Complementing the **National Curriculum**

The program is coordinated and delivered by young graduate engineers who give their time freely to promote engineering in schools. The physics of flight and the task of designing and building a glider are well supported by PowerPoint presentations and practical hands on activities.

The graduate engineers attend the host school on a minimum of 3 occasions to deliver 3 key sessions on designing, making and testing the gliders. The engineers may often provide a more supportive role and attend sessions on more occasions than this to support the design and build phases of the project.

The Flying Start Challenge offers an excellent opportunity to run a cross-curricular project within your school. The physics of flight are embedded within a design and make project of glider design.

The learning outcomes for the project are mapped against the KS3 National Curriculum for Science and Technology so the Flying Start Challenge can easily be embedded within teaching.

When you join this project, your school will receive support materials, including PowerPoint presentation materials to use in the classroom as well as a starter pack of materials for building your gliders.

If your school makes it through to the Finals Day at the Fleet Air Museum, there are even more fun opportunities on offer which enhance the curriculum. In 2008, the team challenges involved designing and building a hovercraft and rocket blaster and the teams get the chance to win some fantastic prizes.

We hope you will want to join this exciting and innovative project!

Objectives	Activity	KS3 Technology NC	KS3 Science NC
What is the Flying Start Challenge, and who is it run by? Promoting aerospace.	Introductory PowerPoint presentation and demonstration glider shown.	Develop a critical understanding of products and their manufacture, and how they contribute to our society.	
Knowledge of what a glider is, its major parts and their functions. Bring in idea of yaw, roll and pitch	Polystyrene gliders given to pupils for experimentation. Pupils identify correct parts of glider. Poster presentation.	Explore existing products to develop knowledge and understanding of materials and components; systems and control; and structures.	Investigate situations in which forces are balanced and unbalanced.
Knowledge of what forces act upon a glider. Knowledge of how lift is generated.	Practical Demonstration to show force of lift. PowerPoint presentation of forces on a wing: lift, weight, drag, thrust.		Forces and their effects: investigate the origin of friction, air resistance, upthrust and weight. Relate forces acting to changes in motion
Knowledge of differing shapes of wings	Pupils experiment with delta, long thin and conventional wing shapes. Mini-competition. Discussion – what is each plane – fighter, airliner, glider..? Are they designed to carry anything, fly fast?	Pupils test and evaluate products, showing that they understand the situations in which their designs will have to function. L5	Understand the relationship between forces on an object and its movement, the effects of air resistance on speed and streamlining. Use ideas of balanced and unbalanced forces to explain the movement of falling objects.
Understand the importance of build quality	Discussion/presentation on factors affecting glider performance	Pupils gain knowledge of quality assurance in production techniques.	
Research, planning and timing	Explain how competition is judged. Research websites given.	Pupils draw on and use a range of sources of information. L6	
Budget	Budget keeping is important – relate it to industry. We need to know how much we spend to make a profit.	Pupils identify a broad range of criteria to evaluate their product relating their findings to the appropriate use of resources L8	
Key Dates and Objectives and what you can win.		They produce plans that predict the time needed to carry out the main stages of making products. L7	

Before the next engineer-led session, pupils need to complete:

DESIGNING	Pupils get into teams to design their glider	Pupils use a wide range of appropriate sources of information to develop ideas. They investigate form, function and production processes. They recognise the different needs of a range of users ad develop fully realistic designs L7	

NC coverage is taken from the Level Descriptors or from the Programmes of Study where no level is given.

Objectives	Activity	KS3 Technology NC	KS3 Science NC
Have knowledge of aircraft/glider manufacturing techniques.	Video of modern aircraft industry, then slides. Discuss assemblies.	Develop a critical understanding of products and their manufacture, and how they contribute to our society.	
Have knowledge of aircraft materials	Interactive presentation of old and modern aircraft materials	Develop knowledge and understanding of materials and components and recognising new materials and processes, and identifying their potential uses	Pupils use knowledge and understanding of the nature and behaviour of materials to describe how new materials can be made. L6
Have knowledge of different material properties.			Pupils demonstrate an increasing knowledge and understanding of materials. L5
Have knowledge of ways of combining materials	Interactive presentation of combining/reinforcing materials	Gain and apply knowledge and understanding of materials and components including joining and combining processes. Pupils work with a range of materials and component and show that they understand their characteristics. L6	
Understand the importance of build quality	Summary of importance of strong structure	Pupils gain knowledge of quality assurance in production techniques.	
Sustainability	What do we mean by sustainability? How does it influence design?	Explore values about and attitudes to the made world and how we live, work and interact within it.	
Reminder about accounting.		Pupils identify a broad range of criteria to evaluate their product relating their findings to the appropriate use of resources L8	

Before the next engineer-led session, pupils need to complete:

PLANNING	In teams, pupils draw up plans to make their gliders	They produce step-by-step plans for achieving their aims. They think ahead about the order of their work, choosing appropriate tools, equipment, materials, components and techniques L4	
WORKING FROM PLANS		They work from their own detailed plans, modifying them where appropriate L5	
MAKING		They work with a range of tools, materials, equipment, components and processes, taking full account of their characteristics. They adapt their methods of manufacture to changing circumstances, providing a sound explanation for any change from the design proposal. L7	

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Objectives	Activity	KS3 Technology NC	KS3 Science NC
Parts of a glider - recap	Revised from session 1	Explore existing products to develop knowledge and understanding of materials and components; systems and control; and structures	Investigate situations in which forces are balanced and unbalanced.
Aircraft development in History	Materials and technology developments	Develop a critical understanding of technological processes, products and their manufacture, and how they contribute to our society.	
Aerospace testing	Why is testing important? Maintenance	Gain knowledge and understanding of production techniques, including those focusing on quality assurance. Apply knowledge and understanding of safety.	
How to test your glider	Consistent throwing, from a fixed point. Measuring and timing accurately and repeatability. Technique	They select appropriate techniques to evaluate how their products would perform when used and modify their products in the light of the evaluation to improve their performance. L7	Consider why it is important to repeat measurements. Pupils measure force, distance and time.
Presenting your designs - How the competition is judged	They make models and drawings to explore and test their design thinking, discussing their ideas with users. L6 They communicate ideas, using a variety of media L7		

Before the regional finals, pupils need to complete:

EVIDENCE FOR THE PRESENTATION	Pupils respond to information they have identified. They identify conflicting demands on their design, explain how their ideas address these demands and use this analysis to produce proposals. L8		

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