

Starter Activities: Art, Design and Craft

Use the images in the Science pages and multimedia gallery to create your own portfolio of stimulus images for use with children/students at all levels.

You could start your collection with images from missions such as [SOHO](#), [Hubble](#) and [Mars Express](#).

Use astronomical images as vehicles to practice techniques or to stimulate projects such as:

- tie-dye: see especially Sun images from [SOHO](#) and nebula images from [Hubble](#)
- Batik
- Printing
- Symmetry paintings
- Blow, splatter, marbling
- Pastel, wet on wet

- Collage work
- Mosaic work
- Space 'stained glass' windows
- Quilling – look at the images of the rings of Saturn from the [Cassini-Huygens](#) mission
- Greetings and celebration cards – use comet and star images for Christmas, light festivals etc

- Make a class space gallery, corridor or corner
- Make a school/class space art gallery for the school intra-net or web site
- Make a class space patchwork quilt – look at traditional sunburst and starburst quilt designs

Use the images of mission spacecraft for modeling projects. Try different projects such as [ISO](#), [Mars Express](#) and [Ulysses](#).

- Build and design your own spacecraft
- Make spacecraft mobiles for the classroom/ space gallery
- Make 3D space boxes
- Construct simple space thaumatropes, stroboscopes and zoetropes

Use the artist impressions from all the projects as well as images from missions such as [Mars Express](#) (and [SMART-1](#) as from late 2004) to stimulate

- Spacescapes
- Fantasy work
- 'Crinkle' pictures/space-scapes

Research how artists through time and from different cultures have interpreted space and the heavens in their work

- Use [ESA Science](#) space images for mixed media/graphics/2D and 3D digital work

Use ESA Science Collections to stimulate use of secondary sources, to encourage personal student research and to extend student ICT skills

Starter Activities: Design and Technology

Visit the ESA [Science project/mission pages](#) (level2) and the [Science and Technology](#) pages (level 3). Here you will find simple to full explanations of the design and construction of the spacecraft.

- Use the interactive 3D models on each mission page to explore the different components of a spacecraft
- Use the **missions** and **technical** pages to design and construct your own space robotic mission craft
- Use the [cut and assemble](#) mathematical models as design models
- Visit the ESA [Concurrent Design Facility](#) (CDF) web pages; use the options on the CDF homepage to:
 - Learn what concurrent engineering is
 - Learn about the layout and nature of facilities available
 - Discover how engineers and scientists use these facilities in the design of a spacecraft.
 - Know how different ESA Science missions have successfully used this facility
 - Create your own CDF. Apply the same processes to your own class projects
- Visit the ESA/[ESTEC](#) homepage
 - Explore the overview of the work at ESA's European Space Research and Test Centre (ESTEC)
 - Discover who designs and builds spacecraft
 - Look inside the clean rooms
 - Discover the test facilities including the Large Space Simulator (LSS)
 - Play the video clip of Integral in the LSS
 - Visit the general (levels 1&2) [multimedia gallery](#) for images of Science mission craft in the test centre – make your own portfolio and display boards
- Visit the [ESA Science Payloads and Advanced Concepts](#) pages (bookmark and check for new updates)
 - Learn about new technology projects for science missions
 - Create your own project scientific posters for the classroom
- Visit the [ESA Technology Transfer](#) pages - learn about the many applications of space technology. Discover how Science missions share their technology with daily life, such as:
 - Landing a potato crisp
 - World Solar Championship winning car
 - Braces for children's teeth
 - Robotic assembly lines
 - Textiles and smart materials
 - Energy
 - Health
 - Environment

Use [ESA Science web pages](#) as a general class research resource and to stimulate and extend student research and ICT skills

Starter Activities: Geography

Use the full spectrum of ESA resources to create your own topic support packs as well as to encourage student research and ICT skills. Use:

- Video clips from the [Online ESA Television](#) site
- Stunning images of Sun, Earth, Moon and planets from the [multimedia galleries](#) and [science mission](#) pages – use science outreach and the science and technical pages
- [Observing the Earth Programme](#) pages – look especially at the mission Envisat here and in the multimedia galleries
- The special ESA Schools [Eduspace](#) programme for earth images and class activities
- Images from [Mars Express](#)
- Images of the Moon from [SMART-1](#) (from January 2005)
- The ESA [Meteorology](#) and [Space Meteorology](#) pages
- Science missions such as [Cluster](#), [SOHO](#), [Ulysses](#)

Use such resources to support such activities as:

- Exploring the relationship between the Sun, Earth and Moon
- Projects on the Solar System and beyond

- Comparing Earth climatic zones
- Looking at earth-like planets: see especially [Mars Express](#) and [Darwin](#) Science missions
- Colonization and terra-forming projects: see especially [Mars Express](#) and [Aurora](#) Programme/harsh environments experiments

- Use stunning images from the missions [Mars Express](#) and [Envisat](#) to create a research collection of comparative images to show physical features, their formation, erosion etc:
 - Volcanic and tectonic activity
 - Desert features
 - Canyon formation
 - Glaciation
 - Drainage patterns
 - Ocean basins
 - Geology
 - River features
 - Effects of man on environment ([Envisat](#) and [Eduspace](#))

- Use the [Science Missions](#) pages, [Earth Observation](#) missions, [Eduspace](#) and [Technology Transfer](#) pages for help with water projects and environment projects

- Use Science missions such as [Cluster](#), [SOHO](#) and [Ulysses](#) to explore the effects of space weather on Earth

Starter Activities: History / Philosophy/ Theory of knowledge

Use the [ESA Science Missions](#) to support various topic and project work such as:

- Voyages of Discovery
- Great Inventions
- Transport through the Ages
- Space Race
- Mans continued fascination with the working of the heavens from the earliest times to present day
 - gods and constellations
 - gods and planets
 - Calendars and names of days
 - places of worship
- The progression of astrology to the science of astronomy
- The impact of science and technology on knowledge and on daily life
- Use the [Mindmap](#) from under Starter Activities on these Education Support pages to support your own schemes of work
- Use the images from the **Science Missions** pages and **multimedia gallery** to compare with the illustrations and explanations of writers, scientists and astronomers from the past. How accurate were they?
- Use the [Interactive](#) section – to show how early astronomers and navigators used a sextant
- Use the **This Day in Space History** from the [Science Outreach](#) pages (Level 2)
- Visit the [SMART-1](#) mission pages – use the images (available from late 2004) to look at man’s understanding of the moon through the ages. Make your own (weather permitting!) lunar calendar. Compare with Mayan astronomy and Galileo’s lunar-cycle ink washes.
- Compare images of real comets – visit the [Rosetta](#) mission pages - with images in tapestries, paintings and contemporary writings
- Use real time images of Sun, Moon and eclipses with topic work on ancient civilizations and worship. Use [SOHO](#) and [SMART-1](#)
- Use real images and/or student paintings of space and ancient astronomical monuments to create a class display or time line
- Use **Science** images from the mission pages and [multimedia](#) galleries to plot against time/man’s understanding of the heavens together with images of gardens through the ages. Consider how the science of astronomy changed the layout of mediaeval European gardens into the visionary Enlightenment gardens of the C18th. Look for examples in the gardens of local great houses, academic institutions and some observatories
- Visit the [Science Missions](#) pages – print out the table of missions. Why are so many missions named after famous or legendary figures?
- Draw out a time-line.
 - Place images of the missions such as [Darwin](#), [Hipparcos](#), [Ulysses](#), [XMM-Newton](#), [Herschel](#), [Planck](#), [Gaia](#), [Cassini-Huygens](#), [BepiColombo](#) etc into the appropriate historical period with contemporary images of the person/figure. Do the same with missions from the other **ESA Programmes**, such as [Galileo](#)
 - Use as a stimulus to consider the knowledge base of a single civilization, or period or trends and factors that expand or suppress knowledge

Use in conjunction with observatories, planetarium, museums, space/science centres and education activities in your local area

Starter Activities: Language and Literature – Mother/Second tongue

Use the [Mindmap](#) from under Starter Activities on these Education Support pages to support your own schemes of work.

