

SCIENCE ASSESSMENT

Assessment Criteria and Guidance Materials
Version 2: September 2016

Created by staff and pupils at:

Captain Cook Primary School
Newham Bridge Primary School

Stage 1 - Stage 6

Guidance Materials

The guidance materials have been designed to aid teachers in making judgements relating to some of the more complex criterion. It is expected that they are used when assessing and moderating to ensure the greatest possible levels of consistency between teaching staff and schools.

Please note:

1. The assessment materials have been devised to be used as a formative assessment tool – it is very important that a criterion is assessed against children's independent work, for example, not with support from an adult.
2. The assessment criteria cover specific areas of science which should be assessed as the children move through the topic. Consider how you could collate this evidence, perhaps a short assessment task at the end of the topic to ascertain how much information the children have retained.
3. Examples given are provided to give further guidance in relation to the specific criterion listed above them. It is important if a child has been assessed as secure, an adult has observed the child working independently on this particular statement rather than supported to achieve.
4. Children working within their year group curriculum, who have previously been assessed as secure, i.e. 100% statements judged to be secure, may be assessed as secure + if they are able to show that they are also secure in all the S+ statements at the bottom of the grid.
5. In order to track progress, only count the secure statements when calculating the raw score.
6. Please note that S+ guidance should not be used for Year 6 statutory assessment, as at time of print, STA had not published guidance for children working at Greater Depth within Science at the end of KS2.

Stage 1

Stage 1 Science Assessment

Assessment Criteria		limited	developing	secure
1	I can talk about some aspects of the world around me.			
2	I can ask questions about what I have seen.			
3	I can show I understand that things change in the world around me.			
4	I can work within a group to answer a simple science question using what I have observed.			
5	I can sort and group.			
6	I can work with an adult on a simple investigation.			
7	I can ask questions to find out more.			
8	I can gather and record data using simple equipment			
9	I can talk about what I have found out and use taught science words.			
10	I can identify and name a variety of common wild and garden plants.			
11	I can describe the basic structure of a plant and tree.			
12	I can identify and name a variety of animals.			
13	I can talk about why animals are suited to different environments.			
14	I can name and locate parts of the human body, including those linked to senses.			
15	I can group animals according to what they eat.			
16	I can identify the differences between groups of animals.			
17	I can answer questions about animals in their habitats			
18	I can name and identify a variety of everyday materials.			
19	I can describe some properties of everyday materials.			
20	I can identify and sort materials into different groups.			
21	I can talk about seasonal changes.			
S+	I can sort, group and give explanations when working in science.			
S+	I can contribute my ideas to a simple investigation.			
S+	I can select a sensible prediction from given choices.			

	1E (entering)	1D (developing)	1S (secure)	1S+ (secure+)
For those children not yet assessed as entering, please refer to the previous stage.	40%+ of statements in developing. (8+)	80%+ of statements in developing (17+)	100% of statements in secure.	100% of statements in secure and all S+ statements secure.

1. I can talk about some aspects of the world around me.

Independently, children should be able to:

- engage in discussions linked to their local environment, contributing things they might have observed;
- talk about similarities and differences in the world around them;
- give at least 3 examples of similarities and differences they have noticed from their own observations.

3. I can show I understand that things will change in the world around me.

Children might observe the growth of plants they have planted, keeping regular records of measurements and observations.

They should be able to observe and talk about changes across the four seasons and changes in the weather associated with the seasons.

They could contribute to displays of what happens in the world around them, including day length as the seasons change.

5. I can sort and group.

Using given criteria, children should be able to sort or group a variety of objects or things.

Children should be able to use their observations to describe how they were able to identify and group objects.

For example: hard and soft materials; common wild and green plants; what animals eat; using their senses to compare different textures, sounds and smells.

6. I can work with an adult on a simple investigation.

Children can take a variety of roles when working with others during a scientific investigation. This could be:

- making suggestions about how to answer the question;
- observing and sharing events;
- gathering and recording results;
- asking questions about what they see;
- noticing a pattern in results;
- suggesting how to make sensible changes to the investigation.

8. I can gather and record data using simple equipment.

Children should be given the opportunity to carry out scientific investigations that involve taking some standard unit measurements.

Working together, the children should be able to read scales in divisions of 1s and 10s in practical situations using a metre stick or a measuring jug.

They should be able to compare measures independently using the vocabulary more or less with some confidence.

9. I can talk about what I have found out and use taught science words.

Children should use their observations to support discussions about their findings. They should be familiar with and confident using a variety of scientific vocabulary. For example:

- name and identify common and wild flowers, examples of deciduous and evergreen trees, and plant structures including: habitats, flowers, plants, trunk, roots, branches, leaves, wild plants, garden plants, flower, petals, stem, fruit, bulb, seed and buds.
- name the main parts of the body such as: head, neck, arms, elbow, face, ears, eyes, hair, mouth and teeth.
- name and identify common animals, humans, fish, amphibians, reptiles, birds, mammals, carnivores, herbivores and omnivores.
- identify and name a variety of everyday materials and describe their physical properties such as: hard/soft, stretchy/stiff, shiny/dull, rough/smooth, bendy/not bendy, *waterproof/non-waterproof & absorbent/non-absorbent* (Although children should be made aware of these terms, scientific investigations to determine if this is a physical property of a material will be carried out in Y2)

10. I can identify and name a variety of trees, common wild and garden plants.

Trees

Oak
Willow
Cherry
Horse Chestnut
Pine
Holly
Sycamore
Hawthorn

Common Wild Plant

Buttercup
Daisy
Bluebell
Snowdrops
Dandelion
Nettles
Elderflower

Garden Plants & Vegetables

Sunflower
Daffodil
Tulip
Lilies
Heather
Roses
Lettuce
Celery
Carrots

12. I can identify and name a variety of animals.

They should be familiar with a range of animals including; humans, fish, amphibians, reptiles, birds, mammals, invertebrates.

Please note: They do not need to know the differences between the different groups at this stage.

The children should be able to discuss which of the animals are carnivores, herbivores and omnivores.

