

Deadly Skies *By David Hill*

Introduction

Travelling into space can be a deadly exercise. Two space shuttle flights from the Kennedy Space Center in the United States have ended in disaster. Read about how these disasters happened and learn about how people continue to explore our amazing but potentially lethal skies.

Reason for reading

You could use this book with your students to:

- explore the topics of space travel and its dangers
- learn about the two unsuccessful flights of the space shuttles *Challenger* and *Columbia*
- explore how the author builds tension and creates atmosphere in his account of the two shuttle disasters.

Setting the scene

Draw on your students' prior knowledge. If necessary, introduce concepts or vocabulary to help them access the story. Also communicate the reason for reading.

- Brainstorm ideas about space travel and exploration. Why is space travel necessary? How does it affect our lives? What important things have we learned from human exploration of space?
- Print the KWLH chart (Template A) or create a KWLH chart on the board. Students, before reading, fill in the first two columns of this chart with what they know and want to know about space travel. After reading, they fill in the last two columns with what they have learned and how.
- Students explore the cover and determine what they think the story is about.
- Introduce vocabulary that the students may need to access the text. Refer to the vocabulary worksheets (2, 3a and 3b) for words that may be unfamiliar.

Getting stuck in

Choose the prompts that you feel your students need. Remind them to note any unfamiliar words and check for clues to the meanings in the text or images.

- End of page 5 – “This is the 25th space shuttle liftoff. What are the first signs that something is wrong? How high must *Challenger* travel before it can go into orbit around Earth? What has caused the failure of the thick rubber rings that usually prevent the fuel from escaping?”
- End of page 9 – “How long is it before the shuttle reaches a height of 16 kilometres? How did the people on Earth find out what had happened to *Challenger*?”
- End of page 13 – “What is the difference between the early space rockets and space shuttles? What is the spacecraft that carries the astronauts and equipment called? The only part of a shuttle mission that cannot be used again is the ...? Name some of the jobs carried out by the space shuttles in space.”
- End of page 17 – “How many missions does the *Columbia* complete?”

- End of page 21 – “At what speed is the *Columbia* travelling towards Earth when it explodes? Why does it explode?”
- End of page 24 – “Name all the space shuttles.”

Taking a closer look

Choose suggestions that suit your students and reason for reading.

Exploring ideas and opinions

- Ask for your students’ opinions of this book. Did they find it held their attention? Why/why not? Why do they think the author wrote it?
- After students complete the three-level thinking guide (Worksheet 1), they discuss their responses in pairs, in small groups, or as a class.
- Students discuss in pairs or small groups: “How important is space travel? Why is it important?” They could prepare a chart of reasons for and against space travel and present it to the class for discussion.

Exploring structure

- Students choose one of the shuttle disasters and document the sequence of events that led to that catastrophe.
- Students explore the strategies that the author uses to build suspense. How does the author’s use of tense help to achieve this? He uses extracts from transcripts of the dialogue between Mission Control and the astronauts. Why?

Exploring language

- Cut out the words and definitions from Worksheet 2 and mix them up. Hand them out to students, who then find their correct “partner”.
- As an alternative to the above activity, divide the class into two groups: one group fills in the second column of Worksheet 3a and the other group fills in the second column of Worksheet 3b. This activity involves the students in creating definitions, which they then use to test the other group.
- Students search for: adjectives such as *bellowed*, *white-hot*, *blazing*; and nouns such as *ticking time-bomb*, *blow-torch*, *shock-waves*. Do these words add to the suspense?
- Students complete Worksheet 4 – the cloze activity.

Moving beyond the text

Choose activities that suit your students and reason for reading.

Reading

- Students read other articles and/or stories about space exploration.

Writing

- Set this writing task: “Imagine you are an astronaut about to take off on a shuttle mission. Write about your experiences during the trip.”

Debating

- Hold a class debate on: “Why it is important for people to explore space.”

Research

- Students do research on:
- the history of space travel
- the countries involved in space exploration.

Art and design

- Students prepare a static image, poster, or book cover that advertises *Deadly Skies*.
- Students create an advertisement for the position of astronaut on a space shuttle mission.
- Students draw a diagram of a space shuttle before takeoff, which shows and describes the main parts (see p 10).

WORKSHEET 1

Deadly Skies – Three-level thinking guide

- Level 1 – Reading on the lines (interpreting what the text says on a literal level)
- Level 2 – Reading between the lines (inferring, or interpreting what the text might mean)
- Level 3 – Reading beyond the lines (evaluating ideas and information)

Students write “agree” or “disagree” beside each statement and then discuss their responses in pairs, in groups, or as a class. The value of this activity lies in the discussion it generates as students justify their views. The activity is not intended as a test for comprehension.

LEVEL 1	Agree/disagree
The space shuttle <i>Challenger</i> was 12 metres high.	
It was freezing at the Kennedy Space Center in January 1986.	
The rubber rings melted in the intense heat from the booster rockets.	
One minute after takeoff, <i>Challenger</i> was as high as Mount Everest.	
The <i>Challenger</i> crew were dead 72 minutes after takeoff.	
The first space shuttle flight by <i>Columbia</i> was in April 1981.	
The space shuttles were built to fly into space and return to earth.	
All parts of a space shuttle mission could be used again.	
The orbiter had two engines so that it could land back on Earth.	
A shuttle could stay in space for up to a month.	
<i>Columbia</i> , the oldest space shuttle, completed 28 missions in space.	
All 10 crew died instantly when the <i>Columbia</i> exploded.	
The cause of the <i>Columbia</i> disaster was something that happened at takeoff.	
Shuttle flights continue today.	

