



FIREBALLS
in the sky

Teacher Resource Book

Exploring planetary science in the primary classroom



Curtin University



WHAT IS FIREBALLS IN THE SKY?

Fireballs in the Sky is a citizen science initiative linked to the research of the Desert Fireball Network (DFN) team at Curtin University. The project aims to record fireballs (meteors or shooting stars) as they enter the Earth's atmosphere in order to calculate where they came from in space and where they landed.

WHAT IS PLANETARY SCIENCE?

Planetary science is the study of planets (including Earth), moons and smaller bodies of the solar system and how they were formed. It is a blend of geology and astronomy.

The study of meteorites, or meteoritics, allows us to find out what asteroids, comets and planets are made of, and thus learn more about the origins of the solar system. The project uses cameras stationed in the desert (the DFN) and a smart phone app (Fireballs in the Sky) which people all around the world can use to report a sighting.



Dramatic meteors are called fireballs

HOW DO I USE THIS BOOK?

This book provides experiments and activity ideas to supplement classroom science and maths teaching around the theme of 'Fireballs in the Sky'.

Experiments can be used individually or as the whole unit to engage students in science and maths.

Resources such as recipes and worksheets are available to photocopy (pages 50 - 69).

There are fact sheets and a glossary at the end of this book to help you out (pages 70 - 89).



Dissecting a meteorite

HOW WILL THIS BOOK HELP WITH FORMAL LEARNING?

The Australian Curriculum emphasises the use of the scientific method and understanding the endeavour of scientists themselves. Each topic in this book is set in Bybee's 5Es model of science learning and comes with a hands-on element. This will allow you to engage, explore, explain, elaborate and evaluate the topic with your students. **Space Rocks** targets students in kindy to year two. The activities in this unit may be scaled up or used as a warm up for the **Origins** unit lessons, designed for years three to six.



Some of the Fireballs team having a cuppa

The experiments in this book have been written in a 'plan, predict, test, analyse, communicate' format to encourage regular use and familiarity with the scientific method.

Students will enjoy learning about the people behind the project on the website and can follow their field trips and achievements through the online blog. You can sign up for the e-newsletter and social media updates on the website.

A matrix of the relevant curriculum links touched on in each topic can be seen at the start of the **Space Rocks** and **Origins** units (pages 8 and 22 respectively).

WHERE CAN I GET MORE HELP?

You can contact the team on fireballs@curtin.edu.au

These experiments and activities, along with templates and fact sheets are also available on the website:

www.fireballsinthesky.com.au

SAFETY

While all of these activities have been devised to carry out in a school classroom, you will still need to assess the risks related to your activity, with your children, in your venue. It is recommended that you read and plan the session ahead of time to be well prepared to mitigate any foreseeable risks.

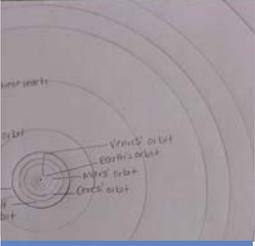
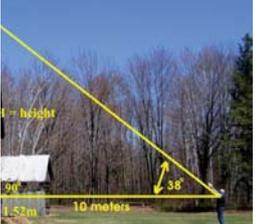
SPACE ROCKS UNIT

FOR YEARS K - 2

Stage	Activities		Page
Curriculum links summary			8
ENGAGE	Describing and classifying rocks (and not-rocks)		9
What is a rock and what is not?	Worksheets		50 - 52
EXPLORE	Shooting Star Stories		12
How do we know there are rocks in space?	Worksheet		53
EXPLAIN	Make a space rocks game		14
What is a Comet, Asteroid or Meteorite?	Worksheet		54
ELABORATE	Making Craters		16
What made that?	Worksheet		55 - 57
EVALUATE	Edible Meteorites		18
What's inside space rocks?	Recipes		58
	Worksheet		59
All worksheets and templates			50 - 69
Fact Sheets	What is a meteorite?		70
	What can we learn from meteorites?		71
	Types of meteorites		72
	Meteorite spotlight		74
	What is an asteroid?		76
	What is a comet?		78
	Australian Aboriginal interpretations of the night sky		80
	What is the Desert Fireball Network?		82
Meteorite Identification charts			84 - 86
Glossary			87

