

NATIONAL CURRICULUM OBJECTIVE:

PUPILS SHOULD BE TAUGHT TO:

- **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, AND 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**
- **DEMONSTRATE THAT DISSOLVING, MIXING AND CHANGES OF STATE ARE REVERSIBLE CHANGES**
- **EXPLAIN THAT SOME CHANGES RESULT IN THE FORMATION OF NEW MATERIALS, AND THAT THIS KIND OF CHANGE IS NOT USUALLY REVERSIBLE, INCLUDING CHANGES ASSOCIATED WITH BURNING AND THE ACTION OF ACID ON BICARBONATE OF SODA**

WORKING SCIENTIFICALLY:

- **PLANNING DIFFERENT TYPES OF SCIENTIFIC ENQUIRIES TO ANSWER QUESTIONS, INCLUDING RECOGNIZING AND CONTROLLING VARIABLES WHERE NECESSARY**
- **TAKING MEASUREMENTS, USING A RANGE OF SCIENTIFIC EQUIPMENT, WITH INCREASING ACCURACY AND PRECISION, TAKING REPEAT READINGS WHEN APPROPRIATE**
- **RECORDING DATA AND RESULTS OF INCREASING COMPLEXITY USING SCIENTIFIC DIAGRAMS AND LABELS, CLASSIFICATION KEYS, TABLES, SCATTER GRAPHS, BAR AND LINE GRAPHS**
- **USING TEST RESULTS TO MAKE PREDICTIONS TO SET UP FURTHER COMPARATIVE AND FAIR TESTS**
- **REPORTING AND PRESENTING FINDINGS FROM ENQUIRIES, INCLUDING CONCLUSIONS, CAUSAL RELATIONSHIPS AND EXPLANATIONS OF AND DEGREE OF TRUST IN RESULTS, IN ORAL AND WRITTEN FORMS SUCH AS DISPLAYS AND OTHER PRESENTATIONS**
- **IDENTIFYING SCIENTIFIC EVIDENCE THAT HAS BEEN USED TO SUPPORT OR REFUTE IDEAS OR ARGUMENTS.**

KEY VOCABULARY:

1. **SOLUBLE** A SUBSTANCE THAT WILL DISSOLVE IN WATER
2. **INSOLUBLE** A SUBSTANCE THAT WILL NOT DISSOLVE IN WATER
3. **SATURATION** THE POINT AT WHICH NO MORE SOLUTE CAN BE DISSOLVED
4. **SOLUTION** A SOLUBLE SOLID IS DISSOLVED IN LIQUID TO FORM A SOLUTION
5. **FILTRATION** THE COLLECTION OF LARGER PARTICLES IN A MIXTURE
6. **BOILING** THE PROCESS BY WHICH MOLECULES OF A LIQUID CHANGE TO VAPOUR MUCH FASTER CHANGE THAN EVAPORATION
7. **CONDENSING** THE CHANGE OF VAPOUR INTO A LIQUID
8. **EVAPORATION** CHANGE FROM A LIQUID TO A VAPOUR
9. **FREEZING** THE CHANGE OF A LIQUID TO A SOLID
10. **MELTING POINT** THE POINT AT WHICH A SOLID SUBSTANCE LIQUEFIES
11. **CHEMICAL CHANGE** ONE WHERE THE MOLECULAR STRUCTURES OF THE COMBINED SUBSTANCES ARE BROKEN DOWN AND RECOMBINED TO
12. **MAKE A NEW SUBSTANCE**
13. **PHYSICAL CHANGE** WHERE THE MOLECULAR STRUCTURES OF THE COMBINED SUBSTANCE STAY SEPARATE, ALLOWING SEPARATION TO OCCUR
14. **REVERSIBLE CHANGE** A PHYSICAL CHANGE THAT WE CAN UNDO
15. **IRREVERSIBLE CHANGE** A PHYSICAL CHANGE THAT WE CANNOT UNDO

CONTEXT

LAERTES SLASHES HAMLET WITH HIS POISONED BLADE. IN THE ENSUING SCUFFLE, THEY SWITCH WEAPONS, AND HAMLET WOUNDS LAERTES WITH HIS OWN POISONED SWORD. GERTRUDE COLLAPSES AND, CLAIMING SHE HAS BEEN POISONED, DIES. IN HIS DYING MOMENTS, LAERTES RECONCILES WITH HAMLET AND REVEALS CLAUDIUS'S PLAN.



WHAT WEAPONS DID THEY USE IN MEDIEVAL TIMES?

NOW, PROBABLY ONE OF THE BEST PARTS OF HISTORY IS LEARNING ALL ABOUT HOW PEOPLE OF THIS TIME FOUGHT. YOU MIGHT BE THINKING "WHAT WEAPONS DID THEY USE IN MEDIEVAL TIMES?" WELL, AS ONE OF THE CRUELEST TIME PERIODS IN OUR HISTORY, LOADS OF DANGEROUS WEAPONS MADE AN APPEARANCE. IN PARTICULAR, WE MAINLY ASSOCIATE THESE WEAPONS WITH THE MIDDLE AGES:

- **SWORDS.**
- **LANCES.**

YEAR 5 PROPERTIES AND CHANGES OF MATERIALS

- **SPEARS.**
- **AXES.**
- **MACES.**
- **CROSSBOWS/LONGBOWS.**
- **DAGGERS.**
- **TREBUCHETS TO GUNS.**
- **CALTROPS.**

BUT NO WEAPON HAS A STRONGER ASSOCIATION WITH THE MIDDLE AGES THAN THE SWORD. FROM NOBLE KNIGHTS TO ROGUE VIKINGS, SWORDS WERE POPULAR WEAPONRY. FOR THE MAJORITY OF THE MIDDLE AGES, BOTH COMMON AND ELITE SOLDIERS MADE EXPLICIT USE OF SWORDS. ALTHOUGH THERE WERE MANY VARIANTS BETWEEN SIZES OF BLADE, HILT, AND POMMEL.

