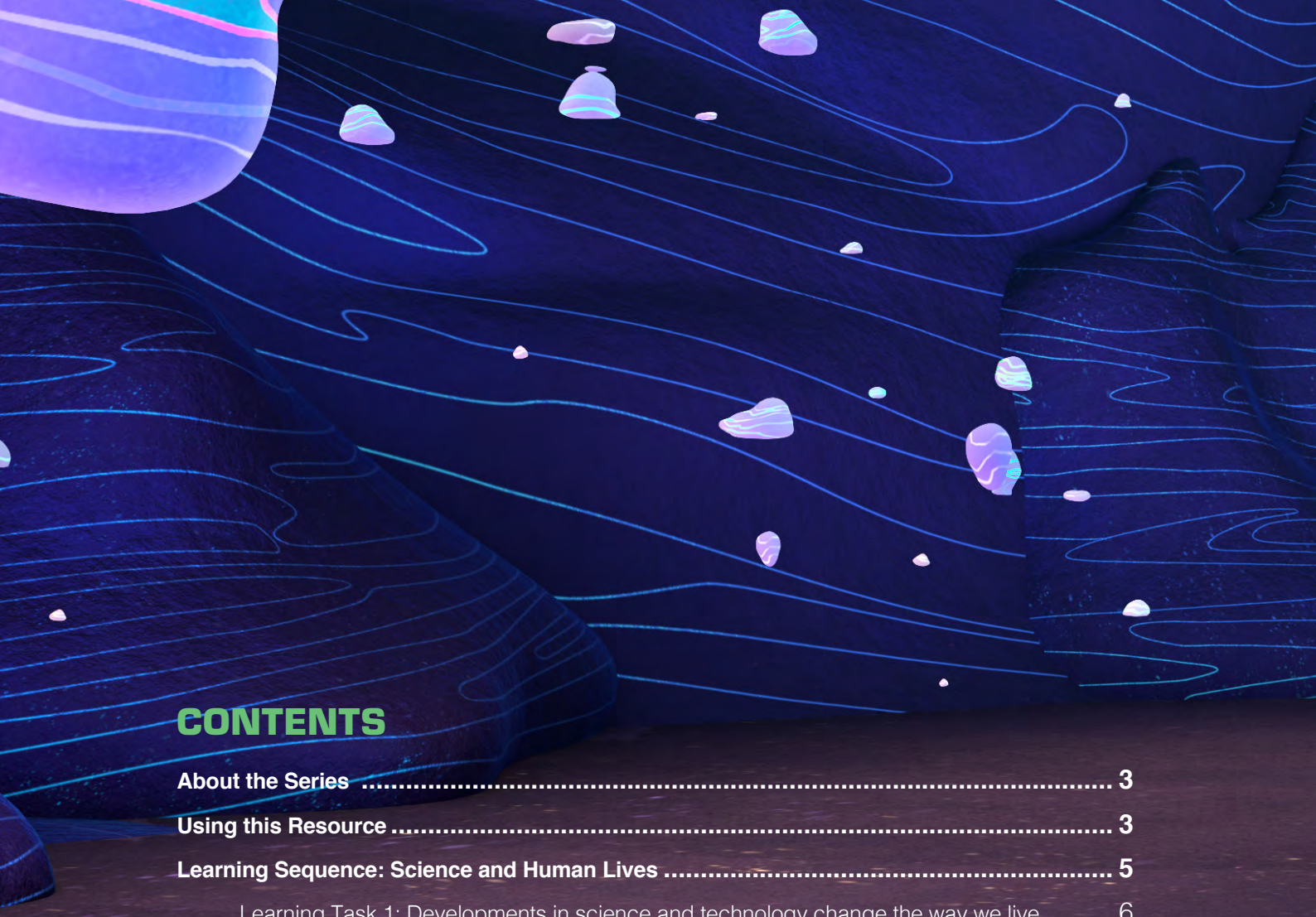
YEAR 5 | SCIENCE AND HUMAN LIVES

© 2022 Australian Children's Television Foundation

Australian Children's Television Foundation



CONTENTS

ABOUT THE SERIES

t's the year 2162 and life is a blast for space adventuring siblings, Jet and Adelaide Nova. Along with their parents, Josie and Hugo, these intrepid Aussies spend their days chasing rogue planets, surfing solar flares and avoiding being eaten by every kind of plantimal – all in the name of science! But what the Nova family really want to do is to meet intelligent extra-terrestrial life – something humanity has yet to do. Then everything changes... During a routine mission, the Novas stumble across an abandoned alien craft, powered by a rainbow substance that's so powerful it sends the craft zipping away at speeds humanity never dreamed possible. Although the Novas are unable to capture the craft, they now know there's a super advanced, intelligent species out there – and they're going to follow the clues to find them!

USING THIS RESOURCE

This *Space Nova* Teaching Toolkit is a science education resource for Year 5 students, with clips from the animated children's series used as provocations for a rich learning sequence on 'Science and Human Lives'. The sequence addresses Science Understanding content descriptors in the Australian Curriculum.

Through curated *Space Nova* clips, tangible experiences and thought-provoking discussion starters, this learning sequence will give students opportunities to critically analyse their observations and challenge their pe-conceptions. This approach lends itself to differentiation, as all students bring varying prior knowledge and experiences to the classroom.

Additional *Space Nova* Teaching Toolkits address key science understandings in other primary year levels. These resources focus on Living Things (Year 3), Forces (Year 4) and Energy (Year 6). Find all teaching toolkits on the ACTF website.

LEARNING SEQUENCE: SCIENCE & HUMAN LIVES

Key Content Descriptor: Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)

SEQUENCE OUTLINE

	Learning Tasks	Additional Australian Curriculum Links
Our Daily Lives		
1	Developments in science and technology change the way we live	
2	Technology advances quickly	ACTDIP012
3	Advances in technology change how we communicate	ACTDIP012
4	Advances in technology change how we learn	ACTDIP012
5	Advances in technology change how we spend leisure time	ACTDIP012
6	Humans and robots	ACTDIP012
7	Humans and AI	ACTDIP012

Practicing Science		
8	What is science?	ACSHE081, ACSIS087
9	Inspirational figures	
10	Humans are behind science and scientists work together	
11	Universal language for science and agreed systems of classification	
12	Science solves problems	
13	Inventions take time to get right	
14	Issues in science	

LEARNING SEQUENCE: SCIENCE AND HUMAN LIVES

OUR DAILY LIVES

LEARNING TASK 1: DEVELOPMENTS IN SCIENCE AND TECHNOLOGY CHANGE THE WAY WE LIVE

Clip: Episode 8, 1:20 - 2:30

In this clip, Luna Port is celebrating its 100th 'birthday' in 2162. After viewing this clip, ask students what they think life will be like in 2162. Do they think the life depicted in *Space Nova* could be likely? Ask students to work in groups to brainstorm what will be similar and what will be different about life in 2162 compared to today. A mind map would be a useful way to record this brainstorm.