13. I can talk about why animals are suited to different environments.

The children should be able to explain that a habitat is somewhere an animal or plant lives. They should understand that a habitat provides plenty of food and materials to build shelter to protect the animal. They should be able to provide suggestions about how you could make an artificial environment for a given animal to feel at home.

14. I can name and locate parts of the human body, including those linked to senses.

Children should be able to:

- explain which part of our body is associated with each sense;
- understand that our eyes give us messages that help us see/understand the world around us;
- name the parts of the eye and talk simply about the role they have;
- understand that sound travels through our ears to send a message to our brain;
- explain how senses warn us of danger;
- understand that some people need help to with their sight or/and hearing and how this might happen.

18. I can name and identify a variety of everyday materials.

Children should be able to name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. They should understand the difference between the object and the material it has been made from.

21. I can talk about seasonal changes

Through drawings or discussions, children should understand that the sun is not always in the same place every day; it changes depending on the time of the day or the time of the year.

In addition, children should:

- know the months of the year;
- be able to talk about the four seasons;
- explain how deciduous trees change as they move through the different seasons;
- talk about the length of the day and how it changes from light to dark;
- be given opportunities to make tables and charts about the weather.

S+ I can sort, group and give explanations when working in science.

Children should be able to use their observations to describe how they were able to identify and group objects. They should be able to give or record reasons why they have decided to sort or group objects using some appropriate scientific vocabulary. They should be able to recognise some similarities and differences between the groups.

S+ I can contribute my ideas to a simple investigation.

Children should have the opportunity to experience different types of scientific enquiry throughout KS1. During discussions around investigations, children should be able to contribute their own appropriate ideas to answering scientific questions.

S+ I can select a sensible prediction from given choices.

From a range of predictions, both appropriate and not, children should be able to make a choice of what they think will happen in the investigation.

Children should be able to give a simple but appropriate explanation to explain why they made that particular choice.

Stage 2

Stage 2 Science Assessment

Assessment Criteria		limited	developing	secure
1	I can show an interest in the world around me and ask questions about what I observe.			
2	I can discuss how things change over time.			
3	I can look out for and spot patterns linked to my work in science.			
4	I can sort, group and give explanations when working in science.			
5	I can contribute my ideas to a simple investigation.			
6	I can select a sensible prediction from given choices.			
7	I can find information using simple sources.			
8	I can talk about what I have found out and use key science words.			
9	I can record and gather data using simple equipment.			
10	I can describe the main changes as seeds and bulbs grow into plants.			
11	I can describe the basic needs for a plant to survive.			
12	I can talk about what happens to a plant when something it needs to survive is changed.			
13	I can explain how a young animal changes as it grows.			
14	I can describe the basic needs of animals for survival.			
15	I can create and describe a simple food chain.			
16	I know what a human needs to be healthy.			
17	I can identify whether things are alive, dead or have never been alive.			
18	I can compare different materials and identify what they could be used for.			
19	I can use what I know about materials to choose the best one for a given task.			
S+	I can discuss what I will change and measure, and what I will keep the same.			
S+	I can use results to draw simple conclusions.			
S+	I can offer a sensible prediction and give a reason for it.			

	2E (entering)	2D (developing)	2S (secure)	2S+ (secure+)
For those children not yet assessed as entering, please refer to the previous stage.	40%+ of statements in developing. (8+)	80%+ of statements in developing. (15+)	100% of statements in secure.	100% of statements in secure and all S+ statements secure.

1. I can show an interest in the world around me and ask questions about what I observe.

The questions children ask should be linked to the world around them, possibly helping to clarify misunderstandings or to help them understand a process. This does not have to be linked to the work the children are completing in science

2. I can discuss how things change over time.

For example, the children should be able to describe how seeds and bulbs grow into mature plants. They should be able to explain the main changes as young animals, including humans grow into an adult. They should be able to talk about the changes that happen when ice melts.

3. I can look out for and spot patterns linked to my work in science.

After making a set of observations, decide what they are going to measure, ask the children if they spotted any patterns in their results. For example, an increase in temperature always causes the ice to melt more quickly.

4. I can sort, group and give explanations when working in science.

With help children should be able to sort a variety of objects or things into categories and give reasons for their choices. For example, shiny and dull materials; what animals eat; what habitat an animal lives in.

5. I can contribute my ideas to a simple investigation.

This covers all areas of an investigation. The child may:

- raise a question that leads to a scientific investigation
- suggest suitable equipment that may be included in the investigation.
- offer suitable suggestions about how a scientific investigation may be carried out.
- make a sensible prediction and give reasons why they have come to that conclusion.
- make comparisons about the outcomes of the investigation.
- ask questions of others or suggest improvements to the way the investigation is carried out.
- notice a pattern in the results from the investigation.

6. I can select a sensible prediction from given choices.

Children should be given the opportunity to predict the outcome of a simple investigation and give reasons why they have made that choice.
Please note: Try to start your investigation with a question; children will usually try to answer it.

7. I can find information using simple sources.

Examples of secondary sources:
Non-fiction books, which the child can access;
science clips;
photographs;
(Please note: the children should be able to read and understand the information)

8. I can talk about what I have found out and use key science words

Year 1 & Year 2 Scientific Vocabulary

Children should know common names of flowers, examples of deciduous and evergreen trees, and plant structures including: habitats, flowers, plants, trunk, roots, branches, leaves, wild plants, garden plants, flower, petals, stem, fruit, bulb, seed and buds.

Children should also be able to name the main parts of the body such as: head, neck, arms, elbow, face, ears, eyes, hair, mouth and teeth. They should be familiar with words such as: animals, humans, fish, amphibians, reptiles, birds, mammals, carnivores, herbivores and omnivores.

When discussing everyday materials and their properties, children should be able to use words such as: hard/soft, stretchy/stiff, shiny/dull, rough/smooth, bendy/not bendy, waterproof/not waterproof, absorbent/non-absorbent, opaque/transparent.

PLEASE NOTE: Y1 children should have had the opportunity to understand the words 'waterproof/not waterproof, absorbent/non-absorbent' Y2 is where they should set up the investigations to find out which materials share these properties.

