



Science Rocks
Career Expo 2020
ONLINE
STUDY GUIDE



planetary science
fireball modelling

Great Southern Science Council Pro Files series – connecting science professionals and our community

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Pro File video interview Watch the Pro File video

Science Rocks On Location: Ellie Sansom – planetary science in the desert

to learn more about this STEM professional, why they chose to work in this field and their pathway to it, their typical work day, favourite part of the job, common myths about their field, and more.



Dr Ellie Sansom on a trip to observe the re-entry of space junk with a team of NASA scientists.



Servicing remote observatories in the Australian Outback with the Desert Fireball Network.



Fireball seen from Perenjori Primary School, Western Australia

EXTENSION MATERIAL – science professionals answered these questions to extend your interest and study in their topic area

FREQUENTLY ASKED QUESTIONS in this topic/job	FAQ 1 I don't want to do mining, why would I study Geology?	<p>Geology is a fantastically broad science that gives you a fundamental understanding of the Earth, how it formed and the impact of/on humans. It gives and understanding of the delicate balance of our planet that can be beneficial to so many different careers, as well as developing those STEM skills with (literally) real-world context. In my year, students went into jobs like marine and environmental conservation (including building waterways in Africa, and modelling underwater landslides), archaeology (human history), speleology (caves), CO₂ sequestration (techniques to remove greenhouse gasses from out atmosphere), banking/accounting (modelling market fluctuations), outdoor adventure business, photography, astronaut-in-training.</p>
	FAQ 2 Why go into research rather than 'getting a real job'?	<p>Why not? I actually get (well) paid to indulge my creativity, question the world around me and in small ways make it a better place for the future. I get to contribute to human knowledge. I get to travel around the world to share the work of my team, and showcase Australia's contribution to science at conferences, and collaborate with global experts.</p>
	FAQ 3 I'm not smart enough to be a STEM professional.	<p>Just because you don't like STEM school subjects, doesn't mean you can't master skills in STEM. Science is about having the courage to ask questions about the world around you. Engineers get to create and design things to improve our way of life. And both use Technology and Maths as a tool. It's all about what you are passionate about and consider fun. You'll enjoy it so much you won't even realise the 'hard' bits you're just picking up along the way.</p> <p>I used to want to be an inventor, but got told that wasn't a real job (I hadn't heard of engineering). Just because you don't know it exists, doesn't mean your dream job isn't out there. Some jobs today didn't even exist when I was at uni (like computer game programmer or app developer). Getting good practice of STEM skills at school, at uni, and even at home (baking is essentially a science experiment!), will keep all your options open when the jobs of the future come along.</p>
YOUR TURN	What question could you ask this person?	

LEARN MORE	Ellie recommends this online piece about asteroids.	https://www.abc.net.au/catalyst/s21-e04-asteroid-hunters/12198186
	Ellie suggests these websites and a video for great resources about her topic	https://www.jpl.nasa.gov/infographics/infographic.view.php?id=11358 https://www.bbc.co.uk/programmes/b00snr0w http://fireballsintthesky.com.au/ https://youtu.be/rVdniqc_G_Q
DO MORE	A citizen science or interactive project that community can be involved in to learn more about this topic	https://play.google.com/store/apps/details?id=com.tw.fireballs&hl=en_AU This is an app that allows you to record the location of any fireballs, also known as shooting stars, that you see in the night sky. The data is collected to help us learn more about where meteorites come from, and, in some cases, to find the meteorites after they have fallen to Earth!
INNOVATE One, Two, Three...solved!	One Big Problem we are trying to understand in this topic area Two innovative ways we are already trying to solve the problem THREE ideas for the problem solving wishlist that anyone could help develop	1 How strong are space rocks? 2 Watch when fireballs explode in the atmosphere (catastrophic breakup or fragmentation event). Perform 'sample return' missions to bring back pristine space-rock material. Watch how asteroids move in space to see if they react to objects passing by (other asteroids) or if bits are flying off of them. Check out meteorite samples on the ground. 3 Create a device to measure the light a fireball makes so we can get a better idea of when explosions happen.
YOUR TURN	Using your new insights for this topic and its issues, please add another idea for the Problem Solving Wishlist. Then think of a research question to test possible solutions.	

<p># CURRICULUM LINKS #</p>	<p># Year 9: science inquiry skills – questioning and predicting #</p> <p>Did you know that meteorites are the oldest rocks in existence? Ellie’s work with the Desert Fireball Network http://fireballsintthesky.com.au/ includes photographing the fireballs that meteorites make when they come through Earth’s atmosphere.</p> <p>Describe 2 questions the Desert Fireball Network team are trying to answer using the evidence in the photographs?</p> <p>Describe how an understanding of a meteorite can reveal information about how our solar system formed and changed over time?</p>
<p>INFLUENTIAL PLANETARY SCIENTISTS</p>	<p>Briefly identify and describe the contributions from 2 STEM professionals who have advanced our knowledge of planetary science.</p>
<p>KNOWLEDGE + IMAGINATION</p> <p>What would it be like?</p>	<p>Ellie’s research on meteorite tracking uses night photography and other technical gear and teamwork to collect and analyse data, though Western scientists also did this type of meteor research well before modern cameras and fast computers and all-terrain vehicles. How did they do it? First Australians are Earth’s earliest astronomers, having been watching and interpreting the night sky for more than 60,000 years. Describe a practical way and a cultural/spiritual way First Australians used their knowledge of the night sky?</p> <p>Imagine you are doing Ellie’s kind of work without all the equipment, and briefly describe your approach to watching, finding, and deducing the origin of a golf-ball sized meteorite you watched fall to your country in rural Western Australia. What fundamental science principles haven’t changed? What methods have? What stories about meteorites might you have shared with your family and friends if you found this 35,000 years ago? Or 100 years ago?</p>
<p>OUR PATCH PLANETARY SCIENCE IN THE GREAT SOUTHERN</p>	<p>Did you know that areas of dark sky that make it easier to observe the night sky are threatened from urban light pollution? https://astrotourismwa.com.au/about/</p> <p>Describe two ways to “preserve” dark sky that your community could achieve.</p> <p>Great Southern Amateur Astronomers are a small group of stargazers based in Mt Barker, Western Australia, and this group have reported observations of the <i>aurora australis</i> or southern lights.</p> <ol style="list-style-type: none"> 1. Research and describe how the <i>aurora australis</i> forms, and how it might appear to you. 2. Why do you think skywatchers could see the <i>aurora australis</i> from Mt Barker, Western Australia? 3. Why do think we are able to forecast these phenomena? http://www.aurora-service.net/aurora-forecast/