Home Learning TV – Junior Science

– 8 September

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| **Segment lesson planning details** |  |
| Title for segment: | Ātārangi - shadows |
| Year levels *(e.g. Yrs1 – 3)*: | 1-3 |
| NZC learning areas:  | Physical world - lightNature of science - investigating in science (observation) |
| Purpose of lesson:(What learners will learn) | Light travels in a straight line.Light cannot go through an opaque object.A shadow is the absence of light. |
| Success Criteria – students will be able to:(how they will know when they have learnt it) | * identify an object as opaque because light cannot shine through it
* match a simple shadow with its object
* draw a Sun with light rays travelling straight from the Sun
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| **Segment production details** |
| Equipment requirements: | Suzy’s home studio  |
| Copyright requirements:Please be specific: Source(*Seven Sizzling Sausages* by Sam Smith –url link to the source), intended use (to demonstrate alliteration), and length (timings for video clips) |  |
| **Segment links and attachments *(list all links to recordings or attachments, the source and confirm that copyright permissions are granted)*** |
| Links to recordings /resources |  |
| Attachments  |  |
| **Segment plan content** |
|  | Teaching and learning activities linked to purpose | High level script (key points/questions)  |
| **Activate**: Activating prior learning, knowledge of contexts and relationships | Connecting with the learners Making connections between episodes.Using riddles as a warm up for the episode topic.I am a unique individual, so my shadow is too! | Kia ora - [greeting in multiple languages][Touch base with audience if they’ve sent in texts or emails] I’ve just finished feeding my pet axolotl. How about you, have you been looking after your pet? One of the things I like to do with my pet [axolotl’s name] is ask him/her riddles. I think it gives him/her something to think about during the day. Here are my riddles:When you’re out in the sun I like to play, but in the rain I go away. Run or walk I always follow, but when you drink, I never swallow. [To pet axolotl - Do you know the answer? No? Well, how about this riddle.]I’m only one colour, but not one size. We meet at your feet - do you know why? [Talk to you axolotl again.]I don’t think my pet knows the answers to my riddles. What about you - do you have an answer? Here they are again:When you’re out in the sun I like to play, but in the rain I go away. Run or walk I always follow, but when you drink, I never swallow. Can you guess? Here was the second riddle - the answer to them both is the same. I’m only one colour, but not one size. We meet at your feet - do you know why? So - what’s the answer? Here’s another clue … [Playing around outside with our own shadow …]That’s right - it’s my shadow, my ātārangi. My shadow is something uniquely mine - and YOUR shadow is uniquely yours! |
| **Learn**: Introducing learningReinforce routines, provide multiple exposure to concepts, and strategies. Scaffolding learning  | Light travels in a straight line. Linking a sophisticated concept to a simple, well-known childhood representation.<https://www.youtube.com/watch?v=gFf84tE1Wkg&feature=youtu.be>**Filename: Celestia\_sun.jpg**<https://www.sciencelearn.org.nz/images/2142-the-sun> | Believe it or not, before we learn about shadows, we need to learn a few things about light. But you might already know more about light than you realise. If you’ve got a book and a pencil handy, draw a picture of te Rā - the Sun. That's where daylight comes from.[draw the image below]Did you draw your picture like this? Did your picture have rays of light going out from the Sun? Thinking about the Sun and light is a great way to start learning about shadows. Let’s watch this video to learn more. [begin video at 2:23 - with the words “Let’s get down to business.” Stop at about 3:51 after “stops with this card here”.]So, we’ve learned that light travels in a straight line. Look again at the Sun you drew. Can you see the light rays that you drew? It’s not safe for us to look at the real Sun, but we can look at this photo. It shows light rays - just like your drawing!OK - that’s a bit about light - and we’ve learned that light travels in straight lines. Now what about shadows? We saw that the light stopped when it hit the piece of cardboard. That’s because the cardboard is opaque - puata-kore. [Check <https://maoridictionary.co.nz/> for pronunciation support.]‘Opaque’ is a scientific word for something that doesn’t allow light to pass through it. The opposite of opaque is transparent - pūataata. It lets the light through. [Please demonstrate the concepts by placing a toy behind something transparent - a window, a drinking glass - and something opaque - a curtain, a china mug.]Let’s see what this has got to do with shadows.