9. I can record and gather data using simple equipment.

Children should be able to communicate their ideas in a variety of ways. Children should be given the opportunity to carry out scientific investigations that involve taking some standard unit measurements. Working together, the children should be able to read scales in divisions of 1s, 2s, 5s and 10s in practical situations using a meter stick or a measuring jug. They should be able to compare two sets of simple data and talk about the similarities and differences between the two.

10. I can describe the main changes as seeds and bulbs grow into plants.

Children should be able to understand that seeds are formed to produce new plants. They should be able to order the images from the life cycle of a plant, giving reasons for their decisions; to clarify understanding, they could ask questions.

11. I can describe the basic needs for a plant to survive.

Children should have the opportunity to understand that bulbs and seeds need water, but most do not need light because they have a source of food inside them.

12. I can talk about what happens to a plant when something it needs to survive is changed.

Children should be able to describe the basic needs of a plant to survive. They should be able to suggest ideas for an investigation in which some of these needs are changed. Using simple comparative tests, they should have the opportunity to compare the differences and present this information in a prepared table, or discuss the changes using the correct scientific language.

For example:

- Withdrawing light;
- withdrawing water;
- changing the type of soil;
- removing the leaves from the plant.

13. I can explain how a young animal changes as it grows.

They do need to understand that animals have young that change as they grow. The children could order pictures of an animal in various stages of development and talk about the main changes.

Children do not need to understand how reproduction occurs.

14. I can describe the basic needs of animals for survival.

Children should be able demonstrate understanding that an animal needs water, food and air to survive.

15. I can create and describe a simple food chain.

Children should understand that all food chains start with a *producer* (a plant) and end with a *top consumer* (an animal).

Please note: Children do not need to include humans in their simple food chains.

For example:

Grass——>Rabbit——>Fox

16. I know what a human needs to be healthy.

Children should be able to talk about the importance of humans eating the right amounts of different types of food. They should be able to design a healthy meal and suggest improvements to their own diets. The children should be able to talk about a cleaning routine and the importance of good hygiene. Children should have a good understanding of why exercise is important for humans and how it affects the body.

17. I can identify whether things are alive, dead or have never been alive.

Using their knowledge of a real animal and its needs, they should compare and contrast its characteristics to that of model animal (which has never lived). If you have access to stuffed animals this would be a good opportunity to discuss animals that were once alive. They should be able to talk about the needs of the living animal and compare it to those of a model. Children could sort pictures into groups and give reasons why they have done so.

18. I can compare different materials and identify what they could be used for.

Children should be able to identify different types of everyday materials.

They should be able to suggest appropriate uses for different materials and understand they can be used for more than one thing e.g. metal can be used for coins, cars and cutlery.

Children should be able to recognise that everyday materials can be used for the same thing such as a table can be made from plastic, wood or metal.

The children should be able to understand that some materials can be recycled and suggest ways in which we could do so.

They should be able to discuss why the properties of materials make them suitable or unsuitable for particular purposes.

19. I can use what I know about materials to choose the best one for a given task.

Wherever possible, children should be given the opportunity to carry out a scientific investigation, for example:

- Which material is the most suitable to use as an umbrella?
- Which material is the most suitable to keep food cool for a picnic?
- Which material is the most suitable to use when making a kite?

S+ I can discuss what I will change and measure, and what I will keep the same.

Children should begin to recognise when a fair test is necessary and with some guidance explain what they think they should change and how they are going to measure it. With adult guidance, they should be able to decide what they will keep the same.

S+ I can use results to draw a simple conclusion.

Children should be able to:

- record simple data and talk about what they have found out;
- communicate their findings in a range of ways, using scientific language.

S+ I can offer a sensible prediction and give a reason for it.

After discussions in class focussing on how they will answer a scientific question, children should be able to make a sensible prediction about the outcome of the investigation. They should be able to offer a reason for their choices using appropriate scientific vocabulary when explaining.

Stage 3

Stage 3 Science Assessment

Assessment Criteria		limited	developing	secure
1	I can make suggestions about how to answer a question by investigating.			
2	I can make observations over a period of time.			
3	I can recognise some naturally occurring patterns.			
4	I can use simple keys and suggest criteria for grouping, sorting and classifying.			
5	I can select information from sources provided.			
6	I can make a prediction about what the answer to a question might be.			
7	I can discuss what I will change and measure, and what I will keep the same.			
8	I can use scientific equipment to make observations and take measurements.			
9	I can record data and results using scientific diagrams and labels, bar charts, and prepared tables.			
10	I can use results to draw simple conclusions.			
11	I can name, locate and describe the functions of the main parts of plants.			
12	I can explore a plant's requirements for life and growth.			
13	I can explain how water is transported in plants.			
14	I can describe the part that flowers play in the life cycle of a plant.			
15	I understand the aspects of a balanced diet for humans.			
16	I can explain the function of skeletons and muscles in humans.			
17	I can compare and group together different kinds of rocks based on their appearance and simple physical properties.			
18	I can in simple terms describe how fossils are formed.			
19	I can recognise that soils are made from rocks and organic matter.			
20	I can explain how I see.			
21	I can explain how shadows are formed.			
22	I can find patterns in the way that the sizes of shadows change.			
23	I can compare and group together magnetic and non-magnetic materials.			
24	I can predict whether two magnets will attract or repel depending on which poles are facing.			
S+	I can recognise factors which make a test fair.			
S+	I can offer an explanation for the results of an investigation.			
S+	I can suggest improvements linked to my investigation.			

	3E (entering)	3D (developing)	3S (secure)	3S+ (secure+)
For those children not yet assessed as entering, please refer to the previous stage.	40%+ of statements in developing. (10+)	80%+ of statements in developing. (19+)	100% of statements in secure.	100% of statements in secure and all S+ statements secure.

1. I can make suggestions about how to answer a question by investigating.

Children should be able to suggest **sensible** ideas about how they might find the answer to a question

For example:

- What do plants need to grow well?
- How are shadows formed?
- Does a surface affect how far an object will travel? (Magnets)
- How can we separate sand pebbles and rocks?

2. I can make observations over a period of time.

Children should be making their own observations and talking about how shadows change as the light source moves.

They should be able to explain in simple terms how the water is transported in plants. They need to use the correct scientific vocabulary when explaining this process using words such as, taken in/absorbed (not sucked up).

