

CAMPAIGNING FOR SAFETY (LEVEL 3)

Description	Learners will learn the concepts of weather, climate and wind formation, and design a safety campaign for their community with precautions to keep in mind during natural disasters such as storms and cyclones.
Leading question	How can I protect my community against natural disasters?
Subjects covered	Science, Geography, English, Math
Total time required	40-60 min a day for 5 days
Resources required	Markers, Paper plates/chart paper, pencil, straw, clay/ dough, pins
Learning outcomes:	<p>By the end of this project, learners will be able to:</p> <p>Knowledge-Based Outcomes:</p> <ol style="list-style-type: none"> 1. Differentiate between weather and climate. 2. Identify and describe the adaptive features of animals in different climatic zones and their respective regions. 3. Explains the process and causes related to wind, storms and cyclones. 4. Conduct experiments to explain concepts such as the effect of variation in temperature on air pressure, effects of temperature on the density of air, etc. 5. Describe the damage caused by storms and suggest measures to reduce the effects of storms and after-storms. <p>21st Century Skill Outcomes:</p> <ol style="list-style-type: none"> 1. Think critically while analysing data and drawing conclusions from experiments. 2. Be creative in designing animal adaptations. 3. Communicate clearly in written and spoken form through the safety campaign.
Previous Learning	Difference between weather and climate
Supervision required	Medium

Day 1 -

Today, you will differentiate between weather and climate and explore how human beings and animals are adapted to different climates.

Time	Activity and Description
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10 minutes	<p>Introduction to Weather and Climate</p> <p>Note: Recap the concepts of weather and climate by facilitating a discussion using the following questions:</p> <ul style="list-style-type: none"> - What do you think the weather is like today? <i>(Remind students that the weather is the day-to-day condition of the atmosphere at a place with respect to temperature, humidity, rainfall, wind speed, etc.)</i> - What is the climate of the place you are in? <i>(Remind the students that the average weather pattern at a place studied over a long time, say 25 years, is used to determine the climate of the place.)</i> - How do you think the climate impacts the way people around you live? <i>(Encourage the students to think about food, clothing, occupations, etc. in the context of their own place.)</i> - Can you give examples of places with the following climates: <ul style="list-style-type: none"> - Desert/Hot and Dry <i>(such as Sahara, Gobi, Thar)</i> - Tropical/Hot and Wet <i>(such as Nigeria, Indonesia, Java)</i> - Polar <i>(such as Norway, Russia, Greenland)</i>
10 minutes	<p>Climate and Adaptations</p> <p>Just like the climate influences our way of life, it also impacts our physical features over generations.</p> <ul style="list-style-type: none"> - Think of an animal you would see in a specific climate zone. - Visualise the animal and make a list of its prominent features. - Discuss and note how these features help them survive in the climate. <p>Note: <i>If time permits, challenge learners to list animals in their area/state and explore how they have adapted to the climate.</i></p> <p>For example: Elephants (Tropical Climate)</p>