Groups should address:

- Where humans live
- What humans eat
- What humans do for work
- What humans do for leisure
- What it will be like for other species of life.

Next, have students create a representation of their imagined future world. They could use drawing / painting, cardboard and paper, creative writing, film, animation, modelling clay or create a digital representation. Give students time to share their imagined future worlds with the rest of the class.

LEARNING TASK 2: TECHNOLOGY ADVANCES QUICKLY

Clip: Episode 22, 11:20 - 12:40

In the above clip, Aubrina visits a planet with lots of 'old' technology scattered around. She picks up a range of appliances and incorrectly guesses their function. Technology has changed so much that she doesn't even recognise these appliances. These gadgets are probably very familiar to students. Ask students which ones they recognise and what functions they actually serve. Then ask the class:

- What technology have you used recently? Today or in the last week?
- What science has helped you in the last week?
- In what ways do you think science and technology have impacted your life?

Encourage students to think about technologies in communication, school, leisure, medicine, cooking, natural environments, and more.

Clip: Episode 9, 1:25 - 2:05

In this clip, Adelaide and Jet are trying to figure out the function of the mysterious cube. It is unfamiliar technology, so Jet decides it's time to 'think laterally' and he makes some unlikely guesses.

What is thinking laterally? It's not simply guessing. You need to have evidence to support your hypothesis. It's about thinking creatively and opening your mind to unexpected possibilities. To replicate this scene, bring a series of outdated objects to school and have students attempt to figure out what the technology was used for. Can they guess more accurately than Aubrina? More realistically that Jet?

Put students into small groups for this task. Give each group a piece of old technology and give them three minutes to discuss what they think the object is and why, then have the groups swap objects. Repeat until the groups have each looked at several different objects then reveal what the objects really are. In the Additional Resources are picture cards that students could use for this task if you don't have physical items to use. Highlight to students that most of these appliances are from recent times when their grandparents were alive, so not all that long ago.

Clip: Episode 4, 0:45 - 2:20

In this clip, Jet gives Adelaide a second-hand VR helmet, but she is a little disappointed because it is 'retro' now and has become outdated / obsolete. Ask students if they have ever used tech that felt outdated, like Adelaide feels about this VR helmet? How often do you have to upgrade technology to stay 'current'? What technology did parents or grandparents use that has become obsolete? What technology do we use today that can be upgraded? Which technologies might change in the future?

LEARNING TASK 3: ADVANCES IN TECHNOLOGY CHANGE HOW WE COMMUNICATE

Clip: Episode 9, 14:15 - 15:55

In this clip, Old Phil and the Novas communicate between their ships using Morse code. As

a class, brainstorm some other ways that people can communicate with others when they aren't together. Then discuss ways that people used to communicate before recent technologies. Students could research some older communication techniques, including how First Nations people communicated in the past (See Additional Resources).

Try some old-fashioned communicating:

- Write a letter to a family member
- Make a tin can telephone
- Work in pairs to write and translate a Morse code message. (Students may prefer to work on graph paper so that they can make sure their dots and spaces are one unit and their dashes are three units long)

After exploring, have students share their thoughts on the older ways to communicate. What are some pros and cons of each one?

Watch the following two *Space Nova* clips which depict communication. In the first clip, the Novas communicate with Janali via a hologram video call. In the second, Aubrina contacts the Novas through their wrist communicator, even though they're on a different planet.

Clip 1: Episode 2, 7:50 – 8:20

Clip 2: Episode 7, 10:20 - 11:40

As a class, discuss what communication might be like in the future. Do students believe we will have hologram video calls, or communication devices like the Novas watches (which allow for video calls between planets)? What difficulties do we currently face with communicating that we will be able to improve on?

LEARNING TASK 4: ADVANCES IN TECHNOLOGY CHANGE HOW WE LEARN

Clip: Episode 17, 0:40 - 2:25

In this clip, we see Jet attending school virtually and doing his schoolwork by dictating. Jet's school is quite different from the ones that students attend. In a class discussion, ask students which technologies they use at school. Which technologies did your parents use when they were at school? What might future schools have?

Do you think schools in the future will be better or worse? Why?

Throughout the coronavirus pandemic, many students across the world had to attend school remotely. As a class, discuss which tools were most effective in students' own experience of remote learning. Which weren't so effective? What technology did students use most? Was there any technology they needed but didn't have access to? How might tech change education in the future? Will it change for better or worse?

Ask students to write a schedule for their ideal day of remote learning. Suggest that they keep in mind what they would usually learn in one school day, and what was achievable when they were learning remotely.

LEARNING TASK 5: ADVANCES IN TECHNOLOGY CHANGE HOW WE SPEND LEISURE TIME

Clip: Episode 4, 10:00 - 11:20

In this clip, Marcie shows Jet and Adelaide how to crafter surf. Ask students what this toy reminds them of. How is it similar or different?

As a short homework task, have students ask the adults they know which toys and games they played with as children. Ask students to share what they learnt with the class.

Browse an online museum collection to find photos of old toys and games. You may find examples that students mentioned and even older examples. The class could also research the toys or games that First Nations people used before white settlement. As you find examples, ask the class whether they would like to play with those toys or games. Are you glad toys have changed to be the way they are now? Why or why not?

Ask students to imagine what toys might be like in the future then have them design and build a futuristic toy individually or in pairs. They should choose a target market to pitch this toy to. Have students present their new toy to the wider class.

LEARNING TASK 6: HUMANS AND ROBOTS

One major difference between the lives of the Novas and our own lives is their dependence on robots and AI. In a class discussion, ask students:

- What is a robot?
- Do robots exist?
- Do you have a robot in your house?
- How are robots changing the way people live?
- How long until we have robots like G9?

In the following clips, we see examples of the many programs Adelaide has added to G9 to make him new and improved. He can clean, dance, sleep, comfort people, ride a horse, garden and hypnotise, among many other things. Watch a few of the clips to see G9 performing different tasks.

- Episode 3, 8:00 - 8:22 (cleaning mode)
- Episode 9, 10:15 - 10:45 (dance mode)
- Episode 9, 4:00 - 4:45 (sleep mode)
- Episode 19, 0:55-1:55 (sympathy mode and boss mode)
- Episode 21, 15:10 - 15:40 (horse riding mode)

Ask students what they would program G9 to do if they had a similar robot. Brainstorm tasks together and make a list. Students may want to program G9 to do their maths homework, clean the dishes, kick a football, bake a cake, or more.

