Home Learning | Papa kāinga TV

Junior Science


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| **Segment lesson planning details** |  |
| Title for segment: | Hau takiwā - floating, falling and flying |
| Year levels *(e.g. Yrs1 – 3)*: | 1-3  |
| NZC learning areas:  | Nature of science: Investigating in science - via exploration, play, using simple modelsPhysical world: exploring everyday physical phenomena - movement and forcesMaterial world: observing and exploring physical properties of air |
| Purpose of lesson:(What learners will learn) | Build upon prior learning about the nature and properties of air.Investigate the push of air, begin to build a foundation for understanding concepts such air resistance and air pressure.Strengthen the understanding that we can use models to visualise forces and/or substances that are invisible. |
| Success Criteria – students will be able to:(how they will know when they have learnt it) | Ākonga will notice that objects with different shapes may fall in a different manner.Ākonga will begin to identify the role that the push of air has on objects and how they move in air.Ākonga will be able to design and use simple models to test how objects fall.Ākonga will begin to differentiate between the concepts of flying, floating and falling. |
| **Segment production details** |
| Equipment requirements: | balloon, several sheets of newspaper, magazine pages, and/or junk mail, science journal, felts/pen, ruler, paper airplane (optional), whiteboard and felts, and access to 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.Reminding tamariki and whānau that this is a science session, but hey - science can be lots of fun and educational, too!Making connections between episodes and acknowledging prior learning. Reviewing concepts and/or introducing concepts for those viewers who may not have seen the prior episode.Indirect shout out to the role of observation and how it aids scientists to initiate and carry out investigations. (NOS)Linking with the theme of innovation and enterprise - we can find alternative materials for our investigation and these materials can be more environmentally friendly.SLIDE 2:* pukapuka and pene for recording our observations
* ruler
* newspaper or scrap paper
 | (Presenter is juggling a balloon from hand to hand.)Oh! I got caught playing when I’m supposed to be working! Let me put my balloon down and get to work. First things first: kia ora, talofa lava, mālō e lelei, hola, namaste. (Catch up with the tamariki.)What’s the weather like where you are? It’s rainy and windy here where I live. Tāwhirimātea and his children are certainly quite active outdoors. Or it might be Tangaloa and his sons causing all of the activity and keeping people indoors. I’m trying to stay active because sitting all day isn’t very good for me. That’s why I was playing with the balloon. I’ve been trying to keep it in the air. And you know what, I've been having so much fun with this challenge, that I really don’t want to stop.Hey, I wonder if we can do both. Let’s get creative and be resourceful - that’s another way of saying let’s learn through playing. I mean, let’s learn through investigating. This is our time to be kaipūtaiao, scientists and kaipūtaiao and scientists are awesome at designing ways to show how the world works.The last time I was with you, we came up with all kinds of ways to investigate [hau takiwā](https://paekupu.co.nz/word/hau-takiwa) - air. Do you remember? We talked about how air is all around us and we used a balloon like this one to show how air takes up space. (Juggle the balloon). How can we use a balloon to design some investigations this time? (Give the balloon a strong swat so that it goes up quite high and then watch as it floats down. Repeat.) Gosh, I got distracted again by watching the way this balloon moves in the air. Hmmm, movement and air. Lots of things move through the air, don’t they? I wonder if we can investigate how things move through the air. Are you in? Then let’s do it!First we’ll need some gear to use in our investigations. I know that lots of people don’t have balloons in their houses, but there are other things we can use to investigate how things move in the air. I’ve got a list here. Can you see if you’ve got these items? If you don’t have the items right now, that’s okay. You can watch what I do and then repeat the activities once you’ve found them later. (Read out items. Suggest a few sheets of newspaper so that everyone gets a turn. The scrap paper can be from junk mail.) Pull out items from your stash as you read out/discuss what is needed.)* pukapuka and pene for recording our observations
* newspaper or scrap paper
* ruler