ONCE WE CAME TO THE THIRTEENTH CENTURY, WE SAW MASSIVE DIFFERENCES IN ITS DESIGN. ITS BLADES BEGAN TO GET NARROWER, SHARPER AND, MOST IMPORTANTLY, MORE SOPHISTICATED. AT THIS POINT IN TIME, THE ARMOUR WAS MUCH TOUGHER THAN BEFORE. THEREFORE, THE SLASHING STYLE OF THE SWORD WAS BASICALLY USELESS AGAINST IT. NOW, SOLDIERS ALIKE WERE USING A TRUSTING METHOD WHICH COULD HELP PIERCE THEIR ENEMIES.

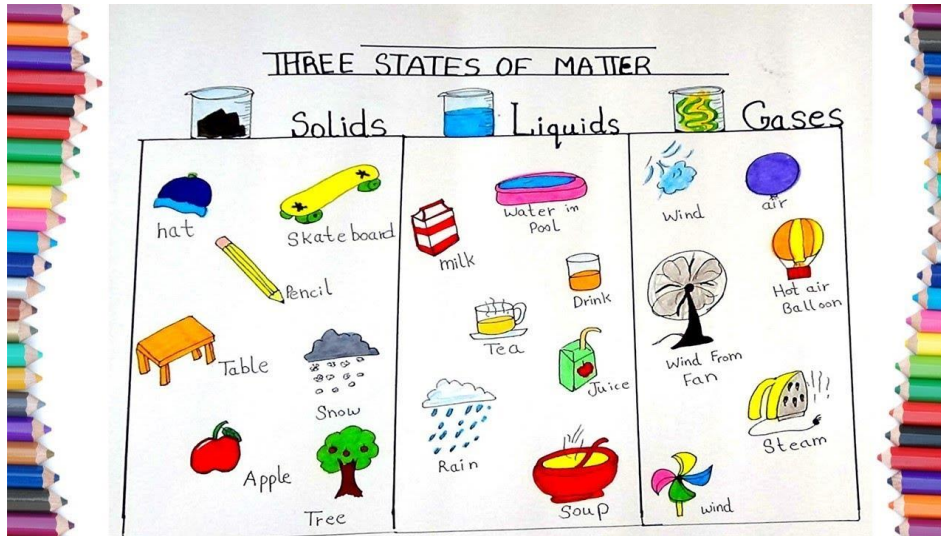
AS WELL AS SWORDS, LOTS OF MILITARIES ACROSS EUROPE USED LANCES AND SPEARS. ALTHOUGH VERY SIMILAR IN DESIGN, THE TWO SERVED OPPOSITE PURPOSES IN MEDIEVAL TIMES. MAINLY, A SPEAR WAS CAPABLE OF FIGHTING IN SINGLE COMBAT AS IT WAS SO VERSATILE. A LIGHT, SHORT WEAPON, THE HOLDER COULD CARRY IT FOR LONG PERIODS OF TIME.



LESSON 1

INTRODUCE THE TOPIC "PROPERTIES AND CHANGES OF MATERIALS" AND ASK CHN TO DRAW WHAT THEY ALREADY KNOW ABOUT THE THREE STATES OF MATTER.

ACTIVITY 1 DIVIDE THE PAGE INTO 3 OR USE THE TEMPLATE BELOW. CHN TO DRAW AND LABEL 5 6 ITEMS IN EACH COLUMN.



ASK THE CHILDREN TO DISCUSS WHAT THEY KNOW ABOUT SOLIDS, LIQUIDS AND GASES. WHAT ARE THE PROPERTIES OF THESE STATES? HOW CAN YOU TELL THE DIFFERENCE BETWEEN A SOLID, LIQUID AND GAS? CAN YOU TURN LIQUIDS TO SOLIDS? GASES TO LIQUIDS?

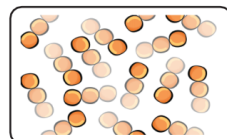
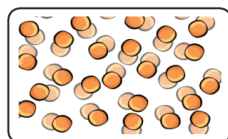
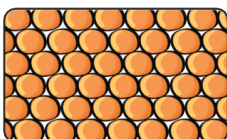
USE BBC BITESIZE VIDEO TO RECAP ON ALL 3 STATES OF MATTER:

<https://www.bbc.co.uk/bitesize/topics/zgwc9cf/articles/zngfp4j>


ACTIVITY 2 USING THE PAIR ACTIVITY WORD CARDS AND PAIR ACTIVITY SHEET, CHILDREN WORK TOGETHER TO SORT THE MATERIALS INTO SOLIDS, LIQUIDS AND GASES. ADD THESE TO ACTIVITY 1

WHAT ARE THE PROPERTIES OF SOLIDS, LIQUIDS AND GASES? HOW CAN WE CHANGE THESE STATES OF MATTER? BOILING/FREEZING ETC. LOOK AT THE DIAGRAM BELOW.

PLENARY CHN TO LABEL AND EXPLAIN AND ROLE PLAY BEING A SOLID/LIQUID AND GAS.



REMINDE THE CHN OF THE LIQUID ON THE SWORD. CLAUDIUS CONVINCES LAERTES TO PUT POISON ON THE TIP OF HIS SWORD TO CUT HAMLET IN THE DUEL.

	<p>Solids</p> 
	<p>Liquids</p> 
	<p>Gases</p> 

ACTIVITY 1

oxygen

ice cubes

**carbon
dioxide**

gold

brick

water

blood

cola

apple

sand

butter

milk

wood

honey




petrol

soup

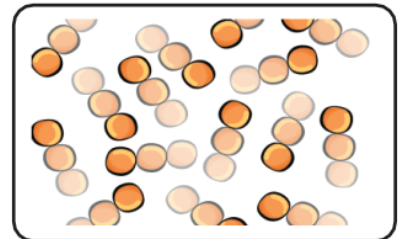
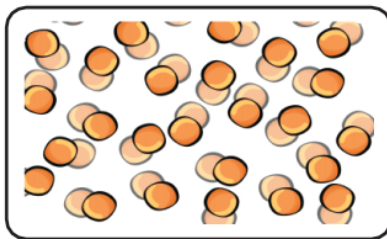
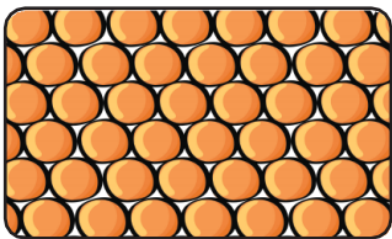
steam

wind

ACTIVITY 2
ANSWERS

Solids 	Liquids 	Gases 
ice cubes gold brick apple sand butter wood	water blood cola milk honey petrol soup	oxygen carbon dioxide steam wind

ROLE PLAY SOLID, LIQUID AND GAS HANDOUT



LESSON 2 I CAN DESCRIBE THE PROPERTIES OF MATERIALS USING SCIENTIFIC VOCABULARY.

