FORECAST the WEATHER

EASY SCIENCE

World Meteorological Day

Each year, on 23 March, the World Meteorological Organisation, its 188 members and the worldwide meteorological community celebrate World Meteorological Day around a chosen theme. This year, the theme is "Weather, climate and the air we breathe".

What's the weather like?

You can learn a lot about the weather on the television or over the radio. But, if you want to learn more about the weather right in the spot where you live, you can build your own weather forecasting station.

Your weather station should include a rain gauge to tell how much it has rained, a compass and a wind vane to tell the direction of the wind, and an anemometer to show how fast the wind is blowing. If you have an outdoor thermometer, you will also be able to record the temperature.

You can be on top of the weather! Keep a record of weather ups and downs in a weather notebook. You can compare weather from one season to the next, or one year to the next.

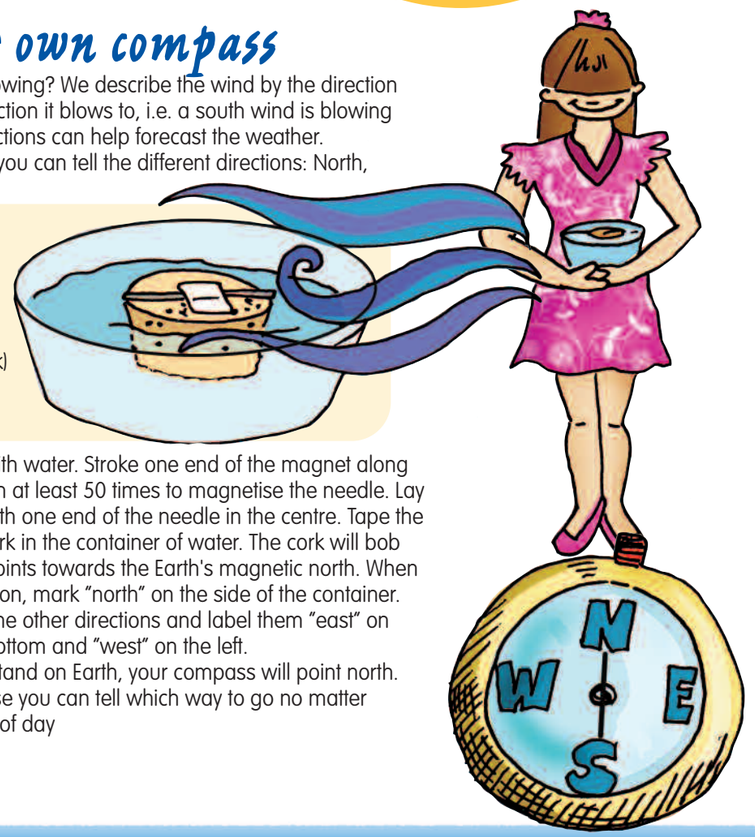
Meteorology is the study of weather patterns. Meteorologists study the weather by recording data and analysing it. You can become an amateur meteorologist by building a weather station and recording your own data. After doing this for a while you'll begin to notice various weather patterns and what they indicate.

Make your own compass

Which way is the wind blowing? We describe the wind by the direction it blows from, not the direction it blows to, i.e. a south wind is blowing from the south. Wind directions can help forecast the weather.
Make a compass so that you can tell the different directions: North, South, East and West.

You will need:

- needle
- magnet
- plastic container
- a cork (1 - to 2 cm thick)
- pen
- water



Fill the plastic container with water. Stroke one end of the magnet along the needle in one direction at least 50 times to magnetise the needle. Lay the needle on the cork, with one end of the needle in the centre. Tape the needle down. Float the cork in the container of water. The cork will bob around until the needle points towards the Earth's magnetic north. When the needle settles in position, mark "north" on the side of the container. Now you can determine the other directions and label them "east" on the right, "south" on the bottom and "west" on the left.

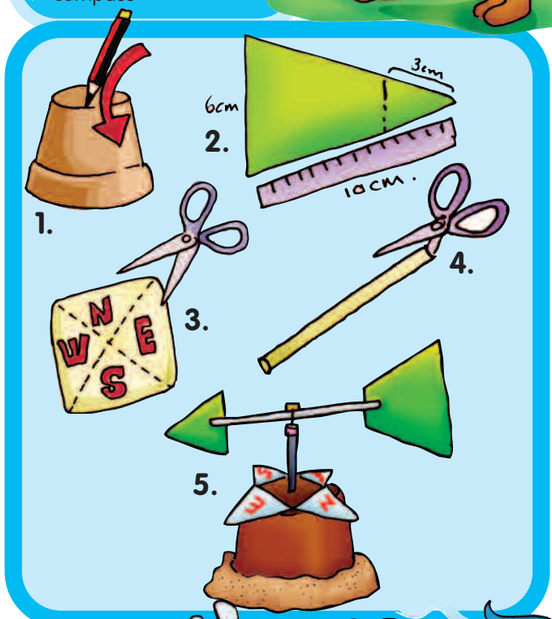
No matter where you stand on Earth, your compass will point north. This is very helpful because you can tell which way to go no matter what the weather or time of day

Build a wind vane

A change in wind direction often indicates that the weather will change soon. Be prepared for sudden change by making this wind vane.