[Suzy’s world video 5:40 - 6:29]Are you watching this with someone? Ask them to stand in front of a window. Can you see the light shining on one side of them? Are they illuminated, like I was? What about the other side? Is it a bit darker? [Refer to/make comparisons with still image.]Does the light shine through them? Of course not, everyone is opaque.Now make another observation. If you’ve asked someone to stand by the window, check if the light is strong enough to form a shadow of the person. That’s going to depend a bit on what time of day it is - whether there’s daylight - and what the weather is like - whether the sun is shining.It’s the kind of thing you can do easily at night-time, using the lights in your home. When you do this - like I am here [still from video] - it seems that to make a shadow, the person has to be between the light source and the surface where the shadow forms. So between the window and the floor.[Have a play outside on a sunny day, please - show how your shadow moves around. Point out where the sun is. What happens if you turn around in different directions - the shadow always falls with you between it and the light. And what if you run - can you escape from your shadow? It’s actually a god game to play when we are social distancing as we can try and tag each other’s shadows.Dance moves are referred to later, too … check out video 3:54 - 4:39 for inspiration.]  |
| **Respond**: Providing opportunities to use and practice  | **Filename: BSC\_Shadows\_BikeShadow.jpg**<https://www.sciencelearn.org.nz/images/4013-the-shape-of-an-object-determines-the-shape-of-its-shadow>Presenter refers to the learners as scientists (thinking/observing as scientists)**Filename: ART\_Light\_and\_shadows\_PenguinShadow.jpg**<https://www.sciencelearn.org.nz/images/4012-an-object-is-always-between-a-light-source-and-the-surface-on-which-its-shadow-forms>Presenter recaps the learning about shadows. | What was my shadow doing when I was moving? Its shape was the same as my shape. The shadows of my hands and my arms, and even my hair, looked a lot like the real things. That’s because the shape of the object always determines the shape of its shadow. Here’s another example. If we look at this photo, can you see how the bike’s shadow has the same bits as the bike? [Point to and discuss the tyre, pedals etc.] I can’t see the bike’s handlebars because they are not in the photo. But if we look at the shadow, will this tell us something about the handlebars? I think the handlebars have grips at the ends and I can also make a pretty good guess about the shape of the handlebars. Why? Because the shape of the object determines the shape of the shadow.This photo shows us another thing about shadows. The shadow and the object are always joined where the object touches the ground. [refer to tyre and kickstand].Have a range of objects out in the sun - different toys might be fun? Note that all of THEIR shadows start at the point where the object touches the ground, too.[Optional, if you feel you have the time …]Now - have you ever noticed what happens to your shadow through the day? Does it stay the same? Or does it change?It still is unique to you - but it can get shorter, and it can get taller. That’s because our position in relation to the Sun is changing as Earth rotates through day and night.[Can you please use some fun time lapse photo videos here to demonstrate this? Perhaps a dinosaur / stuffed toy in one position with photos taken throughout the day? We can help if you feel like you’re running out of time …]There’s so much more we could learn about shadows. But let's be scientists and make observations of this penguin and use these to talk about what we’ve learned today.What do you observe:* the light rays from the Sun move in straight lines
* the penguin is between the light and its shadow
* the penguin has a shadow because the penguin is opaque, we can’t see through it
* the penguin and its shadow are touching
* the penguin’s dance moves are almost as good as mine.

Wait - I’m not sure a scientist would make that last observation. But I still think it’s true!  |
| **Share**: Learner and parent reflection on learning and engagement and what they can do next | **Filename: ACT\_01\_Investigating\_shadows\_BikeRack.jpeg**<https://www.sciencelearn.org.nz/images/3980-shadows-and-shapes> | Well, If you want to investigate more about our learning about shadows – ātārangi you could go outside after this and look at your own ātārangi. Check if you both have the same shape and if your shadow moves the same way you move? You could go on a shadow scavenger hunt and see how many different shadow shapes you can find?Check out this curly bike rack and its shadowYou could check if you see shadows at night? Put on some warm clothes and do some investigations. For indoor fun, you could use a lamp or a torch to make shadows on the wall. Shadow puppets are always fun. Or, you can get someone in your whānau to pose in a silly shape and see if you can lie on the floor and be his shadow.Whatever you do, I’d love to see a photo of you and your unique ātārangi. [Sign off in multiple languages.] |