SLS Science Planning & Assessment Board

Knowledge & Understanding

Explaining Science

Classification

Working Scientifically

Designing Experiments

Data, Tables & Graphs

Making Conclusions

EYFS ------> KS1 ——> Secure | LKS2 ——> Secure | UKS2 ——> Secure ------>

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 6+
Explaining Science							
I remember simple science facts within an activity	I remember simple science facts within a topic	I remember a range of **science facts** within a topic	I am using pre-learning to build connected knowledge	I **connect** knowledge within a topic & from **pre-learning**	I connect knowledge between topics & from pre-learning	I **connect** knowledge across science & the **wider curriculum**	I connect knowledge fluently across science & curriculum
I use science words during an activity	I use & remember relevant science words during activity	I use & **remember** science words over time (short term)	I remember science words I have used before (longer term)	I **remember & use** science words correctly (apply)	I begin to use complex science words correctly	I use **complex** science words correctly (**fluency**)	I use complex science words accurately & fluently
I describe what is happening using words & actions	I describe what is happening using science	I use **science** to describe & **recall** what I have seen	I begin to use science models to describe (sequence)	I use **science models** to **describe** (what, where)	I use science models to describe & begin to explain (why, how)	I use **science models** to describe & **explain** (why, how, logical)	I begin to apply science models to explain new events
I match appropriate pictures & words to label diagrams	I add science word labels to diagrams	I **add science labels** & information (help) to diagrams	I add science labels & information to diagrams	I **annotate** diagrams to help describe & explain	I begin to create & annotate my own 2D/3D diagrams	I create & annotate my **own** 2D/3D **diagrams**	I create & annotate my own complex 2D/3D diagrams
I begin to use science facts to explain my answer	I select science facts to use in an answer	I **select** relevant science facts to use in an answer	I link relevant facts together in an answer	I '**cluster**' related facts together into points (recalled)	I select & prioritise facts to create an argument/answer	I present a **clear & logical** argument / answer	I present an extended & logical argument / answer
Classification							
I sort using pictures or instructions	I sort using simple yes/no statements	I **use** simple spider keys with **obvious differences**	I use large spider keys with obvious differences	I **use** a range of spider keys with **fine differences**	I construct spider & use number keys	I **construct** both spider & number keys	I construct both spider & number keys (complex)
I group by familiar features (size, colour, shape, etc)	I group by difference or similarity	I **group** by difference, similarity or change	I create groups for sorting (create criteria)	I **create** appropriate groups for sorting (create criteria)	I group & sub-group by easily observation (create criteria)	I group & **sub-group** by fine observation (create criteria)	I group & re-group using combinations of criteria
I use my senses to identify properties of materials	I link properties of materials to an application (help)	I **link properties** of materials to an application	I combine properties required for an application (help)	I **describe combined properties** required for an application	I explain how properties suit an application	I **explain the science** behind a range of properties	I describe how material properties can change

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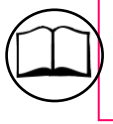
Explaining Science | Classification

EYFS ------> KS1 ——> Secure			LKS2 ——> Secure		UKS2 ——> Secure ------>		
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 6+

