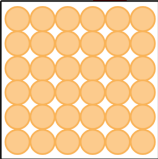
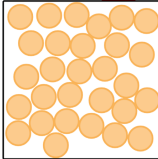
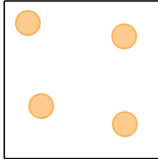














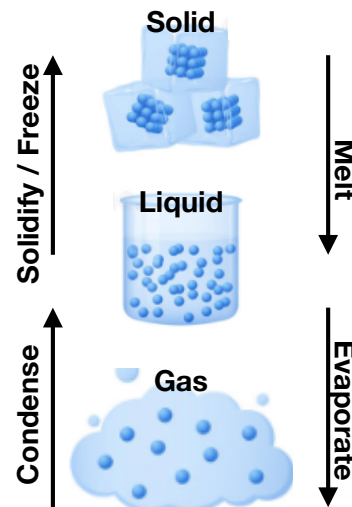
# Year 4 Science Knowledge Organiser - States of Matter

## Knowledge: Solids, Liquids and Gases

Solid:	Liquid:	Gas:
		
<ol style="list-style-type: none"> <li>1. Particles are packed close together</li> <li>2. Particles are arranged in a regular pattern</li> <li>3. Particles do not move freely</li> <li>4. Particles are held together by bonds</li> <li>5. All solids are hard in nature</li> </ol>	<ol style="list-style-type: none"> <li>1. Particles are packed close together but not as tight as solids</li> <li>2. Particles are arranged randomly</li> <li>3. Bonds hold the particles but not as strongly as in solids so they can also move freely</li> <li>4. Take the shape of the container</li> </ol>	<ol style="list-style-type: none"> <li>1. Particles are very far apart</li> <li>2. Particles move around randomly</li> <li>3. Takes the shape of the container</li> <li>4. Can be compressed and squeezed</li> </ol>
Examples:  Ice.  Metal.  Lego.  Rocks	Examples:  Juice.  Water.  Tea.  Soup	Examples:  Oxygen.  Clouds.  Air in balloons.  Steam.

## Changing stages of matter

<b>Melting</b>	Solid	+ heat	Liquid
<b>Evaporation</b>	Liquid	+ heat	Gas
<b>Condensation</b>	Gas	+ cold	Liquid
<b>Freezing / Solidifying</b>	Liquid	+ cold	Solid



Did you know...

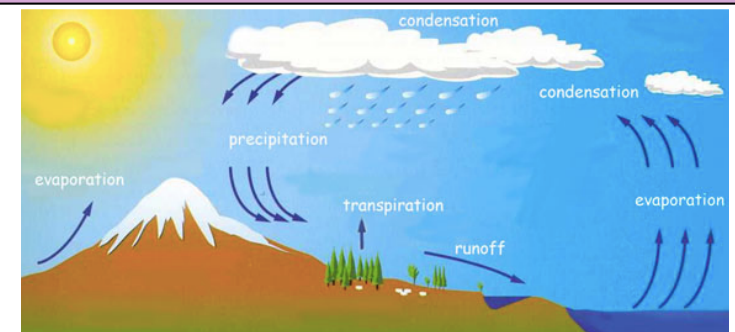
Beam is another state of matter.

Scientists do not fully understand them but the particles act together to achieve something, whereas solid, liquids or gases move around in a meaningless way.

## Vocabulary

1. Solid	Substance that stays same shape and turns to a liquid when heated.
2. Liquid	Substance that flows freely but is a constant volume.
3. Gas	Substance that has no fixed shape and no fixed volume.
4. Compress	Flattened by pressure i.e. from your hand.
5. Mass	Amount of matter that makes up an object. Always stays the same but weight changes with changes in gravity.
6. Volume	Amount of space occupied by an object.
7. Particles	Small piece or portion of a substance.
8. Water Vapour	Gaseous state of water produced by evaporation.
9. Evaporation	Occurs when liquid changes to a gas phase through heating by the sun.
10. Condensation	The conversion of water vapour or gas to a liquid. It can also be seen when water collects as droplets on a cold surface.
11. Heating	States of matter (solid, liquid or gases) expand when heated because particles move faster and therefore the volume increases.
12. Cooling	Decreasing the temperature of a substance.
13. Precipitation	Rain, snow, sleet or hail that falls to the ground.
14. Groundwater	Water held underground in soil or in pores, and crevices in rocks.

## Can you explain the water cycle to your partner...



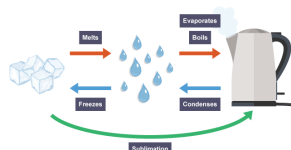
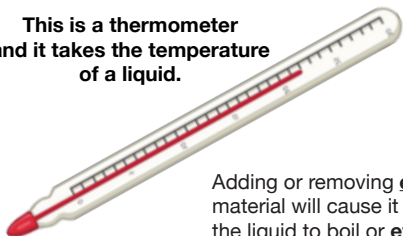
# Year 4 Science Skills Knowledge Organiser - States of Matter

## Key Concepts and what they mean

1. Physics	Physics is the study of energy and matter in space and time and how they are related to each other.
2. Chemistry	Chemistry deals with the properties of substances, the transformations they undergo, and the energy that is released or absorbed during these processes. For example, when plants use sunlight to produce energy (or food for itself).
3. Data Collection	Data collection is the process of gathering and measuring information to answer a question. For example, recording living and non living things to investigate whether numbers change depending on the weather.
4. Cause and effect	Cause and effect is the relationship between events or things, where one is the result of the other or others. For example, the weather gets colder and there is less food around, so animals hibernate.
5. Environmental	Environmental relates to the environment around us at Old Fletton.

## Taking Temperatures

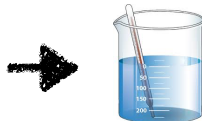
This is a thermometer and it takes the temperature of a liquid.



Adding or removing **energy** from a material can change its state. Heating a solid material will cause it to **melt** from a solid to a liquid. Continued heating will cause the liquid to boil or **evaporate** to form a gas.

## Steps to Success - Using a thermometer

1. Do not touch or hold the reservoir or the bobble end of the thermometer - it will be effected by your body or hand temperature
2. Place the reservoir end in the liquid
3. Don't touch and count to 20
4. Take out and quickly look at the number next to the coloured liquid
5. It will move up or down as the air either heats or cools it. The first number seen is correct



## Comparing Data - Conclusion

A conclusion is a short paragraph that discusses the overall results of an experiment and explains whether the prediction was correct or not.

My prediction was ..... and my results support / dispute this. I think the results show that..... because .....

## Literacy links to this topic

Stories that relate to the topic of 'States of Matter' are:



Itch by Simon Mayo  
Charlie and Chocolate Factory by Roald Dahl

These stories help you to gain a greater understanding of changing states of matter and may spark some questions that you might want to ask in your next science lesson!

## INDEPENDENT VARIABLE

VARIABLE THAT IS CHANGED

Amount of Water



## DEPENDENT VARIABLE

VARIABLE AFFECTED BY THE CHANGE

Size of Plant  
Number of Leaves  
Living or Dead?



## Experiment Steps to Success - Fair Testing

A fair test is a test which controls all but one variable when attempting to answer a scientific question. Only changing one variable allows the person conducting the test to know that no other variable has affected the results of the test.

To help remember how to conduct your fair test, learn the mnemonic:



For example, testing how quickly three items - marshmallow, chocolate and wax - melt over time.

**Change 1 thing:** the item you are melting  
**Measure or observe:** melting / temperature  
**Same for everything else:** heating, beaker, size of item, thermometer