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LEVEL 2	Agree/disagree
The 25th <i>Challenger</i> space shuttle mission should have been scheduled for summer.	
If people at the space mission control centre were more observant, accidents wouldn't happen.	
Space shuttles are safe once they are in orbit around Earth.	
It is important for all shuttle takeoffs to be televised.	
If the o-ring cracks in the <i>Challenger</i> had been opposite the booster rocket, the space shuttle would have been fine.	
Space shuttles are less expensive than space rockets.	
Space shuttles are just huge gliders.	
Astronauts need their spacesuits to keep them warm.	
The space shuttle <i>Columbia</i> was a totally modern spacecraft.	
Mission Control should have decided that the foam plastic had damaged <i>Columbia</i> .	
All spacecraft should be unmanned.	
LEVEL 3	Agree/disagree
Space shuttle flights are too dangerous and should be banned.	
There is no light in space.	
Manned space missions are essential.	
Nothing useful comes from space exploration.	
"One small step for man, one giant leap for mankind!"	

Sheet 2 of 2

Worksheet designed by Barbara Freeman, Wellington, New Zealand, 2007

WORKSHEET 2

Deadly Skies – Match the meaning

Cut out the words and their definitions, mix them up, and ask your students to match the pairs.

<i>Word</i>	<i>Definition</i>
analysed	considered in detail to improve understanding
astronaut	a person who is trained to fly in space
atmosphere	the layer of gases around Earth
blow-torch	a tool that blows extremely hot air
booster	tool or mechanism to increase power
debris	remains or ruins of something
deployed	put to use
emergency	unexpected event that involves danger
exhaust	the waste left over when fuel burns
external	outside
fanned	encouraged, increased
friction	heat created when two things rub together

Word	Definition
gravity	the force that pulls us and other objects to Earth
heat-resistant	preventing heat from passing through
liquid hydrogen	a highly flammable fuel
missile	a dangerous projectile
modernised	brought up to date
orbit	the path followed around something
orbiter	a spacecraft that carries astronauts and equipment
o-ring	a seal that prevents leakage
overhauled	reviewed and repaired
satellite	object that circles another larger object
shuttle	a rocket that travels to and from space more than once
throttle	acceleration control

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Note that some words above may have different meanings in other contexts.

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WORKSHEET 3a – GROUP A

Deadly Skies – Vocab swap

- Divide the class into two groups, and give one group Worksheet 3a and the other group Worksheet 3b.
- In the second column of its own worksheet, each group writes a definition for each of the words in the first column. Where a word has more than one meaning, a group may need to check the page of the book that is listed.
- Each group then folds the first column out of sight and swaps worksheets with the other group.
- Each group guesses the original words, based on the definitions given in the other group's worksheet, and writes them in the third column of that worksheet. A group can go to the page in the book that is listed if it needs help. For an extra challenge, the groups can guess without referring to the page.
- You could make this a fun competition and give points for every correct word.

Word	Definition (Group A)	Word (Group B)
analysed (p 21)	(p 21)	
atmosphere (p 11)	(p 11)	
booster (p 2)	(p 2)	
deployed (p 11)	(p 11)	
exhaust (p 5)	(p 5)	
fanned (p 8)	(p 8)	
gravity (p 12)	(p 12)	
liquid hydrogen (p 4)	(p 4)	
modernised (p 14)	(p 14)	

Word	Definition (Group A)	Word (Group B)
orbiter (p 15)	(p 15)	
overhauled (p 14)	(p 14)	
shuttle (p 2)	(p 2)	

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WORKSHEET 3b – GROUP B

Deadly Skies – Vocab swapap

- Divide the class into two groups, and give one group Worksheet 3a and the other group Worksheet 3b.
- In the second column of its own worksheet, each group writes a definition for each of the words in the first column. Where a word has more than one meaning, the group may need to check the page of the book that is listed.
- Each group then folds the first column out of sight and swaps worksheets with the other group.
- Each group guesses the original words, based on the definitions given in the other group's worksheet, and writes them in the third column of that worksheet. A group can go to the page in the book that is listed if it needs help. For an extra challenge, the groups can guess without referring to the page.
- You could make this a fun competition and give points for every correct word.

Word	Definition (Group B)	Word (Group A)
astronaut (p 6)	(p 6)	
blow-torch (p 8)	(p 8)	
debris (p 21)	(p 21)	
emergency (p 17)	(p 17)	
external (p 4)	(p 4)	
friction (p 20)	(p 20)	
heat-resistant (p 16)	(p 16)	
missile (p 8)	(p 8)	
orbit (p 4)	(p 4)	
o-ring (p 5)	(p 5)	

Word	Definition (Group B)	Word (Group A)
satellite (p 12)	(p 12)	
throttle (p 6)	(p 6)	

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WORKSHEET 4

Deadly Skies – Fill in the gaps

Add your own words in the spaces to make this passage come alive!

What caused this second disaster? The of plastic falling from the fuel tank had and cracked some heat-resistant tiles on orbiter's left wing. When *Columbia* began its plunge back Earth, the friction and of re-entry made these break open or fall

Without the tiles to it, parts the shuttle's left wing became red-..... Wires melted. Instruments burned out. The whole wing buckled and tore away, slamming the orbiter's engines and ripping *Columbia* apart.

Debris from was collected and analysed.

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TEMPLATE A

KWLH chart

<u><i>KNOW</i></u>	<u><i>WANT TO KNOW</i></u>	<u><i>LEARNED</i></u>	<u><i>HOW I LEARNED</i></u>