remains of living things

6. blocks harmful ultraviolet rays

8. are melting due to global warming

9. colorless gas that mixes with water vapor to form acid rain

Age Group: 8 & above

Activity designed and created by Maryam Malik

Short Play

The next activity is a short play, designed to help children understand air pollution and its sources better and to create awareness and consciousness within them to actively work towards reducing their activities that contribute to it.

When the Air Pollution Gremlins Came to Town
-A short play-

Cast:
Ali
Zainab
The Gremlins (5): Smelly Sulfur Dioxide, Nasty Nitrogen Oxide, Lump Lead, Odious Ozone2, Pesky Particulate, Cranky Carbon Monoxide

Setting:
Ali and Zainab are sitting in their living room with the television, radio, air conditioner, fan and five to sox lights on. They are watching a show together on the TV.

Script:

Zainab: I love this show! It is my favorite
Ali: Yeah, I love Tom and Jerry as well. The song playing on the radio right now goes so well with the action on TV.
Zainab: (gets up and looks outside the window) Hey, Ali look at that! (points to the sky)
Ali: Wow, I wonder what that is! Let's go outside and have a look
(Ali and Zainab go outside. A large dark cloud comes close to them. Inside the clouds are the air pollution gremlins. The cloud stops right in front of Ali and Zainab.
Ali: Who are you?
Smelly Sulfur Dioxide: We are the air pollution gremlins. We have come to take over your town.
Zainab: Why would you want to do that? Only nice people live here.
Pesky Particulates: Yeah! you must be nice people but nobody seems to care about the air in this town. So, It looks like a good place to live. (sneer)
Ali: I notice each of you has a different name. Why is that? aren't you all the same?
Cranky Carbon Monoxide: We have different names because we come from different sources and cause different problems.
Ali and Zainab: Oh No!!!
Cranky Carbon Monoxide: I am Cranky Carbon Monoxide. I mostly come from car exhaust and due to incomplete combustion. I like to make people dizzy and give them headaches. (Twists hands menacingly)

Smelly Sulfur Dioxide: I'm Smelly Sulfur Dioxide. I come from smokestacks of power plants and industries. I can hurt your eyes, nose and lungs. You can even eat away iron and steel. I like to make the air look hazy. (Lunges and audience).

Nasty Nitrogen Dioxide: I'm Nasty Nitrogen Dioxide. I have a yellowish-brown color and I come from cars. electric power plants, and other large industries. I can make the air brown and hazy. I like to hurt the lungs, plants, and metals. (Makes an evil laugh)

Lumpy Lead: I'm Lumpy lead. I can contaminate the air, food, and water. I am also found in some old paints. I am very harmful to children and fish. (Does a little dance)

Odious Ozone: I'm Odious Ozone. I'm invisible by myself, but when I get together with my friends, I can help form smog. I can make it hard to breathe. (Lunges at audience)

Pesky Particulate: I am Pesky Particulate. I live in the air and like to travel on the wind. I make things dirty and I can carry harmful chemicals into your lungs as well. (Makes a very loud and evil laugh)

Zainab: All of you sound so terrible! We don't want you to live here.

Odious Ozone: You make it easy for us by wasting electricity and asking your parents to drive you everywhere you want to go!

Ali: You mean that just because we waste electricity and ride around in the car a lot, you guys are here to stay?

Nasty Nitrogen Dioxide: Bingo! Thank you the invitation to live in your town!

Zainab: Well, from now on, you're not invited to our town. I'm not wasting electricity anymore. I am going to walk or ride a bike if I want to go somewhere nearby.

Ali: YEAH! (said firmly) We are starting right now!

(Ali and Zainab rush inside and turn off all the lights and appliances they had left on)

Gremlins: Oh no! We can't live in this town if you cut down on your use of energy and fossil fuels. We will not be able to live in your town.

Lumpy Lead: I am sure we can find another town where people are wasting energy. Let's go friends... (The gremlins leave with their clouds)

Zainab: What do you want to do now?

Ali: Let's go outside and ride our bikes in the fresh and clean air Zainab

Zainab: I hope those gremlins don't ever come back

Ali: They will not as long as we continue to live wisely. Let's ask our whole town to be energy efficient

Age Group: 12 & above

Conversation with Yasmeen Lari

What inspired you to become a sustainable architect?

