

SCIENTIFIC KNOWLEDGE

PLANTS	<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees
MATERIALS	<ul style="list-style-type: none"> Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties.
LIGHT AND ASTRONOMY/ EARTH AND SPACE	<ul style="list-style-type: none"> Observe and describe changes across the four seasons. Observe and describe weather associated with the seasons and how day varies.
ANIMALS, INCLUDING HUMANS	<ul style="list-style-type: none"> Identify and name a variety of common animals including some fish, some amphibians, some reptiles, some birds and some mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

WORKING SCIENTIFICALLY

EXPLORING/ OBSERVING	<ul style="list-style-type: none"> Begin to use simple scientific language to talk about or record what they have noticed Look / observe closely and communicate changes over time Look / observe closely and communicate the features or properties of things in the real world Observe closely using their senses
GROUPING & CLASSIFYING	<ul style="list-style-type: none"> Name basic features of objects, materials and living things Say how things are similar or different Compare and contrast simple observable features / characteristics of objects, materials and living things
QUESTIONING	<ul style="list-style-type: none"> Ask simple questions about what they notice about the world around them Demonstrate curiosity by the questions they ask
RESEARCHING	<ul style="list-style-type: none"> Ask people questions (e.g. an expert or hot-seating) Use simple primary and secondary sources (such as objects, books and photographs) to find things out
PLANNING AND TESTING	<ul style="list-style-type: none"> With help, carry out a simple test/comparative test With help, make a simple prediction or suggestion about what might happen Begin to suggest some ideas e.g. choose which equipment to use, choose which materials to test from a selection Talk about ways of setting up a test
USING EQUIPMENT AND MEASURES	<ul style="list-style-type: none"> Measure using non-standard units e.g. how many lolly sticks/cubes/handfuls, etc. Observe closely, using simple equipment (e.g. hand lenses, egg timers) use senses to compare different textures, sounds and smells
COMMUNICATI NG	<ul style="list-style-type: none"> Communicate their ideas to a range of audiences in a variety of way Complete a pre-constructed table / chart using picture records or simple words Contribute to a class display Add annotations to drawings or photographs Begin to use some simple scientific language Record simple visual representations of observations made
CONSIDERING RESULTS	<ul style="list-style-type: none"> Use recordings to talk about and describe what happened Sequence photographs of an event/observation

**Science Key Learning – Under review 2022-
2023**

Year 2	
SCIENTIFIC KNOWLEDGE	
PLANTS	<ul style="list-style-type: none"> Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
MATERIALS	<ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
LIVING THINGS AND THEIR HABITATS	<ul style="list-style-type: none"> explore and compare the differences between things that are living, dead, and things that have never been alive identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including micro-habitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.
ANIMALS, INCLUDING HUMANS	<ul style="list-style-type: none"> Notice that animals, including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
WORKING SCIENTIFICALLY	
EXPLORING/OBSERVING	<ul style="list-style-type: none"> Use simple scientific language to talk about / record what they have noticed Observe and describe simple processes/ cycles/changes with several steps (e.g. <i>growth cycle, simple food chain, saying how living things depend on one another</i>) Observe closely and communicate with increasing accuracy the features or properties of things in the real world
GROUPING & CLASSIFYING	<ul style="list-style-type: none"> Sort and group objects (compare and contrast), materials or living things by observable and/or behavioural features
QUESTIONING	<ul style="list-style-type: none"> Raise their own logical questions based on or linked to things they have observed eg. 'What will happen if...?'
RESEARCHING	<ul style="list-style-type: none"> Talk about how useful the information source was and express opinion about findings Make suggestions about who to ask or where to look for information. Ask people questions to help them answer their questions Use simple and appropriate secondary sources (such as books, photographs, videos and other technology) to find things out / find answers
PLANNING AND TESTING	<ul style="list-style-type: none"> Carry out simple comparative tests as part of a group, following a method with some independence Make a simple prediction about what might happen and try to give a vague reason (even though it might not be correct) With support, make suggestions on a method for setting up a simple comparative test Talk about a practical way to find answers to their questions
USING EQUIPMENT AND MEASURES	<ul style="list-style-type: none"> Measure using non-standard and simple standard measures (e.g. cm, time) with increasing accuracy Begin to make decisions about which equipment to use Correctly and safely use equipment provided to make observations and/or take simple measurements
COMMUNICATING	<ul style="list-style-type: none"> Record and communicate their findings in a range of ways to a variety of audiences Use simple scientific language with increasing accuracy Record simple data with some accuracy to help in answering questions; - With support or using frameworks, make decisions about how to complete a variety of tables/charts (e.g. a 2 column table, tally charts, Venn diagram, pictograms, block graphs with 1:1 scale). Present findings in a class displays - Sequence / annotate photographs of change over time ☑ Produced increasingly detailed drawings which are labelled/annotated
CONSIDERING RESULTS	<ul style="list-style-type: none"> With guidance, begin to notice patterns in their data e.g. order their findings, sequence best to worst, say what happened over time, etc. Recognise if results matched predictions. (say if results were what they expected) Use their recordings to talk about and describe what has happened Begin to use simple scientific language to explain what they have found out. Give a simple, logical reason why something happened (e.g. I think ... because ...) Begin to discuss if the test was unfair