You will need:

- a long tack
- scissors
- modelling clay
- a plastic pot or container, *e.g., from take-out food*
- ruler
- glue stick
- thin, coloured card
- drinking straw
- 2 pencils with eraser
- compass



- Turn the plastic container upside down. Make a hole in the centre by inserting the pencil, sharp end first. Make sure that it is firmly in place.
- With another pencil and a ruler, draw a large triangle with two 10 cm sides and one 6 cm side on the card. Mark 3 cm back from the tip where the 10 cm sides come together. Draw a line straight across. Cut on the lines you just drew so that you have two pieces of cardboard remaining, one triangular piece and one four-sided piece remaining. The triangular piece will serve as arrow pointer and the other piece will be the tail.
- Also cut out four small triangles from the coloured card. Glue the small triangles to the base of the plastic container at equal distances and on opposite sides from each other as on a compass (see illustration). One point of each small triangle should overlap the edge of the pot, with the pencil in the middle.
- Cut short slits (about 2 cm long) in each end of the straw and insert the large triangle in one end to make the arrow's tail and the small triangle in the other end as the arrow pointer. Push the tack (or long pin) through the centre of the straw and into the eraser on the pencil sticking out of the pot.
- Secure the other end of the pot to a surface with a ring of modelling clay.
- Take the vane outside and watch it swing in the wind. Make sure there is enough room for it to turn freely.
- Finally, use your compass to determine East, West, North and South, and then label the small triangles accordingly. Now you can tell which direction the wind vane is pointing.

Make a nephoscope to determine the wind direction

The direction and speed of surface winds can be changed by obstructions such as trees and buildings. Meteorologists and weather forecasters seek information about wind in the upper air. A nephoscope allows you to determine the wind direction in the upper air by observing drifting clouds.

You will need:

- A large sheet of white paper
- An outside table
- Mirror
- Compass
- Marking pen

- Do this experiment on days when the sky has separate clumps of moving clouds. Lay a sheet of paper on the outside table and place the mirror in the centre of the paper.
- Use your compass to determine the direction of north. Mark "north" on the paper with the marking pen.
- Look onto the mirror and watch the image of the clouds as they move across the mirror. Record the direction that the clouds are coming from and you will have the wind direction.

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Measure the wind

You can build an instrument to measure how fast the wind is blowing.

You will need:

- Four plastic cups
- The top of a plastic bottle with a screw cap
- A bottle with a cork stopper
- Two thin dowel sticks
- A knitting needle

- Colour or mark one of the paper cups so that it is different from the others.
- Ask an adult to help you make a hole in the screw cap of the plastic bottle and push the needle through the hole. Ask for help to make four notches in the plastic rim as shown.
- Stick the dowel sticks right through the cups, one on each end of a stick. Fit the sticks into the notches and see that the openings in the cups all face in the same direction.
- Now push the sharp end of the needle through the cork and fit the cork into the bottle. You may again need help to do this.
- Secure the bottle on dry ground. Watch the cups turn in the wind. Use the marked cup to count the turns. The number of turns per minute tells you how fast the wind is blowing.
- The fancy name for this device is anemometer.

Make your own Rain Gauge

A rain gauge is a must for your weather station. You will want to measure how many millimeters of rain falls in your garden.

You will need:

- A can, at least 8 cm in diameter, with straight sides and a mouth as large as the bottom (or flat-bottomed clear plastic bottle with the top cut off and inverted into the bottle to form a funnel.)
- Water
- Masking tape
- Glass jar, about 4 cm in diameter
- Ruler
- Permanent marker

- Take the large-diameter can (for collecting the rain) and pour 2 cm of water into it. Measure as carefully as possible. Pour the water into your smaller diameter jar (for measuring the rain).
- Place a strip of masking tape vertically on the outside of the jar and mark both the level of the water and the bottom of the jar on the inside. Measure the distance between those two marks and divide by 20, then mark those increments off on the tape. This will give you an easy-to-read scale showing rainfall in millimeters.
- Another method is to use a permanent pen to mark a clear plastic straw with centimetres (and fractions) and insert it to the bottom of the container after a downpour. By putting a finger on top of the straw and withdrawing it, you will be able to read the rainfall depth.
- Set the collecting can outside, away from the house, trees, or anything else that might interfere with collecting your rainfall. You don't want this instrument under cover! Pack sand around it to protect it.
- After a rainfall, pour the contents of the collecting can into the measuring jar and note the results. Should you get more than 2 cm of rainfall at one time, pour the water off, 2 cms at a time, until the can is empty. Don't forget to check the can soon after a storm, or some of your data will evaporate.
- You can measure the amount of rain in one rainfall event, or you can keep track of the rain over a long period of time.
- In South Africa weather observers measure rain at 8:00 in the morning 365 days a year.

Make a hygrometer to measure humidity

Hygrometers are instruments that measure the amount of water vapour in air, called humidity.

