FUTURE TRAVEL

Communication Project
For Teachers **p2&3**, for Students **p4**

HEALTH AND SAFETY

Students should be encouraged to make their own risk assessment before they carry out any activity, including surveys. In all circumstances this must be checked by a competent person. Students using specialised equipment should be supervised at all times.

Combustion of fuels requires careful risk assessment and close supervision. Students should plan and carry out their project, but all practical work must be vetted.

Students may want to set up unorthodox experiments and you may need to seek specialist advice. Organisations such as CLEAPSS and the Royal Society of Chemistry are able to help.

FUTURE TRAVEL:

Gold **Communication** Project - For Teachers

The final frontier - exciting exploration or Martian madness?

Between 1969 and 1972, twelve astronauts walked on the Moon. Since then we've sent space probes sling-shotting across the Solar System, and landed. Rover vehicles to roam the red brown surface of Mars more than 75 million kilometres away. Yet, in the past 35 years, no human has ventured further than a space station in low Earth orbit, only a few hundred kilometres up.

There is talk of astronaut missions to Mars, but can we, and *should* we, realise these dreams?

HAVE YOU EVER WONDERED?

…how Space Agencies justify the huge financial investments in time, staffing and materials needed for space travel?

You might like to imagine yourself in a situation such as…

You have been invited to give a presentation to the under-21 section of your local Astronomical Society. Your subject is whether or not the cost of space travel can be justified. You need to gather information that will allow you to weigh the problems to be overcome against past and possible future, benefits of space travel. Then **use your communication skills** to:

- present both sides of the argument
- explain why one side outweighs the other, and thus convince your audience that the cost of space travel is, or is not, justified.

NOTE: You may choose an alternative audience if you wish, but they should be people with an interest in, and some background knowledge of, space exploration.

Prompts

The **Student Brief** gives some triggers to start students thinking. They should realise that each point triggers further thoughts. Encourage them to identify these themselves. However, if necessary, prompts such as those below might be given, to point students in suitable directions.

- What age-range you will aim at, so you can pitch your presentation at an appropriate level
  - How much younger than 21 might some of your audience be?
  - What level of scientific understanding should you assume?
- Presenting both sides of the argument; making it clear why you support one side; avoiding emotive arguments
  - What do you mean by the 'cost of space travel'?
  - How has previous space research benefited humanity in general?
  - What are the counter-arguments?
- How will you present information?
- How to be entertaining as well as informative
  - How can you present information and numerical data in interesting ways, rather than as dry facts and figures?
  - Can you think up some practical demonstrations of space research 'spin-offs'?
- Using correct scientific language and terminology
  - What are the consequences if your terminology is incorrect, unclear or ambiguous?
  - What is the best way to explain technical terms, bearing in mind the type of audience?
- Understanding your subject
  - If you plan to present a cost-benefit analysis, can you back up your statements with facts and supporting evidence?
  - What factors are being considered in the Research and Practical projects?

Suggestions for supporting students

In contrast to Researchers, Communicators should spend the majority of their time working on how to deliver their message, rather than information seeking. Therefore, it would help if you and/or their Mentor provided sufficient data and/or references to get them started. Students can gather more, once they have decided the focus of their project.

Gold Award students are required to have an external Mentor (normally a scientist or engineer) for their project. The Mentor's role is to provide guidance and support.

The Mentor might be involved in…

- academic or industrial research into, for instance:
  - health or nutritional aspects of space travel, or physiological effects of long-term weightlessness
  - rocket propulsion systems, or satellite power systems
  - commercial applications of space 'spin-off' discoveries and inventions
- promoting, and seeking funding for, space research
- scientific publishing on space research and space travel
- the development of 'space tourism'
- developing spacecraft, or components thereof, with a manufacturer

Contact your Local Coordinator for guidance.

POSSIBLE EQUIPMENT, MATERIALS AND RESOURCES

These will depend on the presentation format(s) chosen by the student. They might include:

- digital camera and access to photo-manipulation software
- video camera and editing facilities
- access to someone skilled in preparing and delivering presentations
- an audience for a dress rehearsal
- an independent audience to whom to present their project
- facilities for practising practical demonstrations

Though primarily a 'theoretical' research project, some time could usefully be spent in the laboratory.

Requirements to demonstrate space spin-offs might include equipment to show how the following work:

- electronic ear thermometer (IR detection and measurement)
- satellite dish (transmission between parabolic reflectors)
- smoke detector (absorption of radiation by smoke particles)
- joystick (multi-directional movement sensors)

Internet search

- UK Space Agency ukspaceagency.bis.gov.uk/default.aspx
- Science & Technology Facilities Council stfc.ac.uk
- NASA www.nasa.gov/exploration
- Space spin-offs - brief list of topics to follow up www.nasa.gov/audience/forstudents/k-4/home/spinoffs_feature_k_4.html

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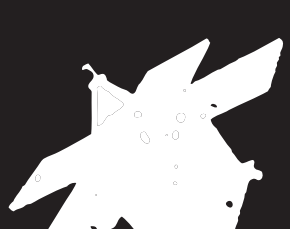
Gold **Communication** Project - For Students



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Some things to think about…

- What age-range you will aim at, so you can pitch your presentation at an appropriate level
- Presenting both sides of the argument; making it clear why you support one side; avoiding emotive arguments
- Using a mixture of communication methods, including experiments
- How to be entertaining as well as informative
- Using correct scientific language and terminology
- Understanding your subject & anticipating questions
- Who will advise you about preparation and delivery of your presentation?

Health and Safety

Should you carry out any experiments to support your arguments:

(a) find out if any of the substances, equipment or procedures are hazardous.

(b) assess the risks (think about what could go wrong and how serious it might be).

(c) decide what you need to do to reduce any risks (such as wearing personal protective equipment, knowing how to deal with emergencies and so on).

(d) make sure your teacher agrees with your plan and risk assessment.

NOTE: Your teacher will check your risk assessment against that of your school. If no risk assessment exists for the activity, your teacher may need to obtain special advice. This may take some time.

(e) if special tools or machines are needed, arrange to use them in a properly supervised D&T workshop.