



Movies in the Science Classroom: *Apollo 13*
Lesson Ideas for Stage 6 Physics
9.2 Space

Abstract: This session seeks to use excerpts from the movie *APOLLO 13* to illustrate dot points in the context of:

9.2 SPACE

Contextual Outline

Scientists have drawn on advances in areas such as aeronautics, material science, robotics, electronics, medicine and energy production to develop viable spacecraft. Perhaps the most dangerous parts of any space mission are the launch, re-entry and landing. A huge force is required to propel the rocket a sufficient distance from the Earth so that it is able to either escape the Earth's gravitational pull or maintain an orbit. Following a successful mission, re-entry through the Earth's atmosphere provides further challenges to scientists if astronauts are to return to Earth safely.

Rapid advances in technologies over the past fifty years have allowed the exploration of not only the Moon, but the Solar System and, to an increasing extent, the Universe. Space exploration is becoming more viable. Information from research undertaken in space programs has impacted on society through the development of devices such as personal computers, advanced medical equipment and communication satellites, and has enabled the accurate mapping of natural resources. Space research and exploration increases our understanding of the Earth's own environment, the Solar System and the Universe.

H 12.3 gather information from secondary sources by:

a) accessing information from a range of resources,

Syllabus – Section 2	Timer reading (Insert tape on 00:00:00)	Movie section
<ul style="list-style-type: none">define weight as the force on an object due to a gravitational field	00:38 00:45 – 00:48	Weightlessness
<ul style="list-style-type: none">explain the concept of escape velocity in terms of the:<ul style="list-style-type: none">– gravitational constant– mass and radius of the planet	00:15	Description of procedure to Lovell Jr.
<ul style="list-style-type: none">identify why the term 'g forces' is used to explain the forces acting on an astronaut during launch	00:28:37	Actual launch and demonstration of effect of g-forces
<ul style="list-style-type: none">discuss the effect of the Earth's orbital motion and its rotational motion on the launch of a rocket	00:19:50	Houston, showing route on wall plan
<ul style="list-style-type: none">discuss issues associated with safe re-entry into the Earth's atmosphere and landing on the Earth's surface	00:23 – 25:50 01:53	Discussion on simulator Heat shield discussion



<ul style="list-style-type: none"> ▪ identify that there is an optimum angle for safe re-entry for a manned spacecraft into the Earth's atmosphere and the consequences of failing to achieve this angle 	01:34:00 02:00 – 02:05	Reference to angle Re-entry and rescue
<ul style="list-style-type: none"> ▪ identify that a slingshot effect can be provided by planets for space probes 	01:05 – 01:07	Using slingshot effect from the Moon
12.4 process information to: e) assess the reliability of first-hand and secondary information and data by considering information from various sources	00:05:30	Book credit to Lovell Lovell's prior experience Actual astronauts were alive when movie was released
14.2 solve problems by: a) identifying and explaining the nature of a problem b) describing and selecting from different strategies, those which could be used to solve a problem c) using identified strategies to develop a range of possible solutions to a particular problem d) evaluating the appropriateness of different strategies for solving an identified problem	01:17 01:20 – 01:25 01:35 – 01:40 01:49	Carbon dioxide problem How to solve the problem Orientation problem Route problem – weight

Other interesting themes:

- Using the simulator; 00:11:20 – 00:13:23, 00:23:40 – 25:26
- Docking procedure; 00:39:50 – 43:00
- Moon shots; 01:07 – 12
- The accident; 00:48:50 – 54
- Release of the service module; 01:52 – 54
- Release of Aquarius; 01:57
- Use of slide-rule for calculations!; 00:58 – 01:00

Other points of interest throughout movie:

- Blasé reaction of ordinary Americans turning to total absorption after accident
- Stress on family / relationships
- Advantage of having a 'control' astronaut at base; 01:15, 01:40 – 41, 01:44 – 47
- Failure of overall mission/benefits of overall mission
- Total lack of female scientists