



## Introduction

Your student finishes the assignment early, or needs a challenging enrichment activity while the other students finish their work. You don't want to introduce an entirely new topic and you don't have time to research a student project activity. What do you do?

You reach for the *High Interest Learning* series, that's what you do! *High Interest Learning* books are organised into topics that are of interest to young people today. Each book contains researched information pages that are fun to read, and extension activities that will engage your students. Internet websites are included to expand your students' abilities to access the information superhighway. *Note:* Because of the mutable nature of the Internet, websites do change. The sites listed in this resource were current at the time of publication.

The *High Interest Learning* series was created to foster learning and stimulate creativity in your students. It also saves you time by providing researched enrichments for your students. They win and you win!



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# Apollo I

**Something to know** 'If we die, do not mourn for us. This is a risky business we're in, and we accept those risks. The space program is too valuable to this country to be halted for too long if a disaster should ever happen.' Gus Gissom, three weeks before *Apollo 1* disaster.

In 1961, President John F. Kennedy committed the United States to putting a human being on the Moon by the end of the decade. NASA started the Apollo Program to accomplish that goal. It was achieved, but not without sacrifices. *Apollo 1* is the story of the biggest sacrifice in attaining the lunar goal.

27 January, 1967, started out as a typical day at Cape Kennedy (later renamed Cape Canaveral) in Florida. The launch date for the lunar mission was set for 21 February, 1967. Astronauts Virgil (Gus) Grissom, Edward White and Roger Chaffee stood on the launch pad, ready to board the *Apollo 204*. They were to perform a preflight test inside the actual rocket. The astronauts boarded the command module (CM) and were strapped into their seats, according to procedure. Then tragedy struck. At 6.31 p.m., near the end of a pre-launch countdown, a spark inside the CM ignited a fire. The astronauts were strapped down and had no escape hatch in case of emergency. All three men were killed in seconds.

The nation was stunned. A period of mourning was observed across the United States. Flags were flown at half-mast. President Lyndon Johnson called for an official investigation of the accident.

NASA had not taken proper safety precautions to help the astronauts trapped in the CM, but no-one had expected a thing like this to happen. Investigators of the fire found out that the amount and location of flammable material in the CM had not been secured. There had been no emergency procedure for the astronauts to escape the CM, and the support crews on the ground had not been prepared for such an emergency.

*Apollo 204* was later renamed *Apollo 1*. The faith of the American people in the space program had been shaken. People at NASA were shaken, too. As a result of the fire, scientists and engineers worked on safety procedures for a year and a half to make sure it would never happen again.

**Something to do**

- The home page for *Apollo 1* on the Internet can be found at:  
[www.hq.nasa.gov/office/pao/History/Apollo204/](http://www.hq.nasa.gov/office/pao/History/Apollo204/)
- You can find a good photo gallery of *Apollo 1* on the World Wide Web at:  
[www.hq.nasa.gov/office/pao/History/Apollo204/gallery.html](http://www.hq.nasa.gov/office/pao/History/Apollo204/gallery.html)
- No commemorative postage stamp has ever been made for *Apollo 1*. Design and colour a postage stamp honouring the brave astronauts of *Apollo 1*.

**Something to think about** What was the most important lesson learned from the tragedy of *Apollo 1*?



## Apollo 13

**Something to know** *Apollo 13* was supposed to fly to the Moon, land in the Fra Mauro area, and collect samples of Moon rocks to be examined back on the Earth. It launched on 11 April, 1970, with the able crew of Jim Lovell, Fred Haise and Jack Swigert.

Everything appeared normal and routine until the craft was halfway to the Moon and an explosion occurred. One of the crew set off the explosion when he stirred the tanks of liquid oxygen, which was standard procedure. The wiring in one of the oxygen tanks had been damaged. When the liquid oxygen was stirred, the wiring shorted out and caused a fire. Hot gas entered the service module where supplies and equipment were stored. That increased pressure in the service module, which caused another explosion that took out an entire wall of the unit.

