

# B.A.D thinking

Cognitive Domain	Type of thinking	Types of activities
<b>Basic</b>	Low level cognitive demand. Involves following instructions.	Name, describe, follow instructions or methods, complete tasks, recall information, ask basic questions, observe, use, match, report, measure, list, illustrate, label, recognise, tell, repeat, arrange, define, memorise, calculate, recite, draw, recall.
<b>Advancing</b>	Higher-level cognitive demand beyond recall. Requires application involving some degree of decision making.	Apply skills to solve problems, explain methods, classify, infer, categorise, identify patterns, organise, modify, predict, interpret, summarise, estimate, compare, use, experiment, demonstrate, practise, show, arrange, point out, graph, separate.
<b>Deep</b>	Cognitive demand involves non-standard, non-routine, inter-connected, multi-step thinking in problems with more than one possible solution. Requires reasoning and justification.	Solve non-routine problems, appraise, explain concepts, hypothesise, investigate, cite evidence, design, create, prove, judge, recommend, justify, generalise, propose, discover, arrange, rate, evaluate, revise, conclude, formulate, construct, develop, connect.

# Milestone 1 - Biology - To understand plants

Milestone indicator	Basic	Advancing	Deep
Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.	<p>What are the <b>names</b> of common wild plants?</p> <p>What are the <b>names</b> of some common garden plants?</p> <p>What are the <b>names</b> of common trees?</p> <p><b>Which</b> trees are evergreen and which are deciduous? (<b>name</b>)</p>	<p>What are the <b>similarities and differences</b> between deciduous and evergreen trees?</p> <p>Think of some ways to <b>categorise</b> plants.</p>	<p>Could you <b>suggest</b> a garden <b>design</b> for someone who likes privacy and bright autumn colours?</p>
Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers.	<ul style="list-style-type: none"> <li>• What are the <b>names</b> the parts of flowering plants?</li> </ul> <p>What is the structure (<b>names</b>) of each part of a flowering plant?</p>	<p>Taking a selection of (real) different flowering plants, what are the structural features? (<b>apply</b>)</p>	<p>Are roots always at the bottom of plants (<b>generalise</b>)?</p> <p>Why do you think that is? (<b>explain concept</b>)</p>
Observe and describe how seeds and bulbs grow into mature plants.	<p><b>Describe</b> the growth of seeds and bulbs.</p>	<ul style="list-style-type: none"> <li>• What are the <b>similarities and differences</b> in the growth of seeds and bulbs?</li> </ul>	<ul style="list-style-type: none"> <li>• What might a scientist need to keep in mind when recording information about the growth of seeds and bulbs? (<b>propose</b>)</li> </ul>
Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	<ul style="list-style-type: none"> <li>• What do plants need to stay healthy? (<b>describe, list</b>)</li> </ul>	<ul style="list-style-type: none"> <li>• How could you try to revive these plants? (<b>apply</b>) [Give pupils a dried out plant, one that's been in a fridge, one that's been kept in the dark etc?]</li> </ul>	<ul style="list-style-type: none"> <li>• How could you <b>devise</b> a way of <b>proving</b> that plants need certain conditions for growth?</li> </ul>

# Milestone 1 - Biology - To understand animals and humans

Milestone indicator	Basic	Advancing	Deep
Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates.	<p><b>Name</b> some common animals.</p> <p><b>Match</b> the animals to the labels birds, fish, amphibian, reptile, mammal and invertebrate.</p>	<p><b>Point out</b> and <b>explain</b> the main differences between birds, fish, amphibians, reptiles, mammals and invertebrates.</p>	<p><b>Create</b> a guide to recognising different types of animals.</p>
Identify and name a variety of common animals that are carnivores, herbivores and omnivores.	<p><b>Name</b> some common animals.</p> <p><b>Label</b> animals as carnivore, herbivores or omnivore.</p>	<p><b>Show</b> how carnivores, herbivores and omnivores are similar and different.</p>	<p>True or false? (<b>prove</b>) Carnivores are not hunted by other carnivores.</p>
Describe and compare the structure of a variety of common animals. (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets)	<p><b>Name</b> and <b>label</b> the structures of common animals.</p> <p><b>Complete</b> tables that compare the structures of common animals.</p>	<p><b>Compare</b> and <b>contrast</b> mammals with amphibians.</p>	<p>What <b>evidence</b> would you show to prove that a reptile could not be confused with a mammal?</p>
Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	<p><b>Label</b> the main parts of the human body.</p> <p><b>Illustrate</b> the parts of the body associated with the five senses.</p>	<p><b>Explain</b> why the sense of touch may be important to a blind person.</p>	<p><b>Suggest</b> some adjustments that could be made around school for a blind or deaf person.</p>
Notice that animals, including humans, have offspring which grow into adults.	<p><b>Name</b> the offspring of animals and humans. (e.g. babies for humans, puppies for dogs)</p> <p><b>Match</b> the offspring to the adult.</p>	<p><b>Explain</b> the main <b>differences</b> between adult animals and humans and their offspring.</p>	<p><b>Suggest</b> some ways that an animal's offspring (including humans) are dependent, for some time, on adults.</p>
Investigate and describe the basic needs of animals, including humans, for survival. (water, food and air)	<p><b>List</b> the basic needs of animals, including humans, for survival.</p>	<p><b>Compare</b> the types of food that different animals require.</p>	<p><b>Explain the concept</b> of humans' need for clean water and why this is not so important for other animals.</p>
Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	<p><b>Describe</b> a healthy diet.</p> <p><b>Describe</b> a healthy lifestyle.</p> <p><b>Observe</b> and <b>describe</b> the effect of exercise.</p>	<p><b>Categorise</b> food types and <b>explain</b> why each group is important to humans.</p>	<p><b>Create</b> a weekly menu and exercise programme for someone your age.</p>