I understood that climate change was a reality and I had to deal with it. I always thought that we had to use the local raw material available to construct buildings and houses but there was only debris after the 2005 Earthquake so we taught people how to use it to deal with the crisis. Young volunteers came from all over the world and guided the locals regarding constructing from whatever was available. Hence we were able to help people make their own houses. In 2009, the IDP crisis, people moved from Swat because of army action so we used bamboo to make kitchen for them and that's when it clicked that we could use these zero carbon materials. So by using the materials we were able understand how they can be helpful.

How do you select which raw materials can be used in a particular region?

You must work with context to see what is available but there are certain materials available everywhere like stones and earth. We can work out different models to make climate-resistant structures that won't be impacted by earthquakes or floods. Using wood, however, is an issue. If 100,000 houses were built in Sindh after the floods of 2011, you would lose approximately 50,000 acres of the forest because so much wood is used to provide burned brick, so I use lime stabilized brick. Lime is mostly available and although it emits carbon it does so in minimal quantity and also absorbs carbon from the air, so it is a good material. Bamboo is available in almost every province (KPK, Sindh, and Punjab with the exception of Balochistan). Bamboo, hence, always comes out to be a winner. I focus on making structures entirely of bamboo or using bamboo for the roofs along with earth and lime masonry.

Conversation with Yasmeen Lari

What is the key to reducing our environmental footprint through architecture?

We must work with materials that are economical and locally sourced. Bamboo, lime-stabilized bricks, and other environmentally friendly materials serve the purpose. Around 40% of our energy consumption is because of the way we construct. Thus, the more we totally do away with cement and steel the better it is. Now with the knowledge we have about climate change, we have to be very careful.

What do you think about the urban structure?

It is very disturbing, in fact, the worst possible situation. In Islamabad, we have multistory towers that lead to high carbon emissions. Karachi is highly polluted and highly degraded. The tragedy is that nobody is concerned and even COVID flourishes in such a structure. All of us should understand that we need a healthier environment. I'm surprised that young people are not coming forward to deal with this issue. I'm tackling this through a zero-carbon street in Lahore where I aim to transform a whole environment through a three-way partnership involving the local community in order to create a sense of ownership.

Conversation with Yasmeen Lari

Tell us a little bit more about the Zero Carbon Street!

In this street, there is no steel or cement and it is entirely paved with a terracotta structure that is permeable, so the aquifer does not get drained since the water gets absorbed. It also gives an amazing cooling effect which maintains the temperature. There are porous pavements where water gets absorbed in soils and aquifer wells. Because of the structure, there was no urban flooding and no urban heat islands this year. I have also constructed trees in Miyawaki-style forests in areas that are polluted so that these areas can become toxin-free. Most importantly, these methods are cost-effective which helps to engage the community and make our project a success.

Throughout your journey as an architect, what was the most memorable moment for you?

In the earthquake area, I saw the worst possible conditions, human misery, and what it had done to people. It taught me a lot of things but also taught me that so many people have a golden heart. Several came from all over the world to assist me in my mission. What touched me the most was that these people, whom we wanted to help, would bring out their best table that might be broken but they would still bring it for us and would share with us whatever they had which was nothing but eggs, welfare biscuits, and tea. It struck me that these people had nothing, yet they were so generous. Women were ready in spite of their misery to come and be with me in my mission. There's a huge reservoir of women who desire to make their lives better. The issue is that there is no knowledge sharing. Money is not needed or important, it is the sharing of skills and expertise which is a requirement.

Conversation with Yasmeen Lari

What role do women play in sustainable architecture?

Women must be involved in community building. Working with them, I have understood that I'm not the one bringing a new skill set to them rather the skills that they employ to make structures are the skills they already knew. If they make the most beautiful terracotta tiles, it's because they know how to knead flour bread so they can also handle clay. There are so many skills that they have, and they do so much but we never acknowledge it. So, it's time for us to lift our women and help them otherwise our country is doomed.













This module was created from love, inspiration and passion from the environment! It is now yours to implement and continue to pass down to others so that they too can think global and act local.

Please send us your feedback and responses to the activities that your students/children have completed, we would love to hear from you!


The
End