

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 recognisingthat they can be answered in differentways• While exploring the world, the childrendevelop their ability to ask questions (suchas what something is, how things aresimilar and different, the ways things work,which alternative is better, how thingschange and how they happen). Whereappropriate, they answer these questions.• The children answer questions developedwith the teacher often through a scenario.• The children are involved in planning howto use resources provided to answer thequestions using different types of enquiry,helping them to recognise that there aredifferent ways in which questions can beanswered. |  Asking relevant questions and usingdifferent types of scientific enquiries toanswer them• The children consider their priorknowledge when asking questions. Theyindependently use a range of questionstems. Where appropriate, they answerthese questions.• The children answer questions posed bythe teacher.• Given a range of resources, the childrendecide for themselves how to gatherevidence to answer the question. Theyrecognise when secondary sources canbe used to answer questions that cannotbe answered through practical work.They identify the type of enquiry that theyhave chosen to answer their question. |  Planning different types of scientificenquiries to answer questions, includingrecognising and controlling variableswhere necessary• Children independently ask scientificquestions. This may be stimulated by ascientific experience or involve askingfurther questions based on their developedunderstanding following an enquiry.• Given a wide range of resources thechildren decide for themselves how togather evidence to answer a scientificquestion. They choose a type of enquiry tocarry out and justify their choice. Theyrecognise how secondary sources can beused to answer questions that cannot beanswered through practical work. |
| Making observations and taking measurements |
| Observing closely, using simpleequipment• Children explore the world around them.They make careful observations to supportidentification, comparison and noticingchange. They use appropriate senses,aided by equipment such as magnifyingglasses or digital microscopes, to maketheir observations.• They begin to take measurements, initiallyby comparisons, then using non-standardunits. |  Making systematic and carefulobservations and, where appropriate,taking accurate measurements usingstandard units, using a range ofequipment, including thermometers anddata loggers• The children make systematic andcareful observations.• They use a range of equipment formeasuring length, time, temperature andcapacity. They use standard units fortheir measurements. | Taking measurements, using a range ofscientific equipment, with increasingaccuracy and precision, taking repeatreadings when appropriate• The children select measuring equipmentto give the most precise results e.g. ruler,tape measure or trundle wheel, forcemeter with a suitable scale.• During an enquiry, they make decisionse.g. whether they need to: take repeatreadings (fair testing); increase the samplesize (pattern seeking); adjust theobservation period and frequency(observing over time); or check furthersecondary sources (researching); in orderto get accurate data (closer to the truevalue). |
| Engaging in practical enquiry to answer questions |
| Performing simple tests• The children use practical resourcesprovided to gather evidence to answerquestions generated by themselves or theteacher. They carry out: tests to classify;comparative tests; pattern seekingenquiries; and make observations overtime.Identifying and classifying• Children use their observations and testingto compare objects, materials and livingthings. They sort and group these things,identifying their own criteria for sorting.• They use simple secondary sources (suchas identification sheets) to name livingthings. They describe the characteristicsthey used to identify a living thing. | Setting up simple practical enquiries,comparative and fair tests• The children select from a range ofpractical resources to gather evidence toanswer questions generated bythemselves or the teacher.• They follow their plan to carry out:observations and tests to classify;comparative and simple fair tests;observations over time; and patternseeking.Planning different types of scientificenquiries to answer questions, includingrecognising and controlling variableswhere necessary• The children select from a range ofpractical resources to gather evidence toanswer their questions. They carry out fairtests, recognising and controllingvariables. They decide what observationsor measurements to make over time andfor how long. They look for patterns andrelationships using a suitable sample.Explanatory noteA comparative test is performed bychanging a variable that is qualitativee.g. the type of material, shape of theparachute. This leads to a rankedoutcome.A fair test is performed by changing avariable that is quantitative e.g. thethickness of the material or the areaof the canopy. This leads toestablishing a causative relationship. | Planning different types of scientificenquiries to answer questions, includingrecognising and controlling variableswhere necessary• The children select from a range ofpractical resources to gather evidence toanswer their questions. They carry out fairtests, recognising and controllingvariables. They decide what observationsor measurements to make over time andfor how long. They look for patterns andrelationships using a suitable sample. |
| Recording and presenting evidence |