Explain that when you instruct a robot, it needs clear and precise instructions that are in order. The best way to do this is by using an algorithm. A common example of an algorithm is a recipe. This lists the steps, in sequence, that need to be followed in order to create the intended meal.

In pairs, have students carefully write the algorithm for a program that tells G9 to complete one task from the jointly created list. This activity can be done with pen and paper. All programs should begin with a ‘start’ instruction. From here an arrow indicates the next instruction, and all following instructions are in sequence connected by arrows up until ‘end’. Have students group up with another pair to test their algorithm by pretending to be each other’s robots. They must do exactly as the program instructs.

Extension: Assume the robot knows nothing at all. It will need to be taught everything from left and right to how to move. This information is called ‘inputs’.

LEARNING TASK 7: HUMANS AND AI

Clip: Episode 19, 3:30 - 5:00

In this clip, Andy tells the Novas about all the trouble that Lunar Port's security AI has been causing. In a class discussion, ask students what AI is. Where can AI be found? In what ways do students interact with AI already?

(This may include targeted advertising, YouTube recommended videos, Pinterest board prediction, Siri on iPhones, Alexa, and more.) What are some concerns associated with AI technology?

The book titled 'Harry Potter and the Portrait of What Looked like a Large Pile of Ash' is a Harry Potter book that was written by a computer. The people at Botnik Studios created it by showing the computer all seven Harry Potter books and then using a text-predicting keyboard to allow it to suggest the words. Read a portion of the book as a class (see Additional Resources), then discuss whether AI can be creative.

If your students have access to devices and the internet, try Google's teachable machine. This involves training an AI to recognise images/poses. The more data you give it, the more accurate it will be. https://teachablemachine.withgoogle.com/train

Explain to class that good AI is based on lots of data. The more data the better. But that data also needs to be representative. For example, Siri is better at recognising some accents than others because it has been disproportionately trained to recognise those accents; it's been given less data for others.

You could check out https://www.i-am.ai/talk-neural-numbers.html to see what a difference more data makes.

PRACTICING SCIENCE

LEARNING TASK 8: WHAT IS SCIENCE?

Clip: Episode 6, 0:40 - 1:30

In this clip, Adelaide confuses the AI by asking a homework question that cannot be answered: 'If the speed of light is three billion metres per second, what's the speed of dark?'

A scientists' job is to ask questions and research the answers. But not all questions can be researched. In a class discussion, ask students which questions they have students researched in previous years. What makes a question investigable?

Explain that an effective way to write an investigable question is to think about the variables that will be in your investigation. This applies when you want to find out the effect that changing one variable has on another variable. The variable you change is called the independent variable, and the things it causes to change are called dependent variables. In an investigation, you measure the dependent variables. Everything else should be kept the same or 'controlled'. An example format for an investigable question (once variables are determined) is:

What happens to [dependent variable] when we change [independent variable]?

See Additional Resources for further guidance in writing investigable questions. After introducing this concept, ask students to write their investigable question. Then, if time and resources permit, support students to design and conduct an investigation that answers their question.

LEARNING TASK 9: HUMANS ARE BEHIND SCIENCE AND SCIENTISTS WORK TOGETHER

Clip: Episode 22, 13:10 - 14:35

In the above clip, Jet, Adelaide, Marcie and Sol struggle to agree on the best way to solve their problem. Discuss their different viewpoints as a class, then watch the following clip.

Clip: Episode 22, 17:25 - 18:20

In this clip, G9 helps the group realise that they need to work together to be successful. Explain to students that scientists need to be openminded and listen to others' ideas. They then need to help each other and work collaboratively. It is easier to solve problems when people work as a team. It is especially good when teams include people with different experiences and skills. For example, biologists and engineers worked together to invent the bionic ear.

Varying perspectives strengthen the solutions we produce. When we fail to approach a solution from multiple perspectives, we can end up with a data bias. This results in a solution that does not actually work for everyone who needs it. This has happened with crash test dummies. These dummies mimic the 'average' male, so cars aren't as safe for taller or shorter people, or for people with different builds.

Ask students to complete a sudoku puzzle alone and time themselves while doing this. Then have them complete another sudoku with a partner and time that. Then have pairs combine to complete a puzzle as a group of four. (Print the puzzles in large type so they are easy for groups to see.) Students may find that the solutions become easier with more minds working on the task.

LEARNING TASK 10: INSPIRATIONAL FIGURES

Clip: Episode 10, 4:45 - 5:20

In this clip, Rocky says he isn't 'Leonardo de Einstein'. In a class discussion, ask students who Rocky referring to? What did these people do? Why are they well known? Do you know of any other interesting scientists?

Ask students to find a scientist, engineer or inventor to research. Try to find examples that represent diverse gender and race, including First Nations Australians. See Additional Resources for lists of interesting scientists who are female, Australian and women of colour. Students should try to answer the following questions about their chosen scientist:

- Who were they?
- What was their contribution to society?
- Were they recognised for their work?

Students could then create a poster, comic strip or written response to share this scientist's story with others.

LEARNING TASK 11: UNIVERSAL LANGUAGE FOR SCIENCE AND AGREED SYSTEMS OF CLASSIFICATION

Clip: Episode 1, 4:30 - 4:50

In this clip, we see Jet's categories for alien life: 'I made a colour chart for grading alien life, from 'red' – that's simple multi-cell organisms and slugs like we've already found – all the way to 'green' for beings like, well, me!"

Scientists need to be able to communicate their findings clearly, so there are some universal ways things are grouped and named. These apply worldwide, regardless of culture.

Clip: Episode 16, 6:35 - 7:25

In this clip, Hugo brings up the Periodic Table to identify an element in the material they've found. The Periodic Table is an example of a universal system for talking about science; it names the elements and groups them based on their properties. Other examples include the kingdoms and other groups that living things are classified into, and definitions that classify objects in space.

For example, planets must satisfy these three rules:

1. It must orbit a star.
2. It must be big enough to have enough gravity to force it into a spherical shape.
3. It must be big enough that its gravity clears away any other objects of a similar size near its orbit.

This definition was agreed upon in 2006. The definition was different before this, and it may change again as scientists learn more. The definition before 2006 resulted in Pluto being called a planet, but when the definition changed, Pluto didn't meet criteria number three. It is now called a dwarf planet instead (not because of its size).