RECAP ON PREVIOUS LEARNING: PARTNER TALK WHAT ARE SOLIDS, LIQUIDS AND GASES? CAN YOU NAME SOME EXAMPLES? CAN YOU EXPLAIN THE STRUCTURE OF SOLID PARTICLES? HOW ARE THEY DIFFERENT FROM LIQUIDS OR GASES? RECAP ROLE PLAY AND ACTIVITY COMPLETED IN BOOKS.

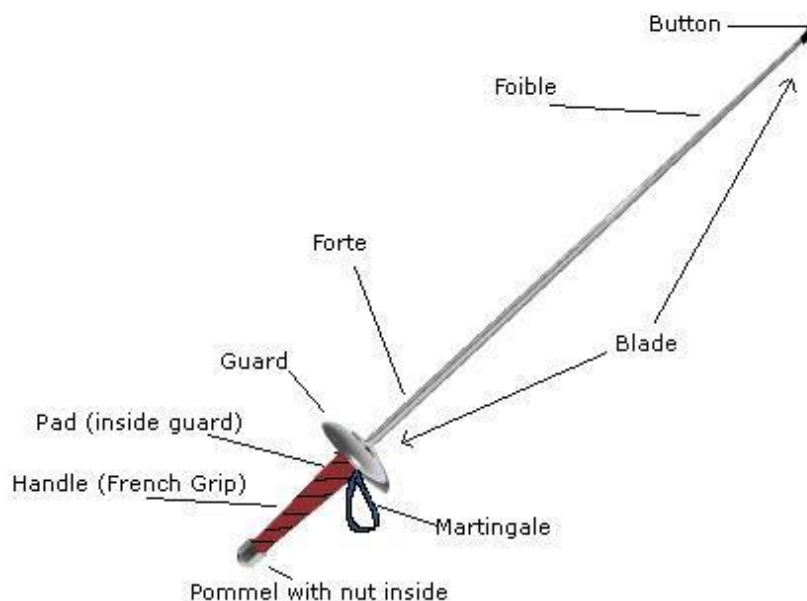
ACTIVITY 1 CHN TO WRITE DOWN AS MANY MATERIALS THEY CAN THINK OF ON THEIR WHITEBOARDS.

EXPLAIN THAT IN THIS LESSON, THEY ARE GOING TO BE THINKING ABOUT THE PROPERTIES OF MATERIALS AND HOW THOSE PROPERTIES MAKE THEM SUITABLE FOR CERTAIN JOBS.

ACTIVITY 2 WHAT MATERIALS ARE THEIR HOUSES MADE FROM? STONE, BRICK, WOOD . WHY ARE THESE MATERIALS SUITED TO BUILDING HOUSES? REMIND THE CHILDREN OF THE TRADITIONAL TALE 'THE THREE LITTLE PIGS. WHICH HOUSE STOOD UP TO THE WOLF'S HUFFING AND PUFFING? WHY DO THEY THINK THAT WAS? **INTRODUCE THE WORD DURABLE TO THE CLASS.**

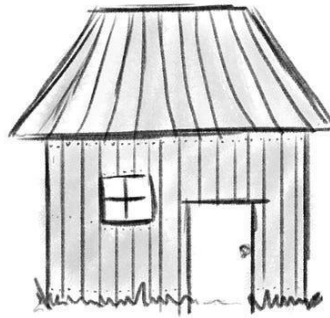
ACTIVITY 2 CHN TO FIND THE DEFINITIONS OF THESE WORDS. GIVE THE CHN THE HANDOUT OR A DICTIONARY TO SUPPORT THEM.

PLENARY WHAT MATERIAL WOULD BE BEST TO CREATE A SWORD? SHOW THE CHN THE IMAGE BELOW. CHN TO USE THE HANDOUT TO DESCRIBE ITS PROPERTIES. IT SHOULD BE .





HOUSE OF STRAW













HOUSE OF WOOD



HOUSE OF BRICKS

Properties of Materials

 flexible	 rigid	 soft
 hard	 shiny	 dull
 magnetic	 strong	 fragile

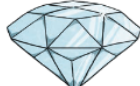
Knight Owl Teaching Resources 

Word to describe properties of materials	Definition
durable	
flexible	
absorbent	
waterproof	
magnetic	
permeable	
conductive	
transparent	
stretchy	

Handout

hard


not easily broken or pierced



A hard diamond.

squashy


easily crushed or squeezed



The play dough is squashy.

smooth


an even and regular surface



Some smooth pebbles.

absorbent


able to soak up liquid



The sponge is absorbent.

bumpy


uneven, raised patches



This shell is bumpy.

opaque


cannot be seen through



She is hidden by the opaque screen.

dull

lacking shine or brightness



The moth's wings are dull.

brittle


hard, but may break easily



The glass is brittle.

translucent


allowing some light to pass through



The screen is translucent.

rigid


unable to be bent or forced out of shape



Stone is rigid.

transparent

can be seen through



This glass is transparent.

soft


not firm to the touch



The kitten has soft fur.

flexible

able to bend



A flexible spring.

rough


uneven, irregular surface



The log has rough bark.

waterproof

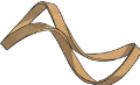
repels water and liquids



A waterproof coat.

elastic


springs back once stretched



An elastic band.

shiny


reflects light, smooth surface



A shiny silver spoon.

