Scartho Infants' School and Nursery

Where we play, learn and grow together

Science – Progression Document

Skills, Knowledge and Vocabulary

<table>
<tr><th></th><th>EYFS</th><th colspan="2">KS1 National Curriculum</th></tr>
<tr><td></td><td>CHARACTERISTICS OF EFFECTIVE LEARNING</td><td colspan="2">WORKING SCIENTIFICALLY</td></tr>
<tr><td></td><td rowspan="4">Explore outside and make some observations about scientific processes they see happening around them

Use some basic scientific vocabulary

Playing and Exploring (Finding out and Exploring)
• Showing curiosity about objects, events and people.
• Question why things happen
• Using senses to explore the world around them.
• Engaging in an open ended activity, showing particular interests.

Playing and Exploring (Being willing to have a go)
• Taking a risk, engaging in new experiences and learning by trial and error.</td><td colspan="2">Ask simple questions and recognising that they can be answered in different ways.
While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions. • The children answer questions developed with the teacher often through a scenario. • The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.</td></tr>
<tr><td></td><td>Year 1
• Ask simple questions about the world around them when prompted.
• Begin to recognise and suggest ways that questions can be answered.</td><td>Year 2
With increasing confidence:
• Ask simple questions about the world around them.
• Recognise that questions can be answered in different ways</td></tr>
<tr><td></td><td colspan="2">Observe closely using simple equipment.
Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. • They begin to take measurements, initially by comparisons, then using non-standard units.</td></tr>
<tr><td></td><td>Year 1
• Begin to observe closely, using simple equipment.
• Use simple observations and ideas to suggest answers to questions.
• Observe simple changes over time and, with guidance, begin to notice patterns and relationships.
• Say what I am looking for and what I am measuring.
• Know how to use simple equipment safely.
• Use simple measurements and equipment with support (eg hand lenses and egg timers)
• Begin to progress from non-standard units, reading cm, m, cl, l, °C</td><td>Year 2
• Observe closely, using simple equipment.
• Use observations and ideas to suggest answers to questions.
• To observe changes over time and, with guidance, begin to notice patterns and relationships.
• To say what I am looking for and what I am measuring.
• To know how to use simple equipment safely.
• Use simple measurements and equipment with increasing independence (eg hand lenses and</td></tr>
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<table>
<tr><td></td><td></td><td></td><td>egg timers) Begin to progress from nonstandard units, reading mm, cm, m, ml, l, °C</td></tr>
<tr><td rowspan="11"></td><td rowspan="11">Begin to ask questions and seek out information about things they observe
Begin to think of questions based around a prompt and engage with research to find out more

Creating and Thinking Critically (Having their own ideas)
• Thinking of ideas.
• Finding ways to solve problems.
• Finding new ways to do things.

Make predictions about what they think might happen in a given situation and begin to give reasons for those predictions