Year 3	
SCIENTIFIC KNOWLEDGE	
PLANTS	<ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
FORCES & MAGNETS	<ul style="list-style-type: none"> compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing.
LIGHT	<ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change.
ANIMALS, INCLUDING HUMANS	<ul style="list-style-type: none"> Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
ROCKS AND SOILS	<ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter
WORKING SCIENTIFICALLY	
EXPLORING/OBSERVING	<ul style="list-style-type: none"> Observe and record relationships between structure and function Observe and record changes /stages over time Explore / observe things in the local environment / real contexts and record observations
GROUPING & CLASSIFYING	<ul style="list-style-type: none"> Decide ways and give reasons for sorting, grouping, classifying, identifying things /objects, living things, processes or events based on specific characteristics Compare and contrast and begin to consider the relationships between different things (e.g. structures of plants, functions of plant parts, diets, skeletons of humans and other animals, changes over time, etc.) Record similarities as well as differences (e.g. what do all skeletons have? as well as the differences between skeletons)
QUESTIONING	<ul style="list-style-type: none"> Begin to understand that some questions can be tested in the classroom and some cannot. Within a group, suggest relevant questions about what they could/have observed and about the world around them. Eg. 'What if we tried...?' or 'What if we changed...?'
RESEARCHING	<ul style="list-style-type: none"> Find things out using a range of secondary sources of information (e.g. books, photographs, videos and other technology)
PLANNING AND TESTING	<ul style="list-style-type: none"> Help to decide about how to set up a simple fair test and begin to recognise when a test is not fair. Make a prediction based on everyday experience With support/as a group, set up simple practical enquiries incl. comparative and fair tests e.g. make a choice from a list of a things (variables) to change when conducting a fair test. (e.g. choose which magnets to compare and which method to use to test their strength). As a group, begin to make some decisions about the best way of answering their qus. Find/suggest a practical way to compare things e.g. rocks, magnets
USING EQUIPMENT AND MEASURES	<ul style="list-style-type: none"> Collect data from their own observations and measurements using notes/ simple tables/standard units Help to make some decisions about what observations to make, how long to make them for, the type of simple equipment that might be used and how to work safely. Make simple accurate measurements using whole number standard units, using a range of equipment Gather data in a variety of ways to help in answering questions ☑ Use equipment accurately to improve the detail of their measurements/ observations (e.g. microscopes, measuring syringes, measuring cylinders, hand lenses)

COMMUNICATING	<ul style="list-style-type: none"> Record and present findings using simple scientific language and vocabulary including discussions, oral and written explanations, notes, annotated drawings, pictorial representations, labelled diagrams, simple tables, bar charts (using scales chosen for them), displays or presentations With scaffold / support record, and present data in a variety of ways to help in answering questions. Communicate their findings in ways that are appropriate for different audiences.
CONSIDERING RESULTS	<ul style="list-style-type: none"> With scaffold/support, describe and compare the effect of different factors on something. (e.g. we noticed that larger magnets are not always stronger) With help, look for changes and simple patterns in their observations, data, chart or graph. Use their results to consider whether they met their predictions. Use their experience and some evidence or results to draw a simple conclusion to answer their original question. Write a simple explanation of why things happened (using the word 'because') and using simple scientific language and vocabulary Say whether what happened was what they expected and notice any results that seem odd. Begin to recognise when a test is not fair and suggest improvements.

