Design Technology / STEM - Key Criteria Pupil Tracker

ARE - 1			Points - 1-4	
Skill	Taught	Support	Independant	Recall
I can work within a range of contexts, such as imaginary, story-based, home, school, gardens and playgrounds.				
I can state what products I am designing and making.				
I can say how my products will work.				
I can say how I will make my products suitable for their intended users.				
I can generate ideas by drawing on my own experiences.				
I can develop and communicate ideas by talking and drawing and give suggestions about what to do next.				
I can use a range of tools provided for a set task.				
I can follow procedures for safety and hygiene				
I can use a range of materials and components, including construction materials and kits, textiles or food ingredients				
I can cut and shape materials and components.				
I can use finishing techniques.				
I can suggest how my products could be improved; what products are, who products are for and what products are for.				
I can communicate what I like and dislike about products.				

I can demonstrate that I know about the simple working characteristics of materials and components.				
I can talk about my design ideas and what I am making.				

ARE - 2			Points - 5-8	
Skill	Taught	Support	Independant	Recall
I can work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment.				
I can say whether my products are for myself or other users.				
I can describe what my products are for.				
I can use simple design criteria to help develop my ideas.				
I can use knowledge of existing products to help come up with ideas.				
I can model ideas by exploring materials, components and construction kits and by making templates and mockups.				
I can use information and communication technology, where appropriate, to develop and communicate my ideas.				
I can think of an idea and plan what to do next.				
I can select from a range of tools and equipment, explaining my choices.				
I can select from a range of materials and components according to their characteristics.				

I can measure, mark out, cut and shape materials and components.				
I can assemble, join and combine materials and components.				
I can use finishing techniques, including those from art and design.				

ARE - 3			Points - 9-12	
Skill	Taught	Support	Independant	Recall
I can gather information about the needs and wants of particular individuals and groups.				
I can develop my own design criteria and use these to inform my ideas.				
I can share and clarify ideas and through discussion I can list the main stages of making.				
I can assemble, join and combine materials and components with some accuracy.				
I can apply a range of finishing techniques, including those from art and design, with some accuracy.				
I can follow procedures for safety and hygiene using a wider range of materials and components than in KS1.				
I can refer to my design criteria as I design and make use of my design criteria to evaluate my completed products.				
I can communicate whether products can be recycled or reused.				
I can talk about (or otherwise record my views and feelings) how well products have been designed.				

I can make strong, stiff shell structures.				
I can show that a single fabric shape can be used to make a 3D textiles product.				
I can show that I know that food ingredients can be fresh, pre-cooked and processed.				

ARE - 4			Points - 13-16	
Skill	Taught	Support	Independant	Recall
I can generate realistic ideas, focusing on the needs of the user.				
I can make design decisions that take account of the availability of resources.				
I can describe the purpose of my products and explain how particular parts of my products work.				
I can model my ideas using prototypes and pattern pieces and make design decisions, taking account of constraints such as time, resources and cost.				
I can select materials and components suitable for the task.				
I can measure, mark out, cut and shape materials and components with some accuracy.				
I can use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components.				
I can use techniques that involve a number of steps.				

I can show that I consider the views of others, including intended users, to improve my work; including how well products have been made; why materials have been chosen.				
I can show how to reinforce and strengthen a 3D framework				
I can show that I know that a 3D textiles product can be made from a combination of fabric shapes.				
I can show (or otherwise demonstrate) that a recipe can be adapted by adding or substituting one or more ingredients.				

ARE - 5			Points - 17-20	
Skill	Taught	Support	Independant	Recall
I can carry out research, using surveys, interviews, questionnaires and web-based resources.				
I can identify the needs, wants, preferences and values of particular individuals and groups.				
I can develop a simple design specification to guide my plans.				
I can indicate the design features of my products that will appeal to intended users.				
I can produce appropriate lists of tools, equipment and materials that I need.				
I can formulate step-by-step plans as a guide to making; including accurately measure, mark out, cut and shape materials and components.				