From a selection of images, they should be able to correctly order, label and explain the different stages of the life cycle of a plant.

3. I can recognise some naturally occurring patterns.

Children should be able to:

- look for patterns and explain what happens to shadows when the light source moves or the distance between the light source and the object changes.
- talk about how magnets behave in relation to each other and what might affect this, for example the strength of the magnet or which pole faces another.
- look for patterns in the structure of fruits that relate to how the seeds are dispersed.

4. I can use simple keys and suggest criteria for grouping, sorting and classifying

Children should be able to identify and group animals with and without skeletons.

They should be able to sort different foods into groups and explain the difference between the groups.

Children should be able to identify and classify rocks according to whether they have grains or crystals and whether they have fossils in them.

Children should be able to sort magnetic and non-magnetic materials.

7. I can discuss what I will change and measure, and what I will keep the same.

Examples:

How can we compare the effects of different factors on plant growth for example the amount of light and fertiliser?

When working with magnets, how can we compare how far different things move on different surfaces?

When comparing rocks, how well do different rocks withstand being ground down?

8. I can use scientific equipment to make observations and take measurements.

The children should have the opportunity to use the following equipment:

hand lenses tape measures metre sticks

egg timers count up/down timers

data loggers

9. I can record data and results using scientific diagrams and labels, classification keys, bar charts, and prepared tables.

After dissecting a flowering plant, they should with some support, be able to separate it into its different parts. Independently they should be able to sort and name the parts of the plant correctly and record their findings accurately.

During a scientific investigation, children should be able to record their results in a prepared table. They should be able to answer questions about the data using the vocabulary more & fewer. They should be able to represent their discreet data using a bar chart.

Simple classification keys e.g. Does it have wings? Could be used to sort animals in the local and wider environment.

11. I can name, locate and describe the functions of the main parts of plants.

Petals Roots Stem Trunk Flower Leaves

The child should be able to locate the different parts of a flowering plant from a clearly drawn picture or during the dissection investigation.

You could give a selection of definitions and ask the child to match the correct word to the correct definition independently.

12. I can explore a plant's requirements for life and growth.

They understand and share what a plant needs to grow and live a healthy life and how this can vary from plant to plant.

They need to be introduced to the idea that plants can make their own food but at this stage they do not need to understanding how this happens.

13. I can explain how water is transported in plants.

It is important the children are using the correct language when describing the parts of the plant included in the process.

They should be able explain how water is absorbed (taken in) by the plant.

14. I can describe the part that flowers play in the life cycle of a plant.

Children should be able to explain what a life cycle is.

They should be able to explain through discussion or labelling and adding information to a series of correctly ordered diagrams.

- Germination
- Growing and Flowering
- Pollination
- Fertilisation and Seed Formation
- Seed dispersal

It is important the children are using the correct vocabulary to describe parts of the plant and the stages of the process.

15. I understand the aspects of a balanced diet for humans.

Children show they understand which types of foods a human needs to eat to be healthy.

Children should understand and talk about the difference between the food groups and the types of nutrients.

16. I can explain the function of skeletons and muscles in humans.

Children should be able to name some of the bones of the human skeleton.

They should be able to explain the function of the skeleton for protection, movement and support. They should understand that muscles are needed to help the skeleton move.

17. I can compare and group together different kinds of rocks based on their appearance and simple physical properties.

The children should be able to group and sort rocks using more than one criteria. This could be based on their hardness and appearance after looking closely at their physical make-up through a hand lens.

Children should be able to consider the hardness of a small quantity of rocks and order them accordingly.

They should be able to give reasons when explaining their decisions.

18. I can explain in simple terms how fossils are formed.

Children should be able to independently draw a cartoon strip to clearly label and describe the simple process of fossilisation.

S+. I can recognise factors which make a fair test.

Children should be able to make sensible judgements about whether a test has been carried out in a fair way.

With guidance, they should be able to identify some of the variables and what was kept the same.

S+ I can offer an explanation for the results of an investigation.

Children should be able to:

- look at the data they collected and offer simple conclusions;
- make predictions based on their results which may include new values;
- compare their own results with those of other groups and offer an explanation for similarities and differences.

S+. I can suggest improvements linked to my investigation.

Suggested improvements may include:

- Trying different time intervals;
- Using different equipment;
- Methods to achieve greater accuracy in data collection.

Stage 4

Stage 4 Science Assessment

Assessment Criteria		limited	developing	secure
1	I can suggest questions and offer ideas for investigations.			
2	I can make predictions using my scientific knowledge.			
3	I can plan, select appropriate equipment and record my investigation.			
4	I can recognise factors which make a test fair.			
5	I can make repeated observations of changes which occur over time.			
6	I can identify simple patterns in recorded measurements.			
7	I can record data and results using scientific diagrams and labels, bar graphs, classification keys and complete a prepared table.			
8	I can offer an explanation for the results of an investigation.			
9	I can suggest improvements linked to my investigation.			
10	I can select information from a source which has been provided.			
11	I can explain how environmental changes may have an impact on living things.			
12	I can name the basic parts of the digestive system and describe their functions.			
13	I can identify the different types of teeth in humans and their simple function.			
14	I can construct and interpret food chains.			
15	I can compare the characteristics of different states of matter.			
16	I can describe how materials change state.			
17	I can identify the part played by evaporation and condensation in the water cycle.			
18	I can identify how sounds are made, associating some of them with something vibrating.			
19	I can recognise that vibrations from sounds travel through a medium to the ear.			
20	I can find patterns between the pitch of a sound and features of the object that produced it.			
21	I can find patterns between the volume of a sound and the strength of the vibration that produced it.			
22	I can construct a simple electrical circuit, identifying and naming its basic parts.			
23	I recognise that a switch opens and closes a circuit.			
24	I can recognise some common conductors and insulators.			
S+	I can plan, select appropriate equipment and use it with accuracy to record my investigation.			
S+	I can recognise and apply factors of fair testing in my investigations.			
S+	I can draw conclusion linked to data collected or observations with some adult guidance.			