Creating and Thinking Critically (Making links)
• Making links and noticing patterns in their experience.
• Making predictions.
• Testing their ideas.
• Developing ideas of grouping, sequences, cause and effect.
•
Creating and Thinking Critically (Choosing ways to do things)
• Planning, making decisions about how to approach a task, solve a problem and reach a goal.
• Checking how well their activities are going. Changing strategy as needed and reviewing how well the approach worked.</td><td colspan="2">Perform simple tests</td></tr>
<tr><td colspan="2">The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.</td></tr>
<tr><td>Year 1</td><td>Year 2</td></tr>
<tr><td>• Perform simple tests with support
• Begin to discuss my ideas about how to find things out.
• Begin to say what happened in my investigation.</td><td>• Perform simple tests
• Discuss my ideas about how to find things out.
• Say what happened in my investigation</td></tr>
<tr><td colspan="2">Identifying and classifying</td></tr>
<tr><td colspan="2">Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. • They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing</td></tr>
<tr><td>Year 1</td><td>Year 2</td></tr>
<tr><td>• Identify and classify with some support.
• Begin to observe and identify, compare and describe.
• Begin to use simple features to compare objects, materials and living things and, with help, decide how to sort and group them.</td><td>• Identify and classify.
• Observe and identify, compare and describe.
• Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them.</td></tr>
<tr><td colspan="2">Gathering and recording data to help in answering questions</td></tr>
<tr><td colspan="2">The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing. • They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs. • They classify using simple prepared tables and sorting rings.</td></tr>
<tr><td>Year 1</td><td>Year 2</td></tr>
<tr><td>• Gather and record data with some adult support, to help in answering questions.
• Begin to record simple data.
• Begin to record and communicate their findings in a range of ways.
• Show results in a simple table that the teacher has provided</td><td>• Gather and record data to help in answering questions.
• Record simple data.
• Record and communicate their findings in a range of ways.
• Show results in a table that the teacher has provided</td></tr>
<tr><td colspan="2">Using observations and ideas to suggest answers to questions</td></tr>
<tr><td colspan="2">Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. • The children recognise 'biggest and smallest', 'best and worst' etc. from their data.</td></tr>
<tr><td>Year 1</td><td>Year 2</td></tr>
<tr><td>Research
• Begin to use simple secondary sources to find answers.</td><td>Research
• Use simple secondary sources to find answers.</td></tr>
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		• Begin to find information to help me from books and computers with help. **Conclusions** • Begin to talk about what they have found out and how they found it out • Begin to say what happened in their investigation. • Begin to say whether they were surprised at the results or not. • Begin to say what they would change about their investigation **Vocabulary** Properties, observe, describe, test, question, object, equipment, question, answer, record, identify, classify, sort, group, compare, magnifying glass, biology, chemistry, physics, data.	• Can find information to help me from books and computers with help. **Conclusions** • Talk about what they have found out and how they found it out. • To say what happened in my investigation. • To say whether I was surprised at the results or not. • To say what I would change about my investigation **Vocabulary** Properties, observe, describe, test, question, object, equipment, question, answer, record, identify, classify, sort, group, compare, magnifying glass, biology, chemistry, physics, data.

NC Objective **Substantive Knowledge** **Common Misconceptions** **Vocabulary**

Reception	Year 1 (KS1)	Year 2 (KS1)
Understanding the World Understand some sense of themselves and their place in the world around them. Substantive Knowledge: I know: • *We are human* • *Some of us are boys and some are girls.* • *Name some parts of the body (head, eyes, nose, mouth, ears, neck, shoulder,*	**Animals Including Humans** names of a variety of common animals including fish, amphibians, reptiles, birds and mammals. Substantive Knowledge: I know: • Names of common animal groups (*fish, amphibians, reptiles, birds, insects, arachnids and mammals)* • Names of individual common animals, native and otherwise (e.g Native - dog, cat, horse, cow, chicken, frog, fly, goldfish, spider. Non-native – monkey, snake, elephant, lion, bear) • Humans are animals - mammals	**Animals Including Humans** animals, including humans, have offspring which grow into adults. Substantive Knowledge: I know: • Animals reproduce • Live birth (mammals) • Many animals lay eggs (birds, fish, reptiles, amphibians, insects, arachnids)