I can accurately assemble, join and combine materials and components accurately apply a range of finishing techniques, including those from art and design.				
I can critically evaluate the quality of the design, manufacture and fitness for the purpose of the products as I design and make them.				
I can evaluate my ideas and products against my original design specification; including; how much products cost to make, how innovative products are, how sustainable the materials in products are and what impact products have beyond their intended purpose.				
I know and can show that materials have both functional properties and aesthetic qualities.				

ARE - 6			Points - 21-24	
Skill	Taught	Support	Independant	Recall
I can show that I work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment.				
I can use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate my ideas.				
I can use computer-aided design to develop and communicate my ideas, generate innovative ideas, drawing on research.				
I can explain my choice of tools and equipment in relation to the skills and techniques I will be using.				

I can explain my choice of materials and components according to functional properties and aesthetic qualities.				
I can demonstrate resourcefulness when tackling practical problems.				
I can identify the strengths and areas for development in my ideas and products.				
I can explain what methods of construction have been used, how well products work and how well products achieve their purposes.				
I can assess and describe how well products meet user needs and wants.				
I can show that I know about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products.				
I know (and can show that I know) how to use learning from science to help design and make products that work.				
I know (and can show that I know) how to use learning from mathematics to help design and make products that work.				
I know (and can show that I know) that materials can be combined and mixed to create more useful characteristics.				
I know, and use, the correct technical vocabulary for the projects I am undertaking.				

ARE - 7			Points - 25-28	
Skill	Taught	Support	Independant	Recall

I can develop detailed design specifications to guide my thinking and use research, including the study of different cultures, to identify and understand user needs.				
I can identify and solve my own design problems, use 2D and begin to use 3D CAD packages (or equivalent) to model my ideas.				
I can produce models of my ideas using CAM (or equivalent) to test out my ideas.				
I can select tools and equipment suitable for the task and produce ordered sequences and schedules for manufacturing products I design, detailing resources required.				
I can make use of specialist equipment to mark out materials; use a broad range of material joining techniques including; stitching, mechanical fastenings, heat processes and adhesives				
I can use CAD/CAM to produce and apply surface finishing techniques, for example using dye sublimation.				
I can investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dyeing and applique				
I can evaluate my products against my original specification and identify ways of improving them.				
I can describe (or otherwise communicate) the positive and negative impact that products can have in the wider world.				

I can show that I know how to classify materials by structure e.g. hard woods, softwoods, ferrous and non-ferrous, thermoplastic and thermosetting plastics.				
I can identify and collect all the tools and equipment needed to make my product				
I can show that I know about the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal.				
I can show how more advanced electrical and electronic systems can be powered and used in my products.				
I can show that I know about textile fibre sources e.g. natural and synthetic and fabrics e.g. plain and woven.				
I know how to select and modify patterns and use them in textile construction.				

ARE - 8			Points - 29-32	
Skill	Taught	Support	Independant	Recall
I can develop design specifications that include a wider range of requirements such as environmental, aesthetic, cost, maintenance, quality and safety.				
I can research the health and wellbeing, cultural, religious and socio-economic contexts of my intended users.				
I can use CAD and related software packages to validate my designs in advance of manufacture.				

I can create production schedules that inform my own and others' roles in the manufacturing of products I design.				
I can make simple use of planning tools, for instance Gantt charts to communicate my plans clearly so that others can implement them.				
I can select appropriate methods to evaluate my products in use and modify them to improve performance.				
I can produce short reports, making suggestions for improvement to products that I am less familiar with using myself.				
I can evaluate products considering life cycle analysis how products can be developed considering the concept of 'cradle to grave'				
I can show how materials can be cast in moulds.				
I can demonstrate that I know how to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines.				
I can apply computing and use electronics to embed intelligence in products that respond to inputs.				
I can make use of sensors to detect heat, light, sound and movement such as thermistors and light dependent resistors.				
I can apply the concepts of feedback in systems how to control outputs such as actuators and motors.				
I can make use of microcontrollers in products I design and manufacture myself.				

I can construct and use simple and compound gear trains to drive mechanical systems from a high revving motor.				