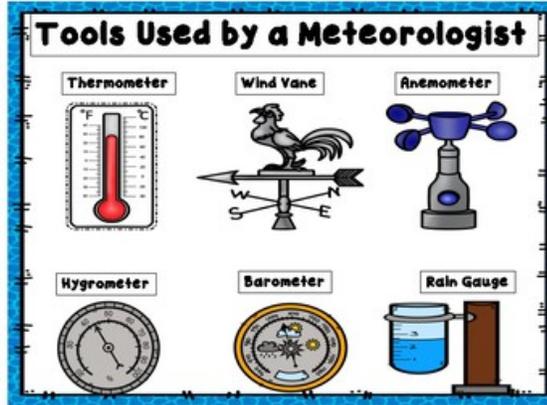
	<p>Elephants have a thick layer of skin, about 1 inch, which helps protect them from the heat of the sun, predators, and their environment.</p> <p>Big ears to keep cool, because it is very hot, and there is little shade.</p>  <p>The tail is used for swatting away bugs, and the elephants babies hold on to the tail.</p> <p>These tusks are used for digging and for protection against predators.</p> <p>The elephants trunk is great for picking up things, smelling, and touching things.</p> <p>Elephants drink about 50 gallons of water a day, to help them stay hydrated.</p> <p>The African Bush Elephant has such big feet, because it needs a big foundation.</p>
10 minutes	<p>Animal Swap</p> <p>Note: <i>Through this activity, learners will apply their understanding of climate adaptations and use critical thinking skills.</i></p> <ul style="list-style-type: none"> - Think of a climate and an animal to which that climate would be very different (<i>For example: Elephant, Polar Climate</i>). - Now, think of ways in which the animal would adapt to the new climate if it was introduced to it (<i>For example: The elephant would grow thicker fur, have sharper claws, and white skin to protect itself from predators!</i>) <p>We have learnt how animals adapt to different climates. How do you think human beings have physically adapted to different climates? (<i>For example: In hot and humid areas, people might tend to be taller and thinner to release heat better. They may have wider noses to avoid warming the air in their noses and darker skin to protect against the sun's rays.</i>)</p> <p>Tip: <i>You can ask learners to read more about the physical adaptations of human beings here: www.britannica.com/science/climatic-adaptation</i></p>
10 minutes	Project Introduction

	<p>We have learnt how human beings and animals physically adapt to climates. These happen over hundreds and thousands of years. However, for the seasonal and weather changes, we adapt using clothes, food, and equipment (such as umbrellas).</p> <p>Sometimes, the weather can also cause a lot of destruction which we may not always be prepared for. For example, during cyclones and hurricanes.</p> <p>In this project, you will design an awareness campaign that educates your community on how they can stay safe during adverse weather conditions, specifically storms and cyclones.</p> <p>Think and answer the following questions:</p> <ul style="list-style-type: none"> - What do I already know about storms and cyclones? - What would I like to know more about? - How does extreme weather affect our lives?
At home activities	Students will make a tool to measure the direction of the wind. They will use this tool to record the wind's direction daily. (See Appendix 1)
Optional Literacy/Numeracy Activity	Our bodies are the result of nature protecting us in ways we do not even realise! Write a letter of appreciation to your body for how it has helped you adapt to different circumstances and gives you the ability to live your life.

Day 2

Today, you will learn about different weather instruments, understand how winds and storms are formed, and explore the causes of lightning-related deaths.

Time	Activity and Description
10 minutes	<p>Predicting the Weather</p> <ul style="list-style-type: none"> - What are the ways in which weather forecasting is useful? - What is a person who studies the earth's atmosphere, including the weather, called? (<i>a meteorologist</i>) - In what ways do people in your community predict the weather? (<i>based on cloudy skies etc</i>) <p>Note: Show learners the images of different instruments used to collect data about the weather and ask them to guess what kind of information each one would provide.</p>



- Thermometer: measures temperature
- Wind Vane: shows the direction of the wind
- Anemometer: measures wind speed
- Hygrometer: measures humidity (the amount of water vapour in the air)
- Barometer: measures atmospheric pressure
- Rain Gauge: measures rain

10 minutes

Wind Formation

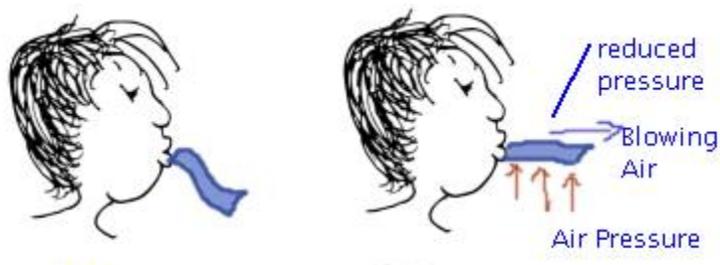
- Does air exert pressure?
- How do you know?
- Can you give some examples? (such as filling a bicycle tyre and blowing a balloon)

Let us do an activity to find out the relationship between air pressure and speed!

