

10

Appendices

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Grow your future: jobs with biology

Biology is the science that deals with the life processes and habits of all living things, from single cells to whole organisms. It studies how they interact with each other and with their environment and includes the study of plants (botany), humans (physiology and anatomy) and animals (zoology), genetics and microbiology. Studying biology gives you the skills and opportunities to advance human knowledge and understanding, including saving threatened species, studying microbes, growing organic plants for food and curing diseases.

There are many routes available after GCSEs. These include taking biology to A level, Diploma courses (in subjects such as environmental and land based studies) and relevant apprenticeships in areas such as health.

Taking science will open up a variety of career options for your future and provide you with skills that will make you very employable. Here is a list of some of the many jobs that skills and qualifications in biology and other STEM subjects can lead you to.

- Acupuncturist
- Adult Nurse
- Agricultural Scientist
- Alexander Technique Teacher
- Anaesthetist
- Animal Physiotherapist
- Arboriculturist
- Aromatherapist
- Bacteriologist
- Biochemist
- Biologist
- Biomedical Scientist
- Biotechnologist
- Botanist
- Children's Nurse
- Chiropractor
- Clinical Engineer
- Clinical Physiologist
- Clinical Research Associate
- Clinical Scientist
- Consumer Scientist
- Countryside/Conservation Officer
- Dental Hygienist
- Dental Therapist
- Dentist
- Dietician
- District Nurse
- Doctor
- Ecologist
- Entomologist
- Environmental Scientist
- Farm Manager
- Fish Farmer
- Forensic Scientist
- Forest Officer
- General Practitioner
- Geneticist (Clinical Laboratory Specialist)
- Health Promotion Education Specialist
- Health Visitor
- Herbalist
- Homeopath
- Immunologist
- Landscaper
- Marine Biologist
- Microbiologist
- Midwife
- Naturopath
- Nutritional Therapist
- Occupational Health Nurse
- Occupational Therapist
- Oceanographer
- Orthoptist
- Osteopath
- Pathologist
- Pharmacologist
- Physiotherapist
- Podiatrist/Chiropodist
- Psychiatrist
- School Nurse
- Sport & Exercise Scientist
- Sports Therapist
- Surgeon
- Toxicologist
- Veterinary Pathologist
- Veterinary Scientist
- Veterinary Surgeon
- Zoologist

For further information

General sites

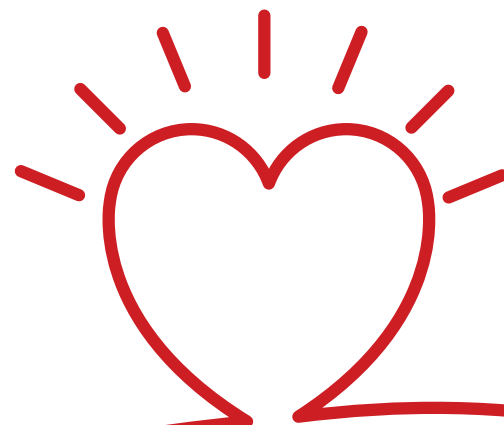
For more information about careers with maths and science go to www.futuremorph.org. Future Morph links to useful websites for other organisations who will be able to help.

Other General Sites

www.futuremorph.org/scienceandmaths
www.apprenticeships.org.uk
www.sectorcareersinfo.co.uk
www.lantra.co.uk

Biology related sites

Society of Biology – www.societyofbiology.org
 Biochemical Society – www.biochemistry.org
 British Pharmacological Society – www.careersinpharmacology.org
 Society of Experimental Biology – www.sebiology.org
 Society of General Microbiology – www.biocareers.org.uk
 British Ecological Society – www.britishecologicalsociety.org



Expand your horizons: jobs with chemistry

Chemistry examines materials in terms of their structure, their physical and chemical properties, how they interact and what role they play in the living world.