# Milestone 1 - Biology - To investigate living things

Milestone indicator	Basic	Advancing	Deep
Explore and compare the differences between things that are living, that are dead and that have never been alive.	<p><b>Observe</b> and <b>list</b> the key features of things that are living, dead and that have never been alive.</p> <p><b>Describe</b> things as living, dead or never been alive.</p>	<p><b>Organise</b> things of your choice into groups: living, dead and never been alive.</p>	<p><b>Give evidence</b> to show that a glass bottle has never been alive.</p>
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.	<p><b>Observe</b> animals/plants in their natural habitats.</p> <p><b>Match</b> the animal/plant to its habitat.</p> <p><b>Describe</b> why the animal/plant is suited to its environment.</p>	<p><b>Categorise</b> animals/plants according to the conditions they require.</p> <p><b>Explain</b> your categories.</p>	<p><b>Suggest</b> reasons why a cactus may find it difficult to survive in cold, wet conditions.</p> <p><b>Create</b> an ideal environment for woodlice and <b>prove</b> that this is a successful habitat.</p>
Identify and name a variety of plants and animals in their habitats, including micro-habitats.	<p><b>Match</b> common animals/plants to their habitats.</p>	<p><b>Explain</b> why a habitat for a plant or animal is suitable.</p>	<p><b>Design</b> an ideal habitat for a hamster (or other animal that is kept as a pet).</p> <p><b>Create</b> a bottle garden for plants that require warm, dry conditions.</p>
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.	<p><b>What</b> does a (name of animal) like to eat? (<b>name</b>)</p> <p><b>Draw</b> a food chain that ends with a sparrow hawk.</p> <p><b>Name</b> sources of food.</p>	<p><b>Explain</b> the <b>differences</b> in a food chain for a herbivore and a carnivore.</p>	<p><b>Always, sometimes or never?</b> All food chains end with a carnivore.</p>

# Milestone 1 - Biology - To understand evolution and inheritance

Milestone indicator	Basic	Advancing	Deep
Identify how humans resemble their parents in many features.	<p><b>List</b> the ways that humans may resemble their parents.</p> <p><b>Match</b> pictures of parents to their children.</p>	Present <b>similarities</b> and <b>differences</b> between parents and their children.	<b>Devise</b> a 'guess who' game to <b>deduce</b> the child of a set of parents.

# Milestone 1 - Chemistry - To investigate materials

Milestone indicator	Basic	Advancing	Deep
Distinguish between an object and the material from which it is made.	<p><b>Match</b> an object to its original material.</p> <p><b>Name</b> the object and its original material.</p>	<p><b>Explain</b> how a bottle is made from sand.</p> <p><b>Choose</b> some objects and <b>explain</b> how they were made from their original material.</p>	<p><b>True or false?</b> Some fleece jackets start as plastic bottles.</p>
Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.	<p><b>Observe</b> and <b>name</b> everyday materials.</p> <p><b>Arrange</b> objects made of the same materials and <b>label</b> the materials.</p>	<p><b>Group</b> objects based on the materials they are made from. <b>Explain</b> your groupings.</p>	<p><b>Investigate</b> which objects started off as a plant.</p>
Describe the simple physical properties of a variety of everyday materials.	<p><b>Observe</b> and <b>name</b> the properties of everyday materials.</p> <p><b>Complete</b> tables that describe the properties of materials.</p>	<p><b>Explain</b> why the properties of materials are useful for deciding which materials to use for an object. Give <b>examples</b>.</p>	<p><b>Design</b> an item of clothing to keep one dry.</p>
Compare and group together a variety of everyday materials on the basis of their simple physical properties.	<p><b>Place</b> materials into groups under the headings given to you.</p> <p><b>Describe</b> the different properties of materials.</p>	<p><b>Decide</b> how to group materials on the basis of their properties. <b>Explain</b> your reasons for your groups.</p> <p><b>Compare</b> and <b>contrast</b> the different properties of materials.</p>	<p><b>Create</b> a 'guess the material' game based on the properties of materials.</p>
Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	<p><b>Observe</b> and <b>describe</b> changes to the shape of solid objects when they are squashed, bent, twisted or stretched.</p>	<p><b>Experiment</b> with changing the shape of solid objects. <b>Organise</b> and <b>summarise</b> your findings.</p>	<p><b>Always, sometimes or never?</b> The shape of wood can be changed through squashing, bending, twisting or stretching.</p>
Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses.	<p><b>List</b> different uses for everyday materials.</p> <p><b>List</b> reasons for the suitability of materials for particular uses.</p>	<p><b>Compare and contrast</b> the properties of materials and use this to <b>explain</b> why certain materials are used for particular purposes.</p>	<p>Paper is unsuitable for a model boat. Do you agree or disagree (<b>reason, justify</b>)</p> <p><b>Devise</b> other <b>hypotheses</b> like this and test them.</p>

