Home Learning TV – Lesson Plan – 21 September 

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| **Segment lesson planning details** |  |
| Title for segment: | Mahia he hāngī |
| Year levels *(e.g. Yrs1 – 3)*: | Year 4-7 |
| NZC learning areas:  | Mathematics and statistics: measuring volume and capacity  |
| Purpose of lesson:(What learners will learn) | Learners will learn about the attributes and ways of measuring volume and capacity  |
| Success Criteria – students will be able to:(how they will know when they have learnt it) |  Learners will be able to: * Understand the attributes used to measure the volume and capacity of a space
* Calculate the volume and capacity of a cuboid
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| **Segment content/context details *(as appropriate)*** |
| Māori specific content i.e., the learning draws on Mātauranga Māori: |  Matariki context: volume and capacity of hangi pit  | Pacific specific content i.e., the learning is focused on Pacific knowledge: |  |
| **Segment production details** |
| Equipment requirements: |  |
| 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(5 mins) | Fractional understanding Using justification  | Kia ora, Talofa lava, Bula Vinaka and Malo leleiToday we are going to warm up with a game of odd one out.One of the following fractions is not like the others. One of the following fractions is not the same.You need to work out which fraction does not belong, and you will have to justify your answer with the word **because.**Here are the fractions. I will give you some time to think about it.**(presenter write on whiteboard)**1/3 6/7 3/8 10/25**(Leave on screen 1 min)**If you said, 1/3 was the odd one, out and justified that by saying BECAUSE this is the only unit fraction, or fraction with a numerator of 1, you would be correct.**(Presenter point to numerator- ensure learners understand what a numerator and denominator is)**If you said 6/7 was the odd one out and justified that by saying BECAUSE this is the only fraction bigger than 1/2 then you would be correct.If you said 3/8 was the odd one, out and justified that by saying BECAUSE this is the only fraction where the denominator is an even number you would be correct.If you said, 10/25 was the odd one out and justified that by saying BECAUSE this is the only fraction that can be simplified to an equivalent fraction of 2/5 you would also be correct.So if they were all the correct answer and nobody was wrong what have we learnt today?We have learnt that in mathematics sometimes there is more than one answer so it is important to explain your reasoning and justify your thinking.Sometimes you can do this with numbers, sometimes with materials and sometimes with visual representations. |
| **Learn**: Introducing learningReinforce routines, provide multiple exposure to concepts, and strategies. Scaffolding learning (10 min) | Introduction to problem Activate prior knowledge Making connections to prior lessons Area of a rectangle Multiplying decimalsIntroduction of three dimensional attributes of volume and capacity Formula for calculating the volume or capacity Multiplying decimals Units of measurement  | Our goals for today are to* Understand the attributes used to measure the volume and capacity of a space
* Calculate the volume and capacity of a cuboid