arms, hands, fingers, chest, tummy/belly, bottom, legs, knees, feet, toes) • *Know we need food, drink and sleep.* *Common Misconceptions to address:* • Our "body" is just our torso. • Mixing up elbows/shouders/knees vocab: human, boy, girl, *head, eyes, nose, mouth, ears, neck, shoulder, arms, hands, fingers, chest, tummy/belly, bottom, legs, knees, feet, toes* **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.** Substantive Knowledge: I know: • Day and night • Recognise the Sun and moon. Seasons: • The year is separated into four seasons. • Winter is cold. • Spring is getting warmer. • Summer is hot. • Autumn gets cooler. • Christmas is in Winter. • Easter is in Spring • Spring is associated with new life. • Leaves fall off many trees in Autumn	*Common Misconceptions to address:* • Humans are not animals • Spiders are insects *vocab: humans, fish, amphibians, reptiles, birds, insects, arachnids and mammals, pets, native, non-native, w*arm blooded, cold blooded, gills, vertebrate, scales, fins, saltwater, freshwater names of a variety of common animals that are carnivores, herbivores and omnivores Substantive Knowledge: I know: • Can explain the meaning of carnivore, herbivore and omnivore. • Names examples of carnivores (e.g. wolf, cat, lion) • Names examples of herbivores (e.g. chicken, rabbit, snail) • Names examples of omnivores (e.g. human, fox, bears) *Common Misconceptions to address:* • Whales/dolphins are fish (They are mammals) • Dogs/bears/foxes are carnivores • Anything with sharp teeth must be a carnivore. • Vegetarians or vegans are herbivores (this is a choice, not a biological truth) *vocab: herbivore, carnivore, omnivore, examples of each, similarities, differences,* structure of a variety of common animals. Substantive Knowledge: I know: • Most **common** animals have a skeleton. • Generally, adult animals have 0, 2, 4, 6 or 8 limbs • Insects have a head, thorax abdomen *Common Misconceptions to address:*	• Names of common young (baby, child, lamb, piglet, puppy, kitten, foal, calf, chick, snakelet, spiderling, larvae) *Common Misconceptions to address:* • Humans aren't animals (revisit this misconception from previous year) • Mammals don't have eggs at all – *all internal.* • All animal young are like small adults (insect larvae, tadpoles) v*ocab: offspring, young, adult, names of young (*baby, child, lamb, piglet, puppy, kitten, foal, calf, chick, snakelet, spiderling, larvae*) g*row, adult basic needs of animals, including humans, for survival (water, food and air) Substantive Knowledge: I know: • Animals need oxygen to survive. • Animals need water and food to survive. *Common Misconceptions to address:* • Fish don't need air – they take it in through their gills. • Aquatic mammals (dolphins, whales) must come to the surface to breathe – hence the blowholes. • Fish etc don't drink water because they live in it. *vocab: survival, water, drink, nutrition, food, eat, air, breathe, needs, aquatic* importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Substantive Knowledge: I know:

• Some animals hibernate over Winter – link to squirrels hiding nuts. • We wear different clothes at different times of year. Changing States • Some solids melt when they get warm (ice, chocolate, cheese) • If you heat water up in a kettle it creates steam. • If liquid is frozen it becomes solid *Common Misconceptions to address:* • Moon only comes out at night. • It always snows in Winter • It can only snow in Winter • All solids can melt (eg wood burns) • Steam is different to water – it is water as a gas vocab: change, season, Spring, Summer, Autumn, Winter, melt, freeze, new life, hibernate, burn, solid, liquid Recognise that humans share the world with animals and plants and these can change over time. Substantive Knowledge: I know: • Humans share the world with plants and animals. • Plants and animals are living things. • Some animals and plants might live with us (look at pets, house/garden plants)	• All animals have a skeleton (jellyfish) • Fish don't have a skeleton. • All animals have legs (snake, worm) • humans/monkeys have 2 limbs – discuss difference between legs and limbs *vocab: skeleton, head, limbs, arms, legs, fins, gills, wings, tail, thorax, abdomen* basic parts of the human body and which part of the body is associated with each sense. Substantive Knowledge: I know: • A variety of main body parts (head, shoulders, chest, arms, legs, "belly"-stomach, feet, hands, knee, elbow, bottom, back) • Sight = eyes, Hearing = ears, Smell = nose, Taste = tongue, Touch = skin *Common Misconceptions to address:* • You use your hands to touch – *any part of your skin can sense touch.* • You use your mouth to taste – *only the tongue has taste buds.* *vocab:* head, shoulders, torso, chest, *limbs,* arms, legs, feet, hands, knee, elbow, "belly"-stomach, bottom, back, skin, eyes, nose, mouth, skull *sense; taste - tongue, mouth; sight - eyes; hearing - ears, sound; touch - fingers, skin, nerves; smell – nose*	• Exercise is important to be healthy • A balanced diet is important to be healthy • Sleep is important to be healthy • Good hygiene (washing hands before food/drink, brushing teeth, cleaning self regularly, avoiding spread of germs) is important to be healthy *Common Misconceptions to address:* • Unhealthy means "fat" – *slim people can be unhealthy too.* • Exercise on its own will keep you slim. • Eating only fruit and veg is a healthy diet. • You can eat lots of unhealthy food as long as you have some veg as well. • Sleep doesn't affect your health. • You only need to wash your hands before you eat. • "Diet" means being "on a diet" *vocab: hygiene, nutrition, exercise, food, wash, clean, brush, sleep, healthy, unhealthy, disease, illness, weight, germs, balanced diet (fruit, veg, meat, protein, carbohydrates, fats, dairy – Plus examples of these)*

