Magazine 4C – Building and Construction

This document provides a transcript for the audio in Magazine 4C – Building and Construction. It includes a text copy for interviews, presenter videos and activity audio.

Slide Image	Transcript
	JOBS BUILDING IN THE COMMUNITY Issue 3 BUILDING & CONSTRUCTION Area and Volume How Don calculates materials required + Learn about Crane Operation Meet Workers Ricky and Jason
	Welcome to Issue 3 of Building Community Introduction to Building & Construction Presenter, Introduction to Building the Community 0:33 minutes *Welcome to Pre-VET* *Hi, you're about to meet Jason, Ricky and Don.* *They all work in different ways in the construction industry.* *They need to know a lot about safety, as well as mathematics.* *Their work involves using accurate measurements with lots of different materials.* *Let's hear what they say about their job.*

Jason Kent – Crane Operator, Darwin Region
3:40 minutes

My name's Jason Kent and I'm from the Pilbara Region in Western Australia, a place called Port Hedland. I've been crane driving for six years. Um, love the job and it's a good job to have.
Cranes are used a lot on construction sites, ah, lifting materials such as sand in bins, concrete, cement, timber, ah, concrete pre-cast walls, um, and, yeah, roofing iron.

[footage of setting outriggers up]

That's the signal to come up. Now I'm slewing right

[checking his machine]

Some of the major things that we, as a crane driver, would be safety, checking your machine for any faults, cracks, any damaged sort of parts on the machine. Also maintenance, yeah, that would be a very day to day sorta job.
Another thing would be, um, just good communication with all your fellow workers.
Coming onto a job site, [footage: Chris, Yes, Jas Yeah, how are you? Pleased to meet you.]

You get yourself into a routine where you look at the job, look at all possible hazards, um, measure out the job which is in crane driving, it would be from where your crane would be to what you're going to lift and how far and how much it weighs.

And also lift studies is another important thing where you need to know your maths and a lot of writing in English in it to understand like what again how you're going to go about the job so everyone knows how it is going to go about so no-one gets confused on what's going to happen.

So with the computer in cranes, also, numeracy is very important in there and knowing what weights you have and, um, all your measurements and your radius, what you call radius on the distance of what you, what weight you're lifting.

The biggest part I enjoy about it is travelling to different places, getting to go out to different communities there's a bit of importance there where when someone wants something lifted to a certain spot you're looked upon as, 'the' person to do it.

The longer you stay at school, the easier it is out in the work field. The more you know the better it is yeah. It gets you easier jobs [laughs] instead of out in the hot sun.

Something that my Dad told me was, um, he didn't really care what I did as long as I enjoyed doing it and, um, put 100% into it and that was basically, yeah. That's my words of wisdom to any of the kids out there. Love doing what you do.

Ricky Gurrawiwi – House Painter Apprentice, North Miwatj Region
2:22 minutes

Yo My name is Ricky – I'm from Elcho Island. I work with Kerry Baker and ah team they work is IPT – Indigenous Painting Team. See.
This my 2 years for apprentice - complete 2 years in Darwin. I went there for course for safety, painting and paperworks training.

We do scraping, sanding, dusting, rolling, pressure cleaning all that stuff is in our yeh preparation yeh – what's that called – yo – preparation job so I can do the job right gah perfect.

For safety we use scaffold and planks that's it.

This one's like for my future and so my kids gonna grow up see me on apprenticeship ah instead of takin sitting-down money yo – take jobs and look after it for years. Yo. Keep workin. Yo keep strong.

You have to keep school – get good education and when you finish your education you should get good jobs - eh – students IPT – should come and visit us one day – gah - paint with us eh ?

I got these boot when I came back from school when I finished school when I came to this nah painting team for this whole project yo. This same boot I finished this whole house. Wah. It's like legend no. Yeh. These boots tell a story.
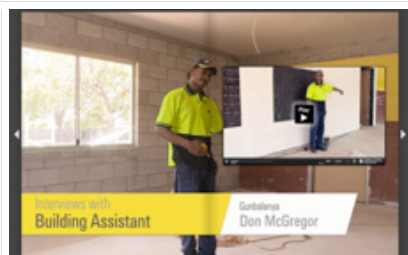
Don McGregor – Building Assisstant, West Arnhem Region
3:30 minutes

Hello my name's Don McGregor. I'm working here in Gunbalanya, Oenpelli as a Construction Trainee.
Some of the skills needed for the job, of course, is good communication skills, just with, ah, fellow workers, colleagues and, of course, upper management; as well as mathematics.