	4E (entering)	4D (developing)	4S (secure)	4S+ (secure+)
For those children not yet assessed use previous stage.	40%+ of statements in developing. (10+)	80%+ of statements in developing. (19+)	100% of statements in secure.	100% of statements in secure and all S+ statements secure.

1. I can suggest questions and offer sensible ideas for investigations.

Children should be able to:

- use their observations to help them to raise and answer their own questions throughout the year;
- make their own decisions about the most appropriate type of scientific enquiry they could use to answer questions.

Investigations may include:

- What damages teeth and how best to look after them?
- Which animals would survive best in their local environment and other environments and why?
- How do changes in environments pose dangers for living things?
- How do materials change when they are heated or cooled?
- What is the temperature when materials change state?

2. I can make predictions using my scientific knowledge.

Pupils should use relevant simple scientific language to discuss their ideas in ways that are appropriate for different audiences. They should use scientific language to first talk about their ideas and at times write about what they have found out. They should be able to compare their prediction to the outcome and make judgements.

3. I can plan, select appropriate equipment and record my investigation.

Children should be able to decide what to do to carry out their investigation.

From a selection of equipment (some relevant and some not) children should be able to select the appropriate equipment necessary to complete their experiment. Once investigations have been carried out children should be able to record what they have found out.

Note - you may provide time for children to explore different equipment to assist them in deciding if it is appropriate for their investigation. They should understand the basic functions of the equipment, explaining what they will need it for and be able demonstrate using the equipment correctly. They should learn how to use new equipment, such as data loggers, appropriately.

4. I can recognise factors which make a test fair.

Children should be able to recognise and explain why a fair test is important for an investigation and make a contribution to help in setting it up. They can show an understanding that to make a test fair they should change one factor at a time whilst keeping all other conditions the same.

5. I can make repeated observation of changes which occur over time.

Children should be able to decide and explain which type of observation to make and how long they should last. E.g. they could investigate the rate of evaporation in areas with different temperatures.

6. I can identify simple patterns in recorded measurements.

Simple patterns children could identify include:

- How the pitch of a sound is affected by the size of the object.
- How the volume of a sound is affected by the strength of the vibration.

7. I can record data and results using scientific diagrams and labels, bar graphs, classification keys and complete a prepared table.

Children should be able to record their data independently in a simple prepared table.

When presenting their findings, children should be using a variety of bar graphs and charts to represent their information.

Classification keys could be used to begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds and mammals; and invertebrates into snails and slugs, worms, spiders and insects.

Plants may be grouped into categories e.g. flowering plants such as grasses, sunflowers, tulips etc. and non-flowering plants such as ferns, mosses and fungi.

Materials could also be compared and grouped according to whether they are solids, liquids or gases.

8. I can offer an explanation for the results of an investigation.

Children should be able to look at the data they have collected and draw their own simple conclusions. Their conclusions should be logical and children should be supported to offer some explanation for their results.

9. I can suggest improvements linked to my investigation.

Children should be able to:

- Identify what went well, if they achieved the result they had predicted;
- Discuss whether their test was a fair test;
- Suggest some improvements they could make to improve the quality of their data;
- Consider if things such as: changing their equipment, continuing the investigation over a longer period of time, using a different material etc. Could improve future investigations.

10. I can select information from a source which has been provided.

Children should be able to use information provided such as in books and internet searches to select relevant information. They should also recognise when and how secondary sources might be helpful when answering questions that could not be answered through practical investigations.

14. I can construct and interpret food chains.

Children should be able to start each food chain with a plant describing this plant as a producer.

Food chains should be a variety of lengths correctly identifying the producers, predators and prey animals.

Arrows should be added to show energy flow within the food chain.

15. I can compare the characteristics of different states of matter.

Children should be able to give simple descriptions of the basic properties of solids, liquids and gases.

Solids - hold their shape and size

Liquids - can flow, cannot keep their shape unless in a container,

Gases - spread around an open space freely, escape from unsealed containers.

They should be able to use this information when talking about different states of matter.

16. I can describe how materials change state.

Children should explore reversible changes. They should be able to identify that some materials change state when they are heated or cooled.

Examples children could discuss include:

Chocolate (solid) when it is heated it melts (liquid) and when it is cooled it returns to being a solid.

Water (liquid) when it is frozen it becomes ice (solid) and when it is heated it returns to being a liquid.

Children should research the melting and freezing points of substances in degrees Celsius.

17. I can identify the part played by evaporation and condensation in the water cycle.

Children should have a good understanding of the water cycle.

They should be able to:

- Use the correct scientific vocabulary when talking about the different features of the cycle and how it works together.
- Talk about why the water cycle is important for life on earth.
- Identify and explain in their own words, the part played by evaporation and condensation.

Children should be given the opportunity to carry out practical investigations observing and recording the evaporation over a period of time.

18. I can identify how sounds are made, associating some of them with something vibrating.

Pupils should be able to:

- explain that sound is made by the vibrating part of an object;
- understand the different ways in which a sound can be made i.e. shaking, rubbing, banging, hitting or blowing a range of objects and musical instruments.

19. I can recognise that vibrations from sounds travel through a medium to the ear.

Children should be able to:

- understand that sound travels by vibrating the particles in the medium (usually air) that it is travelling in;
- understand that sounds can travel through solids, liquids and gases.

20. I can find patterns between the pitch of a sound and features of the object that produced it.

Children should be able to:

- Understand that the pitch of a sound is how high or low a sound is;
- Investigate the pitch of the sounds produced by a range of musical instruments;
- Identify that usually, the longer, thicker, looser the object is the lower the pitch of the sound will be because the vibrations will be slower; the shorter, tighter or thinner the object is, the higher the pitch of the sound will be because the vibrations will be faster.

21. I can find patterns between the volume of a sound and the strength of the vibrations that produced it.

Children should be able to

- Explain in simple terms that bigger vibrations create louder sounds whilst smaller vibrations will create a quieter sound;
- Discuss why you may want to absorb sound e.g. If you lived near a busy road or had a noisy neighbour;
- Explain how sound gets fainter as the distance between the sound source increased. (Children could link their explanation to ripples in water when a leaf is dropped onto the water).

