

Agree or Disagree?

Originally developed by Debbie Myers, Teaching Fellow, Durham University and AstraZeneca Primary Science College member.

Cards to generate discussion and to identify students' misconceptions about the weather. Cut out the cards and ask the students to place them on a Agree/Unsure/Disagree Continuum. Alternatively, read out the statement and ask the students to place themselves along a continuum – this could be the length of the classroom, or outside.

Suggested answers are available below.

As an extension exercise, students could be asked to look up evidence to support their answers, particularly for the 'unsure' cards. The quality and reliability of sources could also be discussed.

Answers for Teachers:

Water only evaporates from seas and oceans. **NO** – water evaporates from lots of other places as well – from puddles and tea cups to glaciers.

Sunshine is good for humans **Unsure** it helps us make Vitamin D; essential for healthy but it contains UVA and UVB that damage the skin and can cause cancer.

The weather helps plants to grow, develop, photosynthesize and to grow in new places. **Yes**

Water vapour is the gas that escapes from hot water. It cools quickly in the surrounding air and tiny water droplets condense to form steam. **yes**

Water is evaporating all the time but we cannot see it happening. **Yes**

Condensation describes the process in which water turns into a gas. **No** – it's the other way round!

Clouds form because more water vapour molecules are condensing into water droplets in the air than are evaporating. **Yes**

A cloud is full of activity: evaporation, condensation, wind and electrical charge moving around. **Yes**

Thunder is a sound effect caused by clouds moving apart when they get too big. **No** – thunder is the sound made by the air inside the lightning getting bigger very quickly.

Wind is when air moves across the surface of the Earth. **Yes**

We can see the wind. **NO** we can only see the effect of the wind.

Winds are useful to nature, dispersing seeds and clearing dead leaves enabling new shoots to grow towards sunlight. **Yes**

Winds helped sailors to travel around the world in sailing ships but modern transport doesn't use the wind. **NO** aircraft pilots often make use of strong winds – or avoid them.

Winds are useful in play and sports: flying kites, windsurfing, kitesurfing, parascending, sailing and parachuting. **yes**

Winds can be very dangerous causing damage to trees, buildings, bridges and sailing craft during storms. **yes**

Clouds are made of water vapour. **NO** clouds are made of water droplets which we can see!

Evaporation is when liquid water turns into a gas (vapour). **Yes**

The weather doesn't really affect me – **NO** the weather affects almost every person, every day. It affects what we eat, wear, how we travel, sport and even how we feel.

The winds around a hurricane are much faster than the winds around a tornado. **Unsure** – it depends on how powerful a system you are looking at. However, faster wind speeds have been recorded around tornadoes – up to 300 miles an hour.

The weather forecast is always right – **point for discussion!**

It rains more in the winter than it does in the summer – **UNSURE** – it depends on where you are, have a look at the Met Office website at <http://www.metoffice.gov.uk/education/teachers/temperate-climate-averages> or <http://www.metoffice.gov.uk/climate/uk/averages/ukmapavge.html> or you could use the data available at <http://www.metoffice.gov.uk/climate/uk/stationdata/> to look at somewhere close to you.

We don't get tornadoes in the UK – **NO** we actually get more per unit area than they do in tornado alley in the USA, they are just usually very small and don't last very long. (see <http://www.ncdc.noaa.gov/img/climate/research/tornado/globdist.jpg> and from Wikipedia: The United States averages about 1,200 tornadoes per year. The Netherlands has the highest average number of recorded tornadoes per area of any country (more than 20, or 0.00048 per km² annually), followed by the UK (around 33, or 0.00013 per km², per year), but most are small and cause minor damage. In absolute number of events, ignoring area, the UK experiences more tornadoes than any other European country).

We can have hurricanes in the UK **NO** hurricanes occur in the Tropics. However, we can have hurricane force winds – that's winds blowing faster than 73 miles per hour.

We can't change the weather - **unsure** People have always tried to change the weather – whether with rain dances or prayers. Recently, scientists have tried making clouds to try to influence where it rains. Billions of dollars were spent trying to stop it raining on the opening and closing ceremonies of the Beijing Olympics. There is some evidence that this 'cloud seeding' works in the USA, where they use it to bring snow to the skiing resorts.

Water only evaporates from seas and oceans.	Sunshine is good for humans.	The weather doesn't really affect me.	The weather helps plants to grow, develop, photosynthesize and to grow in new places.
Water vapour is the gas that escapes from hot water. It cools quickly in the surrounding air and tiny water droplets condense to form steam.	Water is evaporating all the time but we cannot see it happening.	Condensation describes the process in which water turns into a gas.	Clouds form because more water vapour molecules are condensing into water droplets in the air than are evaporating.
A cloud is full of activity: evaporation, condensation, wind and electrical charge moving around.	Thunder is a sound effect caused by clouds moving apart when they get too big.	Wind is when air moves across the surface of the Earth.	We can see the wind.
Winds are useful to nature, dispersing seeds and clearing dead leaves enabling new shoots to grow towards sunlight.	Winds helped sailors to travel around the world in sailing ships, but modern transport doesn't use the wind.	Winds are useful in play and sports: flying kites, windsurfing, kitesurfing, parascending, sailing and parachuting.	Winds can be very dangerous causing damage to trees, buildings, bridges and sailing craft during storms.
Clouds are made of water vapour.	Evaporation is when liquid water turns into a gas (vapour).	The winds around a hurricane are much faster than the winds around a tornado.	The weather forecast is always right.
It rains more in the winter than it does in the summer.	We don't get tornadoes in the UK.	We can have hurricanes in the UK.	We can't change the weather.