The Institution of Engineering and Technology

FIRST LEGO LEAGUE EXPLORE

FIRST® LEGO® League Explore Progression of skills

Design and Technology					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Designing	– Draw on their own experience to help generate ideas and research conducted on criteria. – Begin to understand the development of existing products. – Start to suggest ideas and explain what they are going to do – Begin to develop their ideas through talk and drawings. – Identify a target group for what they intend to design and make based on design criteria.	– Start to generate own ideas by drawing on their own and other people's experiences. – Begin to develop their design ideas through discussion, observation, drawing and modelling. – Identify a purpose for what they intend to design and make. – Develop their ideas through talk and drawings and label parts. – Identify a target group for what they intend to design and make based on design criteria.	– With growing confidence generate ideas for an item, considering its purpose and the user/s. – Identify a purpose and establish criteria for a successful product. – Understand how well products have been designed, made, what materials have been used and the construction technique. – Learn about inventors, designers and engineers. – Start to understand whether products can be recycled or reused. – Know to make drawings with labels when designing. – When planning explains their choice of materials and components including function and aesthetics.	– Start to generate ideas, considering the purposes for which they are designing. – Confidently make labelled drawings from different views showing specific features. – Develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making, if the first attempts fail. – Identify the strengths and areas for development in their ideas and products. – When planning considers the views of others, including intended users, to improve their work. – Learn about inventors, designers and engineers. – When planning explains their choice of materials and components including function and aesthetics.	– Start to generate, develop, model and communicate their ideas through discussion and annotated sketches. – Begin to use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose. – With growing confidence apply a range of finishing techniques, including those from art and design. – Draw up a specification for their design. – With growing confidence select appropriate materials, tools and techniques. – Start to understand how sustainable and innovative products are and the impact they have beyond their intended purpose.

Content taken from: Department for Education (2017) Statutory framework for the early years foundation stage;
Department for Education (2013) The national curriculum in England

Design and Technology

	Year 1	Year 2	Year 3	Year 4	Year 5
Making	– Begin to make their design using appropriate techniques. – Begin to build structures, exploring how they can be made stronger, stiffer and more stable. – Explore and use mechanisms (e.g. levers, sliders, wheels and axles). – Begin to assemble, join and combine materials and components together. – Begin to use simple finishing techniques to improve the appearance of their product.	– Begin to select tools and materials; use correct vocabulary to name and describe them. – Build structures, exploring how they can be made stronger, stiffer and more stable. – Start to assemble, join and combine materials in order to make a product. – Start to choose and use appropriate finishing techniques based on own ideas.	– Select a wider range of techniques for making their product i.e. construction materials and kits. – Explain their choice of tools and equipment in relation to the skills and techniques they will be using. – Start to understand that mechanical systems such as levers and linkages or pneumatic systems create movement. – Start to think about their ideas as they make progress and be willing to change things if this helps them to improve their work.	– Start to join and combine materials and components accurately in temporary and permanent ways. – Know how mechanical systems such as cams or pulleys or gears create movement. – Start to understand that mechanical and electrical systems have an input, process and output. – Know how simple electrical circuits and components can be used to create functional products. – Understand how more complex electrical circuits and components can be used to create functional products. – Continue to learn how to program a computer to monitor changes in the environment and control their products. – Understand how to reinforce and strengthen a 3D framework. – Begin to use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT.	– Understand how mechanical systems such as cams or pulleys or gears create movement. – Know how more complex electrical circuits and components can be used to create functional products and how to program a computer to monitor changes in the environment and control their products. – Understand that mechanical and electrical systems have an input, process and output. – Use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT.
Evaluating	– Start to evaluate their product by discussing how well it works in relation to the purpose (design criteria). – When looking at existing products explain what they like and dislike about products and why. – Begin to evaluate their products as they are developed, identifying strengths and possible changes they might make.	– Evaluate their work against their design criteria – Look at a range of existing products and explain what they like and dislike about the products and why. – Start to evaluate their products as they are developed, identifying strengths and possible changes they might make. – With confidence talk about their ideas, saying what they like and dislike about them.	– Start to evaluate their product against original design criteria. – Evaluate familiar products and consider the views of others to improve them. – Evaluate the key designs of individuals in design and technology and how it has helped shape the world.	– Evaluate their products carrying out appropriate tests. – Be able to evaluate familiar products and conside the views of others to improve them. – Evaluate the key designs of individuals in design and technology and how it has helped shape the world.	– Start to evaluate a product against the original design specification and by carrying out tests. – Evaluate their work both during and at the end of the assignment. – Begin to evaluate it personally and seek evaluation from others. – Evaluate the key designs of individuals in design and technology and how it has helped shape the world.