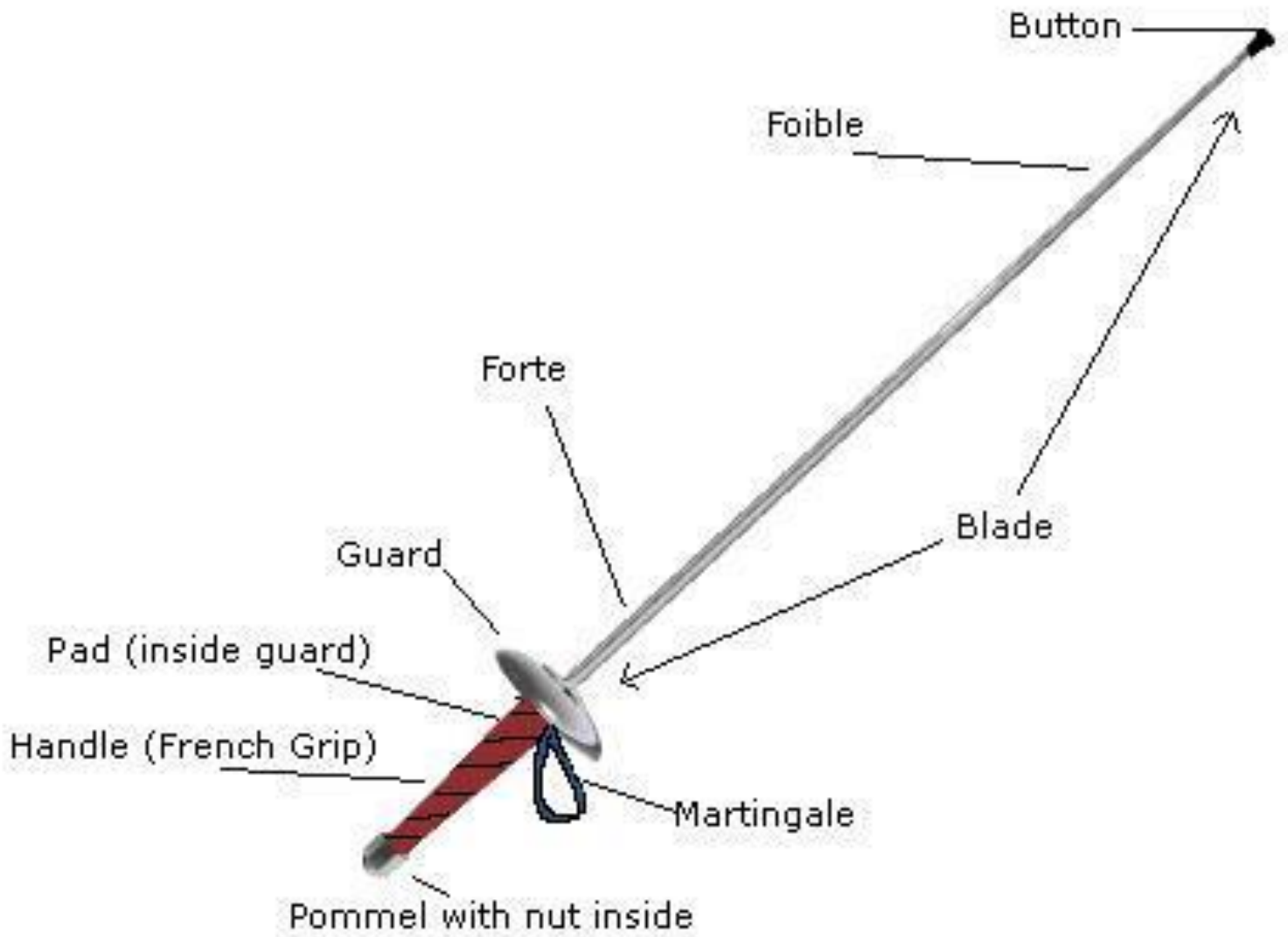
conductor

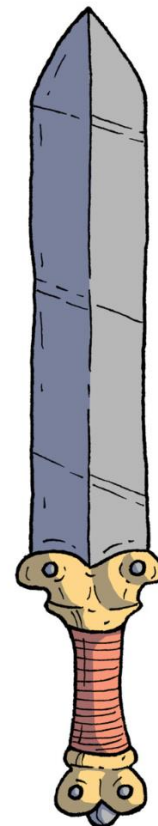
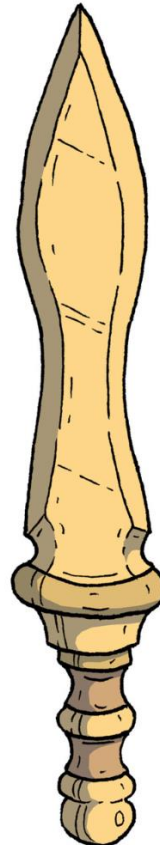
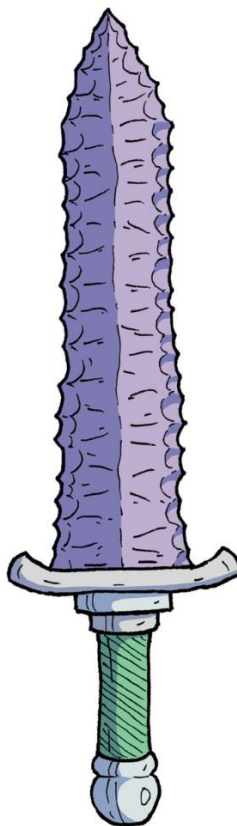
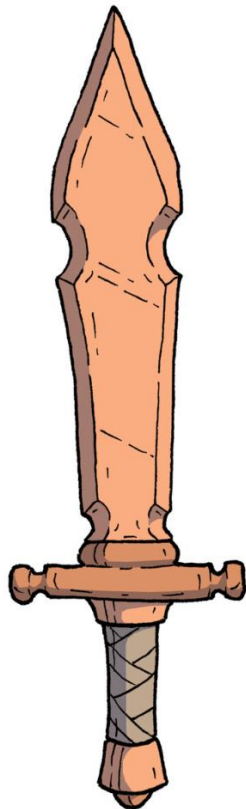
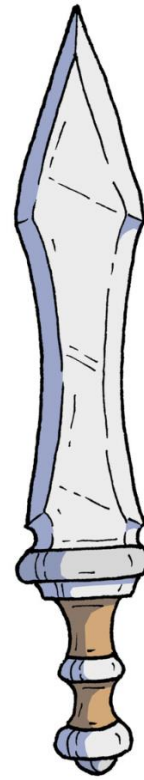
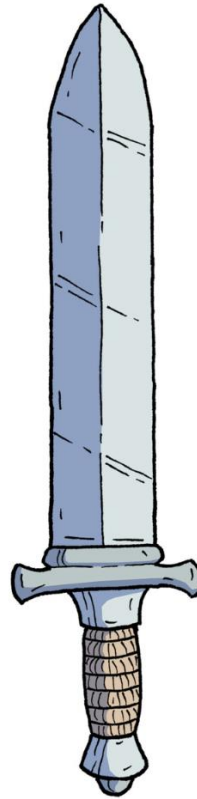
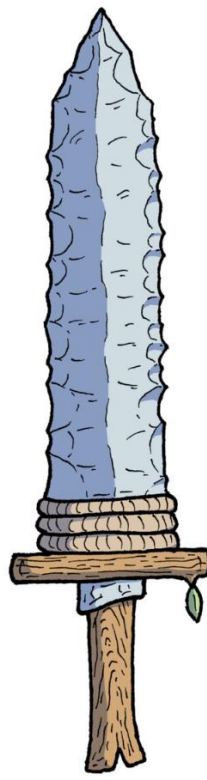
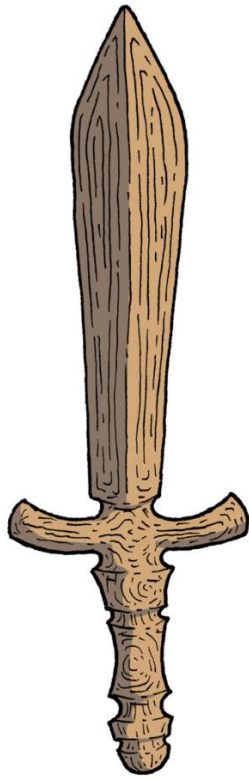
lets heat, electricity or sound to pass through it