Use together with:

- Images, artists impressions, animations and video clips from the [Science Missions](#) pages and multimedia galleries
- [Storyboards](#) from Education Support pages
- Video clips from [ESA On-line Videos](#)
- [ESA publications](#)
- [Technology Transfer](#)
- [Press releases](#)
- [Status reports](#) – see [Science and Technology](#) mission pages
- News items
- Click on the flag on the [ESA](#) portal page for news and stories in that language

Create stunning image resources - Print out images of the spacecraft and their camera results from the [Science Missions](#) pages – look especially at [SOHO](#), [Hubble](#), [Mars Express](#). Use to support such activities as:

- Stimulating descriptive language development and communication skills
- Empathy and emotions
- Work/activity cards
- Story boards, sequencing, story telling and personification
- Creative and fantasy writing – use artists impressions and mission images from [Rosetta](#), [Mars Express](#) and [SMART-1](#) for space-scapes – see [ESA publications](#) for Sci-fi
- Use plastic covered images for Early-Years free play and sand and water play-scapes
- Make your own lotto and memory skills game cards
- Creation stories/ Sagas
- Use [INTEGRAL](#) for information on Black Holes
- Illustrating class projects on favourite/thematic stories/literature

Also for:

- Drama activities
- Multimedia presentations
- Use of language /different genres and target audiences
 - Newspaper/journalist role play
 - Articles explaining aim/results of a mission to general public or a school newspaper
 - Articles explaining the science and the benefits of space spin-off to daily life
- Informed discussions and debates including Model United Nations

ESA Science web pages are very readable and are an excellent tool for

- Expanding student ICT skills
- Use of secondary sources
- Use of different targeted material/genres
- Supporting internationalism, citizenship, hidden curriculum and cross-curricula elements

Starter Activities: Citizenship/Homo Faber

Citizenship is a valuable element in the school curriculum and may appear formally as a domain in its own right and under various names, or informally across subject and activity domains as an active but 'hidden' element.

It is important in creating valuable members of society capable of promoting actions and benefits for the local and global society at all levels of society and enables them to do so with respect to rights and responsibilities, to moral, ethical and spiritual issues.

Discover:

- How ESA works across many countries with many languages and different cultural backgrounds as one big team
- How ESA works for the benefit of the wider scientific and global community

Use:

- The [ESA](#) portal pages and **About ESA**
- The video clips from [ESA Television/Videos on Line](#)
- The [Science mission pages](#) and [multimedia](#) galleries images
- The [Technology Transfer](#) and [Future Activities](#) pages
- ESA Science [Press/Media releases](#) and [ESA publications](#)
- [Observing the Earth](#) programme pages – especially [Envisat](#)
- A print out of the [Mindmap](#) from these Education Support Pages

Support:

- Class/year/school assemblies – use material to make powerful and thought provoking multimedia presentations
- Debates
- Projects on values, ethics, endeavor etc
- Comparative work on opinions and values from the past, from different religious and cultural backgrounds and levels of society
- Projects on United Nations and Non-Governmental Organizations
- Research and debates for Model United Nations/The Hague International Model United Nations Committees and Special Conferences
- Individual and group research
- ICT skills

Starter Activities: Comparative Faiths

Use ESA Science material to support individual, group or class work in exploring symbolism and belief in different religions and cultures. Print out the Entry Points mind map to support your schemes of work.

Use:

- Real stunning images from the [Science Missions](#) pages and [multimedia](#) galleries in conjunction with:
 - Literature such as Rudyard Kipling's *Just So Stories* or similar work
 - Myths and legends
 - Man's attempted and changing understanding of his place in time and the universe
 - Creation stories from societies around the world
 - Creation stories from the major faiths
 - The humanist/scientist creation story – visit the [Astrophysics](#) and [Solar System](#) mission pages
 - Symbolism /Festivals of light – look at mission pages for comets, Sun, stars, moon. Look at [Rosetta](#), [SOHO](#), [Hubble](#), [SMART-1](#)