In *Space Nova*, the Nova family see stars, planets, moon and asteroids. In a class discussion, ask students how they might tell the difference between these. Is it important to be able to differentiate them? Why?

Students could use the picture cards provided in Additional Resources, or find other space bodies, and sort the objects from our solar system as planets, moons, stars, and other. The following criteria will help to guide them.

Planets – See above three rules

Moons – Orbit planets

Stars – Generate light.

LEARNING TASK 12: SCIENCE SOLVES PROBLEMS

Clip: Episode 9, 18:30 - 20:20

In this clip, Adelaide says the Novas want to: 'Use that knowledge to help make the universe a better place.'

As a class, discuss whether science has made the world a better place, and in which ways. Are there any ways in which it has made the world a worse place?

Clip: Episode 9, 9:30 - 10:50

In this clip Adelaide, uses her knowledge of technology to upgrade the support that helps the two-legged dog walk. She aims to make life easier for the dog. Explain that when people conduct research or design products, they are often looking for ways to improve people's lives and to solve problems. The solution has to match the situation.

In a class discussion, have students brainstorm a list of current problems that could be addressed through science. Then ask pairs or groups of students to choose a problem from the list and design a potential solution. Students should draw and write about their designs, explaining which materials are used and how this solves the chosen problem. See Additional Resources for design prompts that could be used in this task.

Clip: Episode 3, 0:45 - 1:15

In this clip, we see that Jet has used plants to solve a problem he identified: galactic hunger. Food shortage is an issue that we are facing on Earth. In a class discussion, ask students about other issues that we are facing on Earth. How are science and technology important to solving these issues? Are individuals also responsible? How does science inform the choices individuals make?

Clip: Episode 18, 13:10 - 16:15

In this clip, the Novas work to provide healthy plants that grow food for the hamsters. Explain to students that we also use science to create disease resistant crops, as well as altering plants in other ways so that they suit our needs better. Many fruits have been modified to make them better for eating. Did you know that bananas used to have huge seeds? Or that peaches were tiny? (See Additional Resources for more information.)

As a creative design task, challenge students to invent the best fruit ever. Create a model of the fruit from plasticine, paper, foil, or other materials. Perhaps one day science will make these fruits a reality.

LEARNING TASK 13: INVENTIONS TAKE TIME TO GET RIGHT

Clip: Episode 8, 7:30 - 8:20

In this clip, Adelaide shows off her impressive new gizmo: invisibility suits. In a class discussion, highlight that we often only see the impressive end results of arduous work when people release their inventions into the world. Explain to students that inventions take a long time to develop. They must be continually evaluated and redesigned. Adelaide knows her invention needs extensive testing before it is ready. Ask students to share some of the cool inventions they have come across.

Clip: Episode 8, 8:20 - 9:35

In this clip, we see testing of the final prototype of Adelaide's invisibility suits. In a class discussion, explain that inventing requires creativity and resilience: even Adelaide makes mistakes. Fear of failure prevents some people from trying new things and taking risks. But if we don't try new things, we won't have any new ideas.

Clip: Episode 23, 0:45 - 2:00

Clip: Episode 23, 22:10 - 22:40

Watch the two clips above. In these scenes, Adelaide demonstrates an impressive invention, but it has some flaws. She spends more time perfecting her invention and they tries it again, but it still needs work.

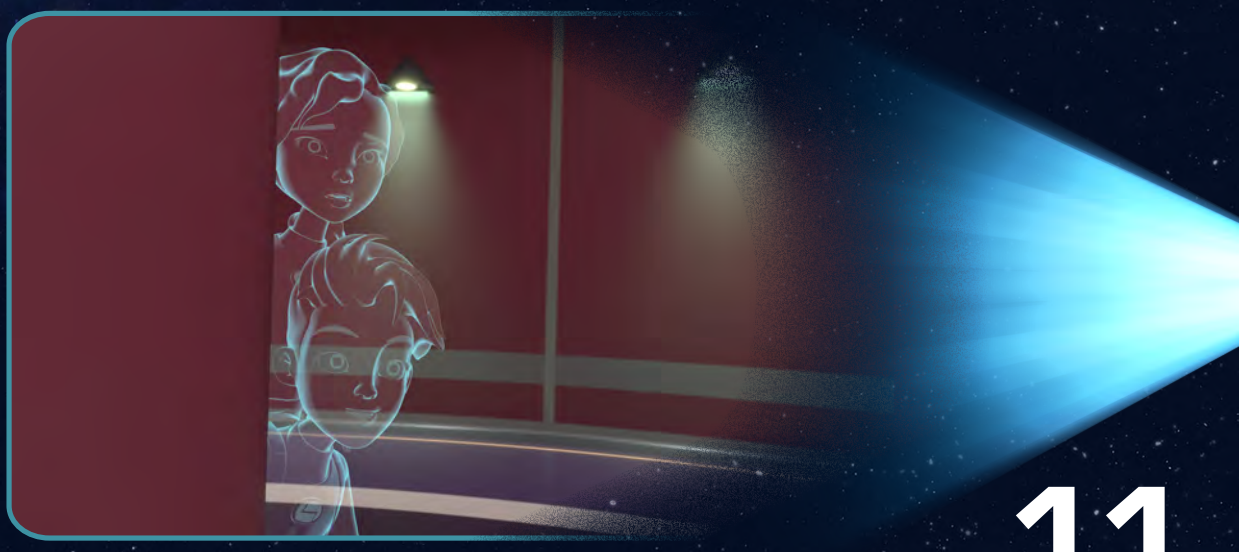
Clip: Episode 26, 2:30 - 3:15

In this clip, we see that Adelaide has persisted and finally created a working version of her invention. The Novas can now use this to set their destination and use the cube to travel.

Ask students to revisit their designs from the previous task and evaluate their effectiveness. It might help if students ask a peer for feedback. This will provide another point of view, perhaps identifying new benefits or flaws. Ask students to reflect on the following questions as they evaluate their design:

- Does your design solve every problem you can imagine?
- Could it be even better?
- Does the design itself create any new problems?

Then provide students with time to edit their designs to improve on their original ideas.



LEARNING TASK 14: ISSUES IN SCIENCE

Clip: Episode 14, 14:00 - 15:00

In this clip, the Novas realise that their presence on the planet is causing damage or 'rapid biological breakdown'. In a class discussion, ask students to share their understandings of how humans are impacting Earth. What can we do to heal our planet? What are some ways that First Nations people of Australia care for Country?

Clip: Episode 9, 10:45 - 12:30

In this clip, Old Phil says that he prefers steam power because: 'Electric power has ruined the galaxy.'