Some metals are conductors of electricity.

Word to describe properties of materials	Definition
durable	not easily broken or worn out; tough and lasts a long time
flexible	easily bent without breaking
absorbent	soaks up liquids easily
waterproof	doesn't let water through; not absorbent
magnetic	having to do with magnets and the way they work
permeable	a material that lets a gas or liquid through it
conductive	A material that lets electricity or heat travel through it, is conductive
transparent	a material that lets light pass through it so that you can see objects on the other side is transparent
stretchy	able to make longer by pulling it without it breaking





LESSON 3 I CAN INVESTIGATE THE THERMAL INSULATION OF DIFFERENT MATERIALS.

RECAP ON PREVIOUS LEARNING; PARTNER TALK CAN YOU THINK OF ANY WORDS TO DESCRIBE THE PROPERTIES OF METAL?

HOW WOULD YOU DESCRIBE THE PROPERTIES OF FABRIC SOME CHILDREN MAY CALL FABRIC 'MATERIAL' SO TO AVOID AMBIGUITY, SHOW THEM A PIECE OF FABRIC . ENCOURAGE THE USE OF TERMINOLOGY TAUGHT IN THE PREVIOUS LESSON DURABLE, RIGID, FLEXIBLE ETC. TAKE FEEDBACK FROM THE CLASS.

HOW WOULD YOU DESCRIBE THE PROPERTIES OF A SWORD?

'WHAT IF' QUESTIONS. ENCOURAGE THE CHILDREN TO THINK OF THREE POSITIVES AND THREE NEGATIVES FOR EACH 'WHAT IF' QUESTIONS. FOCUS ON SWORDS. LOOKING AT A PLASTIC SWORD/WOODEN/METAL.

TEACH THE CHILDREN WHAT THE WORDS THERMAL INSULATORS MEANS. DISCUSS A PRACTICAL EXAMPLE OF THIS WHAT DO YOU DO TO KEEP WARM OUTSIDE ON A COLD DAY? WHICH MATERIALS WOULD MAKE GOOD INSULATORS? WHY? ESTABLISH THAT WEARING A COAT ACT AS A BARRIER BETWEEN THE COLD AIR OUTSIDE AND THE HEAT FROM YOUR BODY THUS KEEPING YOU FEELING WARM.

EXPLAIN TO THE CHILDREN THAT THE CUP OF POISON NEEDS TO STAY WARM IN ORDER FOR IT TO BE EFFECTIVE. IN SMALL GROUPS, CHOOSE ONE OF THE QUESTIONS TO EXPLORE AND PLAN OUT HOW YOU CAN INVESTIGATE IT.



- Are some **cups** better than others at keeping a drink **warmer** for longer?
- What is the best **material** to wrap a **cup** in to keep drinks **warmer** for longer?
- Are two **cups** (one inside another) better at keeping a drink **warmer** for longer?
- Does having a **lid on a cup** affect how long it stays **warm**?

COMPLETE ACTIVITY 1 AND PLAN OUT YOUR INVESTIGATION. CHOOSE ONE OF THE QUESTIONS ABOVE. IE QUESTION 2.



ONCE THE EXPERIMENTS HAVE TAKEN PLACE, DISCUSS THE RESULTS. DID THE CHILDREN PREDICT THE RESULTS CORRECTLY? WHAT DID THEY DISCOVER? WHAT MIGHT THEY DO DIFFERENTLY IF THEY WERE TO REPEAT THE INVESTIGATION?

PLENARY FINALLY, ASK THE CHILDREN TO FIND A PARTNER WHO WASN'T IN THEIR GROUP AND EXPLAIN THEIR FINDINGS AND DRAW CONCLUSIONS. ANSWER THE KEY QUESTION: WHICH MATERIALS MAKE THE BEST THERMAL INSULATORS?

Question



Variables

Fair test

Method

Prediction

Results

LESSON 4 I CAN COMPARE AND GROUP TOGETHER MATERIALS BASED ON THEIR RESPONSE TO MAGNETS.

ASK THE CHILDREN WHAT DOES THE WORD MAGNETIC MEAN? WHAT DO YOU KNOW ABOUT MAGNETS AND THEIR USES? PARTNER TALK GIVE THE CHILDREN SEVERAL MINUTES TO CREATE A MIND MAP ON THEIR WHITEBOARDS. PUT SOME MAGNETS ON THE TABLE FOR THEM TO EXPLORE.