- Images of Sun, Moon, stars and eclipses with images of places of worship
 - How does each faith describe the heavenly bodies
 - How does each faith observe the celestial/luna/seasonal calendar

- Images to make classroom displays, festival cards and decorations
- [Gaia](#) Science mission to stimulate a research project on Gaia and the stars
- Images from [SOHO](#) and [Hubble](#) to stimulate student creation stories
- Images and video clips from the [multimedia](#) gallery to create your own multimedia assembly presentations
- Images and animations with student's own choice of music, description, communication, puppetry, mime or dance

Use [ESA Science](#) mission pages and multimedia galleries to expand individual student /group research work and ICT skills

Starter Activities: Natural Sciences

Use the whole breadth of [ESA](#) and [ESA Science](#) resources to support class teaching and student research at all levels. Use the [Starter Activities Mindmap](#) print out from these Education Support pages with these notes and the [ESA Web Structure](#) print out to get you started.

ESA Science offers exemplars of applications of science and technology across the curricula.

Use:

- ESA [Science and Technology](#) (level 3) pages to access mission scientific overviews, results and status reports.
- [Themes/Wavelength](#) as a quick access. Go to appropriate mission page. Investigate the variety, work and results of the instruments on board the mission. Use with brochures and publications.
- Additional information in [RSSD](#) (level4) mission pages – simply select the mission you are interested in.
- [Science Payloads and Advanced Concepts](#) for up to date news about lab research.
- Technical Support pages via [ESTEC](#) or [Thermal Engineering](#) for the engineering behind an ESA Science mission – includes:
 - Thermodynamics
 - Electrical engineering
 - Mechanical engineering
 - Optics
 - Mathematics and software
 - Space cryogenics
- [ESA Publications](#)
 - Annual Reports
 - ESA Bulletin
 - Mission Brochures
 - Topic BrochuresThese may be downloaded, subscribed to, or purchased. Details are available on these pages.
- The [ESA/ESO Astronomy Exercises](#) for upper school students and link in to the ESA Science and Technology/RSSD pages
- The [Astronomy Resource Notes for Teachers](#) – especially useful for teachers of upper secondary /Baccalaureate students
- The [Interactive](#) tools to support teaching/explanations
- [Mission Patches](#) – all missions have their own identity and mission patch
 - Use the Science pages to research the nature and science content of each patch
 - Use Science/Science and Technology pages to research a mission. Design a mission patch that reflects the science and destination of a chosen mission
- The [cut and assemble](#) mission craft models
 - With appropriate print out image backgrounds and scientific information
 - Create a scientific space mission exhibition – order according to destination/instrumentation/wave length etc
- The [Little Books of Gaia](#) to stimulate similar class science communication projects

The [ESA Science pages](#) and links offers support across the breadth of all general natural science curricula as well as many special topic areas such as:

- Health physics
- Materials
- Telecommunications
- Cosmology
- Astrophysics
- Optics
- Mechanics
- Thermal physics
- Relativity

Starter Activities: [Model United Nations](#)

Use the full spectrum of ESA resources to support research and debate for the different committees, special conferences and Youth Summits.

Conventions and Mandates

Use UN/International Space Law

- See United Nations Office for [Outer Space Affairs](#) including [Committee on the Peaceful Uses of Outer Space](#). This UN office is situated in Vienna.

Use the ESA main portal to access:

- ESA [Facts and Figures](#)
- [ESA Convention](#) – see especially page 10; Use this together with exemplars of ESA's work across disciplines and across Europe and the world; including the developing world
- [ESA Presentation](#)
- [ESA Agenda 2007](#)
- [ESA and the EU – White Paper](#)
- [Euroforum Charter](#) – a collaboration between major European inter-governmental scientific research organizations

ESA Science Programme

Use the ESA [Science missions](#) pages to learn about:

- Research in space and how this contributes to man's understanding of his place in time and universe
- The history and development of the universe and the uniqueness of Earth and its life in the Solar system and to consider what this research tells of the future for Earth, its atmosphere, climates, environments and life forms
- Solar missions such as [SOHO](#), [Ulysses](#) and [Cluster](#) and their contribution to meteorology, solar storm and radiation protection
- How technology developed for such research is turned around for [Earth Monitoring/Observation](#) and for wider [Technology Transfer](#) applications that benefit the whole world