ORIGINS UNIT

FOR YEARS 3 - 6

Stage	Activities		Page
	Curriculum links summary		22
ENGAGE	Making comets with dry ice and water ice		24
	Where do space rocks come from?		60
	Worksheet		
	Meteorite Dissection		29
	Worksheet		61
EXPLORE	Sky Observing		32
	How do we know about space rocks?		62
	Sky Observing frame		63
	Worksheet		
EXPLAIN	Solar Systems		34
	Where do they come from?		36
	How do we measure space?		64
	Worksheet		
	Measuring Intangible Heights		40
	Inclinometer template		65
	Worksheet		66
ELABORATE	Making Craters		43
	What made that?		67
	Worksheet		
	Trajectories		46
	Worksheet		68
EVALUATE	Catapult craters investigation		48
	Worksheet		69



ABOUT THE DESERT FIREBALL NETWORK

Meteorites are the oldest rocks in existence; the only surviving physical record of the formation and evolution of the solar system. They sample hundreds of different heavenly bodies. Potentially, meteorites offer a direct route to understanding our origins. But to decode that record we need to know where they come from. The Desert Fireball Network (or DFN for short) is designed to provide that data.

Meteorites generate a fireball as they come through the atmosphere – you may even have seen one of these yourself. The DFN is a network of digital cameras in the outback desert of Australia which capture photographs of the night sky. By making networked observations of the fireball we can triangulate its trajectory, track the rock forward to where it lands, and back, to where it came from in the solar system.

More and more cameras are being added to the DFN as the project expands. The final network will image the night sky over roughly one-third of Australia, and track whatever is coming through the atmosphere. DFN researchers will then go out and recover the meteorites. Knowing where the meteorite came from, and what it is made of, will help us to address some of the biggest questions in planetary science: how our planetary system came into being and how dust and gas produced a planet capable of supporting life – our Earth.

ABOUT THE APP

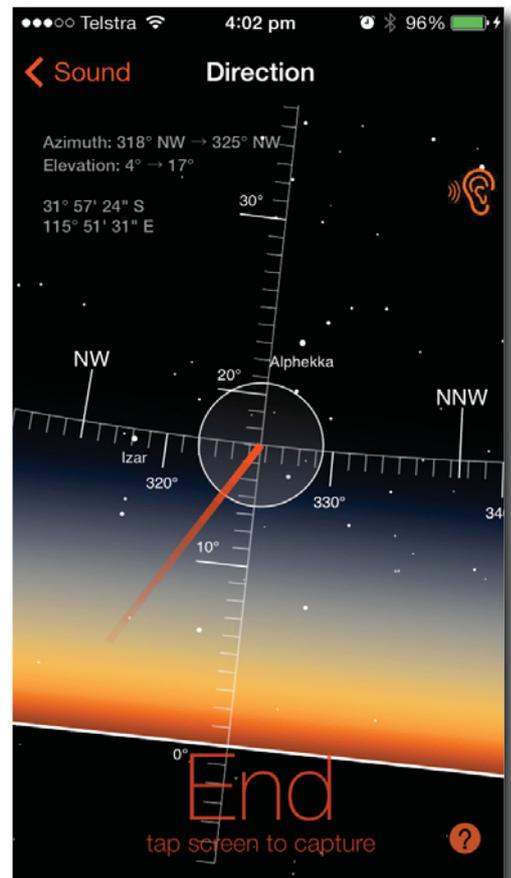
Download the app for free here:
<http://www.fireballsinthesky.com.au/download-app/>

You do not need to take a video recording of a fireball. The app displays the celestial sphere (star map) for you to click and drag the path of the fireball from start to end. The app then prompts you to indicate duration, shape, colour, brightness and fragmentation. It also prompts you to make a note whether you heard a sonic boom during or after seeing the fireball.

Enter your details to hear back from the team and find out about developing research on your fireballs!

ABOUT THE TEAM

The Desert Fireball Network team comprises scientists and engineers with qualifications in a range of areas. Geologists, mineralogists, physicists as well as software, mechatronics and electrical engineers all work on the project.



The Fireballs in the Sky project is an Inspiring Australian initiative supported by the Australian Government through the Department of Industry.

You can find out more about the researchers and partners on the website.

Stay in touch by signing up to the Fireballs newsletters, like us on facebook, or follow us on twitter. You'll be able to find out about what we're up to and the community events we'll be at in the coming months.