| Gathering and recording data to help inanswering 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, tallycharts and block graphs.• They classify using simple prepared tablesand sorting rings. | Gathering, recording, classifying andpresenting data in a variety of ways tohelp in answering questionsRecording findings using simplescientific language, drawings, labelleddiagrams, keys, bar charts, and tables• The children sometimes decide how torecord and present evidence. Theyrecord their observation e.g. usingphotographs, videos, pictures, labelleddiagrams or writing. They record theirmeasurements e.g. using tables, tallycharts and bar charts (given templates, ifrequired, to which they can addheadings). They record classificationse.g. using tables, Venn diagrams, Carrolldiagrams.• Children are supported to present thesame data in different ways in order tohelp with answering the question. | Recording data and results of increasingcomplexity using scientific diagrams andlabels, classification keys, tables, scattergraphs, bar and line graphs• The children decide how to record andpresent evidence. They recordobservations e.g. using annotatedphotographs, videos, labelled diagrams,observational drawings, labelled scientificdiagrams or writing. They recordmeasurements e.g. using tables, tallycharts, bar charts, line graphs and scattergraphs. They record classifications e.g.using tables, Venn diagrams, Carrolldiagrams and classification keys.• Children present the same data in differentways in order to help with answering thequestion. |
| Answering questions and concluding |
| Using their observations and ideas tosuggest answers to questions• Children use their experiences of the worldaround them to suggest appropriateanswers to questions. They are supportedto relate these to their evidence e.g.observations they have made,measurements they have taken orinformation they have gained fromsecondary sources.Using their observations and ideas tosuggest answers to questions• The children recognise ‘biggest andsmallest’, ‘best and worst’ etc. from theirdata. | Using straightforward scientific evidenceto answer questions or to support theirfindings• Children answer their own and others’questions based on observations theyhave made, measurements they havetaken or information they have gainedfrom secondary sources. The answersare consistent with the evidence.Identifying differences, similarities orchanges related to simple scientific ideasand processes• Children interpret their data to generatesimple comparative statements based ontheir evidence. They begin to identifynaturally occurring patterns and causalrelationships.Using results to draw simple conclusions,make predictions for new values, suggestimprovements and raise further questions• They draw conclusions based on theirevidence and current subject knowledge. |  Identifying scientific evidence that hasbeen used to support or refute ideas orarguments• Children answer their own and others’questions based on observations theyhave made, measurements they havetaken or information they have gainedfrom secondary sources. When doing this,they discuss whether other evidence e.g.from other groups, secondary sources andtheir scientific understanding, supports orrefutes their answer.• They talk about how their scientific ideaschange due to new evidence that theyhave gathered.• They talk about how new discoverieschange scientific understanding.Reporting and presenting findings fromenquiries, including conclusions, causalrelationships and explanations of anddegree of trust in results, in oral andwritten forms such as displays and otherpresentations• In their conclusions, children: identifycausal relationships and patterns in thenatural world from their evidence; identifyresults that do not fit the overall pattern;and explain their findings using theirsubject knowledge. |
| Evaluating and raising further questions and predictions |
|  | Using results to draw simple conclusions,make predictions for new values, suggestimprovements and raise further questions• They identify ways in which they adaptedtheir method as they progressed or howthey would do it differently if theyrepeated the enquiry.Using results to draw simpleconclusions, make predictions for newvalues, suggest improvements and raisefurther questions• Children use their evidence to suggestvalues for different items tested usingthe same method e.g. the distancetravelled by a car on an additionalsurface.• Following a scientific experience, thechildren ask further questions which canbe answered by extending the sameenquiry. | Reporting and presenting findings fromenquiries, including conclusions, causalrelationships and explanations of anddegree of trust in results, in oral andwritten forms such as displays and otherpresentations• They evaluate, for example, the choice ofmethod used, the control of variables, theprecision and accuracy of measurementsand the credibility of secondary sourcesused.• They identify any limitations that reducethe trust they have in their data.Using test results to make predictions toset up further comparative and fair tests• Children use the scientific knowledgegained from enquiry work to makepredictions they can investigate usingcomparative and fair tests |
| Communicating their findings |
|  |  Reporting on findings from enquiries,including oral and written explanations,displays or presentations of results andconclusions• They communicate their findings to anaudience both orally and in writing, usingappropriate scientific vocabulary. | Reporting and presenting findings fromenquiries, including conclusions, causalrelationships and explanations of anddegree of trust in results, in oral andwritten forms such as displays and otherpresentations• They communicate their findings to anaudience using relevant scientificlanguage and illustrations |