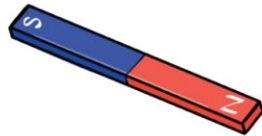
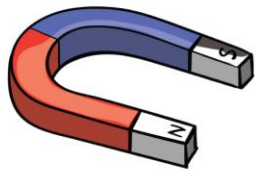
SHOW THE CHILDREN A MAGNET. MOST MAGNETS THAT ARE PRODUCED FOR CLASSROOM USE HAVE DIFFERENT COLOURED ENDS, WHY DO YOU THINK THIS IS? MAGNETS HAVE TWO DIFFERENT POLES . READ THROUGH THE INFORMATION, HANDOUT 1 DEMONSTRATING HOW OPPOSITE POLES ATTRACT BUT SAME POLES, REPEL. GIVE THE CHILDREN SOME MAGNETS SO THAT THEY CAN FEEL THEM ATTRACTING AND REPELLING.

ACTIVITY 1 HOLD UP A METAL SPOON AND A WOODEN SPOON. ESTABLISH THAT THE OBJECTS ARE BOTH SPOONS BUT THE MATERIAL THEY ARE MADE FROM IS DIFFERENT THIS WILL HELP THE CHILDREN UNDERSTAND THAT WHEN THEY INVESTIGATE THE MAGNETIC PROPERTIES OF OBJECTS, IT IS THE MATERIAL THAT THE OBJECT IS MADE FROM THEY WILL BE TESTING, NOT THE NAME OF THE OBJECT .

CHN TO COMPLETE THE TABLE BELOW.

PLENARY RECAP ON THE KEY LESSON QUESTION WHICH MATERIALS ARE MAGNETIC? SHARE RESULTS

Material	Do you think it will be magnetic?	Is it magnetic?



Dictionary Corner

attract – pull towards

repel – push away

Magnets are used all around us. We use them to keep things closed like bags and doors. They are in most **electronic devices**. In fact, **anything that has a motor uses a magnet**.

Televisions, computers and microwave ovens all operate with magnets. Magnets are used to keep refrigerator doors closed and are even mounted on trucks that clean roads. You'll also find magnets in **medical devices** to create a magnetic picture, in **trains**, and the systems used to slow down roller coasters. More uses for magnets are found every day.

Magnetic forces act at a distance. A magnet does not need to be in contact with another object for the magnetic forces to act.

- **Magnets are usually made from iron.**
- The **two ends of a magnet** are called the **magnetic poles**.
- There is a north magnetic pole and a south magnetic pole.
- **Magnets can attract and repel** other objects with their magnetic forces.
- **Magnets can be many different shapes, sizes and colours**, but they will always have a **north and south magnetic pole**.

YEAR 5 PROPERTIES AND CHANGES OF MATERIALS

LESSON 5 I KNOW THAT SOME MATERIALS DISSOLVE IN A LIQUID TO MAKE A SOLUTION.

STEP 1 GET WATER AND GLITTER THIS IS YOUR "POISON POTION".



WATCH THE VIDEO BELOW AND DISCUSS DISSOLVING.

[HTTPS://WWW.BBC.CO.UK/BITESIZE/ARTICLES/ZPBDPBK](https://www.bbc.co.uk/bitesize/articles/zpbdpbk)

INTRODUCE THE TERMS SOLUBLE AND INSOLUBLE

RECAP ON THE NEW SCIENTIFIC VOCABULARY LEARNT SO FAR THROUGH THE LESSON DISSOLVE, SOLUBLE, INSOLUBLE, SOLUTION, SATURATED . IN PAIRS, CHILDREN READ THE DEFINITIONS AND MATCH THE VOCABULARY.

ACTIVITY 1 ENCOURAGE THE CHILDREN TO VERBALLY PREDICT IF THE MATERIAL WILL BE SOLUBLE OR INSOLUBLE BEFORE TESTING.

ONCE THE CHILDREN HAVE HAD TIME TO INVESTIGATE SOLUBLE AND INSOLUBLE MATERIALS, DISCUSS THEIR RESULTS.

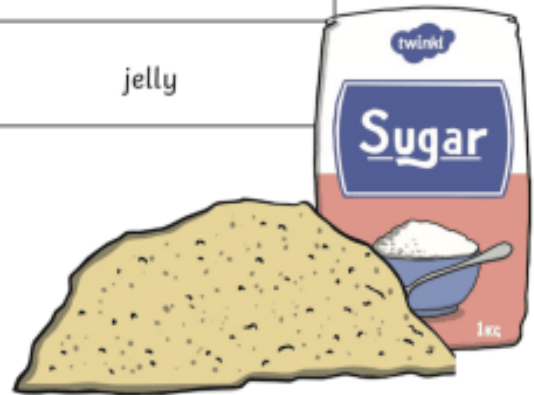
HOLD UP A SUGAR SOLUTION, ASK THE CHILDREN IF IT IS POSSIBLE TO GET THE SUGAR BACK? DISCUSS IDEAS WHAT IS THE NAME OF THE PROCESS BY WHICH A LIQUID TURNS INTO A GAS? 1

PLENARY ACTIVITY 2 TO END THE LESSON, RECAP ON THE KEY SCIENTIFIC VOCABULARY LEARNT THIS LESSON

DISSOLVE, SOLUBLE, INSOLUBLE, SOLUTION, SATURATED . ASK THE KEY LESSON QUESTION WHICH MATERIALS ARE SOLUBLE AND WHICH ARE INSOLUBLE?

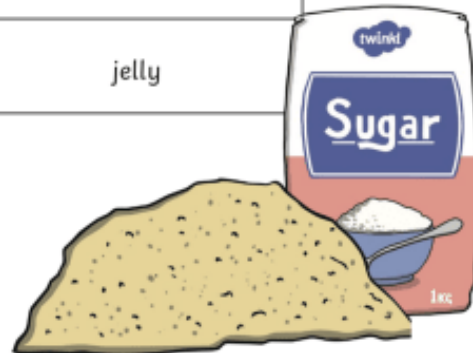
Which of these substances will dissolve in water?

flour	sugar	salt
sand	rice	coffee granules
gravy powder	pepper	jelly



Which of these substances will dissolve in water?

flour	sugar	salt
sand	rice	coffee granules
gravy powder	pepper	jelly



insoluble

when nothing more can be dissolved into the solution

soluble

cannot dissolve in a liquid

solution

the result of two materials being mixed together

saturated

when a material can be dissolved into a liquid

insoluble

when nothing more can be dissolved into the solution

soluble

cannot dissolve in a liquid

solution

the result of two materials being mixed together

saturated

when a material can be dissolved into a liquid

LESSON 6 I CAN PREDICT HOW MIXTURES COULD BE SEPARATED.

