

Can I measure the weather? – Building a weather station

You can build devices yourself and use them to measure the elements of the weather. This will allow you to make observations about the weather in your location and create your own weather report just like a real weather forecaster. Observe the weather for a week. Make your measurements at the same time every day.

You will need the following four devices for this:

- A thermometer
- A barometer
- A weather vane
- A rain gauge

You can build the barometer, weather vane, and rain gauge yourself.

In addition, you should observe the clouds and the visibility every day. That is not as easy as it sounds because you need to look very closely and detect very small differences.

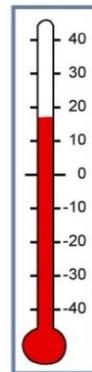
1 Measurement device 1: Thermometer for measuring air temperature

You need:

- 1 thermometer
- 1 strip of cardboard
- 1 pen

What to do:

1. Attach the strip of cardboard to the wall in a shady place.
2. Hang the thermometer on it.
3. Mark the temperature on the cardboard.



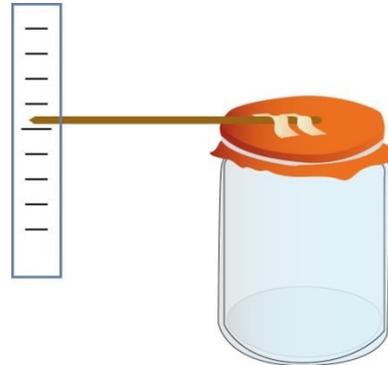
Observe the temperature **for a week**:

- Measure the temperature each day and mark it on the cardboard.
- Enter it on the weather observation sheet each day.

2 Measurement device 2: Building a barometer for measuring air pressure

You need:

- 1 canning jar
- 1 balloon
- 1 kitchen rubber band
- 1 skewer
- Tape
- 1 cardboard strip
- 1 pen



What to do:

1. Cut off the opening of the balloon (the part you blow into). Stretch the rest of the balloon over the mouth of the jar to form a cover.
2. Stretch the rubber band around the edge of the jar to secure the balloon.
3. Attach the skewer firmly to the cover with tape.
You now have a barometer. The skewer acts as the pointer.
4. Place the barometer against a wall in the shade.
5. Then attach the cardboard strip to the wall.
6. Now place the barometer as close as possible to the cardboard strip without the pointer actually touching the cardboard.
7. Mark the position of the pointer on the cardboard.

Observe the barometer **for a week:**

- Mark the position of the pointer on the cardboard each day and write in the date.
- Enter an “L” for low pressure or an “H” for high pressure on the weather observation sheet each day.

Low pressure: If your barometer falls, that is to say, the pointer is lower than it was on the first day, a low-pressure area is on its way, which will bring clouds.

High pressure: If the barometer rises, a high-pressure area is on its way, which will drive the clouds away.

3 Measurement device 3: Making a weather vane for observing wind force and wind direction

You need:

- 1 wooden stick
- 1 piece of cloth
- Glue
- 1 cardboard compass rose
- 1 compass

What to do:

1. Wind the cloth once around the end of the stick.
2. Glue the cloth securely.
3. Make a compass rose out of cardboard symbolizing the four main directions of the compass (north, east, south, west). Write N for north, etc. at the tips.
4. Make a hole in the center of the compass rose, push the stick through it, and secure it with glue if necessary.
5. Push the weather vane into the ground. Make sure that the weather vane is standing where the wind can blow on it from all directions.
6. Align the weather vane to the north using the compass; in other words, the tip of the compass rose with the N must point to the north.



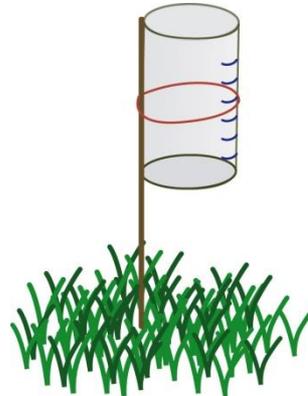
Now observe the weather vane **for a week**:

- Enter the wind force on the weather observation sheet each day:
0 for calm
1 for light wind (the cloth sways on the stick)
2 for strong wind (the cloth blows horizontally in the air).
- Also enter the direction in which the wind is blowing:
N for north
E for east
S for south
W for west
You can read the direction on the compass rose.

4 Measurement device 4: Building a rain gauge for measuring precipitation

You need:

- 1 plastic bottle
- Scissors
- 1 wooden stick
- Tape
- 1 transparency marker
- 1 ruler



What to do:

1. Cut off the top of the plastic bottle with the scissors.
2. Tape the bottle with the hole up at the top end of the stick.
3. Push the stick in the ground. Make sure that rain can get into it from all sides and that there are no walls or roofs in the way.

Now observe the rain gauge **for a week**:

- Mark the water level on the plastic bottle each day.
- Measure the water level each day with a ruler and enter the water level in cm on the weather observation sheet.
- Empty the water out after taking your measurement so that you can measure any new rain again the next day.

5 Measurement 5: Observation of clouds and visibility

You need:

- A map of your school location and the surrounding region within a 50 km radius (e.g., Google Earth)
- Tables for cloudiness and visibility

What to do:

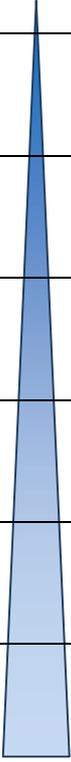
1. Find a location on the school campus from which you can see as far as possible into the distance and have an unobstructed view of the sky.
2. Look for things at different distances that stand out and that you recognize and note them down as your measuring points, for example, the church tower, a certain high-rise building, a factory, or a mountain in the distance. You need approximately five measuring points so that you can estimate the visibility when you make your observations.
3. Look for your measuring points on the map. Measure the distance between these points and your school.
4. By referring to these measuring points, you can now estimate the visibility using the cloudiness and visibility tables.

Observe the clouds and visibility **for a week:**

- Go to your location for making observations every day.
- Estimate the cloudiness and the visibility. Use the values given in the tables on the next page for this purpose.
- Enter your results on the weather observation sheet.

6 Tables for cloudiness and visibility

Cloudiness

Cloud cover increases	Term
blue sky	clear
	sunny
	mostly sunny
	partly cloudy
	partly sunny
	mostly cloudy
	cloudy
complete cloud cover	sky not visible

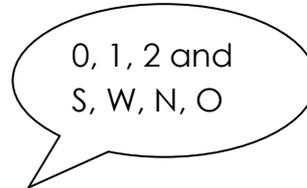
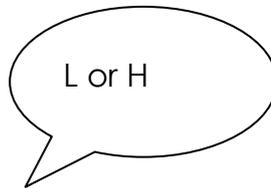
Visibility

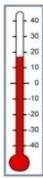
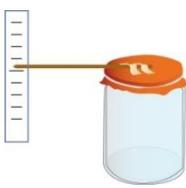
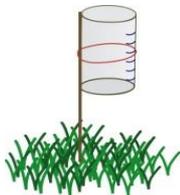
Weather conditions	Visibility in km
very clear	50 km
clear	20 km
slightly hazy	10 km
hazy	4 km
light fog	2 km
dense fog	100 m

My measuring points:

Name	Distance in km

7 Observation sheet for entering the measured values from my weather station



Measurement	Thermometer 	Barometer 	Weather vane 	Rain gauge 	Clouds and visibility 
Date					
1st day _____	°C			cm	
2nd day _____	°C			cm	
3rd day _____	°C			cm	
4th day _____	°C			cm	
5th day _____	°C			cm	
6th day _____	°C			cm	
7th day _____	°C			cm	