Lansdowne School

Schemes of Work – Scientific Enquiry

By the end of the Access pathway pupils will:

- Pupils will be able to understand and explain simple scientific processes, working towards Entry Level Science accreditation.
- They will be able to make predictions and complete simple scientific experiments to test those predictions.
- They will be able to measure and produce simple factual data using diagrams and graphs and record findings using visuals, words and simple phrases. Pupils will have developed a scientific vocabulary.

By the end of the M.1 pathway pupils will:

- Pupils will confidently have the knowledge to achieve Entry Level 2 accreditation.
- They will be able to make predictions and complete scientific experiments to test those predictions.
- They will be able to measure and produce data using a range of methods, such as diagrams and a variety of graphs and record findings to explain scientific outcomes.
- Pupils will confidently use scientific language to discuss and explain their findings.

By the end of the M.2 / M.3 pathways pupils will:

- Pupils will be able to understand, explain and record scientific processes, working towards Entry Level 3 Science Accreditation.
- They will be able to make predictions and complete scientific experiments to test those predictions.
- They will confidently use a variety of means to produce data to verify their findings, which they can explain to a varied audience.
- Pupils will have a solid grasp of scientific language.
- By the end of KS4 they will be fully prepared to start the IGCSE in Environmental Management

Scientific Enquiry Learning Intention:

- Asking relevant questions and using different types of scientific enquiries to answer them
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Learning Intention	**Skills**	**Learning Strategies**
Observation	pupils will learn to: • Sort by a given criterion	Access: • Name real objects/say events they have observed

	• Can describe characteristics of objects and events they observe • Describe or respond appropriately to simple features of objects , living things and events they observe, • Communicating their findings in simple ways • Use and develop keys and other information records to identify, classify and describe living things and materials;	• Use real objects to sort and then classify. • Using prompts and cues say and record their findings, using simple strategies such as a Ven diagram, visuals, short descriptive phrases. • Use visuals to develop keys to classify and describe living things, materials etc. M.1: • Use real objects to sort and then classify – with adult prompts and cues say the categories in which objects etc. have been sorted and classified. • Reinforce knowledge of sorting and classifying real objects to record findings through matching pictures to labels/ write short descriptions of objects. • Writing a short sentence describing the objects and explaining how and why the objects were sorted and classified. • Say events they have observed with pictures/visuals as prompts and cues. • Record these findings using story boards to sequence the events. • Develop a simple visual key to classify and describe living things, materials etc. M.2: • Use real objects, photos and pictures to sort and classify objects using a given criteria. • Describe the objects and explain why they have sorted and classified objects into the given criteria. • Record findings independently using a subject based word bank to describe objects and events and the reasons for the classification. • Say events they have observed with pictures/visuals as prompts and cues. • Record these findings using story boards to sequence the events • Develop a key to describe living things and materials. M.3: • Use photos objects to sort and classify a range of criteria independently.

		• Describe the different objects etc. and say why they have been sorted and classified into those criteria. • Record findings independently showing and explaining the different criteria they have observed. • Develop a key to describe living things and materials
Design an experiment	• Identify problem to be investigated; • Create an hypothesis • What you need to do; • Equipment to use; • How you will do it; • Predict what will happen • Respond to suggestions and put forward their own ideas about how to find the answer to a question. • Recognise why it is important to collect data to answer questions	Access: • Identify a problem to be investigated using visuals, choice boards and adult prompts and cues. • Using visuals and choice boards make a simple hypothesis of the outcome of the investigation with adult prompts and cues. • Identify equipment to be used for the investigation, which is clearly labelled with visuals and words with adult prompts and cues. • Make a simple prediction using a range of photos and visuals to show the sequence of the prediction. • Complete the experiment with adult prompts and cues. • Observe the outcome of the investigation. Pupils will say what they think has happened. • Using visuals sequence the outcome. M.1: • Identify a problem to be investigated. Say what the problem is and make a simple hypothesis of the outcome of the problem. • Record the problem and hypothesis using a subject specific word bank with adult prompts and cues. • Identify equipment to be used for the experiment, which is clearly labelled independently. • Follow the sequence of the experiment – teacher led – record the sequence • Complete the experiment with minimal adult prompts and cues. • Observe the outcome of the investigation/experiment and say what has happened. • Record outcomes using visuals, word bank and short phrases. M.2: • Identify a problem to be investigated.

		• Say what the problem is and make a simple hypothesis of the outcome of the problem. • Record the problem and hypothesis using a subject specific word bank w • Identify equipment to be used for the experiment, which is clearly labelled independently. • Follow the sequence of the experiment – teacher led – record the sequence • Complete the experiment. • Observe the outcome of the investigation/experiment and say what has happened. • Record outcomes using word bank and sentences. M.3: • Identify a problem to be investigated. • Say what the problem is and make a simple hypothesis of the outcome of the problem. • Record the problem and hypothesis. • Identify equipment to be used for the experiment, which is clearly labelled independently. • Follow the sequence of the experiment – teacher led – record the sequence • Complete the experiment. • Observe the outcome of the investigation/experiment and say what has happened. • Record outcomes and showing if the experiment outcomes were the same as those individually predicted and variables.
Making measurements or observations	• Handle equipment and materials safely • Use equipment to make measurements or observations, • Check findings by repeats or a mean. • Write down results • Decide how to record data from a choice of familiar approaches; • Record data and results of increasing complexity using scientific diagrams and	Access: • Adults will demonstrate how to handle equipment and materials safely. Pupils will practice handling equipment and materials with adult prompts and cues. • Equipment will be labelled with visuals so pupils are able to identify equipment and materials. • Pupils will be encouraged to identify the equipment they need for measurements and observations and will measure and observe with adult prompts and cues.