ARE - 9			Points - 33-36	
Skill	Taught	Support	Independant	Recall
I can take creative risks when making design decisions (consider additional factors such as ergonomics, anthropometrics or dietary needs).				
I can analyse where human values may conflict and compromise has to be achieved.				
I can use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations.				
I can combine ideas from a variety of sources.				
I can use mathematical modelling to indicate likely performance before using physical materials and components, for instance when developing circuits or gearing systems.				
I can give oral and digital presentations and use computer-based tools.				
I can select appropriately from a wider, more complex range of materials, components and ingredients, taking into account their properties such as water resistance and stiffness.				
I can follow procedures for safety and hygiene and understand the process of risk assessment.				

I can use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely.				
I can test, evaluate and refine my ideas and products against a specification, taking into account the views of intended users and other interested groups.				
I know about an increasing range of designers, engineers, chefs, technologists and manufacturers and I am able to relate my products to my own designing and making.				
I understand the properties of materials, including smart materials, and how they can be used to advantage.				
I understand the performance of structural elements to achieve functioning solutions.				
I understand how more advanced mechanical systems used in my products enable changes in movement and force.				
I can competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment.				

ARE - 10			Points - 37-40	
Skill	Taught	Support	Independant	Recall
I can identify a user/client that is mostly relevant to the contextual challenge and I can undertake an investigation of their needs and wants, with a good explanation and justification of most aspects of these.				

I can carry out a detailed investigation into the work of others that has influenced ideas.				
I can demonstrate good design focus and understanding of the impact on society including; economic and social effects.				
I can produce a good design brief with an attempt to justify how they have considered most of their client's needs and wants and has clear links to the context selected.				
I can generate imaginative and creative ideas which mainly avoid design fixation and have adequate consideration of functionality, aesthetics and innovation.				
I can evidence good experimentation and communication, using a wide range of techniques.				
I can evidence good development work, using a range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype.				
I can deliver good modelling which uses a variety of methods to test my design ideas, largely meeting requirements.				
I can select materials/components that are mostly appropriate with good research into their working properties and availability.				
I can produce largely detailed manufacturing specifications with good justification to inform manufacture.				
I can use/operate the correct tools, materials and equipment (including				

CAM where appropriate) safely with a good level of skill.				
I can evidence detailed quality control is to ensure the prototype is mostly accurate through partial application of tolerances.				
I can produce a good quality prototype that may have potential to be commercially viable which mostly meets the needs of the client/user.				
I can show good evidence that various iterations are as a result of considerations linked to testing, analysis and evaluation of the prototype, including some consideration of feedback from third parties.				
I can evidence good testing of most aspects of the final prototype against the design brief and specification. I can make detailed reference to any modifications either proposed or undertaken.				

ARE - 11			Points - 41-44	
Skill	Taught	Support	Independant	Recall
I can identify and thoroughly explore design possibilities directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities.				
I can clearly identify a user/client that is entirely relevant in all aspects to the contextual challenge and I can undertake a comprehensive investigation of their needs and wants, with a clear explanation and justification of all aspects of these.				

I can carry out a comprehensive investigation into the work of others that clearly informs my ideas.				
I can produce a comprehensive design specification with a very high level of justification linking to the needs and wants of the client/user and that fully informs subsequent design stages.				
I can generate imaginative, creative and innovative ideas, fully avoiding design fixation and with full consideration of functionality, aesthetics and innovation.				
I can evidence extensive experimentation and excellent communication, using a wide range of techniques.				
I can demonstrate imaginative use of different design strategies for different purposes and as part of a fully integrated approach to designing.				
I can test my design ideas using excellent modelling and a wide variety of methods, fully meeting all requirements.				
I can select fully appropriate materials/components with extensive research into their working properties and availability.				
I can produce a fully detailed manufacturing specification with comprehensive justification to inform manufacture.				
I can consistently use, and operate safely, the correct tools, materials and equipment (including CAM where appropriate) with an exceptionally high level of skill...				

I can evidence a high level of quality control to ensure the prototype is accurate by consistently applying very close tolerances.				
I can produce a Prototype that shows an exceptionally high level of making/finishing skills that are fully consistent and appropriate to the desired outcome.				
I can produce extensive evidence that various iterations are as a direct result of considerations linked to testing, analysis and evaluation of the prototype, including well considered feedback from third parties.				
I can plan and carry out comprehensive testing of all aspects of the final prototype against the design brief and specification. I can make fully detailed and justified reference to any modifications				