There are many routes available after GCSEs. These include taking chemistry to A level, Diploma courses (in subjects such as environmental and land based studies) and relevant apprenticeships in areas such as engineering and health.

Taking chemistry and other STEM subjects will open up a variety of career options and provide you with skills that will make you very employable. Here is a list of some of the many jobs that skills and qualifications in chemistry and other STEM subjects can lead you to.

- Agricultural Scientist
- Anaesthetist
- Analytical Chemist
- Bacteriologist
- Biochemist
- Biomedical Scientist
- Biotechnologist
- Chemical Engineer
- Chemist
- Clinical Physiologist
- Clinical Research Associate
- Clinical Scientist
- Cosmetic Scientist
- Dentist
- Dietician
- Doctor
- Education Laboratory Technician
- Environmental Health Practitioner
- Food Scientist/Technologist
- Forensic Scientist
- General Practitioner
- Leather Technologist
- Marine Biologist
- Materials Engineer/Scientist
- Microbiologist
- Pathologist
- Pharmacist
- Pharmacologist
- Polymer Technologist
- Psychiatrist
- Research Scientist
- Surgeon
- Technical Brewer
- Textile Dyeing Technician
- Textile Technologist
- Toxicologist
- Veterinary Pathologist
- Veterinary Scientist
- Veterinary Surgeon
- Zoologist

For further information

General sites

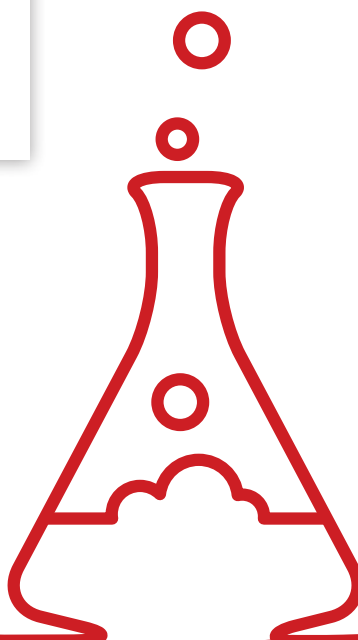
For more information about careers with science and maths go to www.futuremorph.org. Future Morph links to useful websites for other organisations who will be able to help.

Other General Sites

www.futuremorph.org/scienceandmaths
www.apprenticeships.org.uk
www.sectorcareersinfo.co.uk
www.cogent-careers.com
www.improve-skills.co.uk/careers
www.prospect4u.co.uk
www.skillsforhealth.org.uk
www.nhscareers.nhs.uk

Chemistry related sites

Royal Society of Chemistry – www.rsc.org/education
 Association of the British Pharmaceutical Industry – <http://careers.abpi.org.uk>



Set the controls for your future: jobs with design and technology

In design and technology students combine practical and technological skills with creative thinking to design and make products and systems that meet human needs. The subject uses current technologies and considers the impact of future technological developments.

There are many routes available after GCSEs. These include taking design and technology to A level, Diploma courses (in subjects such as manufacturing & product design, and engineering) and relevant apprenticeships in areas such as engineering and construction.

Taking design and technology and other STEM subjects will open up a variety of career options and provide you with skills that will make you very employable. Here is a list of some of the many jobs that skills and qualifications in design and technology and other STEM subjects can lead you to.

