

# career examples list

Engaging students in science, maths and engineering may be difficult, especially when they can't relate it to the world they know. That's why it's so important to *contextualise* lessons.

When students can see the relevance of their learning – how it relates to everyday life – they are more likely to sit up and listen. An example is to show how scientific skills and knowledge are used in various jobs.

This approach not only engages students, it also makes them think about careers which perhaps they had not thought (or even heard) about. Talk of science careers doesn't have to mean people wearing white coats and working in laboratories; all sorts of jobs benefit from a science education, as this resource shows.

The Future Morph practical activities and videos provide material that relates to a number of jobs but there are, of course, many more that are not covered. This list of *Career examples* provides more ideas for contextualising your science lessons and exploring [www.futuremorph.org](http://www.futuremorph.org) should give you ideas for lots more.

Six careers contexts are listed under each of these six headings:

- Living things
- Environmental science
- Energy and motion
- Natural and man-made materials
- Earth and space
- Communication technology

They aim to show a breadth of job type and each gives example work areas, the knowledge and skills required and – importantly – why they are needed.

Hopefully you'll find it a useful reference when planning lessons. Don't forget – the list isn't exhaustive! Space has been left for you to add other ideas as and when you think of them.

## living things

### career examples: living things

#### Medical researcher

<b>Example work areas:</b>	cancer, stem cells, fertility treatment
<b>Knowledge/skills:</b>	human biology, cell behaviour, biochemistry, genetics, microbiology, microscopy, medical ethics, data analysis
<b>Why?</b>	To understand how cells develop and replicate

#### Medical physicist

<b>Example work areas:</b>	imaging (e.g. radiography, ultrasound, CAT, MRI), physiological measurements, prosthetics, replacement parts
<b>Knowledge/skills:</b>	human biology, electromagnetic radiation, materials science, computing, data analysis
<b>Why?</b>	To operate equipment safely and effectively, and design durable prosthetics for use inside and outside the body

#### Food scientist

<b>Example work areas:</b>	nutrition, food additives, chocolate, wine
<b>Knowledge/skills:</b>	biochemistry, chemical processing, chemical analysis, properties of materials, sensory analysis
<b>Why?</b>	To produce safe, nutritious, attractive food and drink

#### Arable farmer

<b>Example work areas:</b>	crop management, agricultural equipment
<b>Knowledge/skills:</b>	plant biology, pest and weed control, conservation, machine maintenance
<b>Why?</b>	To maximise crop quality and quantity, while maintaining the environment

#### Veterinary assistant

<b>Example work areas:</b>	pets, farm animals, working animals
<b>Knowledge/skills:</b>	animal biology, hygiene, equipment and its care, computer data systems
<b>Why?</b>	To ensure smooth running of the vet's surgery and call-outs

## living things

### Wildlife photographer

**Example work areas:** book/magazine illustrations, TV/films, birthday/postcards

**Knowledge/skills:** animal behaviour and habitats, camera technology, lighting technology, digital image manipulation

**Why?** To locate and approach animals and produce quality images

### Other career examples

**Example work areas:**

**Knowledge/skills:**

**Why?**

## environmental science

### career examples: environmental science

#### Environment Agency geoscientist

**Example work areas:** environmental monitoring, pollution control, groundwater quality, waste disposal, mineral abstraction policy

**Knowledge/skills:** ecosystems, analytical chemistry, hydrology, monitoring technologies

**Why?** To formulate, monitor and enforce environmental policies

#### Oceanographer

**Example work areas:** marine ecosystems, ocean currents, chemical composition of sea water, ocean floor movements

**Knowledge/skills:** marine biology, fluid flow, chemical analysis, geology, plate tectonics

**Why?** To understand humans' effects on the oceans, and the oceans' influences on the World

#### Waste disposal manager

**Example work areas:** manufacturing, refuse disposal, recycling

**Knowledge/skills:** materials handling, identification and sorting, hazardous materials, economics, recycling technology

**Why?** To organise maximum material re-use, and minimum waste and environmental damage

#### Landscape gardener

**Example work areas:** garden design, maintenance, restoration

**Knowledge/skills:** plant biology, botany, pest and weed control, environmental science, materials science, hydraulics

**Why?** To ensure healthy plants in suitable environments, including water features and use of appropriate weather-resistant materials