# Milestone 1 - Physics - To understand movement, forces and magnets

Milestone indicator	Basic	Advancing	Deep
Notice and describe how things move, using simple comparisons such as faster and slower.	<p><b>What</b> happens to objects when they are pushed?</p> <p><b>What</b> happens to objects when they are pulled?</p>	<p><b>Experiment</b> with pushing objects gently and hard. <b>Record</b> and <b>explain</b> what happens.</p> <p><b>Experiment</b> with a slope and <b>record</b> how this changes the speed at which an object rolls.</p>	<p><b>Devise</b> ways to slow down a toy car rolling down a slope.</p> <p><b>True or false?</b> The surface on which a toy car rolls affects its speed?</p>
Compare how different things move.	<p><b>Observe</b> and <b>describe</b> the movement of a range of things including things that move with magnets.</p>	<p><b>Compare</b> the movement of remote control cars and a helicopter drone. <b>Explain</b> the differences in movement.</p>	<p>Do heavy and light things move differently? <b>Is there a pattern?</b></p>

# Milestone 1 - Physics - To understand light and seeing

Milestone indicator	Basic	Advancing	Deep
Observe and name a variety of sources of light, including electric lights, flames and the Sun, explaining that we see things because light travels from them to our eyes.	<p><b>Name</b> a variety of sources of light.</p> <p><b>Illustrate</b> how light travels from light sources to our eyes.</p>	<p><b>Experiment</b> with ways to block light from reaching our eyes.</p> <p><b>Point out</b> how this demonstrates that light travels from a source to our eyes.</p>	<p><b>True or false?</b> The brighter the source of light the easier it is to see.</p>

# Milestone 1 - Physics - To investigate sound and hearing

Milestone indicator	Basic	Advancing	Deep
Observe and name a variety of sources of sound, noticing that we hear with our ears.	<p><b>Name</b> a variety of sources of sound.</p> <p><b>Recognise</b> a variety of sounds.</p> <p><b>Observe</b> how we hear sounds with our ears.</p> <p><b>Illustrate</b> that ears allow us to hear sounds.</p>	<p><b>Categorise</b> sounds.</p> <p><b>Compare</b> and <b>contrast</b> sounds based on your own criteria. (<b>choose</b>)</p>	<p><b>Suggest</b> ways to protect our ears from loud sounds.</p>

# Milestone 1 - Physics - To understand electrical circuits

Milestone indicator	Basic	Advancing	Deep
Identify common appliances that run on electricity.	<p><b>Observe</b> and <b>name</b> some sources of electricity. (mains, battery)</p> <p><b>List</b> common appliances that run on electricity.</p>	<p><b>Categorise</b> electrical appliances. <b>Explain</b> the reasons for your categories.</p> <p><b>Compare</b> and <b>contrast</b> some appliances in each of your categories.</p>	<p><b>Always, sometimes or never?</b> Electrical appliances need batteries or mains electricity to power them.</p>
Construct a simple series electrical circuit.	<p><b>Follow instructions</b> to construct an electrical circuit.</p> <p><b>Describe</b> the circuit, <b>naming</b> each component.</p>	<p><b>Modify</b> a circuit to add more components.</p> <p><b>Experiment</b> with and <b>categorise</b> the effect that adding more components has.</p>	<p><b>Diagnose and repair</b> a broken circuit. (<b>solve non-routine problems</b>)</p>

# Milestone 1 - Physics - To understand the Earth's movement in space

Milestone indicator	Basic	Advancing	Deep
Observe the apparent movement of the Sun during the day.	<p><b>Name</b> times of the day.</p> <p><b>Observe</b> and <b>describe</b> the sun's position in the sky at different times of the school day.</p>	<p><b>Show how</b> might you know (<b>apply</b>) roughly what time it is in a day by looking at the position of the sun.</p>	<p><b>Think of a way</b> to prove that it is lunch time using the sun.</p>
Observe changes across the four seasons.	<p><b>Name</b> the four seasons.</p> <p><b>Notice and name</b> the key features of each season.</p>	<p><b>Organise</b> images or objects from each season into categories. <b>Explain</b> your categories.</p>	<p><b>Always sometimes or never?</b> It is warm and dry during Summer</p>
Observe and describe weather associated with the seasons and how day length varies.	<p><b>Observe</b> and <b>record</b> weather over four seasons.</p> <p><b>Describe</b> weather in a named season.</p> <p><b>Describe</b> how daylight length varies in each season.</p>	<p><b>Compare</b> and <b>contrast</b> weather and day length across the four seasons.</p> <p><b>Identify patterns</b> in day length across the four seasons.</p>	<p><b>Plan</b> some activities that would be suited to each season.</p>