- Aerospace Engineer
- Aerospace Engineering Technician
- Architect
- Architectural Technician/Technologist
- Auto Electrician
- Blacksmith
- Broadcast Engineer
- Building Services Engineer
- CAD Draughtsperson
- Chemical Engineer
- Civil Engineer
- Civil Engineering Technician
- Clinical Engineer
- Computer Hardware Engineer
- Computer Service Technician
- Construction Plant Mechanic
- Design Engineer
- Electrical Engineer
- Electronic Engineering Technician
- Electronics Engineer
- Engineering Maintenance Technician
- Ergonomist
- Foundry Patternmaker
- Furniture Maker
- Land-based Engineer
- Land-based Service Technician
- Manufacturing Engineer
- Marine Crafts Person
- Marine Engineer
- Mechanical Engineer
- Mechanical Engineering Technician
- Merchant Navy Engineering Officer
- Mining Engineer
- Model Maker
- Motor Vehicle Body Repairer/Refinisher/Builder
- Motor Vehicle Technician
- Naval Architect
- Nuclear Engineer
- Polymer Technologist
- Refrigeration Technician
- Special Effects Technician
- Telecommunications Technician
- Toolmaker
- Vehicle Breakdown Engineer
- Watch & Clock Repairer
- Welder

For further information

General sites

For more information about careers with design and technology go to www.futuremorph.org. Future Morph links to useful websites for other organisations who will be able to help.

Other General Sites

www.futuremorph.org/scienceandmaths

www.apprenticeships.org.uk

www.tomorrowsengineers.org.uk

www.sectorcareersinfo.co.uk

www.semta.org.uk

www.e-skills.com/careers

www.summitskills.org.uk/careers

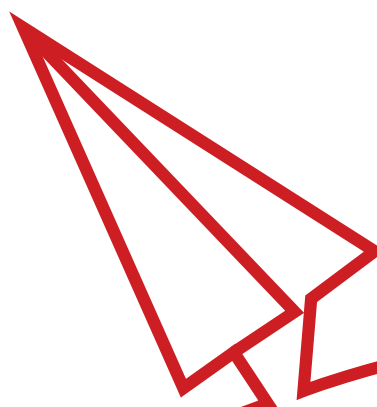
www.skillset.org/careers

Design & Technology related sites

The Design and Technology Association – www.data.org.uk

Institution of Engineering and Technology – www.theiet.org

EngineeringUK – www.engineeringuk.com



Shape your prospects: jobs with maths

Maths is part of just about everything; from calculation, measurement and the study of shapes and the motion of objects, to the science of patterns, for example, in numbers, space or computing. Maths is a vital skill in many fields including engineering, science, medicine, business and social sciences.

There are many routes available after GCSEs. These include taking maths to A level, Diploma courses (in subjects such as engineering, environmental and land based studies) and relevant apprenticeships in areas such as construction and engineering.

Taking maths and other STEM subjects will open up a variety of career options providing you with skills that will make you very employable. Mathematical careers include those which need an advanced knowledge of mathematics, as well as those which require an ability with figures. Here is a list of some of the many jobs that skills and qualifications in maths and other STEM subjects can lead you to.

- Acoustician
- Actuary
- Aerospace Engineer
- Astronomer
- Broadcast Engineer
- Building Control Surveyor
- Building Services Engineer
- Chemical Engineer
- Civil Engineer
- Civil Engineering Technician
- Computer Hardware Engineer
- Design Engineer
- Digital Forensic Analyst
- Electrical Engineer
- Electronics Engineer
- Engineering/Land Surveyor
- Estimator
- Geophysicist
- Land-based Engineer
- Marine Engineer
- Mathematician
- Mechanical Engineer
- Medical Physicist
- Merchant Navy Engineering Officer
- Mining Engineer
- Naval Architect
- Nuclear Engineer
- Oil and Gas Engineer
- Operational Researcher
- Physicist
- Production Engineer
- Statistician
- Stock Market Dealer/Trader
- Systems Analyst

For further information

General sites

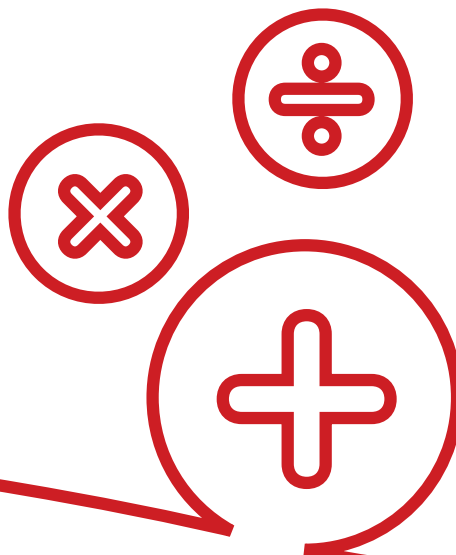
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www.apprenticeships.org.uk
www.sectorcareersinfo.co.uk