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## environmental science

### Forester

<b>Example work areas:</b> Forestry Commission, private estates	
<b>Knowledge/skills:</b>	tree care, propagation, recognition of species, woodland ecology, use and maintenance of equipment
<b>Why?</b>	To ensure long-term supply of suitable trees/timber

### Countryside ranger

<b>Example work areas:</b> National Parks, other public-access land	
<b>Knowledge/skills:</b>	ecology, animal and plant biology, conservation, properties of exposed materials
<b>Why?</b>	To preserve natural environments despite public access

### Other career examples

**Example work areas:**

**Knowledge/skills:**

**Why?**

## energy and motion

### career examples: energy and motion

#### Car designer

<b>Example work areas:</b>	manufacturers, racing teams, add-on kits
<b>Knowledge/skills:</b>	power, aerodynamics, friction (grip), material science, automotive systems, combustion, safety systems
<b>Why?</b>	To achieve required levels of performance and safety

#### Renewable energy advisor

<b>Example work areas:</b>	energy companies, businesses, households
<b>Knowledge/skills:</b>	energy sources, capture and conversion technologies, efficiency, reliability, economics
<b>Why?</b>	To compare viability of renewables in various circumstances

#### Accident investigator

<b>Example work areas:</b>	transport incidents, explosions, collapse
<b>Knowledge/skills:</b>	forces and motion, deformation, materials science, propulsion systems, explosive mixtures, data analyses
<b>Why?</b>	To deduce the cause, and suggest how to avoid repetitions

#### Heating engineer

<b>Example work areas:</b>	commercial and domestic heating, air conditioning and refrigeration systems; heating/cooling industrial processes
<b>Knowledge/skills:</b>	energy conversion, combustion, heat transfer modes, material properties, fluid flow, control systems
<b>Why?</b>	To use energy effectively to produce a desired temperature

#### Sports coach

<b>Example work areas:</b>	professional club, school/college
<b>Knowledge/skills:</b>	human biology (especially muscles, nutrition and metabolism), energy/force/power, levers, psychology
<b>Why?</b>	To understand how players can improve their performance

## energy and motion

### Figure skater

**Example work areas:** entertainment, competition, training/coaching

**Knowledge/skills:** muscle action, forces and motion, friction, linear and angular momentum, moments and balance

**Why?** To enable the skater to propel their body in the required direction at the desired speed

### Other career examples

**Example work areas:**

**Knowledge/skills:**

**Why?**

## natural and man-made materials

### career examples: natural and man-made materials

#### Mineral prospector

<b>Example work areas:</b>	remote sensing (airborne/satellite), field work, laboratory investigation
<b>Knowledge/skills:</b>	prospecting technologies (magnetic, gravitational et al), geology, mineralogy, chemical analysis
<b>Why?</b>	To reliably identify potential mineral resources

#### Chemical engineer

<b>Example work areas:</b>	oil and metal refining, chemical processing
<b>Knowledge/skills:</b>	chemical properties, controlling reactions, energy flow, materials handling, separation techniques
<b>Why?</b>	To decide required conditions for chemical reactions

#### Firework designer/manufacturer

<b>Example work areas:</b>	pyrotechnic devices for bespoke displays, mass-market fireworks for public sale
<b>Knowledge/skills:</b>	fuel-oxidiser systems, flame colours, controlling reaction rates, safe handling, ignition systems
<b>Why?</b>	To design reliable devices giving desired effects and burn time

#### Leather manufacturer

<b>Example work areas:</b>	shoes, handbags, clothing, saddlery
<b>Knowledge/skills:</b>	physical, chemical and biological properties of various skins/hides, preservation processes, dyeing
<b>Why?</b>	To transform skins into types of leather for various uses

#### Architect

<b>Example work areas:</b>	domestic and commercial buildings, civil engineering projects such as bridges, stadia and concert halls
<b>Knowledge/skills:</b>	materials science, forces, heat and sound insulation
<b>Why?</b>	To ensure that designs are functional and feasible, as well as aesthetically pleasing