The astronauts realised that they were losing oxygen, electricity, light and water in the command module (CM) and there were 200,000 miles from the Earth. The mission to the Moon was aborted, and the combined energies of the Apollo crew and the staff at the Mission control in Houston, Texas, were concentrated on bringing the crew back safely. The plan was to orbit the Moon and use its gravitational field as a slingshot to send the spacecraft back to the Earth.

The men could not survive the entire journey home in the CM so they used the lunar module as a lifeboat. However, the lunar module had been designed to support 2 men for 45 hours; it needed to support 3 men for 90 hours. They conserved water by only drinking 150 millilitres a day and saved energy by shutting down most of the systems. As they approached the Earth, they crawled back into the CM and jettisoned the service and lunar modules. The calculations for their point of re-entry into the Earth's atmosphere had to be accurate. If their calculations were off by only a fraction, they could be killed. The calculations were correct, and the crew splashed down in the Pacific Ocean. NASA refers to the *Apollo 13* mission as their 'successful failure' because even though the original mission was not accomplished, the abilities of the crew and engineers to analyse and solve problems in space were a success.

**Something to do**

- Read about *Apollo 13* mission in detail on the Net! You can find it at: [nssdc.gsfc.nasa.gov/planetary/lunar/apollo13info.html](http://nssdc.gsfc.nasa.gov/planetary/lunar/apollo13info.html)
- Every NASA space program has a patch designed for it. Design and colour your own *Apollo 13* mission patch.

**Something to think about** If you had been a member of the *Apollo 13* crew, how would you have kept yourself calm during the mission?



## Aurora borealis and aurora australis

**Something to know** There are two forms of aurorae on the Earth. Aurora borealis is also known as the 'northern lights' and can be seen best near the North Pole. At many times during the year, it can be viewed as far south as Toronto, Canada. Aurora australis is commonly known as the 'southern lights' and is viewed best at the South Pole. Sometimes people living in the lower latitudes can see them on clear summer nights away from large cities. They have been seen as far north as Brisbane before.

The aurorae are nature's cosmic light show. The colours of the night sky can change anywhere from white to green to deep red. The light forms shapes such as streamers, curtains, shells and arcs.

Charged particles of protons and electrons are sent out by the Sun into space. The particles that are blasted out of the Sun become solar winds. The particles in the solar winds enter our atmosphere and become trapped for a while in the outer parts of the Earth's magnetic field. In time, the particles leak down toward the north and south magnetic poles until they smash into the Earth's upper atmosphere. When the particles come in contact with the atmosphere, the particles change into atoms of gas, which give off light, just like a glowing neon sign. When there is a lot of solar activity, such as solar flares, you are more likely to see the aurorae glow in the night sky. At such times, you might even see the aurora borealis as far south as Mexico.

Aurorae were photographed by *Voyager 1* in 1980 as it flew by Jupiter and Saturn. The aurorae on those huge planets were not limited to the magnetic poles like on the Earth, but occurred all over the planets.

**Something to do**

- ▶ Check out aurorae displays on the World Wide Web! You can view them at:  
[www.nmm.ac.uk/site/request/setTemplate:singlecontent/contentTypeA/conWebDoc/contentId/3058](http://www.nmm.ac.uk/site/request/setTemplate:singlecontent/contentTypeA/conWebDoc/contentId/3058)
- ▶ Have a look at the 'Auroras: Paintings in the Sky' website:  
[www.exploratorium.edu/learning\\_studio/auroras](http://www.exploratorium.edu/learning_studio/auroras)

Do you think that you could create a painting as beautiful as an aurora? Have a go at creating your own masterpiece! Take a piece of black construction paper, some watered-down neon tempera paints, a drinking straw and an icy-pole stick. Gently pull the watery tempera paint into the straw with your mouth, being careful not to swallow any paint. Blow the paint onto the black paper to make streaks. Use the icy-pole stick as a paint brush to create swirls and curtains of colour.

- ▶ Design a neon sign to advertise the next aurora sighting near your home.

**Something to think about** Which would you prefer to watch: an aurora display or a fireworks show? Give at least four reasons for your answer.