Of course, on the work site and particularly with construction it's really shown me how, ah, um, mathematics is involved and how to develop on a work site doing mathematics involved in terms of measurements calculating area and the volume of certain things such as concreting.

So every morning when we get onto the site, um, we usually have a pre-start that involves everyone on site itself, be it carpenters, electricians, plumbers, painters, and everyone is made aware or discuss any safety issues for that day on site.
In fact all constructions sites today, not just here but all across Australia, it's important that people, um, actually carry out, um, work site induction course to acquire a white card and that basically covers, ah, safety in general, um, within the construction industry.
 And on a daily basis, of course, PPE, personal protective equipment, must be worn.

I've gone through and done Certificate I and, of course, Certificate II in General Construction. Um, at lot of that training was actually provided on the actual work site itself and there were, um, times when we did some class work as well.

So its important now to have First Aid. Um, it's a requirement now on, of course, most job sites and driver's licence too, yeah.

It's been very challenging but, yeah, very rewarding. I've learned or gained a lot of skills, um, that otherwise I possibly couldn't have gained elsewhere.

So, of course, working with tourism and then changing over through into construction I've learned that skills I have learned within the tourism industry in terms of time management, which is also applied to, ah, tasks that I've carried out within the construction industries.
It's good to be able to, ah, keep that experience here in Gunbalanya.

So it's important, of course, to stay in school to, um, learn those basic skills of numeracy and literacy. Um, as I've found, of course, um, being on a construction site as such it's important to be able to carry out measurements on a daily basis, ah, with different tasks that change throughout the day, as well as being able to communicate effectively with fellow colleagues, um, it's very important on a work site as such.

So it's very important to stay in school. So it's important to even with things that you just stick at them, stick at it, keep going, keep going hard because you can overcome any challenges that may be in front of you

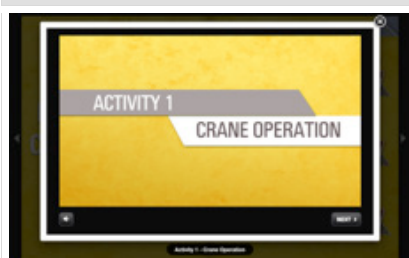|	
	ACTIVITIES Building and Construction Activity Introduction 00:25 minutes *Now you'll have a go at some of the skills used in the construction industry.* *You'll help Jason operate his crane by understanding load weigh, boom length and radius.* *You'll help Ricky and Don find the surface areas of the walls and floors they need to paint and tile.* *You'll also help Don find the volume of the verandah he's built.*
	Building and Construction Crane Operation – In this story, you'll see Jason, using his knowledge of weights and radius to safely lift objects. Painting and Tiling – Now you'll see Ricky and Don using skills to calculate area; helping them order the right amount of materials for their projects. Building an Entry Ramp – Calculate the volume of concrete needed to construct a ramp entry on a verandah.
	Review 00:26 minutes *You've tried reading load charts for the correct boom length and radius for the load weight.* *You've found the surface areas of walls and floors, so now you know how many materials to order.* *You also found the volume of the verandah so now you know how much concrete to buy for Don.* *Good job!*

	Northern Territory Government logo

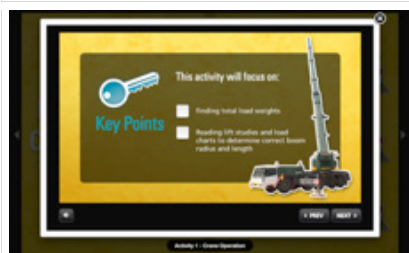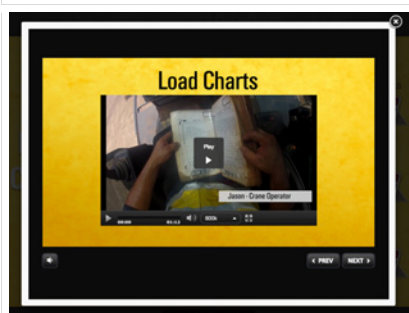| Slide Image	Activity A1 Crane Operation
ACTIVITY 1 CRANE OPERATION	ACTIVITY 1 Crane Operation *In this story, you'll see Jason operating his crane using his knowledge of weights, radius, load chart and lift studies.*
Key Points — This activity will focus on	Key Points This activity will focus on: • Finding total load weights • Reading lift studies and load charts to determine correct boom radius and length *After safely setting up his crane, Jason has to check that the weight of the load in his lift study will be safely lifted by the boom. He has to understand the load chart and radius of the boom in order to do his job safely.*
Load Charts	Load Charts Jason – Crane Operator 01:12 minutes *We've got a thing in the crane called a load chart which would tell you, how much counter weight or what sort of crane you would need to the distance that you need to go and for the weight of what the object is. So the bigger the crane, obviously the further the distance you can move it. The best way that I can explain with cranes is, or to a lot of people, is basically like lifting up a, a car battery. A lot of people can lift up a car battery in close but if you were to lift it up out further with your arm extended it could sort of want to make you want to fall over and, um, that would be the best way to explain how weights and the crane sort of works, ah, because, yeah, a few people say if you have a 50 tonne crane*