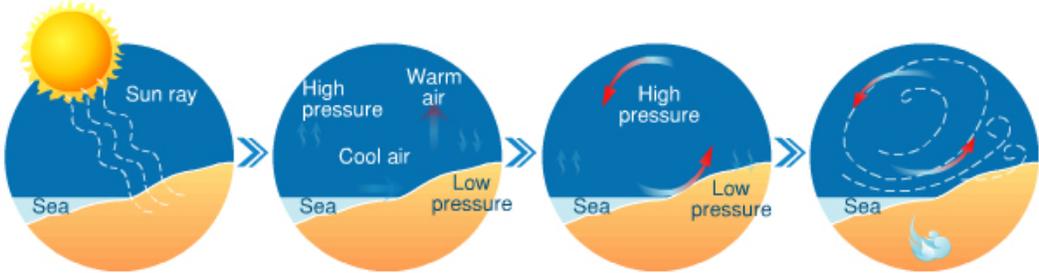
Note: Ask learners to tear a long thin strip of clean paper, place it under their lips, and blow air. Once done, ask them to share what they observed.

The air near our mouth is blown at a high speed.

- When the speed of air increases, pressure decreases.
- Air always moves from high pressure to low pressure. So, the air from below the paper strip rises to the low-pressure area, thereby lifting the paper up.



Why do you think hot smoke rises up?

	<p>When air is heated, it expands and is distributed across more space.</p> <ul style="list-style-type: none"> - This makes warm air lighter than cold air. - This is why the warm air from the smoke rises up. - As the air rises, low pressure is created. <p>Based on what we discussed just now, can you think and explain how winds blow on the earth?</p> <p>Note: After learners share their ideas, explain wind formation using the diagrams, and the included explanation, provided below.</p>  <p>The sun heats the ground surface of the earth which then heats up the air above it. The degree of solar heating varies at different points on the earth's surface.</p> <p>Hot air rises, creating low pressure. As hot air rises, it cools, moves horizontally and eventually falls down, creating high pressure at ground level.</p> <p>These variations in pressure push the air at ground level to move from high pressure areas to low pressure areas.</p> <p>This air movement is wind.</p>
10 minutes	<p>Thunderstorms</p> <p>Let us think about how blowing winds can get dangerous!</p> <ul style="list-style-type: none"> - Have you experienced thunderstorms? What did you and the people in your home do in such situations? - Do winds blow in a certain direction during thunderstorms? - Think about the paper strip experiment we just did. Imagine the paper strip to be the roof of a house. What would happen to the roof of a house in case of a thunderstorm? - Which of these houses (<i>images below</i>) would be better protected from a thunderstorm? Why? <p><i>(The domed roof would be better protected because there is no space for air from below to rise to the top and pull the roof away.)</i></p>



- If you had to give advice to a person building their home in an area prone to thunderstorms, what other advice would you give them?
(Ensure that windows are sealed properly, avoid tall trees around the house in case they fall, and use strong materials to build the house)

10 minutes

Lightning

Have you ever seen a lightning strike during a thunderstorm? Do you think lightning strikes can be dangerous?

A lightning bolt can heat the air around it to a temperature that is 4 times the temperature of the sun! What do you think would happen if a bolt hit a house or a person?

Note: Provide each group with the **Data Set from Appendix 2** (this is a placeholder data set that you can change, and customise the questions accordingly, based on the geographical location of the learners), and allow them 5 minutes to go through it. Once done, discuss the questions given below.

Observe Fig. 1.

- Which states have a high number of lightning strikes?
- Which states have a high number of deaths due to lightning?
- What does this information indicate?

Observe Fig. 2.

- What do you think are the reasons for the high death toll in these states?
(Most of these states depend largely on agriculture and have many people in the fields, who are more exposed to lightning. There also may be a lack of awareness as people may stand under a tree for shelter. A tree in an open field attracts lightning due to its height and thus the chances of people standing under trees being hit are the highest, relative to other situations.)

