Home Learning TV: Junior science 

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| **Segment lesson planning details** |  | |
| Title for segment: | Hau takiwā - air | |
| Year levels *(e.g. Yrs1 – 3)*: | 1-3 | |
| NZC learning areas: | Nature of science: understanding about science - asking questions that lead to investigations; Investigating in science - via exploration, play, using simple models  Material world: Observing and describing some of the physical and chemical properties of air | |
| Purpose of lesson:  (What learners will learn) | Introduce basic concepts about the physical and chemical properties of air - it is all around us, it takes up space, we can feel it when it moves, air is a mixture of gases and sounds travel through air.  By using models, we can make things that are invisible - like air - visual | |
| Success Criteria – students will be able to:  (how they will know when they have learnt it) | Ākonga will be able to identify some of the physical properties of air.  Ākonga will be able to design and use simple models.  Ākonga will use the models to visualise/experience an invisible substance. | |
| **Segment production details** | | |
| Equipment requirements: | whiteboard / paper and felts  2 l and 1 l milk bottle (optional)  balloon(s)  drinking glass  empty flexible, plastic bottle that doesn’t crinkle when squeezed (think about any branding messages)  dictionary  empty bread bag  PPT | |
| Copyright requirements:  Please be specific: Source: (*Seven Sizzling Sausages* by Sam Smith –url link to the source), intended use (to demonstrate alliteration), 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 | Introduction, making connections and setting the scene.  Helping tamariki and whānau switch into science mode by ‘warming up’ the roro.  Using a playful approach to engage tamariki and whānau.  SLIDE 2: Riddle 1  I touch your face. I’m in your words. But if I’m not around, they can’t be heard. Any guesses?  SLIDE 3: Riddle 2  You find me up high and way down low. But you only feel me when the wind blows. What do you think?  SLIDE 4: Riddle 3  If you jump up, you’ll hit me, but it doesn’t hurt. But when you jump down, I might fill up your shirt | Kia ora, talofa lava, mālō e lelei, namaste, g’day! (Greetings from the presenter and a brief korero.)  You know how you stretch your muscles before you do exercise? Well, we are going to stretch our roro - our brains and get them warmed up before we jump into learning about pūtaiao/science.  Let’s get warmed up by answering a riddle. Are you ready? Here goes:  I touch your face. I’m in your words. But if I’m not around, they can’t be heard. Any guesses?  Here’s another riddle: You find me up high and way down low. But you only feel me when the wind blows. What do you think?  How about one more riddle to really get your brain warmed up:  If you jump up, you’ll hit me, but it doesn’t hurt. But when you jump down, I might fill up your shirt.  I think this is the hardest riddle of all!  What do you think? Did you get the answer to all three riddles? If you did, then you know the topic we will learn about today: [hau takiwā](https://paekupu.co.nz/word/hau-takiwa) - air!  Have you got your pukapuka and pene rākau to write with? Great - let’s write the title at the top of the page. (Write hau takiwā - air, saying each letter as you write.) I like to put little pikitia/pictures around my title. What kind of pikitia can we draw about air? Hmmm...this is a tricky one because air is invisible. Maybe we need to learn what air is before we can draw pictures! Let’s get started. |
| **Learn**: Introducing learning  Reinforce routines, provide multiple exposure to concepts, and strategies. Scaffolding learning | Scientists sometimes collect data by making careful observations  Introducing the concept that air takes up space  SLIDE 5: Photo of woman with lung diagram overlay  Filename: JS\_04\_Hau takiwā - air\_WomanWithLungDiagramOverlay.jpg    Using prior knowledge and a common item to aid visualisation of volume. Connecting science and maths.  SLIDE 6: Milk bottle  Filename: JS\_04\_Hau takiwā - air\_MilkBottle\_2Litres.jpg    Connecting to the theme of curiosity  Nature of science - using investigations to answer questions  SLIDE 7: Timer video  Vimeo link: <https://vimeo.com/599183024>  Filename: JS\_04\_HauTakiwaAir\_Timer.mp4  Thinking about data  Concept: we can feel air then it moves  Using a common context to repeat and reinforce the concepts and content vocabulary  Involving tamariki and whānau in physical activity, while reinforcing concepts.  