22. I can construct a simple electrical circuit, identifying and naming its basic parts.

From a range of resources children should be able to:

- Create a simple electrical circuit;
- Create their circuit and be able to identify which parts are working and any parts which may not be working, from this they should be able to swap resources until they have a working circuit;
- Produce a pictorial representation of their circuit;

Please note- conventional circuit symbols do not need to be used however there should be some consistency across the whole school. Please speak to the science lead.

23. I recognise that a switch opens and closes a circuit.

When creating their own simple circuit pupils should be able to identify what effect changing different components have e.g. that a switch opens and closes a circuit. Pupils should recognise that all the switches must be closed for the bulb in the circuit to light.

24. I can recognise some common conductors and insulators.

Children should make predictions and conduct their own investigations to discover which materials are conductors and insulators. They should be able to accurately sort and group materials according to their findings. Children should use their findings to predict whether similar materials will be conductors or insulators.

S+. I can plan, select appropriate equipment and use it with accuracy to record my investigation.

The focus of this statement is to select appropriate equipment and use it with accuracy.

Children should be able to take an accurate thermometer reading without guidance.

Children should be able to measure volume, interpreting the scales on a variety of measuring cylinders.

S+. I can recognise and apply factors of fair testing in my investigations.

Children should be able to identify most of the significant variables in an investigation.

Children should be able to select an independent variable to change whilst keeping all the rest the same.

S+. I can draw conclusions linked to data collected or observations with some adult guidance.

Children should be able to make some general observations themselves from the data they have collected or observed.

'Adult guidance' should support the child to gain a deeper understanding of what can be deduced from the data they have collected.

Stage 5

Stage 5 Science Assessment

Assessment Criteria		limited	developing	secure
1	I can ask questions about my scientific observations and with guidance plan investigations to answer them.			
2	I can observe or measure changes over different time intervals.			
3	I can recognise that scientific ideas change and develop over time.			
4	I can explore and talk about my own and other people's ideas, drawing on known information.			
5	I can use my knowledge and understanding linked to topics such as forces and the solar system to make informed suggestions as to how the world works.			
6	I can recognise and apply factors of fair testing in my investigations.			
7	I can suggest appropriate equipment and use it to gather data.			
8	I can write up or discuss my investigation findings.			
9	I can compare my own results to those of others and identify when errors maybe present.			
10	I can record data and results using scientific diagrams and labels, classifications keys, create my own table, bar and line graphs.			
11	I can draw conclusions linked to data collected or observations with adult guidance.			
12	I can describe differences in life cycles.			
13	I can describe the life process of reproduction in some plants.			
14	I can describe the life process of reproduction in some animals.			
15	I can describe stages in the growth and development of humans.			
16	I can group and classify everyday materials by identifying and describing key characteristics.			
17	I can describe how to recover a substance from a solution.			
18	I can separate different mixtures of materials, including solutions.			
19	I can talk about the advantages and disadvantages of everyday materials for different uses.			
20	I can identify when changes are reversible or non-reversible.			
21	I can describe the movement of the Earth, and other planets, relative to the Sun in the solar system.			
22	I can describe the movement of the Moon relative to the Earth.			
23	I can use the idea of the Earth's rotation to explain day and night and the apparent movement across the sky.			
24	I can identify the effects of air resistance, water resistance and friction that act between moving surfaces.			
25	I can recognise that some mechanisms, including lever, pulleys and gears allow a smaller force to have a greater effect.			
S+	I can write up or discuss my investigational findings and suggest reasons for my results.			
S+	I can suggest appropriate equipment and use it to gather accurate data.			
S+	I can make informed predictions using abstract ideas.			

	5E (entering)	5D (developing)	5S (secure)	5S+ (secure+)
For those children not yet assessed as entering use previous stage.	40%+ of statements in developing. (10+)	80%+ of statements in developing. (20+)	100% of bold statements in secure.	100% of bold statements in secure and all S+ statements secure.

1. I can ask questions about my scientific observations and with guidance, plan investigations to answer them.

Children should be able to ask questions about what they have noticed during their observation.

With support, children should consider how they could discover the answer to their questions and, as a result, plan an appropriate investigation.

2. I can observe or measure changes over different time intervals.

Children should be able to observe and measure how long it takes for some materials to dissolve into a liquid form.

They should be able to describe the movement of the Moon relative to the Earth

5. I can use my knowledge and understanding, linked to topics such as forces and the solar system, to make informed suggestions as to how the world works.

Children should be able to:

- explain how objects fall towards the Earth because of the force of gravity;
- identify the effects of air resistance, water resistance and friction that act between moving surfaces;
- describe the movement of the Earth and other planets relative to the Sun in the solar system;
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

8. I can write up or discuss my investigation findings.

It is expected that pupils should use relevant scientific language and illustrations to communicate their ideas.

Please note: pupils are expected to read, spell and pronounce scientific vocabulary correctly at this stage.

9. I can compare my own results to those of others and identify when errors may be present.

Children should be able to compare their results with other children. They should be able to identify unusual or unexpected results and understand that errors may be present.

Children should be understand that as a result of the potential errors, they would need to repeat those measurements to improve the quality of their data.

10. I can record data and results using scientific diagrams and labels, classification keys, create my own table, bar and line graphs.

Children should:

- have the opportunity to use a range of graphs and bar charts to represent their data graphically;
- be able to decide how many columns and rows are needed to create their own table to record and present the data they are collecting;
- be able to create their own classification keys to group and sort information.

11. I can make conclusions linked to data collected or observations with adult guidance.

Children should be able to make some general observations themselves from the data they have collected or observed.

'Adult guidance' should support the child to gain a deeper understanding of what can be deduced from the data they have collected.

12. I can describe difference in life cycles.

Children should observe life-cycle changes in a variety of living things. They should be taught to understand the differences in the life cycles of a mammal, an amphibian, an insect and a bird.

They should be able to:

- understand all mammals have a similar lifecycle, although the length of each stage varies: internal development where embryo is completely dependent on the mother live birth, infant, child, adolescent, adult;
- understand amphibians have a slightly more complicated life cycle. They undergo a *metamorphosis* (a big change): egg (external development); ; tadpole; frog-let; adult frog;
- understand insects undergo a *complete metamorphosis*: These insects have four stages in their life cycle: 1. egg: 2. larva: 3. Inactive 4. adult stages;
- understand birds have very simple life cycle: They hatch from an egg and grow up into an adult.

