LEARN bydesign

WORKSHOPS

Featuring **SPHERO PROGRAMMING**

STEM Day
Support your learners' *Careers Related Learning* with this carousel of curriculum linked STEM activities

Approx. **150-180** learners

KS3

Full Day 5 workshops

Throughout the day learners will rotate around 5 different STEM workshops, led by our team of education communicators. We have selected 5 workshops that are designed to work with this age group but these activities can be substituted for any in our wider range of STEM workshops upon request.

By the end of these activities' students will
- Understand how their skills and learning in school relate to real world careers and challenges.
- Develop teamwork, problem solving, speaking, listening creativity, and aiming high skills.
- Recognise that STEM careers are for everyone.

Content:
Robot rescue - watch a video of this in action
- After diving in to the world of coding, AI, sequences and senses, learners apply their transferable skills to complete a team challenge.
- Using Sphero robots students attempt to rescue a person from the debris of an earthquake in Japan.
- Throughout the session learners will have to use mathematical and geographical skills to help them succeed.

Tower Tournament
- Short introduction to structural engineering and engineering careers.
- Work in team (4-6) to design and build the tallest tower out of recycled materials.
- Buy their materials from a set budget and adapt to changing supply.
- Test their designs with a large fan (hurricane generator).
- The session concludes with a reflective class discussion on tower performance and consideration of the science behind this.

Practical physics
- Introduction to the physics in sport and a safety briefing on each piece of equipment.
- Learners then rotate though the activities and complete a worksheet to support them in analysing their own performance and the scientific principles underpinning this.
  » Sprint though timing gates.
  » Ball kick in radar inflatable goal.
  » Reaction time in batak board.
  » Look at the power they can generate by using a rowing machine.
- Session finishes with a review of what they have learnt.

Code breaking
- Introduction to codes and their history though to modern computing.
- Discussion around why we use codes and examples (Ann Lister, Alan turning)
- Series of codebreaking challenges in pairs that lead on from each other (Pixel coding, cyphers, morse code, tangrams etc).
- Discussion around careers linked to maths and coding.

Molecules to medicine
- Introduction to atoms, molecules and compounds.
- Understand what different medicines are used for.
- In pairs build a series of molecules of medical drugs (using molymod® kits).
- Discussion around careers linked to biochemistry.
- Working as a whole class, build a large molecule drug while learning about the drug discovery process.
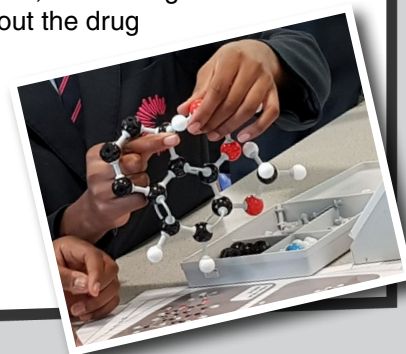
Gatsby benchmarks
- Linking curriculum learning to careers (4).

Watch a video showing some of this in action

SCAN ME

Or click here

Curriculum links

Robot Rescue
» Geography – Developing knowledge about geographical risks and earthquake impact.
» Maths – Use the fundamentals of mathematics to solve a variety of problems, including angles and measurements.
» English – Following instructions, speaking, listening, sharing ideas and presenting.
» Computing – Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.
» PSHE – Develop skills for future success.

Tower Tournament
• Design and Technology:
» Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations.
» Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups.
» Understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists.

Practical Physics
• Science:
» Apply mathematical concepts and calculate results.
» Describing motion: speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time).
• Science - Forces: using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.
• Science - Energy: comparing amounts of energy transferred (J, kJ, kW hour).
• Mathematics: use and derive simple equations and carry out appropriate calculations.

Code breaking
• Mathematics:
» Begin to reason deductively in geometry, number and algebra, including using geometrical constructions.
» Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.
• Computing: understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits.

Molecules to Medicine
• Science - Atoms, elements, and compounds:
» A simple (Dalton) atomic model.
» Differences between atoms, elements and compounds.
» Chemical symbols and formulae for elements and compounds.

Logistics and planning:
All sessions are designed for around 30 learners. Some activities can be run with larger groups if requested.
We ask that a teacher is always present throughout the activities, to support learner engagement and manage behaviour.

Set up:
Robot Rescue - requires hall space with power, projector and screen.
Tower Tournament - Classroom with projector and screen.
Practical Physics - Large hall space with high ceiling (at least 3m) with power.
Code breaking - Classroom with projector and screen.
Molecules to Medicine - Classroom with projector and screen.

Timetable example for full year group with 5 education communicators:

	Period 1	Period 2	Period 3	Period 4	Period 5
Robot Rescue	Group 1	Group 2	Group 3	Group 4	Group 5
Tower Tournament	Group 5	Group 1	Group 2	Group 3	Group 4
Practical Physics	Group 4	Group 5	Group 1	Group 2	Group 3
Code breaking	Group 3	Group 4	Group 5	Group 1	Group 2
Molecules to Medicine	Group 2	Group 3	Group 4	Group 5	Group 1

Why Choose Learn by Design?
We have been delivering workshops into schools since 1995 and have a team of Education Communicators with a range of scientific and educational backgrounds. We can involve ambassadors into the day if requested.

For further learning this activity goes well with:
• **Engineering Our Future day**
• **Destination Rail – Stations to success day**
• **Green Drive workshop**