Reinforcing ideas.  Introducing the concept that air is all around us.  Tamariki can use their new knowledge about air being all around us and filling up spaces.  Designing an experiment to prove that air is all around us.  Using our senses to gather data.  Modeling being curious and asking questions  A very brief introduction to the particle nature of matter. The main focus is that gases, like air, spread all over the place.  SLIDE 8: states of matter image  Filename:    A very brief introduction to the chemical components of air.  Using our senses to experience the invisible presence of water vapour.  Engaging tamariki and whānau in some physical activity and creative thinking.  Making links between the episodes.  Recording ideas by using diagrams to represent concepts. | First of all, if air is invisible, how do we know it’s there? Scientists use their senses to make observations. Let’s use our senses and see if they can help us.  Can you see air? (Mime actions to go with each sense.)  Can you hear air?  Can you smell air?  Can you touch air?  Can you taste air?  Hmmm. . . our senses aren’t really helping us learn about air, are they? You know, when I was young and having trouble figuring things out, my mum always told me to hēhē/breathe - to take a deep breath and think.  Mum’s always right, so let’s take a deep breath and see if that helps us think better. (Draw in an exaggerated breath. Exhale in a similar manner. Repeat this a few times.)  Hey, I think I’ve got it! When we take a deep breath, what’s going into our lungs? Can you feel them filling up? Put your hand on your chest and take some deep breaths. Let’s do it together.  I’ve got a picture of where our lungs are in our bodies. (Discuss the image.) That’s why we feel our chests move when we fill up our lungs.  So, what’s causing our lungs to fill? Āe, it’s air. And we breathe in a lot of air. Let’s look at some numbers:   * Depending on how big you are, your lungs hold about 2 L or more of air. That’s the same volume that a milk bottle holds. (Use a prop, we’ve provided an image in case you’d prefer it)   You have two lungs, so each lung holds how much? (Work out the maths - half.)   * If you have a big person sitting in the room with you, their lungs hold up to 6 L of air. How many milk bottles is that? (Work out the maths.) * I read that we breathe about 12-15 times a minute. * In a day we take around 17,000 breaths. * That adds up to more than 6 million breaths a year!   Those are some really interesting numbers. Numbers like this make me curious. What about you? Are you curious when you hear facts about your body? We don’t have time to test whether we take 6 million breaths in a year, but do you think we can test whether we actually take 12-15 breaths a minute? Okay scientists, how can we test this? What equipment will we need? (A timer, our bodies and a way to record the data we collect. Explain how the process works - counting in your head so that you don’t confuse people in your bubble. They can make tally marks in their pukapuka for each breath they take. Then time your breaths for 1 minute.) [A timer video is provided, although you could use a stopwatch on a phone.]  I took XX breaths, how about you? If you’re watching this with someone, have a kōrero, a chat and find out how many breaths everyone took.  Are the numbers the same or are they different? Talk about your ideas with your bubble. I’m going to give you the amount of time it takes me to make 5 big breaths to think and talk. Go! What are your ideas? Did you notice that what I read said 12-15 breaths? That’s called a range, because not everyone is the same.  Did you notice something else when we were counting our breaths? The air goes in, so it has to go out. Put your hand in front of your mouth when you breathe out. What do you notice? Āe, we can feel the air coming out of our lungs.  I wonder, is it just our lungs that fill with air - are there other examples you can think of? Tell me what you think.  Of course, balloons! When I blow up a balloon, it fills with air. (Demonstrate.) And when I stop pinching the end, the air wooshes out and I can hear the woosh and I can feel it, too.  