12. I can describe the life process of reproduction in some plants.

Children should:

- be able to understand the different types of reproduction in plants;
- be given the opportunity to observe and compare the life cycles of plants in their local environment with other plants around the world so they make judgements about the similarities and differences and ask pertinent questions or suggest reasons.
- know that plants can reproduce sexually to produce seeds or asexually from bulbs and cuttings.

Please note: They could try to grow new plants from different parts of the parent plant i.e. seeds, stem and root cutting, tubers and bulbs.

14. I can describe the life process of reproduction in some animals.

Children should be able to:

- understand that sexual reproduction requires 2 parents- one male and one female, with the male sex cells fertilising the female sex cells.
- be able to observe and talk about the changes in an animal over a period of time;
- explain how different animals reproduce and grow;

Note- Please seek advice from you PSHE Lead prior to covering this area.

15. I can describe stages in growths and development of humans.

Children should be able to:

- identify and describe the changes that occur as humans develop to old age;
- complete a timeline to indicate stages in growth and development of humans including infant, child, adolescent, adult to old age;
- understand the changes experienced in puberty and be able to discuss them.

16. I can compare and group everyday materials on the basis of their properties.

Children should be able to:

- demonstrate a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in Year 4;
- identify that different materials have their own set of properties making them useful for different purposes;
- understand that some materials melt and some materials dissolve; these are both different processes;
- give reasons to explain why they have grouped materials together, with reference to their results.

19. I talk about the advantages and disadvantages of every day materials for different uses.

Children should be able to:

- give reasons, based on evidence from comparative and fair tests they have carried out, for the particular use of everyday materials, including metals, wood and plastic;
- consider the materials properties including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets;
- explain their categorisation of material uses with reference to the materials properties;
- consider which material would be best to create black out curtains or for wrapping an ice cream to stop it melting.

20. I can identify when changes are reversible and non-reversible.

Children should be able to:

- explain that a reversible change is a change that can be undone or reversed.
- understand that a change is irreversible if it cannot be changed back as new materials are formed.
- base their knowledge on work carried out through activities covering reversible changes including evaporating, filtering, sieving, melting and dissolving and irreversible changes such as burning, rusting and also mixing certain substances like bicarbonate of soda and vinegar.

24. I can identify the effects of air-resistance, water resistance and friction that act between moving surfaces.

Children should be able to explain that air and water resistance are both forms of friction.

Air resistance- air pushes against any object moving through it.

Water resistance- pushes objects back making it harder for them to move through water.

They should be able to identify the effects of water resistance by creating and racing boats made out of junk modelling materials.

They should be able to identify the effects of air resistance my investigation the best parachute to slow a person down.

Children should identify when friction may play a useful part in our everyday lives, for example, the breaks on a car. They work by creating friction between the break pad and the wheel to slow the car down.

They should be able to identify when friction may not useful, for example, when a human falls over. The friction between their body and the floor causes a graze on their skin.

S+ I can write up or discuss my investigational findings and suggest reasons for my results.

Children should be able to independently use appropriate and relevant scientific language and illustrations to communicate their ideas from the investigation they have carried out.

After writing up or discussing their investigational findings, the children should be able to:

- report and present their findings from enquiries, making sure they include a conclusion of what they have found out;
- look carefully at their results and use them to make predictions to suggest further comparative and fair tests.

S+. I can suggest appropriate equipment and use it to gather accurate data.

Children should be able to think carefully about the investigation they are carrying out and use this information to help them decide what they will use to gather their data and give reasons why this will help them to make sure it is accurate.

They need to ensure they are recording data and results of increasing complexity.

They need to be able to take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

S+. I can make informed predictions using abstract ideas.

Can the child make informed predictions based on the scientific knowledge they have learned about.

They may be able to use the information they have gained in lessons to explain their understanding of Earth and space and predict how the world operates.

They could use their understanding of friction to explain how objects are slowed when it moves through the air.

They could explain how water resistance slows a boat down in the water and how changing the shape could reduce the amount of resistance on the object.

Stage 6

Stage 6 Science Assessment

Assessment Criteria		limited	developing	secure
1	I can ask questions about my scientific observations and plan investigations to answer them.			
2	I can use my investigations/observations to observe changes over different time intervals.			
3	I recognise that scientific ideas change and develop over time.			
4	I can explore and evaluate my own and other people's ideas using key information to justify my answer.			
5	I can find things out using a wide range of secondary sources.			
6	I can make informed predictions to suggest how the world works using abstract ideas.			
7	I can plan and carry out a fair test and compare results.			
8	I can select appropriate equipment and use it to gather accurate data.			
9	I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.			
10	I can identify when results are reliable and if necessary make repeated measurements.			
11	I can use my investigations/observations to notice and record patterns.			
12	I can make conclusions linked to the data I have collected or observed.			
13	I can name and identify the main parts of the human circulatory system.			
14	I can describe the functions of the heart, blood vessels and blood.			
15	I can describe the ways in which nutrients and water are transported within humans.			
16	I can explain how fossils provide some evidence for evolution.			
17	I recognise that living things change and adapt over time.			
18	I can group and classify living things by identifying and describing key characteristics.			
19	I can use the idea that light travels in straight lines.			
20	I can explain that objects are seen because they give out or reflect light into the eye.			
21	I understand that shadows have the same shape as the objects that cast them because light travels in straight lines.			
22	I can use recognised symbols when representing a simple circuit in a diagram.			
23	I understand the number and voltage of cells will have an impact on the sound of a buzzer or the brightness of a bulb.			
S+	I can evaluate the reliability of methods and suggest improvements.			
S+	I can identify independent, dependent and controlled variables within a scientific investigation.			
S+	I can independently select an appropriate secondary source to find relevant information.			

	6E (entering)	6D (developing)	6S (secure)	6S+ (secure+)
For those children not yet assessed as entering, please refer to the previous stage.	40%+ of statements in developing. (9+)	80%+ of statements in developing. (18+)	100% of statements in secure.	100% of statements in secure and all S+ statements secure.