Observe Fig. 3.

- Who do you think is the most vulnerable to lightning-related deaths?
(Males in rural areas, especially those who work in farms.)

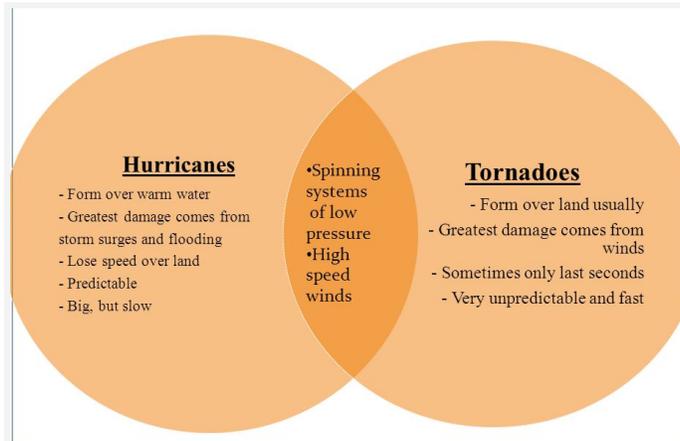
	If you were part of the government, what would you do to prevent deaths caused by lightning?
At-home activities	Find out the precautions people must take in case of thunderstorms and explain the scientific reasoning behind each of them: For example: <ul style="list-style-type: none"> - <u>Precaution</u>: Unplug all electrical devices. - <u>Scientific Reasoning</u>: If lightning strikes near a power line, that energy can travel through that line, into your home and along any wires that are connected to an outlet. In the event that any part of your body is touching or close to a wire or cord that has extra voltage pulsating through it, you could suffer serious injuries.
Literacy/ Numeracy Extension (Optional)	Observe the 'Lightning Deaths, By Cause' infographic provided in Appendix 2. <ol style="list-style-type: none"> 1. Calculate the percentage of lightning deaths caused by standing under a tree. (Total number of tree symbols/ Total number of symbols x 100). 2. Similarly, calculate the percentage of direct hits and indirect hits.

Day 3 –

Today, you will explore the impact of cyclones, think of safety measures in the event of a cyclone, and start working on your safety campaign.

Time	Activity and Description
5 minutes	<p>Introduction to Cyclones</p> <p>So far we learned about thunderstorms and lightning, and what to do to keep ourselves safe in the event of these disasters. Now, let us learn about cyclones!</p> <p>Have you ever heard of cyclones/ hurricanes/ typhoons?</p> <ul style="list-style-type: none"> - What do you know about them? - Have you experienced them? - What do you call them in your local language?

Note: Explain what a cyclone/ hurricane/ typhoon is, and how it is different from a tornado, using the Venn Diagram shown below.

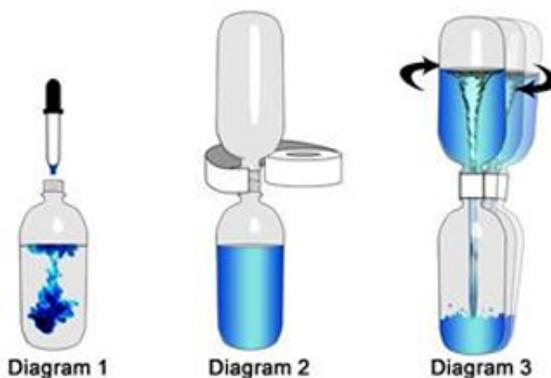


10 minutes

Making a Cyclone

Let us make our own cyclone! To do this:

1. Pour the water into one of the bottles and add a few drops of colouring (diagram 1).
2. Stand the water-filled bottle up and place the empty bottle on top of it.
3. Tape the two bottles together by wrapping masking tape around the necks of the bottles (diagram 2).
4. Flip the bottles over (so the water-filled bottle is on top) and swirl them in a circle (diagram 3).
5. Use a clock to time your cyclone.



- What did you observe?
- How long did the water take to drain to the bottom bottle?