Maths related sites

Maths Careers – www.mathscareers.org.uk
 Institute of Mathematics and its Applications – www.ima.org.uk
 London Mathematical Society – www.lms.ac.uk
 Royal Statistical Society – www.rss.org.uk



Launch your life : jobs with physics

Physics is the science of matter and its motion, as well as space and time. It deals with concepts such as force, energy, mass, and charge, and helps us understand how the world around us behaves.

There are many routes available after GCSEs. These include taking physics to A level, Diploma courses (in subjects such as engineering, science and environmental and land based studies) and relevant apprenticeships in areas such as engineering and construction.

Taking physics will open up a variety of career options for your future and provide you with skills that will make you very employable. Here is a list of some of the many jobs that skills and qualifications in physics and other STEM subjects can lead you to.

- Acoustician
- Aerospace Engineer
- Astronaut
- Astronomer
- Broadcast Engineer
- Building Services Engineer
- Chemical Engineer
- Civil Engineer
- Clinical Engineer
- Clinical Scientist
- Computer Hardware Engineer
- Design Engineer
- Dispensing Optician
- Electrical Engineer
- Electronics Engineer
- Geophysicist
- Hydrologist
- Land-based Engineer
- Marine Engineer
- Materials Scientist/Engineer
- Mechanical Engineer
- Medical Physicist
- Merchant Navy Engineering Officer
- Metallurgist
- Meteorologist
- Mining Engineer
- Naval Architect
- Nuclear Engineer
- Oceanographer
- Oil and Gas Engineer
- Optometrist
- Physicist
- Production Engineer
- Refrigeration & Air Conditioning Engineer

For further information

General sites

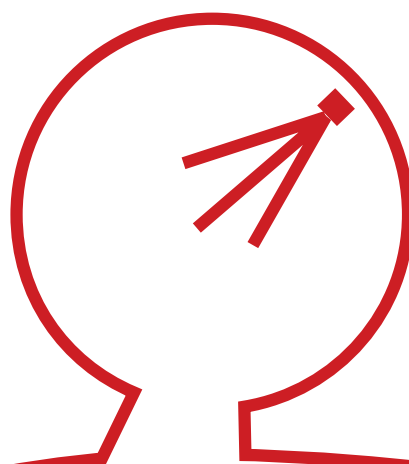
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www.futuremorph.org/scienceandmaths
www.apprenticeships.org.uk
www.sectorcareersinfo.co.uk
www.semta.org.uk
www.euskills.co.uk/careers

Physics related sites

Institute of Physics – www.physics.org/careers, www.iop.org/careers
 Royal Astronomical Society – www.ras.org.uk
 Royal Meteorological Society – www.rmets.org



A STEM careers day

You have been asked to lead a STEM careers off-curriculum day for a whole year group (pre-GCSE) within your school/college for next term. (You may be the Careers Coordinator or you may just be supporting them). This needs to be an event that can help to inform the students about the wide range of careers that STEM subjects can lead to – but you also want to try and enthuse the students about taking STEM subjects beyond 16 – and you want them to have a good time on the day. You have a limited budget (£350 maximum) for the day.

The STEM careers day is an opportunity for STEM subject teachers to begin to work together across the curriculum and to begin to draw in the careers staff. The event will begin to build on new partnerships outside the school/college and will support STEM careers work over the next year.

You are required to produce a plan for the day – along with supporting notes on how you will achieve the aims and an action plan.

A series of questions / prompts will take you through the task.