1. I can ask questions about my scientific observations and plan investigations to answer them.

From their own observations, children should be able to ask questions about what they have noticed. They should be able to understand that scientific investigations are planned from something they have observed or questioned. The result of carrying out an investigation will help them to find an answer to their question and over time help them to understand and predict how the world operates.

They may include information about their own observations or life experiences to contribute to the predictions of the outcomes of the investigation.

The children should be able to consider how they are going to find the answer to their question.

They need to be able to talk about what they will keep the same (constant) and what it is they are going to measure and how this will help them to answer their question where necessary.

2. I can use my investigations/observations to observe changes over different time intervals.

The children should have the opportunity to plan a range of investigations and collect the results from a range of different time intervals. They should make their own decisions about what observations to make and what measurements they will take. They should be able to understand why some investigations may take long than others to find an answer to their question. They should be able to decide the time intervals when they need to take a reading from the investigation.

Some examples of possible investigations with different time intervals:

- Can I demonstrate my understanding of scientific processes by planning an investigation on plant growth?
- How does pollution affect plant growth?
- Does fertilizer really improve the growth of plants?
- Which colours are really in foods?
- What makes a cake rise?

3. I can recognise that scientific ideas change and develop over time.

Children should be able to:

- understand that fossils provide evidence about living things that inhabited the Earth millions of years ago;
- explain through discussions about how the offspring differs from the parent;
- talk about how animals and plants have adapted to live in a range of different environments;
- understand that whilst some changes can be advantageous, others can be a disadvantage.

6. I can make informed predictions to suggest how the world works using abstract ideas.

Can the child make informed predictions based on the scientific knowledge they have learned about.

In evolution and inheritance, children should be able to show a good understanding of the development of evolutionary ideas and theories over time. They should be able to explain how human evolution has occurred. They should be able to talk about how this is not a uniform process for all living things.

From light children should be able to explain how light travels in straight lines and how that all objects reflect light.

7. I can plan, carry out a fair test and compare results.

Children should be able to:

- ask their own questions and select and plan the most appropriate way to answer the question.
- evaluate their own or other people's scientific ideas;
- recognise and control variables where necessary;
- have the opportunity to use a range of scientific equipment to take accurate and precise measurements or readings;
- take repeat readings if necessary;
- notice patterns, group and classify things, carry out comparative and fair tests;
- present findings and draw conclusions in different forms;
- use scientific language to explain and evaluate their methods.

9. I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Children should be creating their own tables to record their results. They should have the opportunity to use a variety of graphs and bar charts to record their findings from a scientific investigation. They should be able to talk about why they have used this particular graph or chart to record their results using vocabulary such as discrete data or continuous data.

13. I can name and identify the main parts of the human circulatory system.

Children should be able to identify and name the main parts of the human circulatory system.

Heart	Blood vessels	Veins
Capillaries	Arteries	Circulatory System

14. I can describe the functions of the heart, blood vessels and blood.

Children should be able to explain:

- the heart is a major organ and it is made of muscle;
- the heart pumps blood around the body through vessels and this can be felt as a pulse;
- the heart pumps blood through the lungs in order to obtain a supply of oxygen;
- blood carries oxygen/essential materials to different parts of the body;
- during exercise, muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase.

15. I can describe the ways in which nutrients and water are transported within humans.

Children should be able to:

- explain what a nutrient is;
- match the nutrient to the role it has in a human e.g. Protein: builds, maintains, and replaces the tissues in your body;
- understand and explain the processes of the digestive system;
- explain the role of circulatory system in transporting nutrients and water in the body.

16. I can explain how fossils provide evidence for evolution.

Children should be able to:

- understand that fossils are very useful for providing evidence of how animals have evolved over time;
- explain how fossils provide information about living things that inhabited the Earth millions of years ago.

Please note: *Children might find out about the work of palaeontologist Mary Anning and about how Charles and Alfred Wallace developed their ideas on evolution.*

17. I can recognise that living things change and adapt over time.

Children should be able to:

- understand the idea that characteristics are passed from parents to their offspring;
- appreciate that variation in offspring over time can make animals more or less able to survive in particular environments; e.g. long neck giraffes;
- give similarities and differences between the fossil evidence and that of a living relative.

Please note: *At this stage, pupils are not expected to understand how genes and chromosomes work.*

18. I can group and classify living things by identifying and describing key characteristics.

The children should be able to

- create their own keys and use them to identify certain plants using observational evidence to devise clear and appropriate questions;
- describe in their own words the features used to classify mammals, amphibians, birds, fish, insects and reptiles.

19. I can use the idea that light travels in straight lines.

Pupils should be able to:

- understand that these lines are often called rays or beams of light;
- create a model or draw a diagram to demonstrate this concept and explain in their own words.

20. I can explain that objects are seen because they give out or reflect light into the eye.

Pupils should be able to understand the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects.

21. I understand that shadows have the same shape as the objects that cast them because light travels in straight lines.

Children should be able to:

- understand when a ray of light is blocked by an opaque object;
- explain how a shadow is the same as the shape of the object that is casting it;
- understand that a shadow can change size depending on the distance the object casting it is from the light source;
- explain how shadows can also be elongated or shortened depending on the angle of the light source.

22. I can use recognised symbols when representing a simple circuit in a diagram.

To ensure we have consistency, it is important children are taught to use the same symbols to represent electrical components across the whole school.

***Please speak to your Science Lead for advice.**

S+ I can evaluate the reliability of methods and suggest improvements.

Children should be able to:

- identify some of the weaknesses in the method they have used to answer a scientific question;
- understand that tests should be repeated to ensure a degree of reliability;
- suggest practical improvements to their chosen method.

S+ I can identify independent, dependent and controlled variables within a scientific investigation.

Children will be able to identify a full range of significant variables in an investigation. They will be able to identify the controlled variable as the factor they are going to change. They know other independent variables will be kept the same. They know they will need to measure the dependent variable.

S+ I can independently select an appropriate secondary source to find relevant information.

Children will need to demonstrate an understanding of the chosen source material. They need to select information carefully rather than copying and pasting a large amount of irrelevant information.