	labels, classification keys, tables, scatter graphs	• Pupils will say and record data findings using visuals. • They will use simple tables, diagrams and graphs, such as ven diagrams and pictograms to record data. M.1: • Adults will demonstrate how to handle equipment and materials safely. Pupils will practice handling equipment and materials. • Equipment will be labelled with visuals so pupils are able to identify equipment and materials. • Pupils will be encouraged to identify the equipment they need for measurements and observations and will measure and observe with minimal prompts and cues. • Pupils will say and record data findings using visuals, pictures and phrases. • They will use simple tables, diagrams and graphs, such as ven diagrams and pictograms to record data. M.2: • Pupils will practice handling equipment and materials. • Equipment will be labelled with visuals so pupils are able to identify equipment and materials. • Pupils will be encouraged to identify the equipment they need for measurements and observations and will measure and observe independently. • Pupils will say and record data findings using short phrases. • They will use tables, diagrams and graphs to record data. M.3: • Pupils will independently use and equipment and materials. • Pupils will be encouraged to identify the equipment they need for measurements and observations and will measure and observe findings and calculations independently. • Pupils will say and record data findings using sentences and paragraphs • They will use a range of more complex tables, diagrams and graphs, independently to record data and findings

Identify patterns and relationships	• Notice patterns; • Draw conclusions based in their data and observations; • Use their scientific knowledge and understanding to explain their findings • Identify patterns that might be found in the natural environment; • Look for different causal relationships in their data; • Discuss the degree of trust they can have in a set of results; • Report and present their conclusions to others in oral and written forms.	Access: • Pupils will become familiar with patterns, supported by adult prompts and cues. • They will draw conclusions based on visual information, using choice boards to make an informed choice based on findings and scientific knowledge/vocabulary. • Use simple data to see similarities or differences. • Say and present conclusions using visuals, words and pictures with adult prompts and cues. M.1: • Pupils will be encouraged to see a range of patterns in their findings with minimal adult prompts and cues. • They will by look at data and draw conclusions and make observations by saying what they can see and what they have found, with adult prompts and cues. • Use data to see relationships and say and record those relationships • Present outcomes using phrases, sentences and graphs. M.2: • Pupils will be encouraged to see a range of patterns in their findings with minimal adult support. • They will recognise a pattern and comment on this pattern using words, phrases and sentences. • They will by look at data and draw conclusions and make observations by saying what they can see and what they have found, with minimal support. • They will use pictures, phrases and sentences to describe their conclusions and observations. • Use data to see and comment on relationships and say/record those relationships • Present outcomes using phrases, sentences and graphs with minimal support. M.3: • See patterns in their findings and comment on these patterns independently

		• They will by look at data and draw conclusions and make observations by saying what they can see and what they have found, independently. • They will use phrases, sentences and paragraphs to describe their conclusions and observations. • Use data to see and comment on relationships and say/record those relationships • Present outcomes using phrases, sentences and graphs independently.
Language of science	• Read, spell and pronounce scientific vocabulary correctly; • Use primary and secondary sources evidence to justify ideas; • Identify evidence that refutes or supports their ideas; • Recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact; • To recognise scientific conventions when drawing diagrams and tables. • Talk about how scientific ideas have developed over time.	Access: • Begin to understand scientific vocabulary using objects and visuals to support understanding. • Read and write scientific vocabulary with visuals. • Look at a range of simple criteria/sources that support ideas and hypothesis using practical situations and objects of reference. M.1: • Begin to understand scientific vocabulary using objects and visuals to support understanding. • Read and write scientific vocabulary using simple words and phrases. • Look at a range of simple criteria/sources that support ideas and hypothesis using practical situations and objects of reference to support understanding. • Begin to name sources that are factual with minimal adult support. • Use a range of strategies that will support reading, writing, recording and understanding a range of scientific vocabulary. • To transfer findings and knowledge into simple graphs and tables. M.2: • See and explain simple patterns with visual support. • Further understand scientific vocabulary using visuals. • Read, write scientific vocabulary using simple phrases and sentences to explain findings, make hypothesis and describe outcomes. • Identify sources that are factual to support findings.

		• Use a range of strategies that will support reading, writing, recording and understanding a greater range of scientific vocabulary. • Transfer scientific knowledge and vocabulary to show outcomes and findings in a range of different ways, i.e. written report, graphs etc. M.3: • To apply correct terminology • Identification of variables • Transfer raw data into graphs • Recognise a pattern and describe it • To use technology to research a hypothesis, selection of fact over opinion, recognise valid evidence. • Relate conclusion to prediction • Suggest improvements or further experimentation