I’m going to continue playing with, I mean observing, how my balloon moves through the air while you go and get the things we’ll need for our investigations. |
| **Learn**: Introducing learningReinforce routines, provide multiple exposure to concepts, and strategies. Scaffolding learning  | Recording content vocabulary and concepts. Links with phonics.Slide 3:Fun - pārekarekaFalling - takaFloating - neke kārewaFlying - hokahokaReview of the particle nature of air.Introducing the concept of ‘push’ with a known, visible context. Recognising that not all pushes are visible.Setting up the investigation, making properties explicit, establishing early parameters for fair testing.NOS - science is a collaborative field. Use those around you to help gather information.Exploring, eliminating possibilities. Using observation to make accurate drawings. Practising the science capability ‘interpret representations’.(for the presenter’s reference only, not for the PPT)Introducing the concept of surface area and its relationship to air resistance. Linking the concept with a known context.Slide 4:FILE NAME: JS\_05\_Parachute.jpgBringing this section to a natural finish, encouraging viewers to do a bit of activity | Let’s get started by opening our pukapuka. Let’s fold the page in half. Watch me, then do it yourselves. If you have a ruler, draw a line down the middle of the page. Then draw a line across the page so that we’ve split the page into 4 parts. Sometimes it’s hard for you to see what I’m doing in my book, so I’m going to draw what my page looks like on the whiteboard.Next, we’ll write a great big F in the corner of each square. Why? Because lots of what we talk about and do today will start with an F. First an F for fun/[pārekareka](https://maoridictionary.co.nz/search?idiom=&phrase=&proverb=&loan=&histLoanWords=&keywords=fun). (Write and spell the words as you go.) Then an F for falling/taka. Next an F for floating/[neke kārewa](https://paekupu.co.nz/word/neke-karewa) and finally an F for flying/[hokahoka](https://paekupu.co.nz/word/hokahoka).Let’s start with fun. Remember last time, we discovered that air is made of gases - really, really tiny particles that fill up spaces. Believe it or not, these air particles are moving around creating a push. It’s not a big push, like the kind you give a door when you want to open it, but it’s still a push. And you know how air is invisible - we can’t see it? We can’t see air pushing against things either - it’s invisible too. Boy, air is tricky stuff isn’t it! This is why we have to be resourceful when we do our investigations.Let’s investigate. Take one piece of newspaper and carefully tear it in half down the centre so that you have two pieces that are the same size. (Demonstrate.) If you don’t have any newspaper, you can use pages from a magazine or a mailer. Whatever you use, the 2 pieces need to be the same. Titiro - let’s observe - are the pieces of newspaper about the same size? Āe. Are they the same weight? (Weigh up/balance in each hand) Āe. Now let’s change the shape of one piece. Scrunch one up so that it’s a ball - like this.Now, stand up nice and tall and drop both the scrunched-up ball of newspaper and the sheet of newspaper from the same height and at the same time. We want this to be a fair test - that means we keep almost everything the same - we just change one thing. (Demonstrate the drop.) Is that what you expected to happen? Shall we repeat our experiment to see if the same thing happens again? If you’re watching this with others, you can all do this together and watch what happens. What did you observe? (Discuss how the ball of paper falls to the ground more quickly than the sheet.) Remember I said that air has a push - an invisible one? Dropping the paper shows us that push. Have you figured out how? Perhaps you could talk about this quickly with someone else. Try to work out how this might be showing the slight pushing force of the air. Did you come up with some reasons? Hmmm… we know that both pieces of paper are the same weight, so one wasn’t heavier than the other. I heard some of you saying the sheet of paper was acting like a parachute. Do you think that might have something to do with how the paper fell?Have you got your pene ready? I think we need to do some drawing in our science pukapuka, our books. We need to draw a model. I’m going to observe the objects before I draw them. Look at their shapes. Look at the size. What shape will you use to draw the paper ball? Me too, it looks round so I will draw a [porowhita](https://paekupu.co.nz/word/porowhita)/circle. What about the sheet of paper? Āe, it looks like a [tapawhā hāngai](https://paekupu.co.nz/word/tapawha-hangai)/rectangle and it’s actually quite a bit bigger, so I’ll need to make my drawing bigger, too. (Draw both shapes - talk about why you are drawing the paper as a line - it’s because you’re showing it as though it is falling through the air and you’re looking at it from the side.)We said that the air presses on objects. So let’s use arrows to show the air pressing against the sheet of newspaper as it falls. Let’s space our arrows out evenly. (Draw several arrows of the same size, pointing to the underside of the line representing the paper, showing the air is pushing against the paper, keeping it afloat. Keep the arrows evenly spaced apart.) Now let’s draw arrows to show air pressing on the ball as it falls. Let’s try and draw the arrows the same size and the same distance apart. (Complete the drawing, but because the ball is smaller, there will be fewer arrows.) What do you observe about the number of arrows? Why do you think there are more under the sheet of newspaper than the ball of newspaper? Āe, you are correct. The piece of paper is bigger than the scrunched-up ball. Scientists say that it has more surface area - there’s more surface for the air to push against. When we dropped the paper, the larger surface area meant the sheet of paper fell more slowly than the scrunched-up ball.Now that we know about surface area, let’s drop the ball of paper and the sheet of paper one more time. Yep, the paper with more surface area was touching a lot more air, so it had more air pushing against it and slowing its fall. This is one reason why a parachute needs to be so big. A person is heavy so there needs to be a lot of air pushing against the parachute to slow the person down. Let’s look at a picture of a parachute. Can you see the big surface area, full of air pressing against the fabric?Gosh, I’d like to be out in the beautiful blue sky, falling like a parachutist or flying like a bird, instead of being stuck inside. We can still pretend. Put your pene down and let’s fly like birds for a little bit. Flap your wings - fly high, swoop low. Then find your tree branch and go back to your perch. |