you should be able to lift 50 tonnes but it doesn't necessarily lift 50 tonnes out at 20 metres away from you.

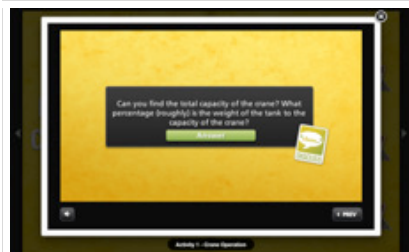|	
	Setting Up The Crane *Before Jason starts lifting, he makes sure that the crane is stable. He does this by making sure it is perfectly level with the leveling device the crane is fitted with, as well as setting up the out riggers to stabilize the crane as it lifts heavy loads.*
	Job Tip This knowledge saves Jason a lot of time, as well as danger. If the crane isn't set up properly, it could not only cost someone their life, but could cost a lot of money in broken equipment, damaged materials, and time spent readjusting the crane. The crane also has to be in the right position to pick up, transport and deposit it's load, much like an excavator.
	More Info NT Worksafe: Can you find the license Jason is required to have in order to operate a tower crane? www.worksafe.nt.gov.au/
	Safety Tip Jason has extensive safety training for this work, and spends a large amount of time doing safety checks on the crane before operating it.
	Lift Study *This is an example of a lift study. It is a document that Crane operating companies need to complete every time they do a job. The maximum radius this crane, on this job is 10 metres, because the weight of the tank they are lifting is 19.5 tonnes, the length of the boom is 25 metres and the capacity of the crane is only 80 tonnes.*
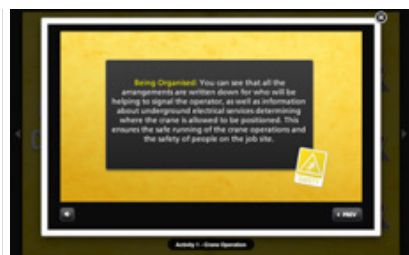
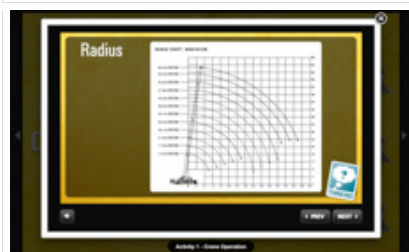|	
	Safety Tip **Being Organised**: You can see that all the arrangements are written down for whoever will be helping to signal the operator, as well as information about underground electrical services determining where the crane is allowed to be positioned. This ensures the safe running of the crane operations and the safety of people on the job site.
	Class Discuss Can you find the total of the crane? What percentage (roughly) is the weight of the tank to the capacity of the crane?
	Correct Answer 19.5T/80 x 100 to turn into a percentage = almost 25 percent.
	Thinking Radius *The radius is the distance between the crane and where it deposits its load. This diagram shows the range of the boom on Jason's crane.*
	Thinking If you hold a weight above your head and slowly lower your arm until it is stretched out in front of you, what happens to the strength of your arm? A crane operates in the same way. A long radius means the load is further away from the crane. It can hold less weight than a smaller radius, even if the boom is the same length.
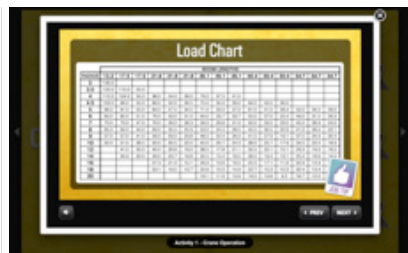
Thinking

This load chart shows the radius, boom length and the weights of the load it can carry when these two things are changed. You can see that the weight the crane is allowed to carry gets less the longer the radius, just like Jason said. Now let's have a look at Jason operating his crane and using the load chart.
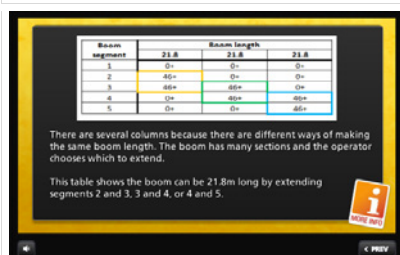

Job Tip

The position of the crane is important for Jason to do his job safely and effectively.
Moving weight close to you does not challenge your strength. Moving weights further away needs more strength.
Positioning the crane in the middle means it is close to everywhere it needs to reach. It can carry the heaviest possible loads.