You can choose which year group and the time within the school calendar to meet your own priorities. (We are aware that school calendars can be outside a teacher's control.)

1. The theme/s for the day

- Do you want to identify a particular topic or theme? This could link to the location of your school/college – is it rural, urban, city based? What industries are within the region? Do you want to show STEM subjects working together? Are you a specialist school/college – could you focus on the specialism?
- Do you want to strengthen or develop particular areas of the curriculum? Are there issues that could be tackled as part of the day e.g. not enough girls choosing physics, engaging student groups who need motivating.
- Are you engaged in any STEM or business related projects that you could link to e.g. Enterprise, Bloodhound.

2. Begin to think of potential activities and content

- Do you want something to give the 'wow' factor for the day? How will you do this? Could it be by something entertaining – circus, theatre.
- Bringing real local people in to meet the students is popular, useful and free. See the Teacher TV programme (Careers). However it does take a bit of organising to be effective and inclusive. Do you know where you can find local STEM Ambassadors from? This is generally a first call. However you may well need a back up plan and there are other schemes. Do you have any known contacts / friends / family working or studying in STEM that could be invited? Support staff in school/college – nurse, technicians can be role models. Students are another set of role models to draw on – undergraduates (past students?) or sixth formers?

- Examine the STEM Directories to find local and national schemes of enrichment activities.
- If you have an after school/college STEM club you may have access to activities you can draw on – or do some research e.g. making bathbombs, building bridges with straws or KNEX, designing a seat with newspaper and sellotape. Then you can add a careers element.
- What other partnerships are in place with the school/college that could be drawn on?
- Can you build in a Personal Learning and Thinking Skills element to the day?
- There are some organisations that may be able to offer support free of charge – the Armed Forces (engineering), public services like – fire brigade (fire safety), police (forensic science).

3. How will you ensure it is inclusive?

- Some STEM activities naturally appeal to more boys than girls. How will you ensure all girls as well as all boys have full access to the activities? (Balance the rocket building with making bathbombs.)
- Have you planned a range of activities that will appeal to a broad range of student achievement and learning styles.
- How will you ensure all activities are accessible for all students?
- How will you ensure that your role models and visitors are not stereotypical? You don't want the girls to be put off because all role models are men. You want to show that STEM careers appeal to a diverse range of people.

4. The framework to make it more than a 'fun day'. Think long term...

- While it is obviously important that the day should be fun, there is a need to ensure the aim of the day is not forgotten. So a workbook for the day will enable the students to reflect afterwards and put their own career thinking into words.
- Could there be a competition and prizes? Will there be a display afterwards for parents' evening? Could you produce something for the school/college newsletter or website afterward?
- How will you encourage ongoing career exploration by students via structured web searches and the careers library?

5. The logistics

- How many are in the year group and how many groups will you have?
- What spaces and rooms in the school/college (or outside) will you need to be available?
- How will you divide the groups up? In tutor groups / separate boys and girls for some activities?
- Can you share out tasks – will you get some administrative support in the school/college?

By the end of the time be ready to share your plan with the group and be quizzed on your reasoning.