## natural and man-made materials

## Sculptor/stonemason

**Example work areas:** works of art, statues, memorials, restoration

**Knowledge/skills:** materials science, cutting and shaping methods, effects of weathering

**Why?** To create the desired shape and texture from a raw block

## Other career examples

**Example work areas:**

**Knowledge/skills:**

**Why?**

## career examples: earth and space

### Seismologist

<b>Example work areas:</b>	research, monitoring earthquake regions, quake-resistant building design, mineral and oil prospecting
<b>Knowledge/skills:</b>	geology, properties of materials, sound and shock-waves, energy transfer, forces, vibration detection and recording instruments, data analysis
<b>Why?</b>	To study and explain earth tremors and mitigate their effects; and to locate underground rock strata where oil or minerals may be

### Archaeologist

<b>Example work areas:</b>	fieldwork ('digs'), laboratory investigation, museums (interpretation), media presentation
<b>Knowledge/skills:</b>	geophysics (site/artefact location), artefact recovery and treatment, material identification, dating techniques, preservation methods, past technologies
<b>Why?</b>	To identify and interpret items, and disseminate information

### Climatologist

<b>Example work areas:</b>	climate change and modelling, indices (e.g. El Niño), hurricane research, drought mitigation, polar research
<b>Knowledge/skills:</b>	meteorology, hydrology, ecology, oceanography, data processing and analysis
<b>Why?</b>	To study long-term climate trends and attempt predictions of future changes, and suggest ways of mitigating their effects

### Satellite/space probe designer

<b>Example work areas:</b>	telecommunications, weather observation, military monitoring, astronomy, space exploration
<b>Knowledge/skills:</b>	material properties under extreme conditions, forces, electronics, communications technology, optics, sensors across the electromagnetic spectrum, power systems
<b>Why?</b>	To design compact, reliable equipment that can survive the forces of launch and conditions in space

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## earth and space

### Astronomer/astrophysicist

<b>Example work areas:</b>	optical and radio telescopes (land-based and in space), radio interferometry
<b>Knowledge/skills:</b>	detection of radiation across the electromagnetic spectrum, data processing and interpretation
<b>Why?</b>	To deduce the nature of the Universe, its contents and processes occurring within it

### Other career examples

**Example work areas:**

**Knowledge/skills:**

**Why?**

## communication technology

### career examples: communication technology

#### Telecommunications engineer

<b>Example work areas:</b>	telephone land lines, wireless transmission, exchanges, internet system, satellite communications
<b>Knowledge/skills:</b>	analogue and digital signals, modulation, fibre optics, microwave transmission, routing systems
<b>Why?</b>	To provide and maintain high speed worldwide communications

#### Computer programmer

<b>Example work areas:</b>	business or education computer network, internet service provider, software producer, games developer
<b>Knowledge/skills:</b>	computer languages and operating systems, digital electronics
<b>Why?</b>	To write programs which translate between the processor's digital machine code and familiar, user-friendly text and graphics

#### Digital camera designer

<b>Example work areas:</b>	still, video, TV and CCTV cameras, specialist cameras e.g. for satellite imaging or astronomy
<b>Knowledge/skills:</b>	optics, image capture (e.g. CCDs), electronics, solid state memory, digital processing (e.g. zoom)
<b>Why?</b>	To optimise resolution and functionality for a given price

#### Paper manufacturer

<b>Example work areas:</b>	virgin and recycled, different grades/textures
<b>Knowledge/skills:</b>	chemical processing, colouring, coating
<b>Why?</b>	To produce papers with properties matched to applications

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## communication technology

### Sound/lighting technician

<b>Example work areas:</b>	theatres, concert halls, broadcasting and recording studios, clubs, outside venues
<b>Knowledge/skills:</b>	amplification systems, electronics, control circuits (e.g. mixing desk), electrical safety, colour mixing
<b>Why?</b>	To set up and operate equipment for controlling the required sound and light levels throughout a performance

### Radio/TV presenter

<b>Example work areas:</b>	background research, studio and outside broadcasts, live broadcasts and recordings
<b>Knowledge/skills:</b>	use of technology (e.g. recording and portable satellite broadcasting equipment)
<b>Why?</b>	To ensure professional quality presenting

### Other career examples

**Example work areas:**

**Knowledge/skills:**

**Why?**