There are several columns because there are different ways of making the same boom length. The boom has many sections and the operator chooses which to extend.

This table shows the boom can bbe 2 1.8m long by extending segments 2 and 3, 3 and 4, or 4 and 5.

Checking Weight and Radius
Jason – Checking Weight and Radius
03:11 minutes

Unknown male: Jason has to make the boom shorter.
When he makes it shorter, we'll pick this piece of steel up, that we know weighs 4,400 kilos or 4.4 tons. Jason's looking at a computer in the cab and the computer will tell him how far that he can put that 4.4 ton away from the crane.

Jason: This is your maximum tons that you can lift at that radius. That is your radius at 8 metres. That's what weight we have on at the moment which is the weight of the hook and the length of the boom. About to change that.

[Checks manual]

I'm leaving at I'm changing into crane mode which tells me, , basically what weight I can pick up, at what distance. At the moment, um, the crane is set up so I can pick up at around about 10 metres and, which allows me to lift about 19.5 tons, but I already have 900 kilos of the hook weight so I have to take, that into consideration.

Different lengths can lift different amounts or weights. The more you've got your boom out the less you can lift. The shorter the boom the more it can lift. These are the different sections, your first, second, third and fourth and fifth. At the moment I'm putting out the second section at 46%, the third at 92, the fourth at 92 and the fifth at 92. The first one I'm leaving at 0%

[Hook footage w/ stele block]

Unknown male: How much weight have you got on, Jas?
Jason: 5.3, including the hook.
Unknown male: What did it read empty?
Jason: 1 ton.
Unknown male: The hook's 4 point.
Jason: But with it reading empty, it's about 900 kilos.
Unknown male: Okay, so its 4.4, the reading's 5.3 So spot on, eh?
Jason: Yup.
Unknown male: So now we know the computer is telling how much that weight is correctly, right so what we do is deduct the weight of the hook from what the computer is saying and that'll give you the weight of what the steel block is.
Jason: 5.3 and I've gone, then I'll have 5.5 on there.
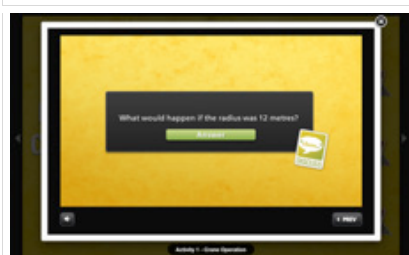*Unknown male: What's your operating radius?*
Jason: Ah, 20.9.
Unknown male: Yeah.

Weight and Radius

You can see that in Jason's load chart, the radius of 10 metres lists 19.6 tonnes as the weight allowed, with a boom length of 43.3 metres. The radius can change while keeping the boom length the same, but the weight the crane can carry has to change as well.
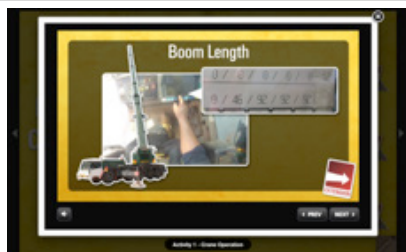
Class Discuss

What would happen if the radius was 12 metres?