Air can be measured as absolute humidity (the amount of water vapour in a unit volume of air), or as relative humidity (the ratio of moisture in the atmosphere to the maximum moisture the atmosphere can hold). It is what gives you that horrible sticky feeling on a hot day. We feel most comfortable with relative humidity between 30% and 60%.

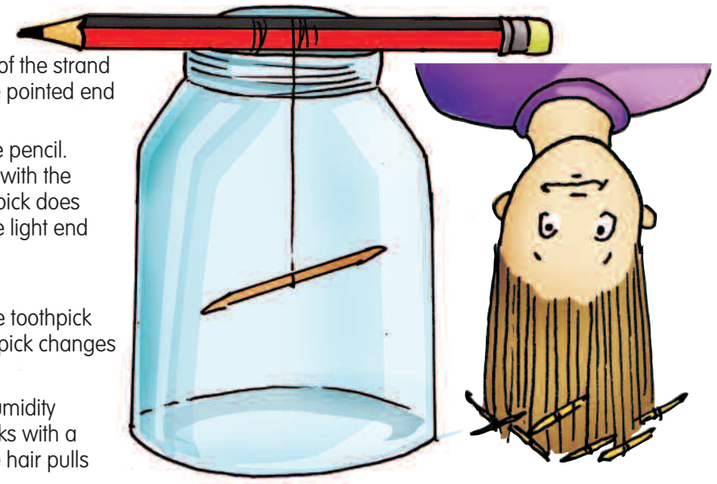
You will need:

- Sticky tape
- A straight strand of hair about 12 cm long
- Flat toothpick
- Permanent marker
- Pencil
- Large glass bottle
- Glue

What to do:

- Use a small piece of sticky tape to fix one end of the strand of hair to the centre of the toothpick. Colour the pointed end of the toothpick with the marker.
- Stick the free end of the hair to the centre of the pencil. Place the pencil across the mouth of the bottle with the toothpick hanging inside the bottle. If the toothpick does not hang horizontally, add a drop of glue to the light end to balance the toothpick.
- Place the bottle where it can stay undisturbed.
- At regular times, observe the directions that the toothpick points for one week. You will see that the toothpick changes direction.

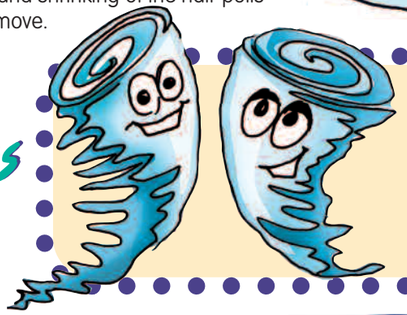
What happens? The hair stretches when the humidity increases (think of those bad hair days!) and shrinks with a lower humidity. The stretching and shrinking of the hair pulls on the toothpick, causing it to move.



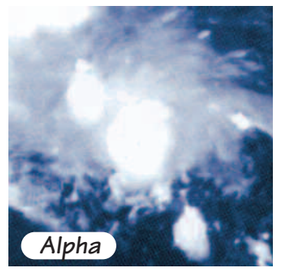
Did you know?

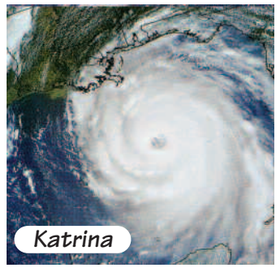
Most commercial hygrometers were literally made from horse hair until as recently as the 1990s. Electronic sensors have since gotten cheaper to build and are more accurate.

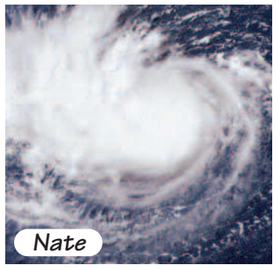
Seven Scary Hurricanes recorded in 2005

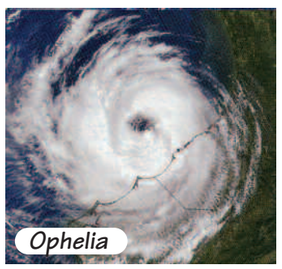


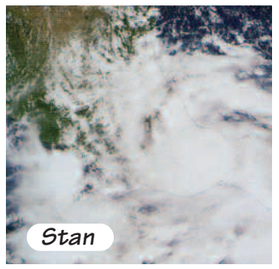
Hurricanes names are chosen from a list selected by the World Meteorological Organisation. The Atlantic is assigned six lists of names, with one list used each year. Every sixth year, the first list begins again. Each name on the list starts with a different letter, for example, the name of the very first hurricane of the season starts with the letter **A**, the next starts with **B**, and so on. The letters "Q", "U", "X", "Y" and "Z", however, are not used. Often when an unusually destructive hurricane hits, that hurricane's name is retired and never used again.











Weather jokes

What did the one tornado say to the other?
"Let's twist again like we did last summer."

What did the one hurricane say to the other?
"I have my eye on you!"

Extracts from " An inconvenient truth" by Al Gore.