

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 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

Example work areas: cancer, stem cells, fertility treatment

Knowledge/skills: human biology, cell behaviour, biochemistry, genetics, microbiology, microscopy, medical ethics, data analysis

Why? To understand how cells develop and replicate

Medical physicist

Example work areas: imaging (e.g. radiography, ultrasound, CAT, MRI), physiological measurements, prosthetics, replacement parts

Knowledge/skills: human biology, electromagnetic radiation, materials science, computing, data analysis

Why? To operate equipment safely and effectively, and design durable prosthetics for use inside and outside the body

Food scientist

Example work areas: nutrition, food additives, chocolate, wine

Knowledge/skills: biochemistry, chemical processing, chemical analysis, properties of materials, sensory analysis

Why? To produce safe, nutritious, attractive food and drink

Arable farmer

Example work areas: crop management, agricultural equipment

Knowledge/skills: plant biology, pest and weed control, conservation, machine maintenance

Why? To maximise crop quality and quantity, while maintaining the environment

Veterinary assistant

Example work areas: pets, farm animals, working animals

Knowledge/skills: animal biology, hygiene, equipment and its care, computer data systems

Why? 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?

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

Example work areas: Forestry Commission, private estates

Knowledge/skills: tree care, propagation, recognition of species, woodland ecology, use and maintenance of equipment

Why? To ensure long-term supply of suitable trees/timber

Countryside ranger

Example work areas: National Parks, other public-access land

Knowledge/skills: ecology, animal and plant biology, conservation, properties of exposed materials

Why? To preserve natural environments despite public access

Other career examples

Example work areas:

Knowledge/skills:

Why?

career examples: energy and motion

Car designer

Example work areas: manufacturers, racing teams, add-on kits

Knowledge/skills: power, aerodynamics, friction (grip), material science, automotive systems, combustion, safety systems

Why? To achieve required levels of performance and safety

Renewable energy advisor

Example work areas: energy companies, businesses, households

Knowledge/skills: energy sources, capture and conversion technologies, efficiency, reliability, economics

Why? To compare viability of renewables in various circumstances

Accident investigator

Example work areas: transport incidents, explosions, collapse

Knowledge/skills: forces and motion, deformation, materials science, propulsion systems, explosive mixtures, data analyses

Why? To deduce the cause, and suggest how to avoid repetitions

Heating engineer

Example work areas: commercial and domestic heating, air conditioning and refrigeration systems; heating/cooling industrial processes

Knowledge/skills: energy conversion, combustion, heat transfer modes, material properties, fluid flow, control systems

Why? To use energy effectively to produce a desired temperature

Sports coach

Example work areas: professional club, school/college

Knowledge/skills: human biology (especially muscles, nutrition and metabolism), energy/force/power, levers, psychology

Why? 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

Example work areas: remote sensing (airborne/satellite), field work, laboratory investigation

Knowledge/skills: prospecting technologies (magnetic, gravitational et al), geology, mineralogy, chemical analysis

Why? To reliably identify potential mineral resources

Chemical engineer

Example work areas: oil and metal refining, chemical processing

Knowledge/skills: chemical properties, controlling reactions, energy flow, materials handling, separation techniques

Why? To decide required conditions for chemical reactions

Firework designer/manufacturer

Example work areas: pyrotechnic devices for bespoke displays, mass-market fireworks for public sale

Knowledge/skills: fuel-oxidiser systems, flame colours, controlling reaction rates, safe handling, ignition systems

Why? To design reliable devices giving desired effects and burn time

Leather manufacturer

Example work areas: shoes, handbags, clothing, saddlery

Knowledge/skills: physical, chemical and biological properties of various skins/hides, preservation processes, dyeing

Why? To transform skins into types of leather for various uses

Architect

Example work areas: domestic and commercial buildings, civil engineering projects such as bridges, stadia and concert halls

Knowledge/skills: materials science, forces, heat and sound insulation

Why? 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

Example work areas: research, monitoring earthquake regions, quake-resistant building design, mineral and oil prospecting

Knowledge/skills: geology, properties of materials, sound and shock-waves, energy transfer, forces, vibration detection and recording instruments, data analysis

Why? To study and explain earth tremors and mitigate their effects; and to locate underground rock strata where oil or minerals may be

Archaeologist

Example work areas: fieldwork ('digs'), laboratory investigation, museums (interpretation), media presentation

Knowledge/skills: geophysics (site/artefact location), artefact recovery and treatment, material identification, dating techniques, preservation methods, past technologies

Why? To identify and interpret items, and disseminate information

Climatologist

Example work areas: climate change and modelling, indices (e.g. El Niño), hurricane research, drought mitigation, polar research

Knowledge/skills: meteorology, hydrology, ecology, oceanography, data processing and analysis

Why? To study long-term climate trends and attempt predictions of future changes, and suggest ways of mitigating their effects

Satellite/space probe designer

Example work areas: telecommunications, weather observation, military monitoring, astronomy, space exploration

Knowledge/skills: material properties under extreme conditions, forces, electronics, communications technology, optics, sensors across the electromagnetic spectrum, power systems

Why? To design compact, reliable equipment that can survive the forces of launch and conditions in space

earth and space

Astronomer/astrophysicist

Example work areas: optical and radio telescopes (land-based and in space), radio interferometry

Knowledge/skills: detection of radiation across the electromagnetic spectrum, data processing and interpretation

Why? 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

Example work areas: telephone land lines, wireless transmission, exchanges, internet system, satellite communications

Knowledge/skills: analogue and digital signals, modulation, fibre optics, microwave transmission, routing systems

Why? To provide and maintain high speed worldwide communications

Computer programmer

Example work areas: business or education computer network, internet service provider, software producer, games developer

Knowledge/skills: computer languages and operating systems, digital electronics

Why? To write programs which translate between the processor's digital machine code and familiar, user-friendly text and graphics

Digital camera designer

Example work areas: still, video, TV and CCTV cameras, specialist cameras e.g. for satellite imaging or astronomy

Knowledge/skills: optics, image capture (e.g. CCDs), electronics, solid state memory, digital processing (e.g. zoom)

Why? To optimise resolution and functionality for a given price

Paper manufacturer

Example work areas: virgin and recycled, different grades/textures

Knowledge/skills: chemical processing, colouring, coating

Why? To produce papers with properties matched to applications

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communication technology

Sound/lighting technician

Example work areas: theatres, concert halls, broadcasting and recording studios, clubs, outside venues

Knowledge/skills: amplification systems, electronics, control circuits (e.g. mixing desk), electrical safety, colour mixing

Why? To set up and operate equipment for controlling the required sound and light levels throughout a performance

Radio/TV presenter

Example work areas: background research, studio and outside broadcasts, live broadcasts and recordings

Knowledge/skills: use of technology (e.g. recording and portable satellite broadcasting equipment)

Why? To ensure professional quality presenting

Other career examples

Example work areas:

Knowledge/skills:

Why?