Prompts

1. The theme/s and the AIM for the day

2. Potential activities and content

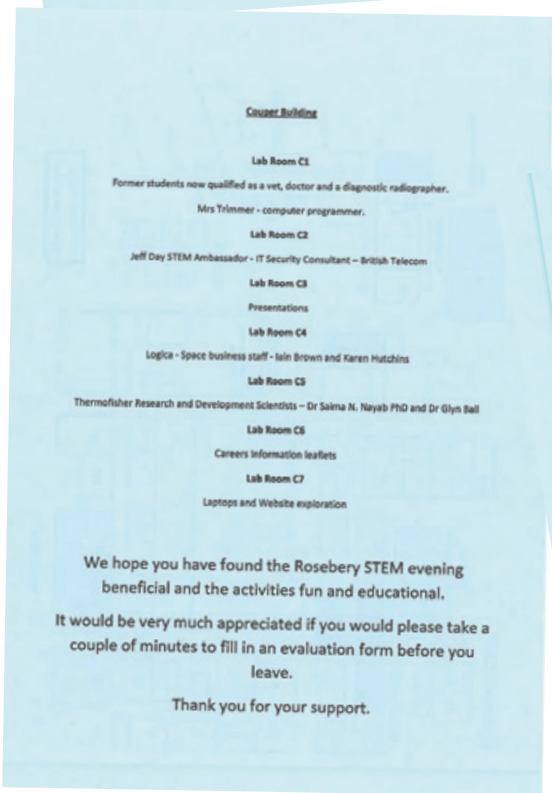
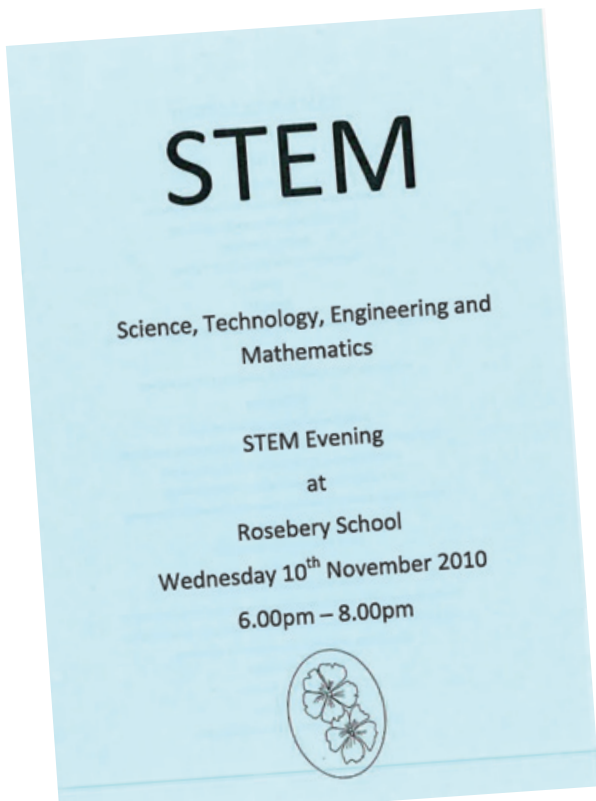
3. How will you ensure it is inclusive?

4. The framework to make it more than a 'fun day'.
Think long term...

5. The logistics

Supporting Decision Notes

A STEM careers evening



Helsby High School STEM Themed Food Week

Managed by Liz Cullen, SSAT Lead Practitioner

Objectives for the Event

- To make students aware of the amount of Science and Technology which goes into something as basic, but important, as the food which we eat.
- To make students aware of the wide variety of STEM careers available.
- To encourage students to consider a STEM career
- To encourage students to consider studying STEM subjects at a higher level
- To make students aware of the importance of the transferable skills which STEM subjects develop.
- To make students aware of cross curricular links and of skills which can be transferred to enhance STEM subjects.
- To support the school's work as a Leading Edge School in terms of the community awareness aspect of the Curriculum Dimensions.
- To provide an exciting and memorable week!

Main Elements of the Event

- Linked to Science and Engineering Week
- Used the theme of "Food"
- Involve as many departments as possible and as many year groups as possible with activities in lessons throughout the week, for example activities on food ethics in RE, on food rationing in WW2 in history, on food and energy in physics and on how to make ice cream in chemistry.
- Interactive Careers Day for Year 10
- Visiting speakers and a brewery visit
- Charity events in aid of the World Food Programme
- Displays throughout the school and a quiz

Careers Day

- Joint initiative with the Work Related Learning Coordinator
- Focus on jobs in any area relating to "Food"
- Interactive, in the form of "speed dating"
- Used as many contacts as possible; local employers, colleges, universities, staff contacts, educational consultants, STEMPOINT, Science Ambassadors.