INTRODUCE THE WORD SEPARATION GO THROUGH KEY NEW KEY WORD FROM THE VIDEO.

[WHAT IS SEPARATION? BBC BITESIZE](#)

SEPARATION MIXTURES CAN BE SEPARATED BY METHODS LIKE SIEVING, FILTERING AND EVAPORATING.

SIEVING A MIXTURE MADE OF SOLID PARTICLES OF DIFFERENT SIZES, FOR EXAMPLE SAND AND GRAVEL, CAN BE SEPARATED BY SIEVING.

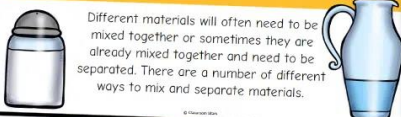



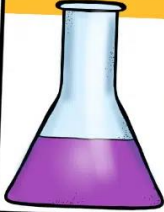
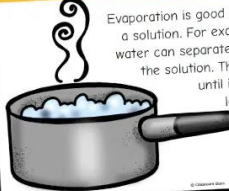
FILTERING YOU CAN SEPARATE A MIXTURE OF SAND AND WATER BY PASSING IT THROUGH A PIECE OF FILTER PAPER. THE WATER IS ABLE TO PASS THROUGH THE TINY GAPS IN THE PAPER BUT THE SAND PARTICLES ARE TOO BIG AND ARE LEFT ON THE SURFACE OF THE FILTER PAPER.

EVAPORATING BY DISSOLVING SALT IN WATER YOU MAKE A SOLUTION. YOU CAN SEPARATE THE SALT FROM THE WATER AGAIN BY BOILING THE SOLUTION. THE WATER WILL EVAPORATE UNTIL IT IS ALL GONE. THE SALT WILL BE LEFT BEHIND.

DECANTATION/DECANTING IS THE PROCESS OF SEPARATION OF LIQUID FROM SOLID AND OTHER IMMISCIBLE NON MIXING LIQUIDS, BY REMOVING THE LIQUID LAYER AT THE TOP FROM THE LAYER OF SOLID OR LIQUID BELOW. THE PROCESS CAN BE CARRIED OUT BY TILTING THE MIXTURE AFTER POURING OUT THE TOP LAYER.

CHN TO COMPLETE ACTIVITY 1 CHN TO MATCH THE MEANINGS. CUT AND STICK OR DRAW A LINE. CHN TO DRAW A PICTURE NEXT TO IT TO REMIND THEM.

- Mixing and Separating Materials -

<h3>Mixing & Separating Materials</h3>  <p>Different materials will often need to be mixed together or sometimes they are already mixed together and need to be separated. There are a number of different ways to mix and separate materials.</p>	<h3>Soluble</h3>  <p>Substances that dissolve in water, like salt, sugar and instant coffee, are called soluble substances. These substances dissolve completely in water to make a solution.</p>	<h3>Dissolving</h3>  <p>Some solids or substances dissolve in water when you mix them together. When a substance dissolves, it looks like it has disappeared. However, although the substance cannot be seen, it is still there as it has just mixed with the water to make a solution.</p>
<h3>Sieving</h3>  <p>If there is a mixture of large solid particles and small solid particles, for example stones and soil, they can be separated by sieving.</p>	<h3>Filtering</h3>  <p>A mixture of water and a solid like sand can be separated by filtering. The mixture of sand and water is poured into the filter funnel, which is lined with filter paper. The water can pass through the paper to collect in the beaker. The sand particles cannot pass through the filter paper and instead collect in the filter funnel.</p>	<h3>Evaporation</h3>  <p>Evaporation is good for separating a liquid from a solution. For example, the salt from salty water can separate from the water by boiling the solution. The water will evaporate until it is all gone. The salt will be left behind. If we collect the water vapour that evaporates we can cool it to form water again.</p>

GO THROUGH OTHER KEY WORDS WHAT DO THESE WORDS MEAN? DISSOLVE, SOLUBLE, INSOLUBLE, SOLUTION, SATURATED.

PUT SUGAR INTO A HOT WATER SOLUTION. THINKING TIME HOW COULD YOU SEPARATE THE SUGAR FROM THE WATER? LOOK AT THE METHODS ABOVE.

REMINDE THE CHILDREN OF THE PROCESS OF EVAPORATION. ESTABLISH THAT THIS IS THE BEST WAY OF SEPARATING A SOLUBLE SOLID FROM A LIQUID. ASK IF ANY OF THE CHILDREN HAVE BEEN IN THE SEA AND THEN DRIED OFF IN THE SUN. WHAT HAPPENS AND WHY ARE THERE SALT CRYSTALS ON THEIR SKIN? WHERE HAVE THEY COME FROM? WHY CAN'T YOU SEE THE SALT IN THE SEA?

EXPLAIN TO THE CHILDREN THAT THERE ARE OTHER WAYS TO SEPARATE MATERIALS THAT HAVE BEEN MIXED.

**WHAT WOULD BE THE BEST METHOD FOR SEPARATING A MIXTURE OF RICE AND SAND
2 SOLIDS ?**

ACTIVITY 2 EACH TABLE TO BE GIVEN A MIXTURE TO SEPARATE. AFTER THE CHILDREN HAVE INVESTIGATED SEPARATING A VARIETY OF MIXTURES, ASK THEM TO FEEDBACK TO EACH OTHER. CHN TO COMPLETE THE TABLE AS A CLASS ONCE ALL INVESTIGATIONS HAVE TAKEN PLACE.

FINALLY, ASK THE KEY LESSON QUESTION HOW CAN MIXED MATERIALS BE SEPARATED?

Evaporating
and Condensing

Separates insoluble
solids from liquids

Decanting

Separates two
liquids which have
different weights

Magnetism

Separates different
sized solids

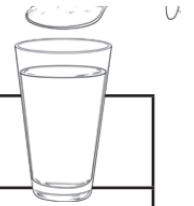
Filtering

Separates soluble solids
from liquids

Sieving

Separates iron and
steel from non
magnetic materials

Write in the process used to separate each mixture.