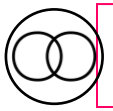
Prediction	Observed Variables Categoric Data (words) - Charts			Design		Measured Variables Continuous Data (numbers) - Graphs		
	I use experience to suggest what might happen next	I suggest what might happen in an investigation	I suggest what might happen (**simple prediction**)	I predict cause & effect (science prediction)	I predict a trend (**relationship prediction**)	**I use K&U to explain my relationship**	I reason K&U to make a **hypothesis** (relationship)	I reason K&U to generate a testable hypothesis
Equipment	I use a range of everyday items to investigate	I use a limited range of science equipment correctly (help)	I **use** a range of science equipment correctly	I select suitable equipment for the task	I **select & use** suitable equipment for the task	I select equipment with the right scale for the task (help)	I **select & use** equipment with **right scale** for the task	I select & use equipment for increased precision
	I begin to know what it means to investigate safely	I notice risk (help) & can list some common dangers	I **notice risk** in my investigation & know common dangers	I predict obvious risk & act on safety suggestions	I predict obvious risk & **work safely** (mostly)	I begin to plan to minimise risk & work safely (consistently)	I plan to **minimise risk** & describe safe use of equipment	I predict & control a range of risks independently
Design	I use experience to suggest an idea to investigate	I suggest an idea to investigate & ask questions	I **suggest** an idea to investigate from observations	I identify cause & effect in my investigation	I **plan** investigations by selecting variables to change	I plan investigations & ensure controlled variables kept same	I **plan reliable** investigations (use of variable terminology)	I plan a reliable investigations with increased precision
	I'm aware that variables change in an investigation	I begin to identify the cause variable in an investigation	I **identify** the **cause variable** correctly (label & range)	I suggest a suitable data range for a cause variable	I suggest a data **range & interval** for a cause variable	I suggest a data range, interval & sufficient readings	I plan to collect **repeat readings** (>3) & calculate mean	I plan to reduce error by care of measurement
	I follow short demo & spoken instruction with multiple parts	I follow short demo, spoken & picture instructions	I **follow** short spoken & written instructions in order	I follow written instructions & write a simple method	I **design & write** a simple **ordered** method (from plan)	I design & write an ordered method (controls variables)	I **design & write** an **ordered reliable** method (repeats)	I design & write a reliable method (repeats; precision)



Researching & communicating:
Use secondary sources to find & organise relevant information

Observing & measuring over time:
Over short (seconds / minutes) or long (days / months) periods of time

Comparative & Fair testing:
One variable changed; others are kept the same. Use words or numbers



Identification & classification:
Sorting into groups based upon criteria

Finding patterns:
Patterns emerge from observation

Problem solving:
Applying science knowledge to find answers

WS Skills are taught & practised **through** a range of Enquiry Type investigation

Designing Experiments

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EYFS ------> KS1 ——> Secure | LKS2 ——> Secure | UKS2 ——> Secure ------>

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 6+
Data	I position numbers on a number track to 10 & beyond	I position numbers on a number track to 20 & beyond	I measure **labelled** divisions on a number line (inc. in steps)	I measure unlabelled divisions on a number line (+ve values)	I measure **unmarked** divisions on a number line (+ve values)	I measure divisions on a number line past zero (-ve values)	I **scale up/down** a number line (axis) & decide on limits	I scale up/down a number line (axis) confidently
	I use non-standard units to measure & compare	I measure in non-standard & compare e.g. heavier/lighter	I measure **standard units** (inc. length, mass, capacity)	I measure/compare values in standard units	I **measure/convert** values in standard units (inc. time)	I measure/convert values in standard units (inc. area)	I **measure/calculate** with standard units (inc. area & volume)	I calculate compound units (e.g. acceleration)
Tables	I use a simple table by recording in pictures & words	I use a simple table by recording in words and numbers	I **use** a simple table recording in words & numbers (inc. tally)	I use a frame to construct a simple table of results	I **construct** a **simple table** to compare cause & effect	I use a frame to construct a complex table of results	I **construct** a **complex table** to show repeated data	I construct complex tables to include calculations
Graphs	I add to pictograms with help	I use a frame to add to pictograms & block charts	**I construct** simple pictograms & **block charts**	I use a frame to construct a bar chart (help)	I **construct bar charts** correctly (inc. numerical axis)	I use a frame to construct a graph & can scale axes (help)	I **construct graphs** & can scale at least one axis independently	I construct graphs & can scale each axis confidently
	I represent groups using resources, marks & numbers	I add to block charts by counting up	I **use scale** on block chart (coordinate) to add correct blocks	I draw bars on a bar chart (one axis coordinate)	I **plot coordinates** on a graph in the first quadrant	I join plotted coordinates with straight lines	I plot mean values & draw a **trend line** for linear data	I plot mean values & draw a trend line for non-linear data
	I compare groups using comparative language							