Charity Event

- Sixth form students heavily involved in the organisation
- Sponsor a sixth form student to live off a bowl of rice for 24 hours
- On line quiz on the world food programme
- Guess the number of grains of rice in the jar

Displays

- Timeline of technological developments in food production in main corridor
- "Fascinating Food Facts" throughout the school
- Food information posters in the canteen
- Display of fiction and non fiction books related to food in the library

Helsby High School Science and Engineering Week Quiz

Names(Max3):

Form:

Time Line (Look in the breakout space)

- | | |
|--|--|
| 1. How many thousand years ago did the Egyptians start making bread using yeast? | |
| 2. In which country was the fishing reel invented? | |
| 3. How many hundred years ago was alcohol first distilled in China? | |
| 4. Which group of people were the first to produced distilled water in 800 AD? | |
| 5. Name the British inventor who designed the steel plough in 1837? | |
| 6. In what year was pasteurisation invented? | |
| 7. In which country was ginger ale first created? | |
| 8. In what year were plastic bottles first used for soft drinks? | |

Fascinating Facts (Look out around school)

- | | |
|---|--|
| 9. How can you tell if an egg is fresh when you put it into a glass of water? | |
| 10. Which vitamin helps prevent night blindness? | |
| 11. The emperor of which country apparently discovered tea? | |
| 12. What is the scientific name for the part of a potato plant that we dig up and eat? | |
| 13. In what year did the first McDonald's restaurant open in this country? | |
| 14. What is the additional ingredient that the ancient Mayans used to spice up their hot chocolate? | |
| 15. What poisonous substance does marzipan contain? | |

General Knowledge (Go find out or guess!)

- | | |
|--|--|
| 16. How much fat is there in a single 'Pringle'? | |
| 17. Bassetts originally launched the 'Jelly Baby' to mark the end of something, what was it and what were they first called? | |
| 18. Who invented coca-cola? | |
| 19. What chemicals are mixed with the food in your gut to digest them? | |
| 20. What is your appendix for? | |
| 21. Is a banana a herb, a fruit or a vegetable? | |
| 22. Is a tomato a herb, a fruit or a vegetable? | |
| 23. Where does the word sandwich come from? | |
| 24. Which is the most expensive spice? | |
| 25. What is the most popular food in the world? | |

Answers: 1. 6000 2. China 3. 1400 4. Arabs 5. John Deere 6. 1871 7. Ireland 8. 1970 9. It floats 10. Vitamin A 11. China 12. Tuber 13. 1974 14. Chillies (and corn) 15. Cyanide

CPD Session on STEM Careers

Aims and Objects

- Capture students' interest and imagination
- Use stimulating contexts to develop an appreciation
 - of the applications of science
 - that science-based jobs are really exciting
 - that scientists make an important contribution to society
 - that scientists use the skills they are developing
 - that scientists work in multidisciplinary teams
 - of the many different careers and jobs involving science
 - of the subjects and qualifications required to progress in science

Activity One

- Watch the 'Science Teachers' TV programme
- <http://www.teachers.tv/video/31980>
- Identify which key messages the teacher addresses.
- How does she address those messages.
- Be prepared to discuss your ideas.

Activity Two

- Choose a science topic you all teach or are familiar with.
- Look back at the key messages slide again and discuss
 - which activities you would keep
 - which activities you would adapt or enhance
 - which activities you would replace to enable you to introduce the key messages appropriately into the scheme of work for that topic
- Develop an outline exemplar scheme of work for your topic to present and evaluate.

Useful Resources

<http://www.futuremorph.org>

<http://www.nhscareers.nhs.uk>



Department for
Education

Department for Education initiative to promote subject choice and careers in Science, Technology, Engineering and Maths (STEM) delivered by the Centre for Science Education at Sheffield Hallam University and Babcock International Group

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