

Science

Progression in working scientifically skills

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| Years 1 and 2 | | | | | Years 3 and 4 | Years 5 and 6 | | |
| Asking questions and recognising that they can be answered in different ways | | | | | | | | |
| Asking simple questions and recognising  that they can be answered in different  ways  • While exploring the world, the children  develop their ability to ask questions (such  as what something is, how things are  similar and different, the ways things work,  which alternative is better, how things  change and how they happen). Where  appropriate, they answer these questions.  • The children answer questions developed  with the teacher often through a scenario.  • The children are involved in planning how  to use resources provided to answer the  questions using different types of enquiry,  helping them to recognise that there are  different ways in which questions can be  answered. | | | | | Asking relevant questions and using  different types of scientific enquiries to  answer them  • The children consider their prior  knowledge when asking questions. They  independently use a range of question  stems. Where appropriate, they answer  these questions.  • The children answer questions posed by  the teacher.  • Given a range of resources, the children  decide for themselves how to gather  evidence to answer the question. They  recognise when secondary sources can  be used to answer questions that cannot  be answered through practical work.  They identify the type of enquiry that they  have chosen to answer their question. | Planning different types of scientific  enquiries to answer questions, including  recognising and controlling variables  where necessary  • Children independently ask scientific  questions. This may be stimulated by a  scientific experience or involve asking  further questions based on their developed  understanding following an enquiry.  • Given a wide range of resources the  children decide for themselves how to  gather evidence to answer a scientific  question. They choose a type of enquiry to  carry out and justify their choice. They  recognise how secondary sources can be  used to answer questions that cannot be  answered through practical work. | | |
| Making observations and taking measurements | | | | | | | | |
| Observing closely, using simple  equipment  • Children explore the world around them.  They make careful observations to support  identification, comparison and noticing  change. They use appropriate senses,  aided by equipment such as magnifying  glasses or digital microscopes, to make  their observations.  • They begin to take measurements, initially  by comparisons, then using non-standard  units. | | | | | Making systematic and careful  observations and, where appropriate,  taking accurate measurements using  standard units, using a range of  equipment, including thermometers and  data loggers  • The children make systematic and  careful observations.  • They use a range of equipment for  measuring length, time, temperature and  capacity. They use standard units for  their measurements. | Taking measurements, using a range of  scientific equipment, with increasing  accuracy and precision, taking repeat  readings when appropriate  • The children select measuring equipment  to give the most precise results e.g. ruler,  tape measure or trundle wheel, force  meter with a suitable scale.  • During an enquiry, they make decisions  e.g. whether they need to: take repeat  readings (fair testing); increase the sample  size (pattern seeking); adjust the  observation period and frequency  (observing over time); or check further  secondary sources (researching); in order  to get accurate data (closer to the true  value). | | |
| Engaging in practical enquiry to answer questions | | | | | | | | |
| Performing simple tests  • The children use practical resources  provided to gather evidence to answer  questions generated by themselves or the  teacher. They carry out: tests to classify;  comparative tests; pattern seeking  enquiries; and make observations over  time.  Identifying and classifying  • Children use their observations and testing  to compare objects, materials and living  things. They sort and group these things,  identifying their own criteria for sorting.  • They use simple secondary sources (such  as identification sheets) to name living  things. They describe the characteristics  they used to identify a living thing. | | | | | Setting up simple practical enquiries,  comparative and fair tests  • The children select from a range of  practical resources to gather evidence to  answer questions generated by  themselves or the teacher.  • They follow their plan to carry out:  observations and tests to classify;  comparative and simple fair tests;  observations over time; and pattern  seeking.  Planning different types of scientific  enquiries to answer questions, including  recognising and controlling variables  where necessary  • The children select from a range of  practical resources to gather evidence to  answer their questions. They carry out fair  tests, recognising and controlling  variables. They decide what observations  or measurements to make over time and  for how long. They look for patterns and  relationships using a suitable sample.  Explanatory note  A comparative test is performed by  changing a variable that is qualitative  e.g. the type of material, shape of the  parachute. This leads to a ranked  outcome.  A fair test is performed by changing a  variable that is quantitative e.g. the  thickness of the material or the area  of the canopy. This leads to  establishing a causative relationship. | Planning different types of scientific  enquiries to answer questions, including  recognising and controlling variables  where necessary  • The children select from a range of  practical resources to gather evidence to  answer their questions. They carry out fair  tests, recognising and controlling  variables. They decide what observations  or measurements to make over time and  for how long. They look for patterns and  relationships using a suitable sample. | | |
| Recording and presenting evidence | | | | | | | | |