It’s not fair that I have all of the fun. Why don’t we pretend that I’m a balloon and you get to blow me up. Start blowing! (Raise your arms as if you are filling with air.) Stop! If you blow in any more air, I might burst. Okay, let the air out. (Deflate by lowering your arms and wiggling and using sound effects.) It’s my turn - e tu. I’m blowing air into you. (Use several breaths.) Can you feel yourself inflating, getting bigger and bigger? I’m letting go now. Whoosh.  I’m going to do that again. This time, I’m not going to use as much air, just a couple of breaths. Are you ready? (This time just do a couple of breaths.) What do you look like now? Are you a big balloon or a small balloon? You’re right - small, because there isn’t as much air to take up space in your balloon body.  Wow! we’ve just learned two things about air:   * air takes up space - like in our lungs or a balloon * we can feel air when it moves.   Shall we draw pikitia in our books to show these two things. I think I will draw a balloon and some swirls to represent air moving.    (This image is for presenter use only.)  Boy, all of that breathing in and out and blowing up balloons has made my mouth really dry. I’m pleased I’ve got a glass of wai māori/drinking water nearby. Excuse me while I take a drink. (Pick up an empty glass, pretend to drink and show that it is empty.) Bother! It’s empty. I forgot to fill it up. Let’s see - here’s a bottle of water, I can pour some water into my glass. (Mime pouring from a plastic bottle.) Oh no! This bottle is empty too! There’s nothing in it.  (Looking at the audience) Pardon, what did you say? Did you just say that my glass isn’t empty? But when I tip it, nothing comes out. Ahh. I get it now. My glass isn’t really empty because it has air in it. You are right. What about my bottle? Does it have air in it too? Yes. Air is all around us - even if a space looks empty, it has air in it.  Some of you look like you don’t believe me. How can we test that there’s air in the bottle? Kōrero with those around you, or if you’re by yourself, tell me your ideas. Hmmm...shall we put your ideas to the test?  Some of you mentioned that I can squeeze the bottle and feel what’s coming out of it. (Squeeze) I can feel it. That’s one sense I can use to observe there's air in the bottle - I can feel the push of air. I wonder if I can see the push of air. (Direct the air flow to your hair, if you have a fringe or wispy bits so we can see it move. Alternatively, direct the air to the balloon and watch for movement.)  There’s one more sense I think we can use - can you hear the air blowing out of the top, and then being sucked back in the bottle? (Please use this only if it works for your plastic bottle. Some bottles make a useful woosh sound.)  I’m really enjoying working with you clever, curious ākonga - you are coming up with lots of interesting ways to investigate air. Do you remember earlier when I said that our senses weren’t very good at helping us learn about air? Boy was I wrong!  Okay, now we know that:   * air is all around us * air takes up space, and * we can feel air when it moves.   I still have a couple of questions about air, though. What is air? We said that air takes up space, but it’s not like I can pick it up and hold it. We said that air is in my glass, but it’s not like I can pour it from my glass to my mouth. Let’s think like scientists. What do we do when we need more information? We do some research.  Luckily, I’ve got a dictionary handy. It says that air is a mixture of different gases. You might need to help me with this. Can you remind me what a gas is? Let’s see - things can be solids, liquids or gases.  Solids have a firm shape - like my dictionary or this table the dictionary is sitting on.  We also know that things can be liquids - like water or milk. Liquids take the shape of the container they’re in - and if I spill a liquid, it just goes everywhere!  What about gases? Do they have a shape? Not really - gases are pretty much everywhere unless we trap them in something like we did in the balloon.  Let’s look at these drawings. They show the particles in solids, liquids and gases. Let’s focus on the image of the gas. What do you think the arrows are showing in this image? Āe, gas particles spread all over the place - and they’re always moving!  Next question - what is in air? The dictionary said it is a mixture of gases. One gas you will already know because we need it to survive - [hāora](https://paekupu.co.nz/word/haora-2)/oxygen. You’ve probably also heard of [hauhā](https://paekupu.co.nz/word/hauha)/ carbon dioxide or CO2. We breath in air with oxygen in it. We use some of the oxygen and breath out air with more carbon dioxide in it.  