As a class, discuss the impacts that electric power has had on our planet. What are some alternative energy sources that students know of? Where else could we harness energy from?

Explain that as technology advances and human lives increasingly depend on electricity, we are damaging the Earth by burning fossil fuels to generate the electricity we need. An alternative is renewable energy sources. These are sources of energy that last forever and won't run out like coal or oil. Examples include hydropower, wind and solar power. (See Additional Resources for information on these and other renewable energies.)

In a collaborative design task, have students to design and build a model of a vehicle that is powered by renewable energy. Their model doesn't have to move – but it's great if it can!

Clip: Episode 9, 5:10 - 6:05

In this clip, the Novas must navigate flying through a lot of space junk. In a class discussion, ask students what they think space junk is. Why is it there? Is it a problem? What other waste has been produced as we develop technology?

What issues does obsolete technology cause?

Explain that space junk is material that humans have left floating in space. It includes satellites that have failed or been left in orbit at the end of their mission, as well as smaller things like paint flecks that have fallen off a rocket. This is just one example of the material waste that humans produce. Plastics, textiles, old computers and other waste is also piling up in landfills on Earth.

Clip: Episode 4, 2:25 - 3:45

In this clip, we see that Adelaide recognise that outdated technology still contains useful materials. She looks through the 'antique' technology for parts.

Ask students to investigate the best ways to recycle old technology and to think of clever ways to upcycle it. Can they suggest building something new from old tech like Adelaide does?

EPISODE SYNOPSES

EPISODE 1
STAR DUST

The Novas, a family of maverick space explorers, make an interstellar discovery that could change the course of history. Armed with knowledge that they have come across an alien space craft powered by a rainbow substance they have never seen before, they set out to find where the space craft and its ethereal substance – Star Dust – has come from.

EPISODE 2
OVER BEING A NOVA

Bored with searching rocks for evidence of their recent findings, Adelaide accepts Sol's challenge to a 'space-off' in the asteroid belt. But when Sol gets into trouble, Adelaide and Jet perform a heroic rescue and rediscover what being a Nova is all about.

EPISODE 3
BLACK HAMSTER

When Jet creates a nutrient-dense super pickle, it attracts a space hamster that Jet calls 'Pickles'. Pickles' survival instinct allows it to turn into a small black hole, throwing Luna Port into chaos. Will Jet be able to keep his new friend – or will he have to free him for the good of Luna Port?

EPISODE 4
ESCAPE FROM TR-227

While travelling to complete a supply drop off at a research facility, the Novas crash land on the planet. They are confronted by a deadly gravity storm that threatens not only their lives – and the lives of the researchers they find there – but also their life-saving work!

EPISODE 5

SEAWEED SAMBA

When the Nova's mission to what they believe is a Star Dust Planet goes horribly awry, they find themselves held underwater by a sentient seaweed plant. Meanwhile Aubrina, determined to learn what the Novas are up to, sends son Sol to find out – undercover.

EPISODE 6

STEEL COMET

When a large comet appears on a collision course with Luna Port, the Novas take a huge risk to divert it. They realise it's no comet at all, but a frozen-over spaceship presumed lost for over 100 years!

EPISODE 7

FRIENDS IN DARK PLACES

When the Novas investigate a system based on data they obtained from the 'Eagle' (the frozen spaceship from 'Steel Comet'), they find a planet that appears uninhabited – until they fall through quicksand to the caverns beneath! Meanwhile, Aubrina continues to keep a close eye on the Novas – often popping up on comms at the most inconvenient times!

EPISODE 8

INVISIBLE SIBLINGS

When G9 malfunctions at the Luna Port centennial celebrations, Aubrina takes him into custody and seeks to reprogram G9. Jet and Adelaide go on a mission to save their favourite robot, stumbling across a library of hidden alien artefacts inside a locked room owned by Aubrina – including a mysterious alien tech cube!

EPISODE 9

STEAM SHIP

When the Novas are forced to land on a junk planet for repairs, they come face to face with Old Phil and his dog Calisto. Phil claims to enjoy solitude and quiet, but he may know more than he is letting on – especially after he takes the Novas' cube!

EPISODE 10

GRAFTER

Sol's attempt to win at the science fair by sabotaging all of the other projects goes drastically wrong when the Nova's project – a giant half plant half animal – kidnaps him. Even stranger, on analysis it seems Sol was responsible for the creature's sudden transformation – and this transformation was caused by alien DNA!

EPISODE 11

GHOST STATION

It's Josie's favourite holiday, Halloween, and to celebrate she surprises her sceptical family by booking a 'ghost tour' of a spooky space station. When they receive a distress call from the station and land there, even the most sceptical Novas start to believe!

EPISODE 12

THE JUMP

After the Novas help expose Aubrina for her wrongdoing and have the Star Dust Crystal returned, they're ready to make their first Star Dust 'jump' and explore parts of space that humanity has never seen before. Aubrina, meanwhile, isn't going down without a fight, and enlists a shadowy figure to stop the Novas at all costs!

EPISODE 13

FINALLY AN ALIEN

With the Novas now able to jump millions of lightyears in minutes, their quest to find Star Dust Aliens kicks into high gear. But after Sol demonstrates unexplained super strength in a Grav Ball game, Jet and Adelaide realise that their search for aliens might take them closer to home.

EPISODE 14

THE GOLDILOCKS ZONE

Having learned where the Tychon was being taken on the day Sol was discovered on as a baby, the Novas take Sol on a mission to a planet inhabited entirely by mega-flora – then Sol goes missing.

EPISODE 15

ROGUE PLANET

When the Novas research drones send them an image of what looks like a Star Dust Ship, the Novas and Sol go to investigate. In the process, however, they become trapped on a tiny rogue planet full of adorable insects – and the planet is heading directly towards the system's sun! Meanwhile, Aubrina has plans of her own – to get her own Star Dust Crystal and gain the power of 'jumping' for herself.

EPISODE 16

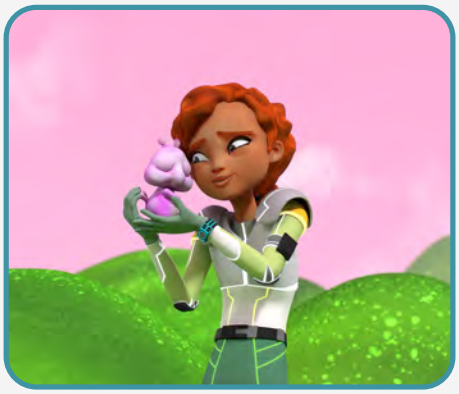
THE PUZZLE

The Novas investigate a planet millions of lightyears from known space that appears to have pyramid-like temples that may have been created by intelligent beings. Soon, however, they find the pyramids ARE the intelligent beings – and these aliens aren't the type looking for a friendly chat!