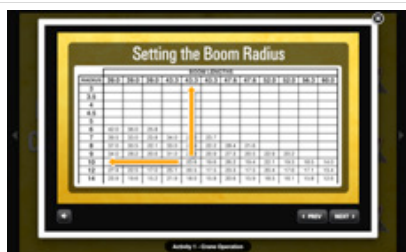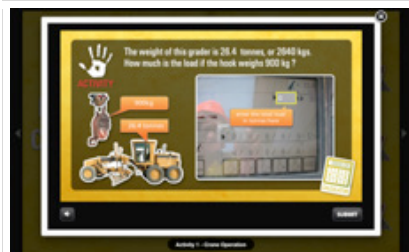|	
	Answer The crane could tip over because the weight at that radius is 17.5 tonnes.
	Boom Length *The computer in Jason's crane helps him to see how many sections of the boom are at their length capacity. These percentages make up the 43.3 metres in the load chart.*
	More info Fly Jib: Sometimes cranes need to put a load further away than the boom can reach. In this situation, a projecting arm is attached to the end of the boom. This is called a fly jib, and allows a crane to reach up and over something tall, like another building.
	Setting the Boom Radius *If Jason has a load, that is 28tonnes, he would look up the load and set his boom radius and length accordingly, remembering to add the weight of the hook which is 900 kgs.* *In this case, the radius would be 10 metres, and the boom length 43.3 metres.*
	Activity The weight of this steel block is 18.8 tonnes, or 18600kg. how much is the load if the hook is 900kg, or 0.9 tonnes? Answer in tonnes.

	Activity Click on the boom length and radius that is required for 19.5 tonnes.
	Activity The weight of this grader is 26.4 tonnes, or 26400 kgs. How much is the load if the hook weighs 900 kg? Answer in tonnes.
	Activity Find the boom length and radius that is required for 27.3 tonnes.
	Activity *The weight of this excavator is 30.1 tonnes, or 30100 kgs. How much is the load if the hook makes up 900 kg of this weight?*
	Activity Find the boom length and radius that is required for 31 tonnes.

Key Points
This activity has focused on:
Finding total load weights
Reading lift studies and load charts to determine correct boom radius and length

How would you, like to be a crane operator?
Would you be able to follow a lift study and load charts?
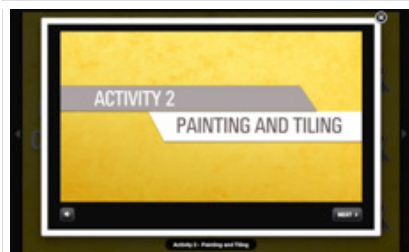*Are you good at mental calculations?*
Now you'll see other jobs in the construction industry that require a lot of mathematics.
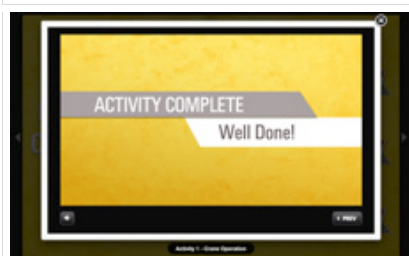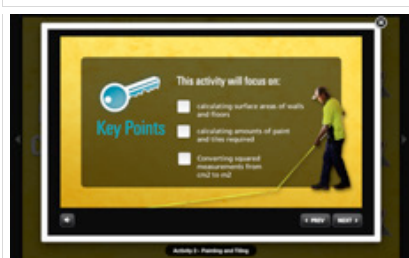
Activity Complete. Well Done!

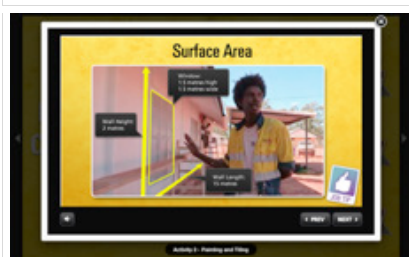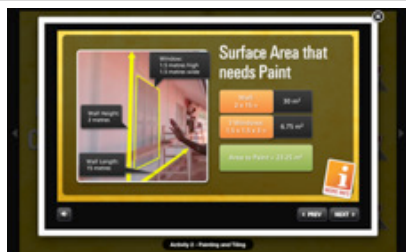| Slide Image	Activity A2 Painting and Tiling
	ACTIVITY 2 Painting and Tiling *In this story, you'll see how Ricky and the painting team need to know how much paint they will need as well as how many tiles Don needs for his job.*
	Key Points This activity focuses on: • Calculating surface areas of walls and floors • Calculating amounts of paint and tiles required • Converting squared measurements from cm^2 to m^2 *In order to work these things out they have to know how to find the surface area of the space they are working on, as well as how much area the materials they work with cover. Later on, we'll see Don taking measurements for his tiling job, but first, let's have a look at what Ricky does.*
	Ricky – House Painter Apprentice 00:46 minutes *Nicky's doin - with the pots work and for all of us so we can start work When we prep things sand it and dust it, clean it so that paint will stick – roughly yo. And we use this white, white first – like primer – yo. First coat. After we finish first coat – then we put colour then it's like 3 coats every house – 3 coats – primer – first coat then last coat - finish coat.*
	Surface Area *To figure out how much wall space needs paint and order the paint he needs, Ricky needs to find the area of the windows. He can do this by multiplying the windows' length by the height.*