Year 4	
SCIENTIFIC KNOWLEDGE	
ELECTRICITY	<ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors.
SOUND	<ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases.
LIVING THINGS AND THEIR HABITATS	<ul style="list-style-type: none"> recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things.
ANIMALS, INCLUDING HUMANS	<ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey.
MATERIALS – STATES OF MATTER	<ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
WORKING SCIENTIFICALLY	
EXPLORING/OBSERVING	<ul style="list-style-type: none"> Discuss ideas and develop descriptions from their observations using relevant scientific language and vocabulary Observe and record relationships between structure and function or between different parts of a processes Observe and record changes /stages over time
GROUPING & CLASSIFYING	<ul style="list-style-type: none"> Make a simple guide to local living things. Use guides or simple keys to classify / identify [animals, flowering plants and nonflowering plants]. Begin to give reasons for these similarities and differences. Record similarities as well as differences of more complex groups of objects/living things/events (e.g. evaporation and condensation, different food chains, different electrical circuits)
QUESTIONING	<ul style="list-style-type: none"> Ask/raise their own relevant questions with increasing confidence and independence that can be explored, observed, tested or investigated further Ask questions such as ‘What will happen if...?’ or ‘What if we changed...?’ Choose/select a relevant question that can be answered [by research or experiment / test].
RESEARCHING	<ul style="list-style-type: none"> Make decisions about which information to use from a wide range of sources and make decisions about how to present their research Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.
PLANNING AND TESTING	<ul style="list-style-type: none"> Carry out simple fair tests with increasing confidence investigating the effect of something on something else Start to make their own decisions about the most appropriate type of science enquiry they might use to answer scientific questions (is a fair test the best way to investigate their question?). Make a prediction based on the knowledge acquired from previous explorations /observations and apply it to a new situation Explain their planning decisions and choices Make some of the planning decisions about what to change and measure/observe. Begin to recognise when a fair test is necessary.
USING EQUIPMENT AND MEASURES	<ul style="list-style-type: none"> Begin to identify where patterns might be found and use this to begin to identify what data to collect Make more of the decisions about what observations to make, how long to make them for and the type of equipment that might be used. Recognise obvious risks and how to keep themselves and others safe Learn how to use new equipment, such as data loggers & measure temperature in degrees Celsius (°C) using a thermometer.

	<ul style="list-style-type: none"> • Collect data from their own observations and measurements, using notes/simple tables/standard units • Make accurate measurements using standard units [and more complex units and parts of units] using a range of equipment and scales
COMMUNICATING	<ul style="list-style-type: none"> • Record findings using relevant scientific language and vocabulary, including discussions, oral and written explanations, notes, drawings (annotated), pictorial representations, labelled diagrams, tables and bar charts [where intervals and ranges agreed through discussion], displays or presentations • Begin to select the most useful ways to collect, record, classify and present data from a range of choices • Make decisions on how best to communicate their findings in ways that are appropriate for different audiences
CONSIDERING RESULTS	<ul style="list-style-type: none"> • Notice/find patterns in their observations and data. (Describe the effect of something on something else) (e.g. as I lengthen the ruler I notice that the pitch gets lower) • With some independence, analyse results / observations by writing a sentence that matches the evidence i.e. deciding the important aspect of the result and summarising in a conclusion (e.g. metals tend to be good conductors of electricity) • Begin to develop their ideas about relationships and interactions between things and explain them ☑ Use relevant scientific language and vocabulary to begin to say/explain why something happened • Use results to suggest improvements, new questions and/or predictions for setting up further tests • Compare their results with others and give reasons why results might be different

Year 5	
SCIENTIFIC KNOWLEDGE	
EARTH AND SPACE	<ul style="list-style-type: none"> describe the movement of the Earth, and other planets, relative to the Sun in the solar system describe the movement of the Moon relative to the Earth describe the Sun, Earth and Moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
FORCES	<ul style="list-style-type: none"> explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identify the effects of air resistance, water resistance and friction, that act between moving surfaces recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
LIVING THINGS AND THEIR HABITATS	<ul style="list-style-type: none"> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals.
ANIMALS, INCLUDING HUMANS	<ul style="list-style-type: none"> Describe the changes as humans develop to old age.
MATERIALS – STATES OF MATTER	<ul style="list-style-type: none"> compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic demonstrate that dissolving, mixing and changes of state are reversible changes explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.
WORKING SCIENTIFICALLY	
EXPLORING/OBSERVING	<ul style="list-style-type: none"> Evaluate their observations and suggest a further test, offer another question or make a prediction Observe (including changes over time) and suggest a reason for what they notice
GROUPING & CLASSIFYING	<ul style="list-style-type: none"> Suggest reasons for similarities and differences Compare and contrast things beyond their locality (e.g. features of animals, life cycles of different living things, melting compared with dissolving, etc). Decide which sources of information (and/or equipment and/or test) to help identify and classify
QUESTIONING	<ul style="list-style-type: none"> Decide whether their questions can be answered by researching or by testing . Independently ask their own scientific questions taking some ownership for finding out the answers. Eg. 'What would happen to... if we changed...?'
RESEARCHING	<ul style="list-style-type: none"> Find out how scientific ideas have changed/developed over time Articulate and explain findings from their research using scientific knowledge and understanding Make decisions about which information to use from a wide range of sources
PLANNING AND TESTING	<ul style="list-style-type: none"> Carry out fair tests and other investigations with increasing independence Suggest more than one possible prediction and begin to suggest which is the most likely. Justify their reason with some knowledge and understanding of the scientific concept Make decisions about which variables to change, measure and keep the same Make most of the planning decisions for an investigation. Recognise when it is appropriate to carry out a fair test.
USING EQUIPMENT AND MEASURES	<ul style="list-style-type: none"> Make their own decisions about what observations to make or measurements to use and how long to take them for (recognising the need for repeat readings on some occasions). Take measurements using a range of scientific equipment with increasing accuracy and using more complex scales / units Identify possible risks to themselves and others and suggest ways of reducing these Choose the most appropriate equipment and make accurate measurements
COMMUNICATING	<ul style="list-style-type: none"> Use their developing scientific knowledge and understanding and relevant scientific Present and explain their findings through talk, in written forms or in other ways (e.g. using technology) for a range of audiences / purposes Record data and results of increasing complexity using different formats e.g. tables, annotated scientific diagrams, classification keys, graphs and models Make decisions about the most appropriate way of recording data