EPISODE 17

A BLACK HOLE ATE MY HOMEWORK

When Jet and Adelaide realize they have too much work and reading to get through in one night, they devise a plan to slow time by taking Adelaide's flyer to the very edge of a black hole in order to slow down time.



EPISODE 18

WHITE HAMSTER

After detecting human technology in a far-flung region of the universe previously inaccessible to humans, the Novas excitedly head out to examine it – only to find that it is the escape pod that Jet used to evacuate his space hamster, Pickles. When they finally catch up with Pickles, however, he – and his family - need their help more than ever.

EPISODE 19

PAMELA BARNACLE

With Luna Port's security system malfunctioning (and no longer responding to orders), the Novas journey to visit the ex-president of Luna Port, Pamela Barnacle, the system's creator. When they arrive, however, they find Pamela is even more under the same system's control – and soon, so are the Novas!

EPISODE 20

SHORE LEAVE

After a series of dead ends in their search for Star Dust, the Novas spot a planet that looks like paradise itself and decide to visit it for some much-needed R&R. Soon, however, their dream getaway turns out to be just that – and one that they're unable to wake up from!

EPISODE 21

ALIENOSAURS

The Novas head to an Earth-like planet, hoping to find the Star Dust aliens. Instead, they find highly evolved and aggressive alien dinosaurs, and they find out what it's like when humans are at the bottom of the food chain!

EPISODE 22

COLLISION COURSE

Jet, Adelaide, Sol (and a visiting Marcie Yang) are thrown together to represent Luna Port in a Grav Ball game for visiting delegates – they just aren't the best team. Then, in the middle of the game, Luna Port faces a catastrophic shut-down and blackout. Now this not-so-awesome foursome really must learn to work together – and the stakes couldn't be higher. Meanwhile, Aubrina goes in search of plans for the Star Dust cube to create her own!

EPISODE 23

YOWIE!

While on the lookout for intelligent life on the other side of the universe, one of the Novas' drones delivers footage that will make them question everything they know about Aliens – blurry video of what appears to be a real live bigfoot!

EPISODE 24

SWEET DREAMS

After Sol starts to have vivid dreams about his home world, the Novas enlist the help of the 'energy creature' from Shore Leave to help uncover the details of this planet. Things take a turn, however, when Sol's brain refuses to release him from the dream state – and not even the powerful energy creature can stop him!

EPISODE 25

DARK ICE

Following Sol's vision, the Novas journey to a what they believe is Sol's home planet – only to discover that it is completely frozen over. On closer inspection, they realise the planet may hold the answers to all of their questions - and they must journey below the ice...

EPISODE 26

STAR DUST ALIENS

The Novas finally locate another Star Dust alien rock ship and set off to finally make first contact. When they arrive, however, the ship's engines explode. They uncover Sol as a stowaway and find out that Andy, who accompanied them, is a robot in disguise – all part of Aubrina's plan to stop the Novas in their tracks and make first contact with the aliens herself. Will the Novas lose their chance to make real contact with the Star Dust aliens forever?

THE MAKING OF *SPACE NOVA* BY SLR PRODUCTIONS

The science fiction genre presents a great opportunity to wonder 'What if?' in an imagined futuristic world with human dynamics we can all relate to. At the core, the Novas are like most families: full of love and support, with the occasional sibling rivalry, shenanigans and plenty of dad jokes. But what if this is an intrepid family of intergalactic explorers in search of alien life in the year 2162? Now we're talking! We jumped at the opportunity of creating a unique, exciting show.

Animation lends itself to boundless imagination and creativity since every frame has to be created from scratch – literally. The stories were crafted around classic science fiction tropes in a world full of exciting possibilities. *Space Nova* allowed us to push the limits of imagination in every aspect of life in space: family and home, friendship and play, school and work. And when work involves discovering Star Dust, a powerful rainbow substance powering a rock ship, launching an epic alien quest across the universe, more than just a job, this becomes the adventure of a lifetime.

The *Space Nova* world was created with a base in science and a healthy dose of imagination. Extensive research was carried out on space exploration and the latest technological advancements. Their home, the Luna Port international space station, is based on structures that are capable of generating artificial gravity with and added touch of wow factor which makes it inviting and special. The characters wear high-tech, insulating suits with glowing LED lights and self-propulsion based on future trends of comfort and functionality. We took the possibilities of 3D printing into creating nutritious, delicious food. The Grav Ball game was born out of the combination of zero gravity and team sports such as basketball.

Space Nova presents a hopeful, aspirational take on the future which informed the look of the show in every aspect. Their world is bright, colourful and friendly. Organic shapes like curves and swirls dominate the design as opposed to straight lines and harsh angles. Surfaces are smooth and warm instead of sleek and cold. And since the Novas are a family of Australian astronauts, an Aussie flavour is interspersed in their palette with greens and golds. Their spaceships also have echoes of Australian fauna (the cicada and sugar glider) which was also carried through to the sound design. G9, the lovable family bot, resembles an adorable marsupial.

Space phenomena in itself is spectacular proving that nature is indeed the best inspiration. Planets, celestial butterflies, comets, black holes, supernovas, nebulas and galaxies, all presented incredible story and visual opportunities where we had to look no further than the latest findings on space exploration. Serendipity came knocking when NASA released the first ever image of a black hole just as we were in the middle of production. Needless to say, we gladly took visual cues in our design from this historic moment.

From the outset, the Novas discover the first ever proof that humanity is not alone in the universe setting in motion a thrilling saga across the cosmos. Along the way, we visit planets with different alien life forms where we let our imagination run wild along with interesting scientific ideas. To name a few: hamster-like aliens capable of creating black holes; a cross between a plant and an animal resulting in plantimals; sentient, bioluminescent seaweed with their own unique visual language; bismuth formations come to life, while dinosaurs evolve on another planet! Once again, nature provided the source material and we just had to add inventiveness and have fun with it.

Space Nova was produced with the latest CGI technology, a medium which perfectly suited the epic scale of the show as well as the subtle emotional needs of character animation. A very successful blend of artistic and technical skills; every design and storyboard was initially crafted by hand and then fully realized through computer animation to reach our screens (something that was considered science fiction not that long ago!). The result is a rich, vibrant world that draws us in, we can feel it and almost touch it.

We had the ride of our lives making *Space Nova* and hope the show will be enjoyed by all for years to come. The universe keeps surprising us in this new frontier for exploration and we can't wait to find out what's in store in the future. Reach for the stars!