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Design and Technology					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Computing	– I can describe what happens when I press buttons on a robot. – I can press the buttons in the correct order to make my robot do what I want. – I can describe what actions I will need to do to make something happen and begin to use the word 'algorithm'. – I can begin to predict what will happen for a short sequence of instructions. – I can begin to use software/apps to create movement and patterns on a screen. – I can use the word 'debug' when I correct mistakes when I program.	– I can program a robot or software to do a particular task. – I can look at my friend's program and tell you what will happen. – I can use programming software to make objects move. – I can watch a program execute and spot where it goes wrong so that I can debug it.	– I can break an open ended problem up into smaller parts. – I can put programming commands into a sequence to achieve a specific outcome. – I keep testing my program and can recognise when I need to debug it. – I can use repeat commands I can describe the algorithm I will need for a simple task. – I can detect a problem in an algorithm.	– I can use logical thinking to solve an open ended problem by breaking it up into smaller parts. – I can use an efficient procedure to simplify a program. – I can use a sensor to detect a change which can select an action within my program. – I know that I need to keep testing my program while I am putting it together. – I can use a variety of tools to create a program. – I can recognise an error in a program and debug it. – I can recognise that an algorithm will help me sequence more complex programs.	– I can decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program. – I can refine a procedure using repeat commands to improve a program. – I can use a variable to increase programming possibilities. – I can change an input to a program to achieve a different output. – I can use logical reasoning to detect and debug mistakes in a program. – I use logical thinking, imagination and creativity to extend a program.

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Science

	Year 1 and 2	Year 3 and 4	Year 5
Working Scientifically	– Explore the world around them and raise their own simple questions. – Begin to recognise different ways in which they might answer scientific questions. – Carry out simple tests. – Ask people questions and use simple secondary sources to find answers. – Observe closely using simple equipment with help, observe changes over time. – With guidance they should notice patterns and relationships. – Record simple data. – Use their observations and ideas to suggest answers to questions – talk about what they have found out. – With help, they should record and communicate their findings.	– Raise their own relevant questions about the world around them. – Start to make their own decisions about the most appropriate scientific enquiry they might use to answer questions. – Set up simple practical enquiries. – Recognise when and how secondary sources might help them to answer questions. – Make systematic and careful observations – help to make decisions about what observations to make and how long to make them for. – Collect and record data from their own observations. – Discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including displays or presentations of results. – With support they should identify new questions arising from the data, making predictions for new values.	– Use their science experiences to explore ideas and raise different kinds of questions. – Recognise which secondary sources will be most useful to research their ideas. – Make their own decisions about what observations to make, what measurements to use and how long to use them for. – Decide how to record data and results of increasing complexity from a choice of familiar approaches; tables and graphs. – Use relevant scientific language and illustrations to discuss, communicate and justify their ideas. – Use their results to make predictions and identify when further observations and comparative tests might be needed.

Art and Design

	Year 1	Year 2	Year 3	Year 4	Year 5
Form	– Construct. – Use materials to make known objects for a purpose. – Make simple joins.	– Awareness of natural and man-made forms. – Expression of personal experiences and ideas. – To shape and form from direct observation. – Decorative techniques.	– Shape, form, model and construct. – Plan and develop. – Understanding of different methods of construction. – Aesthetics.	– Plan and develop. – Analyse and interpret natural and manmade forms of construction.	– Plan and develop ideas. – Shape, form, model and join. – Observation or imagination. – Properties of media.

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Speaking and listening			
	Year 1 and 2	**Year 3 and 4**	**Year 5**
Listen carefully and understand	– Take turns to talk, listening carefully to the contributions of others. – Seek clarification when a message is not clear. – Understand instructions with more than one point.	– Engage in discussions, making relevant points. – Ask for specific additional information to clarify.	– Understand how to answer questions that require more than a yes/no or single sentence response. – Demonstrate active listening by justifying ideas or expanding on the ideas of others.
Develop a wide and subject-specific vocabulary	– Use subject specific vocabulary to explain and describe. – Suggest words or phrases appropriate to the topic being discussed.	– Use interesting adjectives, adverbial phrases and expanded noun phrases in discussion. – Use vocabulary that is appropriate to the topic being discussed or the audience that is listening.	– Use adventurous and sophisticated vocabulary. – Explain the meaning of words, offering alternatives. – Use a wide range of phrases that include determiners, modifiers and other techniques to add extra interest and clarity.
Speak with clarity and confidence	– Speak in a way that is clear and easy to understand. – Speak confidently to a group of peers so that they understand the message of what is being said. – Reflect on the clarity of the message given.	– Use a mixture of sentence lengths to add interest to discussions and explanations. – Explain a project or concept to a group of peers. – Explain and develop ideas across the curriculum. – Reflect on the effectiveness of the explanation.	– Vary the length and structure of sentences. – Ask questions and make suggestions to take an active part in discussions. – Present an idea, topic or explanation to a group of peers. – Expand and justify ideas across the curriculum. – Reflect on the effectiveness of the explanation, expansion and justification.
Hold conversations and debates	– Take turns to talk, listening carefully to the contributions of others. – Know that different people hold opinions that are different from our own. – Know that different language is appropriate in different situations (formal and informal). – Make contributions that are relevant to those that have come before.	– Make relevant comments or ask questions in a discussion or a debate. – Seek clarification by actively seeking to understand others' points of view. – Respectfully challenge opinions or points, offering an alternative. – Vary language between formal and informal according to the situation.	– Negotiate and compromise by offering alternatives. – Debate, using relevant details to support points. – Offer alternative explanations when others don't understand. – Select appropriate language in a range of situations (formal or informal).