Mixture	Process
salt + water	
sugar + water	
rice + pasta shapes	
sand + water	
flour + rice	
paperclips + sawdust	

Activity 2


Write in the process used to separate each mixture.



Mixture	Process
salt + water	
sugar + water	
rice + pasta shapes	
sand + water	
flour + rice	
paperclips + sawdust	

Filtering

When we mix sand and water the sand doesn't dissolve. To get the sand back we could try sieving it but it would run through the big holes in the sieve. We need to use a filter. Filters have very tiny holes – so small that we can't see them.




What could you use as a filter?

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Separating Solutions


If you make a mixture of sugar and water the sugar disappears, it has dissolved. It is still in the solution because you can taste it. How could you get the sugar back? You could try filtering it – does that work?



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Sieving


To separate a mixture of large and small solids we can use a sieve. We can also use a sieve to separate mixtures of liquids and large solids.



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Dissolving


When we add some solids to water or other liquids they seem to vanish! In fact the materials are still there – they have just dissolved. That means they have mixed completely with the liquid, the solid particles can no longer be seen.



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Evaporation


If you have a mixture of a solid and a liquid where the solid has dissolved you have made a solution. If you filter it the dissolved solid will pass through the filter with the liquid. To get the solid back you need to evaporate the liquid. The solid will be left behind.



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Magnets

Magnets can also be used to separate solids, but only if one of the solids is magnetic! If you have a mixture of sand and iron filings you cannot sieve the filings out – how would a magnet help you?



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LESSON 7 I CAN EXPLAIN WHY SOME CHANGES ARE IRREVERSIBLE.

WATCH THE VIDEO AND DISCUSS. [HTTPS://WWW.BBC.CO.UK/BITESIZE/ARTICLES/ZK9MT39](https://www.bbc.co.uk/bitesize/articles/zk9mt39)

GO THROUGH THE KEY VOCABULARY. GIVE THE CHILDREN FIRST A CHANCE TO DISCUSS INDEPENDENTLY.

- 1. IRREVERSIBLE CHANGES A CHANGE IS CALLED IRREVERSIBLE IF IT CANNOT BE CHANGED BACK AGAIN. IN AN IRREVERSIBLE CHANGE, NEW MATERIALS ARE ALWAYS FORMED. SOMETIMES THESE NEW MATERIALS ARE USEFUL TO US.**
- 2. HEATING HEATING CAN CAUSE AN IRREVERSIBLE CHANGE. FOR EXAMPLE, YOU HEAT A RAW EGG TO COOK IT. THE COOKED EGG CANNOT BE CHANGED BACK TO A RAW EGG AGAIN.**
- 3. MIXING MIXING SUBSTANCES CAN CAUSE AN IRREVERSIBLE CHANGE. FOR EXAMPLE, WHEN VINEGAR AND BICARBONATE OF SODA ARE MIXED, THE MIXTURE CHANGES AND LOTS OF BUBBLES OF CARBON DIOXIDE ARE MADE. THESE BUBBLES AND THE LIQUID MIXTURE LEFT BEHIND, CANNOT BE TURNED BACK INTO VINEGAR AND BICARBONATE OF SODA AGAIN.**
- 4. BURNING BURNING IS AN EXAMPLE OF AN IRREVERSIBLE CHANGE. WHEN YOU BURN WOOD, YOU GET ASH AND SMOKE. YOU CANNOT CHANGE THE ASH AND SMOKE BACK TO WOOD AGAIN.**

REVERSIBLE CHANGES REVERSIBLE AND IRREVERSIBLE REACTIONS ARE DIFFERENT. A REVERSIBLE CHANGE IS A CHANGE THAT CAN BE UNDONE OR REVERSED. IF YOU CAN GET BACK THE SUBSTANCES YOU STARTED THE REACTION WITH, THAT'S A REVERSIBLE REACTION. A REVERSIBLE CHANGE MIGHT CHANGE HOW A MATERIAL LOOKS OR FEELS, BUT IT DOESN'T CREATE NEW MATERIALS. EXAMPLES OF REVERSIBLE REACTIONS INCLUDE DISSOLVING, EVAPORATION, MELTING AND FREEZING DISCUSS PREVIOUS LESSON.

RECAP ON LAST LESSON AND REMIND THE CHILDREN THAT WE CAN SEPARATE SOLIDS AND LIQUIDS USING A VARIETY OF METHODS SIEVING, FILTRATION, USING MAGNETS, EVAPORATION .

THINKING TIME ASK THE CHILDREN IF THESE CHANGES ARE REVERSIBLE OR IRREVERSIBLE? EXPLAIN THAT WHEN COOKING, THE CHANGE TO THE MATERIAL IS OFTEN IRREVERSIBLE AS A CHEMICAL CHANGE HAS HAPPENED.

**ON THEIR WHITEBOARDS, CHILDREN NOTE DOWN ANY OTHER IRREVERSIBLE CHANGES THAT THEY CAN THINK OF
HINT THINK ABOUT HEATING MATERIALS . DISCUSS EXAMPLES THE CHILDREN HAVE THOUGHT OF.**

COMPLETE ACTIVITY 1 CHN TO SORT THE STATEMENTS. GIVE THE HANDOUT AS AN AID.

PLENARY GO THROUGH THE STATEMENTS. CAN YOU ADD ANYMORE FROM THE PREVIOUS LESSON?




Reversible Changes	Irreversible Changes

- baking a cake
- making toast
- cooking an egg
- making ice cubes
- boiling water
- melting cheese
- making jelly
- spilling water on sand
- putting sugar in tea
- burning a candle


Reversible Changes	Irreversible Changes

- baking a cake
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Reversible

- ✓ States of matter 
- ✓ Solid + Liquid 
- ✓ Solid + Solid 
- ✓ Soluble solid + Liquid

Irreversible

- ✗ Burning 
- ✗ Rusted metals 
- ✗ Heating food 
- ✗ Mixed ingredients 

Reversible

- ✓ States of matter 
- ✓ Solid + Liquid 
- ✓ Solid + Solid 
- ✓ Soluble solid + Liquid

Irreversible

- ✗ Burning 
- ✗ Rusted metals 
- ✗ Heating food 
- ✗ Mixed ingredients 