Now, repeat the experiment without swirling the bottle and record the time too.

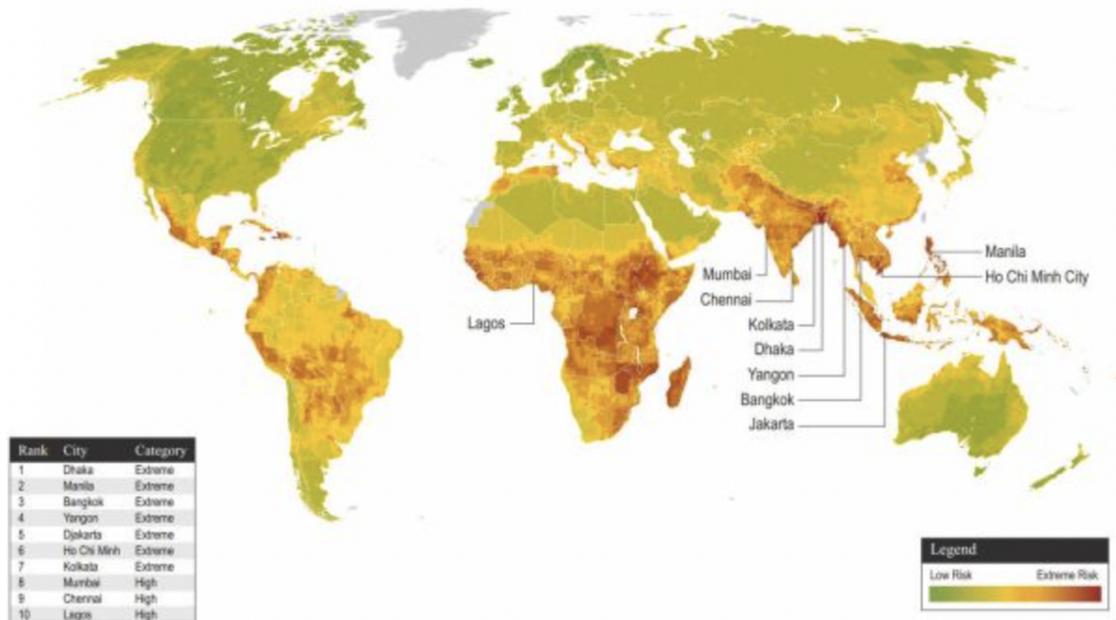
- What did you observe?
- How long did the water take to drain to the bottom bottle?

Imagine a cyclone in real-time. How do you think it impacts the places it hits?

10 minutes

Impact of a Cyclone

Note: Show learners the map below that indicates cyclone-prone areas in India and ask them the listed questions (this is a placeholder map that you can change, and customise the questions accordingly, based on the geographical location of the learners).



- Which continents are more prone to cyclones?
- What is common between these areas? (They are mostly coastal.)
- How can one predict a cyclone approaching? (Satellite images, strong winds pushing the water towards the shore.)
- What happens after a cyclone? (It causes severe flooding, and loss of life and property, including telephone lines, power cables and houses)
- If you live in a cyclone-prone area, what would you put in your 'emergency kit'? (items such as identity documents, batteries, torch, food, and first-aid)

	<p style="text-align: center;">MAP SHOWING WIND & CYCLONE ZONES IN INDIA</p>
<p>15 minutes</p>	<p>Cyclone Simulation</p> <p>Imagine that a cyclone is approaching our area in one day! People are nervous and unsure what that means for them. The city needs you! These are the different departments working towards minimising cyclone damage:</p> <ul style="list-style-type: none"> - Meteorological Department, - Law Enforcement, - Medical Emergency Team, - Fire Department, - Rescue Operations, - Animal Protection, - Traffic Police, and - Communications. <p>For each department,</p> <ul style="list-style-type: none"> - list the different things that they will do to prepare for the incoming cyclone and keep as many people and animals safe. - list any requests that they may have from any other departments. <p>Tip:</p> <ul style="list-style-type: none"> - <i>If more than one learner is being taught this module, for this activity, divide the departments among learners or assign one department to a group of learners.</i>