CHARACTER BIOGRAPHIES

ADELAIDE NOVA

13-year-old Adelaide Nova is a keen adventurer and scientist with a special passion for technology, robotics, and flying spacecraft. In fact, as excited as she is at the prospect of encountering intelligent extra-terrestrial life, an equal priority on her list is finally earning her large ship pilot's license!

When she's not taking lessons, Adelaide can usually be found in her lab or the cargo bay tinkering with her latest invention. Whether it's creating camouflaging meta-fabric to turn into 'invisibility suits', creating nano-technology that can repair an entire eco-system, or simply upgrading her VR gear, Adelaide always has a technological hack up her sleeve.

Due to her affinity with tech, it's also no wonder Adelaide is especially close to the family robot, G9, and always giving him special upgrades (with varying levels of success!).

JET NOVA

The youngest of the intrepid Nova family, 12-year-old Jet has a passion for space exploration, Grav Ball, astrobiology and – most importantly – aliens!

Whether at home or in his lab on the family's starship, Jet is surrounded by all manner of plants, both from Earth and beyond. He especially likes doing experiments with his specimens. Whether it's creating a super sticky plant-based glue, or a flower designed to explode on impact, the rest of the Nova family often find themselves test subjects for Jet's latest biological masterpiece!

Jet has even created a specially designed chart, which he uses to track the various 'levels' of lifeforms he and the Nova family encounter on their missions. He just hopes that, now the Novas are on the trail of the first confirmed alien spaceship sighting, he can finally fill the chart all the way to the top!

JOSIE NOVA

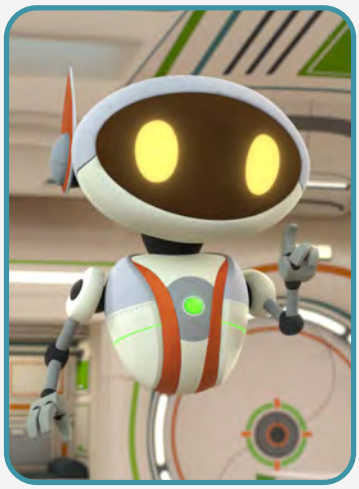
Josie Nova is both an intrepid astrobiologist and an ecologist. Mother of Adelaide and Jet Nova, she has a lot to teach her kids about seeking out adventure! Tempering her passion for adventure is her love of nature. Josie is an expert on all things in the natural world. In other words, she doesn't mind getting her hands dirty when it comes to the search for extra-terrestrial life!

A respected scientist on Luna Port – especially when it comes to space exploration – Josie is also well known for her 'can do' attitude. And this attitude certainly comes in handy when dealing with bureaucrats like the Luna Port President, Aubrina Eridani, who seems determined to restrict the Novas' 'frivolous' scientific missions. Between Josie and Hugo, Josie is the risk taker and has a 'devil-may-care' attitude when raising her children. As long as they are good and have fun – she doesn't mind too much what they do.

HUGO NOVA

Like the rest of his family, Dr. Hugo Nova has a passion for unlocking the secrets of the universe. One of the best astro-geologists (and pilots) on Luna Port, Hugo spends most of his time collecting, examining and thinking about rocks – after all, they're core building blocks of the universe. Just don't try to tell him geology is boring: in his own words, 'rocks rock!'

Still, Hugo is more than just a scientist. Hugo is also a great chef (he even uses old-fashioned 20th century implements), a student of history and a great dad. Compared with wife, Josie, Hugo is also the more over-protective parent. If anyone is going to be a little conflicted when it comes to taking Jet and Josie on their away missions, it's Hugo. Still, space will always be an unpredictable place, and the kids wouldn't have it any other way!



G9

The family's 'pet' robot, G9 is the 5th member of the family. With databanks full of useful info, G9 is a real asset to the Novas' missions. He's also a favourite of Adelaide, who is constantly working on new 'upgrades' for the robot, improving his intelligence, pumping up his strength, or even teaching him to play the ukulele at parties!

If there's one thing Adelaide can't 'fix' about G9, it's that he can be a terrible worry wart, and will often be the first to hide when danger rears its head – and thanks to the Novas' missions, danger is never far. After all, he may be nuts and bolts, but G9 still fears the 'big reset'. Still, when his 'humans' are really threatened, G9 can find extreme courage deep within his circuits. He's quite attached to the Novas – they're not bad for a bunch of irrational humans!

SOL ERADANI

Found by Aubrina as a baby on an abandoned exploration ship, Sol has grown up the spoiled child of the most powerful person on Luna Port – it's really gone to his head! Aubrina is such a workaholic, he still often feels that he comes second behind her job and is always keen to earn her attention and love. From everyone else on the station he not only expects but demands respect – and most give it to him.

In fact, the only kids who don't seem to respect this 'power' are Jet and Adelaide Nova, who think he's a bully and a joke. Jet and Adelaide never have to fight for their parents' attention, and this annoys Sol. He takes every opportunity to take the Nova kids down a peg and show them who's the true 'top dog' on the port. As such, Sol easily latches onto the Nova family's eccentric reputation to ridicule them.

AUBRINA ERADANI

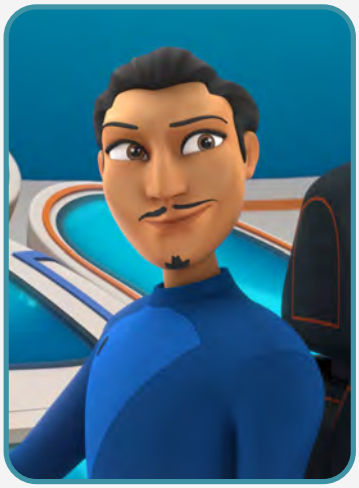
Aubrina Eradani was once a young explorer out to make a name for herself. Then, just over 13 years ago, she discovered a baby on an abandoned space cruiser – and an unidentified craft shooting out streams of a strange rainbow substance and disappearing at an incredible speed! Aubrina raised Sol as her own and waited for Star Dust to appear again.

She became Luna Port's president after clawing her way to the top. It's from this position that Aubrina wields the control and power she thinks she deserves. Still, the Novas refuse to toe the line. When she suspects this same family may have sighted HER discovery, she's determined to take the spoils for herself – at any cost! If she's going to take what's hers and discredit the Novas, she's going to have to do it quietly and carefully!

JANALI BANKS

Like the Novas, Janali works for the Australian Space Association and is Head of the E.M.U. telescope which sits above Luna Port. Janali is an Indigenous Australian astronomer from Gamilaraay. She was also a child prodigy who could have done anything, but, like the Novas, believes there are still great mysteries left to be uncovered out there.

