

# Question: What is so special about water? Could we survive without water?

## National Curriculum Link

**Science Y4: States of Matter**

KS2 Science Working Scientifically

### IB Learner Profile Links

Inquirers – Nurture skills for research and curiosity

Knowledgeable – Develop conceptual understanding and engage with issues and ideas

Communicators – Express yourself confidently and work cooperatively to solve problems

Thinkers – Use critical and creative thinking skills

Reflective – Consider the wider world and our own ideas and experience

Risk-takers – Work independently and cooperatively to explore ideas and innovative strategies

### Prior Skills – Y2 (Everyday Materials)

- Know the difference between an object and the material from which it is made
- Identify and name a range of everyday materials (wood, plastic, metal, water, rock, brick, paper, glass)
- Describe the simple physical properties of a variety of everyday materials
- Compare and classify a variety of materials based on their simple physical properties
- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, rock, brick, paper and cardboard for particular uses
- Explore and know how the shapes of solid objects made from some materials can be changed (e.g. by squashing, bending, twisting and stretching.)
- Explore changes of solids when they are heated and cooled and usefulness (e.g. bread)
- Ask questions and

### New Skills – Y4

- compare and group materials together, according to their state of matter; whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled and explain what happens
- Measure or research the temperature at which different materials change state in degrees Celsius (°C)
- Use measurements to explain changes to the state of water and link to the water cycle.
- Identify the part played by evaporation and condensation in the water cycle
- Investigate the rate of evaporation with temperature.
- Plan and set up a simple fair test to make comparisons
- Plan a fair test and isolate variables and explain why it was fair and explain which variables have been isolated
- Suggest improvements and predictions linked to questions
- Decide which information needs to

### Future Skills – Y5

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- Know that some materials will dissolve in liquid to form a solution,
- Describe how to recover a substance from a solution
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- Can they use a graph to answer scientific questions
- Ask a variety of types of questions
- Plan and carry out a scientific enquiry to answer questions, including recognising and controlling variables.
- Make predictions based on scientific knowledge
- Take measurements, use a range of scientific equipment, read scales accurately with increasing accuracy, repeat readings and find averages for more accurate results.
- Record data and results

<p>decide how they might find answers to them.</p> <ul style="list-style-type: none"> <li>• Explore, using the senses and make and record observations and measurements.</li> <li>• Use first-hand experience and simple information sources to answer questions.</li> <li>• Communicate findings in a variety of ways including diagrams, pictures, charts, tables and ICT to record their observations</li> <li>• Use scientific words to describe what they have observed and measured</li> <li>• Make simple predictions and make links to prior learning or something they have observed before</li> <li>• Recognise when a test is unfair</li> <li>• Describe their observations and use them to draw conclusions and answer questions</li> </ul>	<p>be collected and decide which is the best way for collecting it</p> <ul style="list-style-type: none"> <li>• Use their findings to draw a simple conclusion</li> <li>• Take repeated measurements for accurate results</li> </ul>	<p>using scientific diagrams, present data in tables, including repeated readings</p> <ul style="list-style-type: none"> <li>• Draw bar charts and line graphs to show results then use to identify patterns</li> <li>• Draw conclusions and relate conclusions to scientific knowledge</li> </ul>
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### **Knowledge, Skills and Understanding for topic area**

- compare and group materials together, according to their state of matter; whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled and explain what happens
- Measure or research the temperature at which different materials change state in degrees Celsius (°C)
- Use measurements to explain changes to the state of water and link to the water cycle.
- Identify the part played by evaporation and condensation in the water cycle
- Investigate the rate of evaporation with temperature.

### **Knowledge, Skills and Understanding for Working Scientifically**

- Plan and set up a simple fair test to make comparisons
- Plan a fair test and isolate variables and explain why it was fair and explain which variables have been isolated
- Suggest improvements and predictions linked to questions
- Decide which information needs to be collected and decide which is the best way for collecting it
- Use their findings to draw a simple conclusion
- Take repeated measurements for accurate results

### **Challenge**

- Can they group and classify a variety of materials according to the impact of temperature on them?
- Can they explain what happens over time to materials such as puddles on the playground or washing hanging on a line?
- Can they relate temperature to change of state of materials?

## **Resources**

- Clear bottle (to fill with water)
- Mixture of S, L, G – Plasticene, Brick/stone, sand, salt, marbles, rice, flour, sugar
- Clear plastic measuring jugs/containers
- Magnifying lenses or hand held magnifiers
- Cotton wool
- Sawdust
- Sponge/ foam rubber
- Viscous and non-viscous liquids including: water, orange juice, cooking oil, toothpaste, washing up liquid.
- Stop watches
- Evaporating equipment
- kettle or saucepan for boiling water
- apparatus for measuring volume of liquids
- thermometers Ice cubes
- Butter, chocolate, candle wax,
- Hair dryer, battery-powered fan
- Data logging equipment –temperature sensor
- Gravel, soil, dried peas, teabags
- Filter paper
- Range of different sized sieves

## **Suggested Quality Texts**

Non-fiction: Books in topic box and school library

Fiction: The Mystery of the Melting Snowman by Florence Parry Heide

## **Website/Apps**

BBC science clips for teacher use

<http://www.bbc.co.uk/learningzone/clips/changes-of-the-state-of-water/1858.html>

Water cycle Called Rainy days section from 9 mins to 12 mins to explain cycle.<http://www.tes.co.uk/teaching-resource/Teachers-TV-What-Stuff-Does-6047888/>

[http://teacher.scholastic.com/activities/studyjams/water\\_cycle/](http://teacher.scholastic.com/activities/studyjams/water_cycle/)

## **Extended Writing Opportunities**

Research about Global Warming

Newspaper report about the effects of Global Warming

An explanation of the water cycle

The story of the water droplet with key scientific vocabulary

Create an information leaflet/ non chronological report about the importance of water.

## **Numeracy Skills**

Standard units; ml, l, minutes, seconds. Measure the volume of liquids by reading scales to nearest division labelled and unlabelled. Time: measuring time on a stopwatch and use to draw Bar charts 1:1, 1:2, 1:5 & 1:10 scale. Frequency table. There is a natural link with children's maths work on temperature.

## **Wow starter/experience**

United Utilities visit and workshop based on the Water cycle and cleaning water.

Visit Southport Eco Centre or look at opportunities at Martin Mere.

## **Cross Curricular Links/ enquiry time activities:**

Art: Create different shapes with clay or plasticine and put water into the mould and freeze it.

Science/ICT: Separating by sieving: Big beans from small beans, lentils from rice, rice from salt, sand from stones, solid particles in oven dried soils.

Create a dissolving Race. Each team has a plastic bottle half full of water, and salt. One spoonful is added the teams see who can make the salt dissolve fastest and record results with a timer.

Literacy/ICT: Create a comic strip to storyboard about the journey of water in the water cycle. Create an

information leaflet or powerpoint presentation about the importance of water, using the Internet for research.  
PE/Music: Create movements linked to the changes water goes through during the water cycle and link movements to music/ sounds created with musical instruments.  
Music: Listen to the water cycle song. Ch add actions to song to show understand each part of the water cycle.  
<http://havefunteaching.com/songs/science-songs/water-cycle-song/>