	<p>- If needed, give an example to the learners, as shown below:</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>Communications Team</p> <p>To Do</p> <ul style="list-style-type: none"> - Broadcast precautions on TV, radio, and social media. (Eg: emergency service numbers, guidelines to unplug electric devices, storing food, etc.) - Provide hourly updates to citizens on the status of the cyclone. - We will ensure people are not panicking by providing motivating messages in a calm manner. <p>Requests</p> <ul style="list-style-type: none"> - We need frequent (every 30 minutes) updates from the Meteorological Department. - We need to know from the Traffic Police which roads are blocked/open. </div>
At-home activities	<ul style="list-style-type: none"> - Interview people in your community about the precautions they take in case of wind-related disasters, especially the ones you are focusing on in your project. - Record the direction of the wind with your homemade wind vane.
Optional Literacy Extension	<p>Interview people in your family or community if they have experienced a cyclone. Alternatively, collect images of the impacts of storms or cyclones. Based on what you hear/ see, write an engaging story on a storm or a cyclone with a beginning, middle, and end.</p>

Day 4 –

Today, you will prepare for your presentations on the next day.

Time	Activity and Description
30 minutes	<p>Designing a Safety Campaign</p> <p>Think about your safety campaign and choose a natural disaster that you will design it on. Consider the following questions:</p> <ul style="list-style-type: none"> - Which disaster is your area more prone to? <i>(The campaign should cover at least 1 disaster.)</i> - What are some safety precautions people need to know? <i>(There should be at least 5 precautions.)</i> - Who is your main audience? Do they have access to means of communication such as TV and radio? - What is the most effective way to communicate your message? <i>(For example, if you want to reach rural farmers, using the local language is a good idea. If they do not have access to TV, maybe visual pamphlets or skits would be more helpful.)</i> <p>After this, start preparing the outline of your safety campaign. Remember that:</p> <ul style="list-style-type: none"> - You need to both speak and present a poster or a pamphlet during your presentation. Therefore, plan your presentation accordingly.

	<ul style="list-style-type: none"> - It should be concise and convincing, keeping the type of audience in mind. - You can also demonstrate science experiments to make your point more convincing.
10 minutes	<p>Reflection</p> <p>Think and answer these questions based on your experience of working on this project so far:</p> <ul style="list-style-type: none"> - How do I feel about my presentation the next day? Will it convince people to be more prepared towards natural disasters? Why? - What can I do to improve my presentation? - What was easy for me to do in this project? What are my strengths? - What did I find challenging? Who can I seek help from? - What are some questions I still have?
At-home activities	<p>Improve your preparation for your presentation based on your reflections.</p> <p>Discuss your presentation with an elder and ask for their feedback to help you improve your presentation further.</p>

Day 5 -

Today, you will present your safety campaign!

Time	Activity and Description
10 minutes	<p>Preparation</p> <p>Take 10 minutes to make any final preparations/ get ready for your presentation.</p>
20 minutes	<p>Presentation</p> <p>Note:</p> <ul style="list-style-type: none"> - Learners will present their campaign to friends or family members. Help them arrange a few people as an audience if needed. - Ask the learners present, request the audience to think about: <ul style="list-style-type: none"> - Are they convinced that they should be better prepared in the event of a natural disaster, based on the presentation? - two things they like about the presentation - two things they think the learners should work on - Once the presentation is complete, the feedback can be shared with the learners.
10 minutes	<p>Reflection</p> <p>Congratulations on making your presentations! Let us reflect on how this project went for us by thinking about these questions:</p> <ul style="list-style-type: none"> - How did the presentation go versus how you felt about it the previous day? - What went well? - What could have been better? - What are my key takeaways from this project? - What do I want to explore further on this topic?