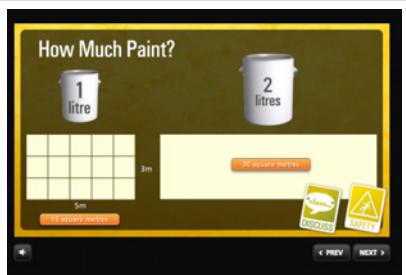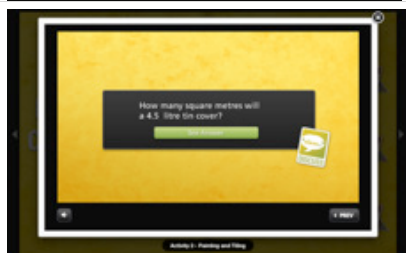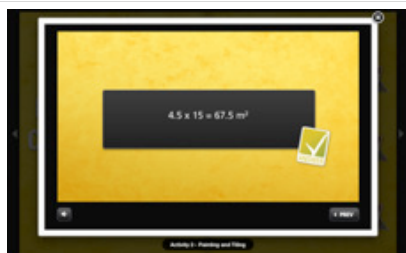|	
	Job Tip Details: Ricky would include the window frames in the wall measurements, because they would need to paint those with the base coats. Depending on the size of the job, details like these could add up to a lot of paint needed if they were missed.
	Surface Area that needs Paint *The area of all three windows is 6.75 square metres. Ricky needs to subtract this from the area of the wall, which is 30 square metres.*
	More Info m^2 Square Metres: Area is always written in 'square units' to indicate that it is not a distance, but a 'square' of space (in this case, a wall) that is being measured. It is said 'square metres', NOT 'metres square'.
	How Much Paint? *Paint normally covers 15 square meters per litre. They need to divide the area of the wall by 15 to get the number of litres of paint they need.* *If the area of the wall they are painting is 30 square metres, they will need 2 litres of paint for this wall.*
	Class Discuss How many square metres will a 4.5 litre tin cover?
	Correct Answer $4.5 \times 15 = 67.5m^2$

Safety Tip

When painting, Personal Protective Equipment (PPE) must be worn. Some paints contain harmful chemicals that can hurt you. Air masks, eyewear and gloves are good PPE for these kinds of paints. Other paints are completely non-toxic and harmless.
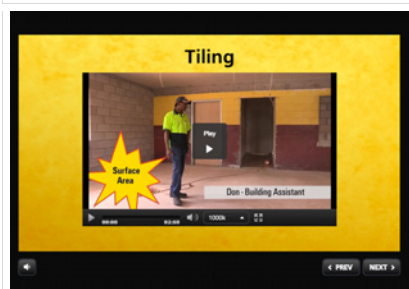
Tiling
Don – Building Assistant, Tiling
0:2:50 minutes

So in this area here, um, actually we need to tile this entire area.
So we have two types of tiles that we use, just the floor tiles and then, of course, skirting tiles that go all the way around the edges. Um, quite simply, with a tape measure we measure out the length and width of the actual area that we need to cover with tiles.
So quite easily with our length there, I've already put the tape measure out. It measures out overall distance of 7.6 metres. Um, obviously with our skirting tiles we have to measure from the end of the wall to this section and to measure it in sections so we can eventually work out, and excluding the door way, um, how many skirting tiles we may need.
So 7.6 is one measurement that we needed, bit noisy, and we'll just get the other one, dit-dit-der, 6.8. So the other measurement we needed here is, of course, works out to 6.8 metres.
So with those two measurements, you can, of course, calculate the total area that you need. Um, then, of course, to be able to work out the amount of tiles that we need to cover that area, ah, we need to actually measure the tiles themselves.
So if we're using tiles for example in the existing office area they are approximately work out to a measurement of about 300 x 300 or 30 x 30 cm, um, and then from that we can work out with our total area here how many tiles that we may need to fill this area. Sometimes you may order just a little more tiles just in case, because they're quiet fragile to handle.
So as a general rule on a construction site with a lot of materials, um, you might allow for 10% extra materials,
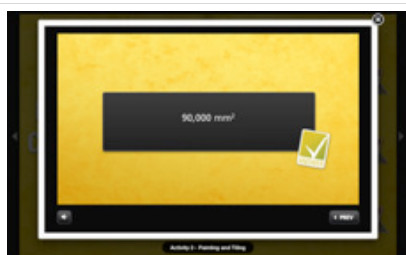
Area of Floor and Tiles

Don finds the surface area of the floor by measuring its length and width. This area is 51.68m^2. The area of one tile is 30 cm by 30 cm. This is equal to 0.09m^2.