ESA Observing the Earth Programme

Use the ESA [Earth Observation](#) missions to learn about:

- Increased awareness of the precious and fragile properties of Earth and its life forms
- New powerful scientific tools for better understanding and improved global management of the Earth and its environments
- Monitoring and warning of natural hazards and disasters such as earthquakes, flooding, volcanic eruptions, hurricanes
- General wide-area weather forecasting
- Monitoring of depletion of rain forests, melting/retreating ice shelves, the annual rise in sea levels, the depletion of ozone and the rise of air pollution
- Tracking of animal, bird and fish migration patterns
- Tracking of oil slicks and illegal dumping at sea
- Vegetation and desertification studies
- Agriculture and land use including strategic crop strategies
- Water studies and water management

Discover ESA's partnership role with TESEO (Treaty Enforcements Services using Earth Observation) together with parties to the Kyoto Protocol, the Ramsar Convention on Wetlands, the Convention to Combat Desertification (UNCCD), World Heritage Convention (HHC) etc. Learn how an NGO can access reliable information and Environment ministers can widen their knowledge base.

Visit ESA [Future Activities](#) on the main portal page to learn about ESA's [Living Planet Programme](#)
Visit the [Eduspace](#) pages to see daily images of oil slicks and natural hazards etc – request your free school password.

ESA Technology Transfer Programme

Use the [Technology Transfer](#) pages to discover how ESA shares its technology with the world for the benefit of all. Here are just some of the many benefits you can find on these pages:

- Medicine
 - Supernova technology for melanoma recognition
 - Heart and cancer treatment from space radiation detector technology
 - Shape memory alloys for fracture and dental repairs
 - Fibre optics from space cameras for endoscopic work
 - Microwave spectroscopy for cancer cell identification
 - Mathematical processing chip for 2D and 3D medical imaging
 - Satellite imaging technology for stroke prevention
 - X-ray lens technology for determining protein structures
 - Astronomy camera and light detector technology for chemical changes in cancerous cells
 - Space electrophoresis technology for improved blood tests
 - Space gas detector technology for medical laboratory work with micro-organisms/pathogenic bacteria
 - Laser cleaning

- Food preservation and packaging
- Extra sensitive sensors for robotic limbs
- Innovative space materials for flame proof materials
- vandal resistant sheeting for haulage trucks
- Lightweight alloys for more efficient aircraft
- Improved radar systems
- Improved brakes and airbags for transport manufacture
- Spacegearing for better gear boxes
- Space sensors for warning systems against catastrophic equipment failure & control of heavy vibration
- Bluetooth chip technology

- Water
 - Removal of harmful parasites from drinking water supplies
 - Recycling of 'grey' water into drinking water
 - Remote monitoring and controlling of drinking water supply networks

- Environment
 - Cleaner fuels for greener cars
 - Offshore exploration
 - Solar cells for solar energy applications
 - Space actuators from comet exploration for more efficient car engines

Use the [ESA Television/ Online Videos](#) on the main portal page for a selection of film clips on all of the above programmes.

Use the [ESA Publications](#) for downloadable articles and brochures on all of these topic areas. Several items are available for purchase or subscription.

Check the news items on the portal regularly for updates as well as the [Press Releases](#).

Use the [Future Activities](#) pages to keep abreast of future research and benefits to the global community:

Future activities of the European Space Agency

A number of future programmes are underway to build on current successes. This page provides an entry point to the various Future programme pages in each of ESA's Directorates.



[Advanced Concepts Team](#)



[Aurora - the European Programme for the Exploration of the Solar System](#)



[Future launchers](#)



[Galileo - Europe's future global navigation system](#)



[General Studies Programme](#)



[Human Spaceflight - what's next?](#)



[ESA's Living Planet programme - the future of Earth Observation](#)



[ESA Science - advanced concepts](#)



[Technology - preparing for the future](#)



[ESA's Telecommunications programme - the Future](#)