- Plants and animals change over time (link to seasonal changes – hibernation, leaves falling off trees etc).
- Recognise that plants and animals grow.
- That plants generally grow from seeds or bulbs planted in the ground.
- Name some animals and types of animals (eg insects/minibeasts)
- Some animals are born live and some come from eggs (link to knowledge of human babies and chicks.
- Recognise some animals have three clear stages – eg caterpillar-cocoon-butterfly
- That animals live in different habitats.
- General classifications of some animals eg farm animals, zoo animals, pets

Common Misconceptions to address:

- It always snows in Winter
- It can only snow in Winter
- All animals are born from eggs
- Birds/fish aren't animals

vocab: animals, pets, plants, seeds, bulbs, flowers, trees, living things, baby, young, old, born, hatch, grow, habitat

Recognise that weather and temperature is not always the same.

Substantive Knowledge: I know:

- See above – seasons.
- There are different types of weather.

Plants

names of a variety of common wild and garden plants, including deciduous and evergreen trees.

Substantive Knowledge:

I know:

- Common flowering plants (daisy, sunflower, tulip, rose, pansy)
- Common plant types (tree, bush, flowering plant, grass)

Common misconceptions to address:

- All trees lose leaves in Autumn.
- A leaf is a type of plant in itself.

Vocab: plant, flower, deciduous, evergreen, garden plant, honeysuckle, hydrangea, insects, lavender, magnolia tree, marigold, primula, rose, sunflower, sweet pea, bark, blossom, leaves,

basic structure of a variety of common flowering plants, including trees.

Substantive Knowledge:

I know:

- The general structure of a flowering plant (roots, stem, leaves, flowers)
- Recognise the general structure of a tree (roots, trunk, branches, leaves, flowers – for some)

Common misconceptions to address:

- All trees lose leaves in Autumn.
- A flower is the whole plant.

Vocab: stem, trunk, leaf, branch, flower, roots, seeds, shrub, moss, petals, bulbs, soil, grow, living thing,

Living Things & Their Habitats

differences between things that are living, dead, and things that have never been alive.

Substantive Knowledge:

I know:

- The features of living things (MRS GREN – Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, Nutrition)
- That a dead plant or animal used to be alive.
- Things which have never been alive.

Common Misconceptions to address:

- Rocks etc are "dead" because they aren't alive.

Vocab: living, dead, never lived, movement, respiration, sensitivity, nutrition, excretion, reproduction, growth

names of a variety of plants and animals in their habitats, including micro-habitats.

Substantive Knowledge:

I know:

- The difference between a habitat and micro-habitat.
- Identify a variety of plants and animals which live in given habitats.
- A variety of plants and animals which live in given micro-habitats.

