



2009/10

## Programme & Information

Exciting half or full day

# STEM Activities

*Knex Challenge. Roll & Sail Vehicles, Structures, Rockets & Rocket Car, Imagineering Tasters - Make Test & Take, Wind Generators and Solar Cells, Primary Electronics & Control (Pilots)*

### Knex Challenge 2009/2010

This very popular KS2 competition was run by Imagineering in the 2008/9 year with over 35 Schools and 1600 children taking part in the Coventry and Warwickshire sub region. This is based on a design, make and test activity using a comprehensive Knex Kit with evaluations of sketching/drawing team work, final model and an operational test. For 2009/2010 the half day School Sessions will run from 5<sup>th</sup> October until early May with a final entry date of 14<sup>th</sup> April 2010 and prices will remain as in 2009. (see page 2).

**Early booking is advised** if you would like to secure a preferred date for your school. This challenge is suitable for Years 4, 5 and 6. Information for year groups involved, expected numbers, session times required and proposed delivery location is most useful when booking. The challenge can be run for a maximum of 70 children in any one session

### The Gravity & Sail Buggy Challenge KS2

A Half or full day activity designing, making, modifying and testing small Knex 4 and 3 wheeled model vehicles built to strict specifications. Testing with inclined plane and table fans enables concepts of gravitational and 'fluid' forces to be demonstrated & compared. (Can be run for KS1, Y2 in a simplified form)

### Structures. KS2 Y4, 5 & 6 also KS3 Y7

Challenges involving various types of structure, Design, building and testing for strength and stability, some with loading tests to destruction. Activities can be chosen to involve various materials, towers, frames, polygons, bridges, and building sections. These challenges are a useful enhancement for the curriculum elements on forces and strong shapes. Students work in teams and for some need to set up a manufacturing production line to make the structural components.

### Rockets and Bloodhound Rocket Car KS2 & 3

The Rocket Vehicle challenge involves design and construction of a simple vehicle which can be propelled by a compressed air pulse. Good structural design and correct wheel alignment gives a challenge to the students to make a vehicle which will not disintegrate and run straight for a long distance. Air rockets can be enhanced by detailed theory on the NASA web site.

<http://exploration.grc.nasa.gov/education/rocket/rktstomp.html>

Simple card tube rockets with fins can be fired at 45° showing stability on an arced flight, the best ones go furthest. Simple average speed calculations can be made and relationships between rocket weight and performance considered.

### Imagineering Tasters - Make, Test and Take

**Flight** - Starting with the simple theory of how flight can be achieved and some simple paper gliders, children build an individual advanced wooden Glider which is competitively tested and they keep. CONT →

## 2, Imagineering Challenges 2009 - 2010 Programme and information - Continued

### **Compass and Morse Buzzer** - After revising

magnetism, children build a working compass, magnetising the pointer, making the scale, assembling all parts, on fine days the challenge can be completed by following a short navigational exercise using the compass. Extending to simple electromagnetism children can build a working Morse key buzzer. This can bring out many simple electrical circuit concepts including multiple switch action and inductance as they watch the sparks!

**Steady Hand Game** - An exciting construction challenge which is made without any soldering activity. A polarity sensitive 1.5V buzzer is used with a kit of parts containing 10 pieces. The unit is mounted on a predrilled wooden baseboard. As well as reinforcing electrical circuit theory the unit gives students free reign to their own design ability for the contact wire pattern.

### **Three axis Hydraulic arm with Gripper**

**(KS2 Y6 & KS3 Y7)** - Practical robotics in action using water filled syringe actuators on a Revolte Robot capable of holding and moving a cup full of water. Simple hydraulic theory is covered and practical rotational mechanisms built. A class group using 10 robots can end with a timed production line competition. This challenge has been run in a modified form at National Technology Fairs (Big Bang)

**A combination of any of the above and many others may be included for  
Summer School Sessions**

### **COMING SOON!** The Alternative Energy Challenge

Wind Generators and Solar Cells - 'The Alternative Energy Power Station' Plans for this involve Solar Cells plus a simple Wind generator mounted on a flexible framework, Fan blades can be are shaped and put on a simple hub to drive the generator. Operation is tested using a powerful security light and table fan

### Primary Electronics (Pilots)

With support from *The West Midlands Digital Hub* at Finham Park School Coventry, Imagineering Challenges offer a new half day Pilot Challenge on Introductory Practical Electronics for KS2, Y5 & 6. Pupils learn about the latest surface mount components and current industrial methods of circuit construction using special temperature controlled ovens. Pupils will not use soldering irons. Early booking may secure a special reduced price with free components for small group sizes and feedback

### Vehicles & moving structures in control

Knex and possibly other 'construction' kits in control using simple programming interfaces probably including the new unique 'Imagineering Controller Board' ©

### ***COSTS***

**Knex Challenge KS2 Y4, 5 or 6** £110.00 up to 35 - £160.00 - 36 to 70

*(Special rates outside Coventry or Warwickshire or for more than 70 students)*

**Gravity & Sail Buggy Challenge, Structures, Rockets & Alternative Energy**

£120.00 up to 35 Half day session - £200.00 up to 60 Full Day session

**Imagineering Tasters, Make, Test & Take**

Half Day Sessions £120.00 up to 30 MAXIMUM PLUS KIT FEE (prices on application)

**Pilot Electronics & Control - Prices on application**

For booking or further information please contact: **Peter Lock - 07929 748411**

E: [Challenges@imagineering.org.uk](mailto:Challenges@imagineering.org.uk) or log on to the Imagineering Challenges Web Site:

<http://sites.google.com/site/imagineeringchallenges/>

*(Risk assessment, CRB & Public Liability information available on request)*

**Imagineering Foundation**  
*Delivering STEM activities for over 10 years nationwide*  
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