CONSIDERING
RESULTS

- Describe straightforward patterns in results linking cause and effect e.g. using er...er or the word 'more' (e.g. the longer, thinner shapes move through the water more quickly OR the larger the wings, the longer it takes the spinner to fall)
- Look for / notice relationships between things and begin to describe these.
- Comment on the results and whether they support the initial prediction
- Use their scientific K&U and appropriate scientific language and terminology to explain their findings and data and answer their initial question
- Draw a valid conclusion (explain why it happened) based on their data and observations
- Begin to recognise how repeated readings improve the reliability of results
- Compare results with others and comment on how reliable they are

Year 6	
SCIENTIFIC KNOWLEDGE	
EVOLUTION AND INHERITANCE	<ul style="list-style-type: none"> recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
LIGHT	<ul style="list-style-type: none"> recognise that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
LIVING THINGS AND THEIR HABITATS	<ul style="list-style-type: none"> describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics.
ANIMALS, INCLUDING HUMANS	<ul style="list-style-type: none"> Identify and name main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans.
ELECTRICITY	<ul style="list-style-type: none"> associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram.
WORKING SCIENTIFICALLY	
EXPLORING/OBSERVING	<ul style="list-style-type: none"> Use correct scientific knowledge and understanding and relevant scientific language to discuss their observations and explorations Identify changes that have occurred over a very long period of time (evolution) and discuss how changes have impacted the world
GROUPING & CLASSIFYING	<ul style="list-style-type: none"> Use and construct a classification key / branching database using more than two items Compare and contrast things beyond their locality and discuss advantages/disadvantages, pros/cons of the similarities and difference
QUESTIONING	<ul style="list-style-type: none"> Recognise scientific questions that do not yet have definitive answers Refine a scientific question to make it testable i.e. Ask a testable question which includes the change and measure variables - e.g. what would happen to ... if we changed ...? e.g. What affect would we have on ... if we ...? e.g. How would exercise affect the pulse rate? Independently ask a variety of scientific questions and decide the type of enquiry needed to answer them
RESEARCHING	<ul style="list-style-type: none"> Research how scientific ideas have developed over time and had an impact on our lives. Use evidence from a variety of sources to justify their ideas Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. Interview people to find out information
PLANNING AND TESTING	<ul style="list-style-type: none"> Predict what a graph might look like before collecting results Make a hypothesis where they say how one thing will affect another and give a reason for their suggestion with a developing understanding of the scientific concept Identify variables to change, measure and keep the same in order for a test to be fair Independently plan investigations and explain planning decisions Decide when it is appropriate to carry out a fair test investigation, comparative test or alternative
USING EQUIPMENT AND MEASURES	<ul style="list-style-type: none"> Decide whether to repeat any readings and justify the reason for doing so Make their own decisions about what measurements to take (and begin to identify the ranges used). Make, and act on, suggestions to control/reduce risks to themselves & others Use equipment fit for purpose to take measurements which are increasingly accurate and precise Decide the most appropriate equipment to use to collect data
COMMUNICATING	<ul style="list-style-type: none"> Articulate understanding of the concept using scientific language and terminology when describing abstract ideas, observations and findings Record data and results of increasing complexity using scientific diagrams and labels, recognised symbols, classification keys, tables, bar and line graphs, and models. Make decisions about how to present and explain their findings through talk, in written forms or in other ways (e.g. using technology)
CONSIDERING RESULTS	<ul style="list-style-type: none"> Spot unexpected results that do not fit the pattern (anomalies) Identify patterns in results collected and describe them using the change and measure variables (causal relationships) (e.g. as we increased the number of batteries the brightness the bulb increased Identify evidence that refutes or supports their ideas

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| | <ul style="list-style-type: none">• Independently form a conclusion which draws on the evidence from the test)• Use scientific language and terminology explain why something happened• Be able to suggest reasons for unexpected results (anomalies)• Describe how to improve planning to produce more reliable results• Say how confident they are that their results are reliable and give a reason |
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