Data, Tables & Graphs

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	EYFS ------> KS1 ——> Secure			LKS2 ——> Secure		UKS2 ——> Secure ------>		
	EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 6+**
Patterns	I recognise, create & describe simple patterns (e.g. size)	I recognise, create & describe simple number patterns	I **describe** simple features & **patterns** in data & charts	I describe simple patterns in data, charts & graphs	I **describe** simple patterns, **trends** & relationships in data	I describe patterns, trends & relationships in data	I **describe changing patterns**, trends & relationships	I compare changing patterns, trends & relationships
	I begin to use 'more or less' to compare observations	I use 'more or less' to compare numbers	I see obvious **differences in sets of numbers**	I see subtle differences in sets of numbers	I see differences (error) in **repeated data**	I spot anomalous data that doesn't fit the pattern	I **spot anomalous data** & explain from the method	I deal with anomalous data to increase reliability
Conclusions	I talk about changes through my senses during activities	I describe the changes that are happening	I **describe the changes** that have happened	I describe my results by linking cause & effect	I **describe trends** & begin to use science models to **explain**	I use data in my conclusion & science models to explain	I use **primary & secondary data** in my conclusions	I use a range of data in conclusions to support validity
	I explore 'what if ..' questions through talk & play	I explore different ways to do things through play	I suggest a **different way** to do things with help	I suggest improvements to my method	I suggest **sensible improvements** to my method	I identify strengths & weaknesses & improvements	I suggest **limitations (data) & practical improvements**	I suggest limitations (use data) & justify improvements

Working Scientifically – word lists

KS1

Axis = reference line drawn on a graph to show the range of data for each variable (shows values)
Block chart = visual toll to show data/counts as bars built up by adding component blocks. Used to compare data visually
Cause = the variable we chose to change in an investigation
Data = a measured or counted outcome for a variable (numbers)
Effect = the variable that changes when we change the cause
Experiment = investigation that looks for a link between variables (fair or comparative test)
Observation = sensed outcome for a variable (described in words)
Pictogram = chart that uses pictures to represent data
Prediction = suggests what might happen based upon prior knowledge or experience (not a guess)
Results table = way of presenting data from an investigation
Risk = dangers when doing an investigation, using equipment or working in an area
Standard units = a quantity of a variable that is used as a standard measure (e.g. litre, meter, gram, etc)
Variable = a factor that can change

LKS2 (plus KS1)

Bar chart/graph = visual tool that uses bars to compare discrete data
Comparative test = fair test comparing discrete differences
Conclusion = the answer you give to a question (based upon data)
Continuous data = values are numbers (result from counting/measuring)
Coordinate = used to plot data (x/y) on a graph
Data interval =numerical gap between data points for a variable
Data point = a coordinate for a variable
Data range = maximum & minimum values for a variable
Discrete data = values are distinct/separate (e.g. male/female; counts)
Fair test = an investigation where only one variable is changed (cause); all others are kept the same and at their best value
Line graph = visual tool that shows a relationship trend between two continuous variables (it is essentially a scatter graph)
Method = ordered sequence of steps taken during an investigation. It can be written or in diagram form
Prediction (correlation/relationship) = describes the expected trend for two variables (cause & effect) that are linked
Prediction (scientific/causal) = suggestion as to what might happen based upon prior knowledge, experience or observation. Links the cause with the predicted effect. Does not have to describe the trend
Spider key = branching classification key where each branch has a yes/no choice (dichotomous key) leading to further choices
Trend = the outcome when two variables (cause & effect) are linked

UKS2 (plus KS1/LKS2)

Anomalous data = data that does not fit a pattern
Controlled variable = variables kept at the same value so they do not influence the dependent variable in a fair test

Making Conclusions

Data set = vales for repeated data
Data spread = variation of the data away from a mean (often due to imprecise measuring or when the controlled variable have not been kept the same)
Dependent variable = changed (effect) as a result of changing another. This is observed or measured and demonstrates a relationship in a fair test
Hypothesis = a reasoned prediction based upon theory, experience or direct observation
Independent variable = chosen variable (cause) changed in a fair test.
Mean = 'average' value from a data set
Number key = classification key that is a written, condensed version of a spider key
Precision = how similar your repeated data is (good technique & equipment choice)
Primary data = your experimental data or observations from an investigation
Reliability = if your data can be repeated (i.e. no error). Can be improved through collecting repeated values and calculating a mean
Results table (complex) = Table that contains multiple columns to show repeated data, calculations or a variety of features of a variable
Risk assessment = formal assessment of risk leading to improved safety recommendations or change in practice
Secondary data = researched data or observations. It can also be data gathered from others doing a similar experiment. Used to compare/support
Trend line = line drawn roughly between coordinates to show the trend (does not have to go through all data points)
Valid data = reliable, accurate & no bias or error (we are measuring what is expected)

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