Additional enrichment activities:	Students can create models of disaster-proof houses by applying the concepts they learned in the project, using household items (such as straws and clay).
Modifications for simplification	<p>For their final project, instead of the campaign, learners can put together a ‘weather journal’ that documents the weather at different times of day for 5 days and explore 5 different questions through simple experimentation.</p> <p>(Such as:</p> <ul style="list-style-type: none"> - How does the temperature change during the day? - How accurate is weather prediction? Compare the accuracy of two or more TV meteorologists. - How does weather affect human emotion? - What is the difference between the temperature in direct sun and in the shade? Is the difference always the same?)

ASSESSMENT CRITERIA

A majority of my students were able to:

- Give examples of climate adaptations in animals
- Differentiate between thunderstorms, cyclones, and tornadoes
- Provide precautionary measures to protect themselves from wind-related disasters with scientific reasoning
- Convince the audience they make their presentations to, to be better prepared for natural disasters than they currently are.

APPENDIX 1

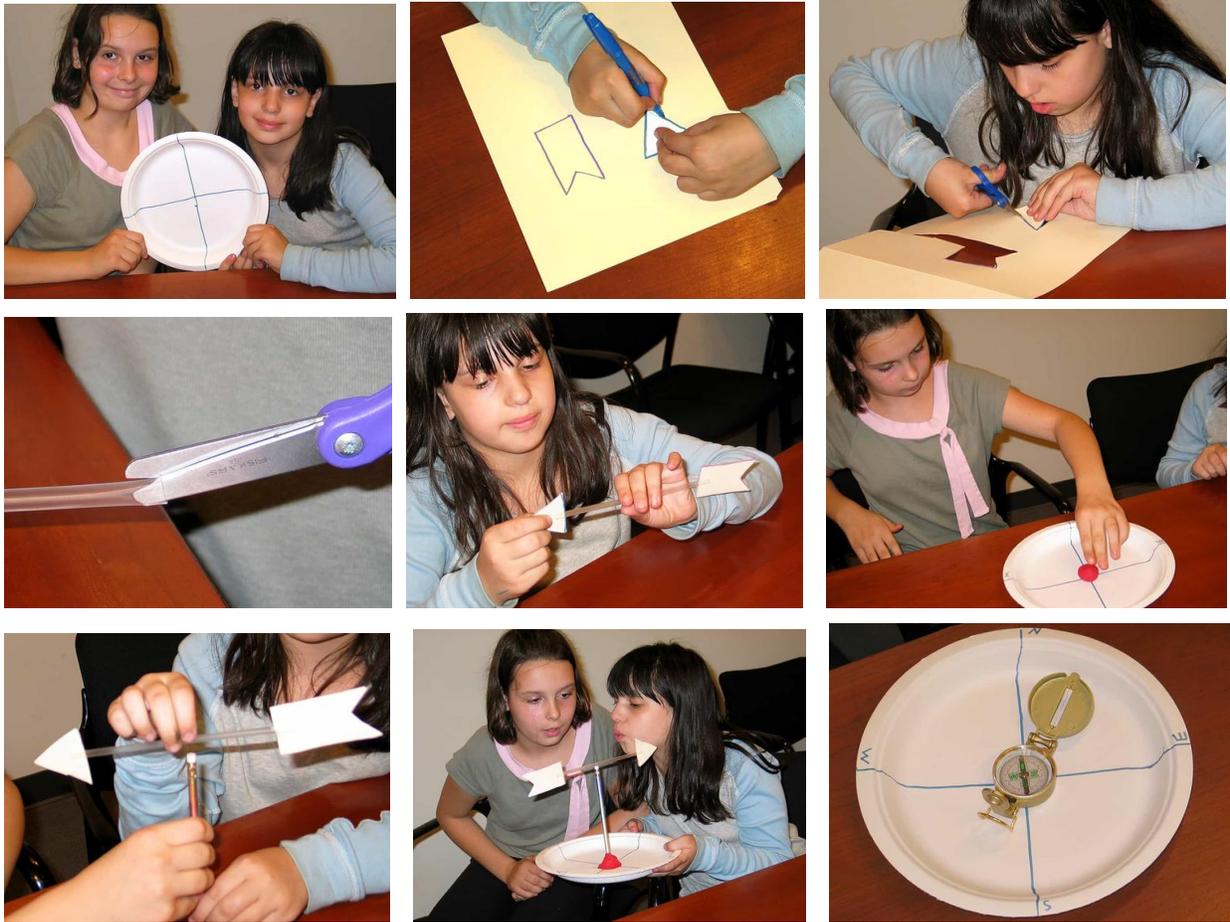
How to Make A Wind Vane

1. Use a marker to divide your paper plate into 4 equal sections. Label the ends of the lines as North (N), South (S), East (E) and West (W) correctly.
2. Draw and cut out the wind vane shapes as shown in the image, on cardboard.
3. Cut half-inch slits on either side of a straw and insert the cardboard shapes at the same angle. You can use small pieces of tape to keep it in place.
4. Attach a lump of clay at the centre of the paper plate. Stick the sharp end of a pencil to it.
5. Push a straight pin through the middle of your straw and into the eraser of the pencil.

To Measure Wind Direction:

Take your wind vane outside and place it in an open area. Place the compass in the centre of your paper plate. Turn your plate so that the line labelled **N** matches up with the compass arrow pointing north. What direction is the wind blowing?

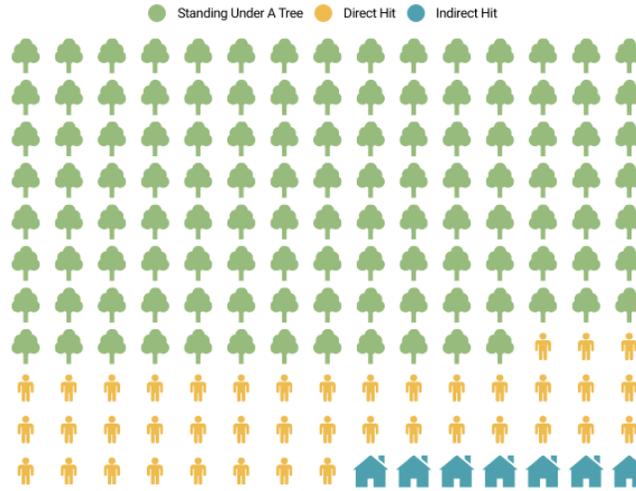
(Remember: The arrow points in the direction the wind is blowing from. So if your wind vane is pointing north, the wind is actually blowing south.)



APPENDIX 2

Figure 1: South West Monsoon Lightning Report 2019 - Strikes versus Deaths

Lightning Deaths, By Cause



Direct Hit: The lightning struck the person directly.

Indirect Hit: The lightning struck the house which led to accidents and deaths.

News Article

More than 100 people killed during lightning strikes in India

CNN, Fri June 26, 2020

More than 100 people have been killed during lightning strikes in two Indian states in two days, according to authorities. In the northern Indian state of Uttar Pradesh, 24 people died due to lightning in the past 24 hours, according to senior Uttar Pradesh State Disaster Management Authority official Aditi Umrao. In the neighbouring Indian state of Bihar, at least 83 people were killed in lightning strikes on Thursday, according to the state government. In total, at least 107 people have died from lightning strikes in the two states.

Bihar's Disaster Management Department said the Gopalganj district saw the highest death toll, with 13 people killed. The rest of the deaths were recorded in 22 separate areas across the state.

All the deaths in Bihar were recorded Thursday. Compensation of \$5,300 will be given to the families who have lost loved ones, said Sandeep Kumar, an official at Bihar's Disaster Management Department.

The deaths in India often occur among farmers, who head outside to prepare their fields just as the monsoon rains arrive. They want to cut it as close as possible to the start of the rains. For example, if

they seed too early it is still hot and the crop will die, but if it's too close to the onset they are vulnerable in open fields during thunderstorms.

Figure 3: Categories of Casualties