There are lots of other gases in the air, too. One gas might surprise you. Hold your hand up to your mouth and breathe out on your palm a few times - like this. (Demonstrate.) Now put your palm on your cheek. Can you feel the moisture touch your cheek? Air holds tiny gas particles of water in it - we call this water vapour. Water vapour is invisible, but we can feel it’s presence, just like we can feel air sometimes.  There’s one last thing I’d like to mention, but to do this you need to stand up and move as far away from the TV and other people as you can. Are you far away? Good - now tell your family or me as many words that rhyme with air as you can. Did they hear you? Did you hear their suggestions? Are you wondering what this has to do with the science of air?  So many questions! Have you been watching other episodes of Papa Kāinga TV this week? We’ve talked a lot about sound. Do you remember that for sounds to be heard, they need to travel through something? And often that something is … air! When you speak, you create a sound that causes vibrations - tiny movements of air particles. These vibrations travel through the air, and when they hit my ear - well, my body turns it into a sound I recognise as your words. If we didn’t have air between us, no one could hear you talk. That’s a pretty weird thought, isn’t it?  Before I forget, we need to add another pikitia in our pukapuka. We learned that air is a mixture of gases, so let’s draw some circles with arrows, like we saw in the diagram earlier. That way we will remember that air is a gas.  Let’s have a look at our drawings [review all your drawings.] |
| **Respond**: Providing opportunities to use and practice | Linking back to the riddles as a context to use and practice the new kupu and knowledge.  Display riddle PPT slides again.  SLIDE 9: Riddle 1 repeat  SLIDE 10: Riddle 2 repeat  SLIDE 11: Riddle 3 repeat | Now that we are all experts about hau takiwā, air, let’s go back to the riddles from the beginning and see if they are easier to answer now.  I touch your face. I’m in your words. But if I’m not around, they can’t be heard.  How is this riddle about air? It’s because air is all around us, we breathe air out of our lungs when we speak, and sound travels through air. Ka pai!  Riddle number two: You find me up high and way down low. But you only feel me when the wind blows.  How is this riddle about air? Right again - air is all around us and even though we can’t see air, we can feel it when it moves.  Riddle number three: If you jump up, you’ll hit me, but it doesn’t hurt. But when you jump down, I might fill up your shirt.  How is this riddle about air? Air is a gas, so we don’t feel it, but air takes up space, so if I jumped out of a tree with my shirt flapping around me, it might fill up with air and act like a parachute.  The riddles make a lot more sense now that we know so much about air - how cool is that? |
| **Share**: Learner and parent reflection on learning and engagement and what they can do next | Reminding ākonga that they have pictures/words of key ideas from the episode to reflect on and use again.  Providing an opportunity for families to do/plan simple activity/activities together.  SLIDE 12: SLH logo | Thanks for being so curious and helping me design investigations to answer my questions. Being able to do the activities really helped me learn more about some of the properties of air - an invisible substance.  If you get a chance to talk to others who didn’t watch this episode with you, ask them to answer the riddles. See if you can spark their curiosity, too. You can use the pikitia you drew in your pukapuka to explain what you know about air.  You can even design some simple investigations of your own. What can you do with an empty bread bag to show that air takes up space or that we can feel air when it moves?  How can you use plastic bottles in the bath or in a sink full of water? If you come up with some other ideas, I’d love to hear about them.  [Optional - squeeze out a bottle under water - the bubbles contain the air that was in the bottle, but that is being displaced by the water.]  Remember what my mum says, “Take a deep breath, think and get creative!”  [Shout out to Science Learning Hub for help planning this episode.]  Ka kite ano. |