| Gathering and recording data to help in  answering questions  • The children record their observations e.g.  using photographs, videos, drawings,  labelled diagrams or in writing.  • They record their measurements e.g.  using prepared tables, pictograms, tally  charts and block graphs.  • They classify using simple prepared tables  and sorting rings. | | | | 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  • The children sometimes decide how to  record and present evidence. They  record their observation e.g. using  photographs, videos, pictures, labelled  diagrams or writing. They record their  measurements e.g. using tables, tally  charts and bar charts (given templates, if  required, to which they can add  headings). They record classifications  e.g. using tables, Venn diagrams, Carroll  diagrams.  • Children are supported to present the  same data in different ways in order to  help with answering the question. | | | Recording data and results of increasing  complexity using scientific diagrams and  labels, classification keys, tables, scatter  graphs, bar and line graphs  • The children decide how to record and  present evidence. They record  observations e.g. using annotated  photographs, videos, labelled diagrams,  observational drawings, labelled scientific  diagrams or writing. They record  measurements e.g. using tables, tally  charts, bar charts, line graphs and scatter  graphs. They record classifications e.g.  using tables, Venn diagrams, Carroll  diagrams and classification keys.  • Children present the same data in different  ways in order to help with answering the  question. | |
| Answering questions and concluding | | | | | | | | |
| Using their observations and ideas to  suggest answers to questions  • Children use their experiences of the world  around them to suggest appropriate  answers to questions. They are supported  to relate these to their evidence e.g.  observations they have made,  measurements they have taken or  information they have gained from  secondary sources.  Using their observations and ideas to  suggest answers to questions  • The children recognise ‘biggest and  smallest’, ‘best and worst’ etc. from their  data. | | | Using straightforward scientific evidence  to answer questions or to support their  findings  • Children answer their own and others’  questions based on observations they  have made, measurements they have  taken or information they have gained  from secondary sources. The answers  are consistent with the evidence.  Identifying differences, similarities or  changes related to simple scientific ideas  and processes  • Children interpret their data to generate  simple comparative statements based on  their evidence. They begin to identify  naturally occurring patterns and causal  relationships.  Using results to draw simple conclusions,  make predictions for new values, suggest  improvements and raise further questions  • They draw conclusions based on their  evidence and current subject knowledge. | | | | Identifying scientific evidence that has  been used to support or refute ideas or  arguments  • Children answer their own and others’  questions based on observations they  have made, measurements they have  taken or information they have gained  from secondary sources. When doing this,  they discuss whether other evidence e.g.  from other groups, secondary sources and  their scientific understanding, supports or  refutes their answer.  • They talk about how their scientific ideas  change due to new evidence that they  have gathered.  • They talk about how new discoveries  change scientific understanding.  Reporting and presenting findings from  enquiries, including conclusions, causal  relationships and explanations of and  degree of trust in results, in oral and  written forms such as displays and other  presentations  • In their conclusions, children: identify  causal relationships and patterns in the  natural world from their evidence; identify  results that do not fit the overall pattern;  and explain their findings using their  subject knowledge. | |
| Evaluating and raising further questions and predictions | | | | | | | | |
|  | | Using results to draw simple conclusions,  make predictions for new values, suggest  improvements and raise further questions  • They identify ways in which they adapted  their method as they progressed or how  they would do it differently if they  repeated the enquiry.Using results to draw simple  conclusions, make predictions for new  values, suggest improvements and raise  further questions  • Children use their evidence to suggest  values for different items tested using  the same method e.g. the distance  travelled by a car on an additional  surface.  • Following a scientific experience, the  children ask further questions which can  be answered by extending the same  enquiry. | | | | | Reporting and presenting findings from  enquiries, including conclusions, causal  relationships and explanations of and  degree of trust in results, in oral and  written forms such as displays and other  presentations  • They evaluate, for example, the choice of  method used, the control of variables, the  precision and accuracy of measurements  and the credibility of secondary sources  used.  • They identify any limitations that reduce  the trust they have in their data.  Using test results to make predictions to  set up further comparative and fair tests  • Children use the scientific knowledge  gained from enquiry work to make  predictions they can investigate using  comparative and fair tests | |
| Communicating their findings | | | | | | | | |
|  | Reporting on findings from enquiries,  including oral and written explanations,  displays or presentations of results and  conclusions  • They communicate their findings to an  audience both orally and in writing, using  appropriate scientific vocabulary. | | | | | | | Reporting and presenting findings from  enquiries, including conclusions, causal  relationships and explanations of and  degree of trust in results, in oral and  written forms such as displays and other  presentations  • They communicate their findings to an  audience using relevant scientific  language and illustrations |