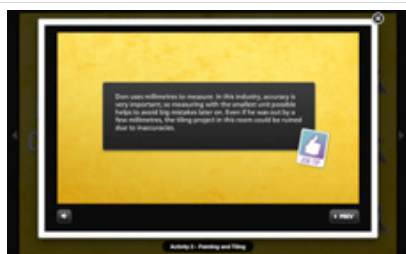|	
	Class Discuss How many square millimetres is the tile?
	Correct Answer 90,000 mm^2
	More Info If you work out the tile measurement in cm^2, you need to divide by 10 000 to get the area in square metres. There are 100cms in a metre, so a square metre is 100cm x 100cm = 10 000 cm^2
	Job Tip Don uses millimetres to measure. In this industry, accuracy is very important, so measuring with the smallest unit possible helps to avoid big mistakes later on. Even if he was out by a few millimetres, the tiling project in this room could be ruined due to inaccuracies.
	How many tiles? *In order to work out how many tiles will cover the floor, Don has to divide the surface area of the floor by the surface area of one tile.*

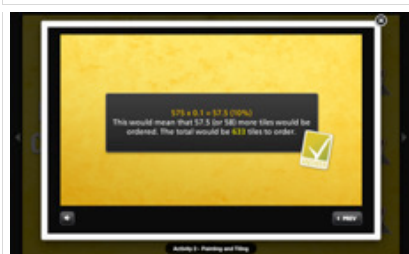|	
	More Info Rounding Up: Tiles are always bought as whole tiles. Because the answer is more than a whole number, Don needs to round UP. He will cut one tile to cover that section or he would end up with a gap.
	Job Tip Units of Measurement: Don is careful to use the same units of measurement, whether they are mm, cm, or m. Doing his calculations like this with cm and m would end up in a big error.
	Thinking + Discuss *Don Says they always order 10% more in case any break during the tiling process or crack in the future.* *How many would 10% of 575 be?*
	Correct Answer $575 \times 0.1 = 57.5$ (10%) This would mean that 57.5 (or 58) more tiles would be ordered. The total would be 633 tiles to order.
	Activity Find the surface area of the wall. Type in the answer.
	Activity Find the total surface area of these windows. Type in the answer.

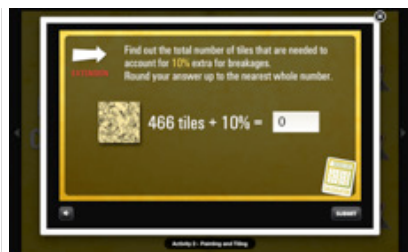|	
	Activity Find the surface are of the Wall that needs paint. Round your answer up to the next whole number.
	Activity *Find the amount in litres of paint required to paint this wall with* **one base coat**. *Round your answer up to the whole number.*
	More Info Remember that 1 litre of paint covers 15 square metres of wall.
	Extension Activity Ricky said they apply two coats of primer and one coat of colour paint. They use 3 litres for one coat. Type in the amount of primer and colour paint they need to buy.
	Activity Find the surface area of this floor.
	Activity Find the surface area of the tile in metres.