As such, she is a great champion for the Novas and their more 'maverick' methods. So, when the Novas tell her about their discovery of Star Dust she is keen to help – and determined to keep a watchful eye out for anything that might help them on their quest. A former babysitter to Jet and Adelaide, Janali also has an important 'big sister' relationship to the siblings, and they often go to her for advice and guidance.



ANDY LING

A beloved figure on Luna Port, Andy is both the head of the Australian Space Association and one of four international members on the Luna Port Council. Most importantly, he is a big supporter of the Novas and their covert quest to find Star Dust and Star Dust aliens.

This means he is walking the fine line between allowing the Novas to bend the rules and actively bending the truth to the Council and Aubrina. Even though Aubrina and Andy are technically equals on the council, if he is found to have broken the rules, it might endanger his position – and therefore ASA's ability to continue doing any missions in deep space.

ADDITIONAL RESOURCES

LEARNING TASK 2: TECHNOLOGY ADVANCES QUICKLY

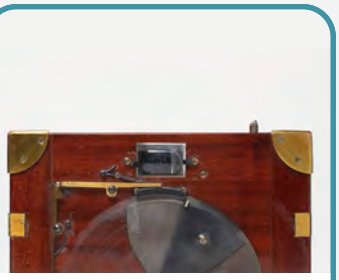
Show the following images (from Museums Victoria) to students and have them guess the uses of each object.

Images from Museums Victoria:
https://collections.museumsvictoria.com.au/items/400491

Answers are provided here:

STOVE FROM 1937

COMPUTER JOYSTICK FROM 1980



CAMERA FROM 1889

CASSETTE TAPE FROM 1980

WASHING MACHINE FROM 1955

TELEPHONE FROM AROUND 1920

PORTABLE COMPUTER FROM 1983

VACUUM CLEANER FROM 1936

LEARNING TASK 3: ADVANCES IN TECHNOLOGY CHANGE HOW WE COMMUNICATE

See this link for information on First Nations peoples' use of Message Sticks:

https://blog.qm.qld.gov.au/2012/11/06/message-sticks-rich-ways-of-weaving-aboriginal-cultures-into-the-australian-curriculum/

See this link for information on Morse code:

https://en.wikipedia.org/wiki/Morse_code

LEARNING TASK 7: HUMANS AND AI

View a portion of the book titled 'Harry Potter and the Portrait of What Looked like a Large Pile of Ash' here:

https://botnik.org/harry-potter-chapter/

LEARNING TASK 8: WHAT IS SCIENCE?

See this link for guidance in writing investigable questions:

https://primaryconnections.org.au/resources-and-pedagogies/strategies/supporting-students-write-questions-investigation

See this link for guidance on conducting fair investigations:

https://primaryconnections.org.au/resources-and-pedagogies/strategies/conducting-fair-test-investigations

LEARNING TASK 9: INSPIRATIONAL FIGURES

See the following lists for interesting people who have worked in STEM fields:

https://projectexploration.org/2021/03/31/women-in-stem/

https://www.science.org.au/education/history-australian-science/interviews-australian-scientists

https://online.maryville.edu/blog/women-of-color-in-stem/

LEARNING TASK 12: SCIENCE SOLVES PROBLEMS

If students have trouble thinking of design ideas, a set of cards from Cards for the Future would be a useful prompt. These add the following constraints: type of object, vision and topic.

https://www.nesta.org.uk/report/cards-for-the-future/

See this link to learn more about how fruits and vegetables have changed through genetic modification:

https://www.sciencealert.com/fruits-vegetables-before-domestication-photos-genetically-modified-food-natural

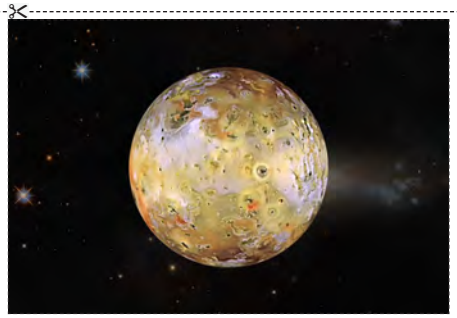
LEARNING TASK 14: ISSUES IN SCIENCE

See this link for information on renewable energy sources:

https://www.forteachersforstudents.com.au/site/themed-curriculum/renewable-energy-in-australia/facts/

ADDITIONAL RESOURCES

LEARNING TASK 11: UNIVERSAL LANGUAGE FOR SCIENCE AND AGREED SYSTEMS OF CLASSIFICATION



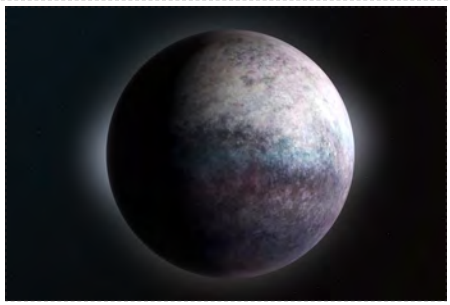
IO - orbits Jupiter, is round and has active volcanoes.

Mars - orbits the sun, round amd has nothing in its orbit.

Saturn - orbits the Sun, round and has nothing in its orbit.

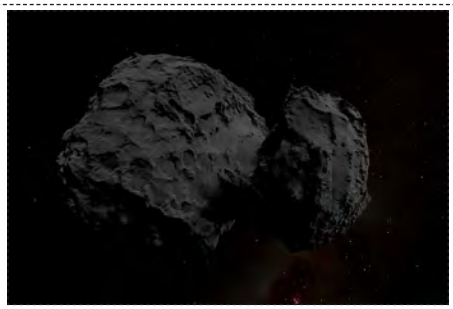
Moon - orbits the Earth, is round and rocky.

Earth - orbits the Sun, round and has nothing in its orbit.



Triton - orbits Neptune, is round and icy.

Sun - generates light.



67P/Churyumov–Gerasimenko - orbits the sun, not round.

© 2022 Australian Children's Television Foundation

ACKNOWLEDGEMENTS

SPACE NOVA EDUCATION RESOURCE DEVELOPED AND DISTRIBUTED BY AUSTRALIAN CHILDREN'S TELEVISION FOUNDATION.

Space Nova is an SLR Productions programme for the Australian Broadcasting Corporation, presented by Screen Australia and Nine Network Australia in association with Giggle Garage, Screen NSW, Australian Children's Television Foundation, ZDF Enterprises GmbH and Super RTL.

Curriculum Writer: Sophie Oakes