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Mathematics					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Number (number and place value)	– Count to and across 100. – Read and write numbers from 1 to 20.	– Read and write numbers to at least 100 in numerals and in words. – Use place value and number facts to solve problems.	– Solve number problems and practical problems involving number and place value concepts.	– Solve number and practical problems that involve number and place value concepts with increasingly large positive numbers.	– Solve number problems and practical problems that involve larger numbers, negative numbers and rounded numbers.
Number (addition and subtraction)	– Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations.	– Solve problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures.	– Add and subtract numbers mentally. – Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	– Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	– Solve addition and subtraction multi-step problems in contexts.
Number (multiplication and division)	– Solve one-step problems involving multiplication and division.	– Solve problems involving multiplication and division, using materials and multiplication and division facts, including problems in contexts.	– Solve problems, including missing number problems, involving multiplication and division.	– Solve problems involving multiplying and adding.	– Solve problems involving addition, subtraction, multiplication and division and a combination of these.
Number (fractions)	– Recognise, find and name a half as one of two equal parts of an object, shape or quantity. – Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	– Recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity.	– Solve problems that involve fractions.	– Solve simple measure problems involving fractions.	– Solve problems which require knowing percentage and decimal equivalents.

Measurement	– Compare, describe and solve practical problems for:
	  – lengths and heights
	  – mass/weight
	  – capacity and volume
	  – time
	– Measure and begin to record the following:
	  – lengths and heights
	  – mass/weight
	  – capacity and volume
	  – time
	– Sequence events in chronological order using language.
		– Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm) and mass (kg/g) to the nearest appropriate unit, using rulers and scales.	– Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g).	– Convert between different units of measure.	– Convert between different units of metric measure.

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Mathematics					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**

Geometry (properties of shape)	– Recognise and name common 2-D and 3-D shapes, including:
	  – 2D shapes
	  – 3D shapes
		– Identify and describe the properties of 2-D shapes
		– Identify and describe the properties of 3-D shapes
		– Identify 2-D shapes on the surface of 3-D shapes
		– Compare common 2-D and 3-D shapes and everyday objects
			– Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them		– Identify 3-D shapes, including cubes and other cuboids, from 2-D representations

Geometry (position and direction)	– Describe position, direction and movement, including whole, half, quarter and three-quarter turns	– Order and arrange combinations of objects in patterns and sequences – Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)	– Interpret and present data using bar charts, pictograms and tables		– Complete, read and interpret information in tables, including timetables

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English				
	Year 1	**Year 2**	**Year 3 and 4**	**Year 5**
Reading (word reading)	– Apply phonic knowledge and skills as the route to decode words. – Read accurately by blending sounds in unfamiliar words containing GPCs that have been taught.	– Read further common exception words, noting unusual correspondences between spelling and sound and where these occur in the word. – Read most words quickly and accurately, without overt sounding and blending, when they have been frequently encountered.	– Apply their growing knowledge of root words, prefixes and suffixes both to read aloud and to understand the meaning of new words they meet. – Read further exception words, noting the unusual correspondences between spelling and sound, and where these occur in the word.	– Apply their growing knowledge of root words, prefixes and suffixes both to read aloud and to understand the meaning of new words that they meet.
Reading (comprehension)	– Discussing word meanings, linking new meanings to those already known.	– Discussing and clarifying the meanings of words, linking new meanings to known vocabulary.	– Read further exception words, noting the unusual correspondences between spelling and sound, and where these occur in the word.	– Maintain positive attitudes to reading and understanding of what they read by continuing to read and discuss an increasingly wide range of genres. – Understand what they read by asking questions to improve their understanding. – Distinguish between statements of fact and opinion. – Retrieve, record and present information from non-fiction.
Writing (transcription)	– Apply simple spelling rules and guidance.	– Learning new ways of spelling phonemes for which one or more spellings are already known, and learn some words with each spelling, including a few common homophones. – Learning to spell common exception words.	– Spell words that are often misspelt.	– Use knowledge of morphology and etymology in spelling and understand that the spelling of some words needs to be learnt specifically.
Writing (composition)	– Write sentences. – Discuss what they have written with the teacher or other pupils.	– Develop positive attitudes towards and stamina for writing by writing for different purposes. – Consider what they are going to write before beginning by writing down ideas and/or key words, including new vocabulary.	– Plan their writing by discussing and recording ideas.	– Plan their writing by noting and developing initial ideas, drawing on reading and research where necessary.
Writing (vocabulary, grammar and punctuation)		– Learn how to use sentences with different forms: statement, question, exclamation, command.		

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