**Pushes and pulls**

When Vikings travelled across the sea in their longships the wind filled the sails and pushed the boat along. If there was no wind the Vikings pulled the oars to move the ship.

- What other things can we move using pushes and pulls?
- Pushes and pulls can make things move. What other things can pushes and pulls do?

**Habitats and environment**

Vikings traded furs from reindeer, wolves and foxes to people in the Mediterranean for silk and other goods. Animals like reindeer live in the far north and the Arctic.

- Can we find out what the environment is like in the Arctic compared to the Mediterranean?
- Why do you think animals in the Arctic have thicker, softer fur than animals in the Mediterranean?
- Can you think of any other differences between animals in the Arctic and the Mediterranean?

**Seasonal change**

In the far north of Norway, above the Arctic Circle, it is always light (daytime) in summer and always dark (night-time) in winter. In Denmark the seasons are more like Britain, with long nights in winter and long days in summer.

- What are the differences between the weather in summer and in winter in Britain?
- What do you think the winter weather is like in northern Norway?
- Vikings travelled south as far as the Mediterranean. What differences in weather do you think they would find as they travelled south?
Separating mixtures

Nowadays, a machine called combined harvester cuts corn at harvest time and separates the grain from the straw and chaff. In Viking times this had to be done by hand using a flail in a process known as threshing. The straw is made of big pieces, and the chaff and grain out of small pieces. The chaff is much lighter than the grain.

Can we separate a mixture made of three things in a way similar to threshing? One part of the mixture is made of big pieces (like the straw), one made of small but light pieces (like the chaff) and one made of small but heavy pieces (like the grain). Once you have separated the big pieces, you need to think of a different way to separate the smaller pieces from each other.

Exercise and healthy lifestyles

Vikings were great sailors and often rowed their longships up rivers and across the sea. They also liked sports and tests of strength like lifting heavy rocks and throwing spears.

1. How does exercise affect your pulse and breathing rate?
2. Why are they affected?
3. What else happens to your body when we exercise?
4. How would you explain what your pulse is to somebody who didn’t know?

Light reflection from surfaces

Vikings were very skilled at making gold, silver and bronze jewellery. These metals can be polished to make them very shiny; some can be polished enough to use them as mirrors.

1. When we look into a mirror what is it we are actually seeing?
2. What other materials can we find that are good for making mirrors?
3. The image in a metal mirror can sometimes be wobbly, especially if the mirror has been dented. Why do you think this is?

Light and shadows

Vikings used sun shadow boards to find their way when travelling. These devices were a bit like a sundial: they used shadow to find the direction they were travelling in, but they only worked on sunny days.

1. Which materials cast good shadows?
2. Can we use shadows for things other than telling time or direction?

The Earth, sun and moon

Vikings travelled long distances by sea but were not scared of falling off the edge of the Earth, even though they did not know the Earth was spherical. They also thought the sun and moon were horse-drawn chariots that followed each other through the sky around the Earth.

1. The Vikings thought that the lands of the Earth were surrounded by a huge sea. How much of the Earth is land and sea?
2. Were the Vikings correct?
3. We now know that the Earth, sun and moon are different sizes. Can we make scale models of the Earth, sun and moon?

Conditions for growing plants

It is harder to grow crops in Scandinavia where Vikings come from because it is colder there. One of the reasons the Vikings came to Britain is because it is easier to grow food here.

1. Can we find out where common food plants that we eat today are grown (e.g., lemons, plums, barley, potatoes)?
2. Can we make a table showing whether plants can grow in colder places like Norway or only in hotter places like the Mediterranean?
3. What other things and conditions do plants need to grow?

Function of the skeleton

Viking warriors trained a lot for battle. Their training involved getting used to fighting when wearing chainmail armour and other protective equipment.

1. Chainmail armour is like the skeleton of some animals. Which animals have their skeleton outside their bodies?
2. Not all animals have a bony skeleton. Can we find out what other types of skeleton some animals have?
3. Your skeleton is also like armour but protects organs inside your body. Which parts of your skeleton protect organs in your body?

Changes in materials

The Vikings lived in an ever-changing world. In winter it was cold and the land was covered in snow and ice, in summer it was much warmer and the land was green with plants. These changes would have affected how Vikings lived their lives.

1. Think of a way to measure how hard butter is. How does the hardness change as the temperature changes?
2. What is the difference between drying laundry in winter and in summer?

Comparing and grouping rocks

Vikings used rocks for sharpening weapons, grinding grain into flour and as an abrasive for smoothing hard skin or rough wood.

1. What do you think makes rocks good for sharpening, grinding and smoothing?
2. Can we select and test different rocks, grouping them into rocks suitable for each job?

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Balanced forces

Vikings loved to play games of strength and skill, for example lifting heavy objects or tug of war. When both teams in a game of tug of war are pulling with the same strength they stay still: we say the forces are balanced. What happens when the forces become unbalanced?

Can you describe, using balanced and unbalanced forces, how a Viking lifts a heavy log and holds it still over his head?

Contact forces

Viking longships were long and narrow and didn’t sink far into the water. They were the fastest ships of that time. If Vikings rowed up a river but got to a stretch that was too shallow or narrow for rowing, they would take their ship out of the water and pull it across the land until they got to a suitable part for rowing again.

Can we make a model to investigate boat shapes and find out which shapes float best in water?

Can we investigate which surfaces are best for pulling objects across? How does the weight of an object affect how easy or hard it is to pull it across a surface?

What forces are acting in these situations?