Common Misconceptions to address:

- A habitat refers to where animals live, not plants.
- A plant can't be a habitat (a tree/bush is also an example of a micro-habitat)

Vocab: plants, animals, habitats, micro-habitats

most living things live in habitats to which they are suited and different habitats provide for the basic needs of

• about and be able to describe simply: rain, snow, sun, wind, cloudy. • Generally in which seasons it rains more and in which it is sunnier. • Generally in which seasons it is cooler and in which it is warmer. • The connection between weather and temperature: e.g. sunnier usually hotter, wind and rain usually colder. • That rainbows can appear when it is rainy and sunny. *Common Misconceptions to address:* • It is always hot in Summer • It is always cold in Winter • It always snows in Winter • It can only snow in Winter • Rainbows always appear when it rains • A leprechaun hides his gold at the end of the rainbow! vocab: weather, temperature, sun, rain, snow, wind, cloud, hot, cold warm, cool, rainbow **Understand that not all objects are made from the same materials.** Substantive Knowledge: I know: • A material is what something is made from. • Objects can be made from different things. • Name some common materials (wood, brick, stone, glass, plastic, metal, cotton) *Common Misconceptions to address:*		different kinds of animals and plants, and they depend on each other. Substantive Knowledge: I know: • Identify a variety of habitats (forest, grassland, desert etc) • Identify a variety of plants and animals which live in given habitats. • Recognise ways in which animals/plants are suited to their habitats (frogs are good swimmers, camels store fat, monkeys have feet they can use to climb) *Common Misconceptions to address:* • a desert is hot (Note – no rain; Antarctic also desert), • Camels store water – actually fat *Vocab: habitat, suitability, adapted* how animals obtain their food from plants and other animals, using the idea of a simple food chain, and different sources of food. Substantive Knowledge: I know: • A Producer starts every food chain. It is always a plant. • All animals are consumers. • Animals which eat other animals are predators. Animals eaten by other animals are prey. • An animal can be both predator and prey (eg fox) • An animal with no predators is an apex predator. • The arrows in a food chain show “is eaten by”. • Identify/create a food chain with at least three links. *Common Misconceptions to address:* • Arrows show what the animal eats.

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- Everything is made from the same thing.
- Clothes are made from “material”

vocab: material. wood, brick, stone, metal, plastic, glass, cotton

Understand electricity exists and can be dangerous.

Substantive Knowledge:

I know:

- Electricity is what makes many things work – be able to name some.
- Identify plugs and plug sockets are linked to electricity.
- electricity can be dangerous.
- Not to play with plug sockets.
- Lightning is electricity.

Common Misconceptions to address:

- Plugs are safe.
- Lightning is the sound
- Lightning is “made of light”

vocab: electricity, electrical, plug, plug socket, dangerous, lightning

Understand the sun can be dangerous.

Substantive Knowledge:

I know:

- The sun produces heat and light
- It is dangerous to look at the sun because it can hurt your eyes.
- It is dangerous to be out in the sun too long as it can burn your skin.
- Sun cream is good protection for skin.

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- Plants can’t be consumers (Venus fly trap)
- An animal is either predator or prey but not both.

Vocab: food chain, food source, predator, prey, producer, consumer, predator

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Seasonal Changes

changes across the four seasons.

Substantive Knowledge:

I know:

- Months in each season.
- Leaves falling off deciduous trees in Autumn.
- New life in Spring (plants and animals)
- Changes in appropriate clothing

Common Misconceptions to address:

- *All plants lose their leaves in Autumn/Winter – not true.*
- *No flowering plants can survive in Winter (snowdrops, pansies)*

Vocab: names of all 12 months, change, season, Spring, Summer, Autumn, Winter, deciduous, evergreen, month, year leaves, fruit, fall, Fungi, animals, migration, hibernate, adapt, active

weather associated with the seasons and how day length varies.

Substantive Knowledge:

I know:

- As we move from Winter to Summer, days get longer and nights get shorter. Weather becomes warmer.
- As we move from Summer to Winter, days get shorter and nights get longer. Weather becomes colder.
- Seasons are linked to the Earth **moving around the Sun**.

Common Misconceptions to address:

- *Seasons are linked to the Earth turning around/spinning.*

Vocab: weather, colder, warmer, hotter, snow, rain, sun, temperature, day, night, longer, shorter, light, Earth, Sun, sleet, hailstone, lightening,

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Plants

how seeds and bulbs grow into mature plants.