| **Respond**: Providing opportunities to use and practice  | Making connections with prior experiences.SLIDE 5:FILE NAME: JS\_05\_76977195\_m.jpgUsing known objects/contexts to observe/explain how birds and planes have evolved/are designed to deal with the push of air.SLIDE 6:FILENAME: JS\_05\_albatross.jpgSLIDE 7:FILENAME: JS\_05\_airbus.jpgTamariki have the opportunity to put their new knowledge to use in an engaging manner. Some of the examples are not straight forward - hopefully extending the thinking of older/more capable learners.Slide 8:FILENAME: JS\_05\_feather.jpgSlide 9:Filename: JS\_05\_bird.jpgSLIDE 10:Filename: JS\_05\_bee.jpgSLIDE 11:Filename: JS\_05\_balloon.jpgSLIDE 12:Filename: JS\_05\_toyplane.jpgSLIDE 13:Filename: JS\_05\_glider.jpgSLIDE 14:Filename: JS\_05\_kiwi.jpgSLIDE 15:Filename: JS\_05\_leaf.jpgSLIDE 16:Filename: JS\_05\_helicopter.jpg | (An actual paper plane would be good here, but it’s optional.)Okay clever people, we still have 3 more sections to fill in our science book. We’ve done the fun, now we need to think about floating, falling and flying. We used paper to show floating and falling. Do you think we could use paper to show flying? You are right, we could fold a piece of paper into a paper plane, like the one in this picture. I wonder if the push of air affects things that fly? What do you think? The shape of the paper plane might give us some clues.Do you see how the paper plane starts with a point, and then gradually gets wider? This special shape helps it move through the air more easily than our paper ball or the piece of newspaper can. Humans learned about this special shape by observing manu/birds. Let’s look at this picture of an albatross. See how its body starts with a pointy beak, and then is really smooth along its stomach, and its feet are tucked in? That’s called streamlining. The wings are a special shape to take advantage of the push of air. They help keep the albatross in the air, enabling the manu to fly and even float and soar at times. Humans have been able to copy the shape of birds’ bodies and wings and come up with some pretty innovative and inspiring ways to move through the air. Here’s a picture of one of my favourite innovations - an Air New Zealand aeroplane. See how it’s got a pointy nose at the front and a streamlined body? Back to our science book! We could draw things we made from paper, but let’s get more creative. I’m going to show you some more photos. You’ve got a choice - you can either record some of these ideas in your book now or you can get active with me and add your ideas later. If you want to be active, e tu, stand up. When I show you a picture of something that you think flies, spread your arms out wide like a bird or an Air New Zealand plane. If you think the thing I show you floats, put your hands above your head, with your fingers touching, so that your arms resemble a parachute. If you think the thing I show you falls, well, that’s pretty easy.Let’s go. (Show each image on the PPT slide and briefly discuss whether it flies, falls or floats. Some are debatable.(Note for presenter background, not for sharing - floating = falling slowly because the force of gravity is bigger than the push from the air; things that fly stay flying because energy is being used to overcome the force of gravity)* feather (floats/then falls)
* piwakawaka (flies)
* bee (flies)
* balloon (floats and then falls)
* toy plane (falls)
* hang glider (floats/flies)
* kiwi (falls - poor kiwi, good thing it's got big feet to land on)
* leaf (floats/falls)
* helicopter (flies)
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| **Share**: Learner and parent reflection on learning and engagement and what they can do next | Linking to the theme of enterprise and innovation.Reviewing content vocabulary and science concepts.PPT slide: Falling - takaFloating - neke kārewaFlying - hokahokaProviding opportunities for families to do activities together and hopefully a reminder to add information to the other ‘Fs’ on the page. | That was fun! I’m glad we had the opportunity to play, I mean investigate and experiment. It’s amazing how much science we can do with just a bit of recycled paper. We can be pretty innovative too.Do you remember what we learned about? * invisible air has an invisible push
* we can use investigations and models to help us experience and ‘see’ this invisible push
* objects move through the air - some fall, some float and some fly.

What could you do with your whānau to continue investigating how things move through the air? * If you’re not stuck inside like me, you can go outside and collect items like feathers or floaty dandelion seeds or rocks, and make collections of things that float or fall.
* You can also look for things that fly, but they’re hard to collect. You might have to collect their names, instead.
* You can investigate the best paper airplane design for flying, gliding, floating or falling. What innovative design can you come up with?
* You can use a bread bag, some string or flax fibres, and a Lego figure to design and make a parachute.
* You can fill in the other 3 sections of your science book!

Shout out to the Science Learning Hub team for help planning this episode]Ka kite ano. |