Now let’s get to today’s problem. During Matariki we always put on a hāngi for the whānau to celebrate. We have a lot of people in our whānau and have to dig a large hole for the hāngi pit. This means a lot of mahi for everyone involved, but it’s always a worthwhile outcome!The size of the hāngī pit depends on the number of baskets of food that need to be cooked. Have you thought about all the mathematics involved with putting down a hāngī? We need mathematics to help us make sure the hāngī is cooked properly and to ensure there is enough kai. There is also a lot of measurement involved such as temperature, time, area, volume and capacity.Today we are going to be looking at the capacity of the hāngī pit. Capacity means the amount that the hāngī pit can contain. Take a moment to think about the last lesson when we investigated the area of our Matariki Kite. Do you remember how we worked out the area of a rectangle? That’s right! We multiplied the length by the width and then we knew how much space the rectangle would cover. **(Presenter demonstrate on whiteboard)**The length of the hāngī pit is 2 metres and the width is 1.5 metres. Talk to someone next to you about how we can work out the area - or, how much ground the hāngī pit will cover. We need to figure this out so we know where to dig it. **(Pause 30 sec)**Did you say to multiply the length by the width? If you did, you were right. So using the formula for area, length times width**(presenter write on whiteboard)** 2 x 1.5 = I know that 1.5 is the same as one and a half. One plus one equals two. One half plus one half equals one. **(presenter write on whiteboard)**1 + 1 = 2 ½ + ½ = 1And two plus one makes three. 2 + 1 = 3 Have we missed anything? Yes you’re right, the unit we’re measuring the area with. The area the pit will take up is three square metres **(presenter write on whiteboard 3m²).**Ok so now we know the area the hāngī pit is going to take up. But we don’t know the capacity, or how many baskets we’ll be able to fit into the pit, when we’ve dug it. When we’re working out the capacity there’s another dimension we need to consider. So far, we have length and width. What do you think the other dimension is? If you noticed we didn’t include how deep the hāngī pit is, then you were spot on!When working out capacity we are working in 3D - three dimensions - and this dimension is called height. So, if area is length multiplied by the width, how do you think we would calculate the capacity? **(Pause 5 sec)**If you said Length x width x height you’ve got it**.(Presenter write formula on whiteboard)**We can use the same formula to measure the volume as well. Remember when we calculate capacity, we are measuring the amount that something can contain. Volume is the amount of space that a substance or object occupies. Ok let’s figure this out. Remember length times width was 3m**² (presenter point to whiteboard).** The height is 1.25m so we need to multiply three with 1.25. **(Presenter write on whiteboard)**3 x 1.25 = I know that three times one is three**(Presenter write on whiteboard)** 3 x 1 = 3And three times point two five is point seven five **(Presenter write on whiteboard)** 3 x .25 = .75 Last of all, three plus point seven five makes three point seven five. **(Presenter write on whiteboard)**3 + .75 = 3.75Because we are working in three dimensions our unit of measurement must reflect this. For the area the unit of measurement is squared, what do you think might happen to the unit of measurement for volume and capacity**? (pause 5 sec)**The unit of measurement is metres cubed because the volume or capacity fills a three-dimensional space. Have a look at this example **(PowerPoint slide 2).** Can you see why we measure in a cubic unit? **(pause 5 sec)**Yes, because the attribute we’re measuring is three dimensional. For our whānau hāngī, we now know that the capacity of the pit is 3.75 cubic metres.Now let's look at how many baskets the whānau will use for the kai. Remember these will be used to fill the space in the pit.The hāngī baskets dimensions are zero point nine metres long, 0.7 metres wide, and 0.25 metres high. 0.9m, x 0.7m x 0.25m **(presenter write on whiteboard)** The pit dimensions were two metres long, 1.5 metres wide, and 1.25 metres deep. 2m x 1.5m x 1.25 m **(presenter write on whiteboard)** |
| **Respond**: Providing opportunities to use and practice (3 min 30 sec) | Consolidating understanding: finding capacity using new learning Importance of justification  | So how can we work out how many baskets we can fit in the hāngī? I’ll give you a moment to think about that. **(pause 10 sec)**Let’s look at the bottom layer first. How many baskets can we fit across the 1.5 metres? If we put two in the bottom layer, we will need to add zero point seven metres and zero point seven metres. **(presenter write on whiteboard)** 0.7 + 0.7 = 1.4 metres This means we can fit two baskets across the width, with a bit of space on each side for the steam to cook the kai. Remember each basket is 0.9m long. Zero point nine plus zero point nine makes one point eight metres **(presenter write on whiteboard)** 0.9 + 0.9 = 1.8 metresBecause the pit is two metres long that works out well. We can fit two baskets long, and again, there’s room for that nice hot steam to circulate and cook the kai. The bottom layer will look a bit like this representation **(PowerPoint slide 3)** How many layers of baskets do you think the whānau could have in their hāngī? **(pause 30 sec focus on slide 3)**When I was working this out I thought about the rocks, embers and hot iron bars at the bottom of the pit taking up some space. I went for 3 layers**(PowerPoint slide 4)**How many baskets is that all together? **(pause 5 sec)** Did you say twelve? Shall we check. To figure out how many baskets we can use the formula for volume. The length times the width is two times two. See how that’s the bottom layer? Then when we times this by the height, which is three cubes. Four times three makes twelve cubes - or in our case baskets in the hāngī - all together. **(PowerPoint slide 5)** There are other ways to lay the baskets in the hāngī. I thought about four layers, but then I didn’t do this as I was worried that all the kai would not be cooked properly. I also thought about two layers but worried the kai would be too dry. It’s really important to remember that in mathematics there is not always one answer. We could have gone with two, three or four layers. As long as you can justify your reasoning it’s all good.  |
| **Share**: Learner and parent reflection on learning and engagement and what they can do next**(1 min 30 sec)** | Recap of learningStudents to consider area in their livesOpportunity to share learning with whanau and provocationintroduced for further discussion. | Do you remember our goals? Āe, they were to* Understand the attributes used to measure the volume and capacity of a space
* Calculate the volume and capacity of a cuboid

So what have we been learning about today? We have learnt about the difference between capacity and volume. Volume is the amount of space taken up by an object, while capacity is the measure of how much an object can hold. When calculating capacity and volume they both use the same formula of length times width times height. **(Camera focus on formula written on whiteboard with working out done in today's lesson)**We also learnt that putting down a hāngī requires a lot of maths!Talk to your family about traditional cooking methods you might have, like umu or lovo. Ask if they’ve ever thought about all the mathematics involved in cooking like this - they might be surprised. Another thing you can do is have a look around your house and see what you can find with measures of volume or capacity. I’ll give you a clue, normally you can see these measurements written on bottles containing liquid. Ka kite ano.  |