Substantive Knowledge:

I know:

- Show the stages of growth of a typical plant (seed, germination, roots, seedling, stem, leaves, flower, seed dispersal)

Common Misconceptions to address:

- All flowers grow from seeds.
- The plant grows up first, then roots.

Vocab: seed, bulb, germination, roots, seedling, stem, leaves, mature, flower, seed, dispersal, shoot

plants need water, light and a suitable temperature to grow and stay healthy.

Substantive Knowledge:

I know:

- Identify plants need water, light and a suitable temperature to grow and stay healthy.

Common Misconceptions to address:

- Temperature doesn’t matter.
- Plants need soil to grow.
- Plants won’t grow at all without light.
- Plants can grow with no water.

Vocab: suitable temperature, water, light, grow, soil, healthy

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- Sunglasses are protection for eyes
- A cap can protect the eyes and face.

Common Misconceptions to address:

- The Sun isn't hot in Winter.
- If it isn't very hot, you can't get sunburn.
- Sun cream means you can't get burnt.
- Sunglasses mean your eyes can't be hurt by the sun.

vocab: Sun, light, heat, hot, burn, sunburn, sun cream, bright, blind, sunglasses, cap

Everyday Materials

there is a difference between an object and the material from which it is made.

Substantive Knowledge:

I know:

- Object = item or thing, material= what the thing is made from.

Common Misconceptions to address:

- *Material is "what clothes are made from."*
- *"Material" is the name of a material – "This is made of material."*

Vocab: object, material, made from

names of a variety of everyday materials.

Substantive Knowledge:

I know:

- Be able to name *wood, plastic, glass, metal, cotton, brick, water, and rock as materials.*

Common Misconceptions to address:

- *All metals are the same*
- *All rocks are the same*

Vocab: wood, plastic, glass, metal, cotton, brick, water, and rock, rubber, fabric

simple physical properties of a variety of everyday materials.

Substantive Knowledge:

I know:

- Be able to describe given materials and give general statements about materials "Cotton is soft.".

Common Misconceptions to address:

- *All metals are hard/rigid*
- *All rocks are hard*
- *All wood is hard/rigid*

Everyday Materials and Their Uses

suitability of a variety of everyday materials for particular uses.

Substantive Knowledge:

I know:

- Identify what materials certain items are made from.
- Why items are made from given materials – eg. walls made of bricks as they are strong, hard, heavy etc.
- Why certain materials would be unsuitable for given items – eg teapot made of chocolate unsuitable because the chocolate would melt.

Common misconceptions to address:

- Mix up items/materials/ properties

Vocab: suitable, unsuitable, wood, metal, plastic, glass, brick, rock, paper, cardboard

shapes of solid objects made from some materials can be changed by *squashing, bending, twisting and stretching.*

Substantive Knowledge:

I know:

- Solids do not change shape on their own.
- A force must be applied to change the shape of a solid.
- Solids can be squashed, bent, twisted or stretched.
- Different solids may take a different amount of force to change shape.

Common misconceptions to address:

- "squishing"
- Solids can change shape on their own

	• *Rigid, strong and hard are the same thing (rigid – doesn't bend, strong – is able to withstand force/pressure without changing shape, hard – not easy to break)* • *Soft is the same as smooth.* *Vocab: property, rough, smooth, hard, soft, strong, weak, rigid, flexible, waterproof,* not Waterproof, transparent, opaque, absorbent, bendy, not absorbent compare and group together a variety of everyday materials on the basis of their simple physical properties Substantive Knowledge: I know: • Be able to group a variety of materials based on physical properties – "The rock and the metal are together because they are hard." *Common Misconceptions to address:* • *as previous* *Vocab: property, rough, smooth, hard, soft, strong, weak, rigid, flexible, shiny, stretchy, dull,*	• If we can't apply enough force it can't be done (eg iron bar – we couldn't bend it but a machine could). *vocab: squashing, bending, twisting and stretching.*