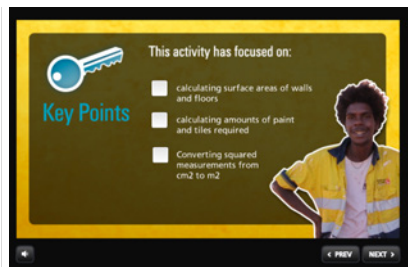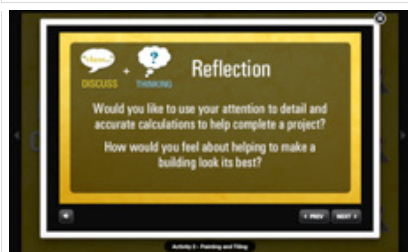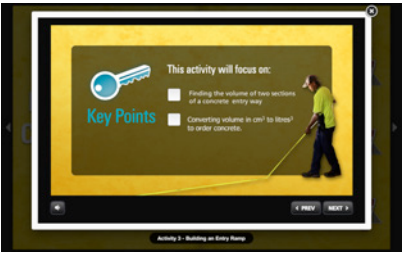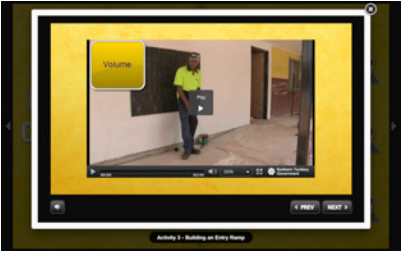|	More Info
	Square Metres: Are is always written in units that are 'squared' to indicate that it is not a distance, but a 'square' of space (in this case, a wall) that is being measured.
	Activity
	How many tiles will Don need to do the job? Round your answer up to the nearest whole.
	Extension Activity
	Find out the total number of tiles that are needed to account for 10% extra for breakages.
	Round your answer up to the nearest whole number.
	Key Points
	This activity has focused on:
	• Calculating surface areas of walls and floors
	• Calculating amounts of paint and tiles required
	• Converting squared measurements from cm^2 to m^2
	Well done!
	You've found the surface area of spaces Ricky and Don work on. You've determined the amount of materials required to cover these areas based on their measurements and converted units of measurements as well.
	Discuss + Thinking
	Reflection
	Are you good at converting units of measurement?
	Would you like to use attention to detail and accurate calculations to help complete a job?
	How would you like to make a building look its best?
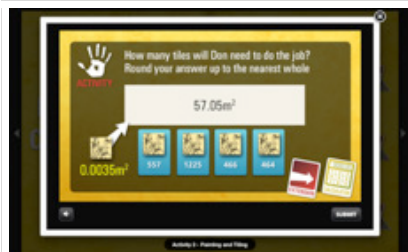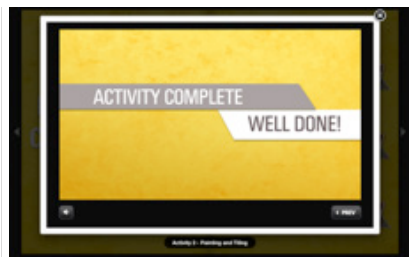
Activity Complete. Well Done!

Slide Image	Activity A3 Building An Entry Ramp
	ACTIVITY 3 - Building An Entry Ramp *In the last activity, Don found the area of a floor. He needs to use the same calculation as part of figuring out the volume of concrete to order for a concrete entry on a verandah.*
	Key Points This activity focuses on: • Finding the volume of two sections of a concrete entry way • Converting volume in cm^3 to m^3 to order concrete *Don had to think about the sections the entry was going to be built in. He had to know the measurements of each section to work out the volume of concrete he needs. Listen to him describe how he made the entry.*
	Don – Building Assistant, concreting 2:42 minutes *Okay so this here is the outdoor veranda area where were put a slab. We actually did this one in two sections Um, so we put in our form work around the sides and this section in the middle here we had more form work. Um, so basically it was all filled in with concrete itself. Ah, later when we actually did the ramp, um, along the actual wall there, we actually marked lines in to give us our height and that actual angle or as I should say the fall, the gradient or fall, of the actual ramp itself.*

Um, a little tricky, that one. But overall with the slab itself, the veranda here, um, it does have fall, um, away from the wall so in any case if there is rain or it there's water that gets into this area you want the water to be able to run off the slab again. If water sits on an area or slab or walkway for too long it can get slippery. So very important.

So with the ramp area, ah, it's an area we actually did separately to the rest of the slab itself. Um, so basically from the actual doorway itself we measured two distances along the wall, um, equal distances apart on either side and then, um, formed a line against the wall, there's a faint line there, ah, and that gave us an idea of the fall, um, from the actual top of the ramp. Basically the top of the ramp area is all actually one height with a slight fall to it. That's basically a square area that's been mapped out. Um, so we measured out a certain distance off the wall and as well as along the wall and then using a laser level we were able to get the right, um, height or fall so we formed that top part up, ah, to let it settle and then from there we were able to, ah, slowly form it down, work it down, down to what our existing, or initial slab area and smooth it all over.

See that faint line going along there. So you see where it goes from here, there's one there, so that's where we bring it out and that's where it drops off.
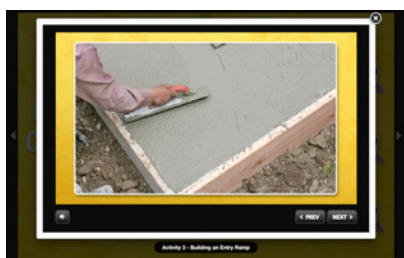
In order to pour the concrete for this job, Don had to make a frame from wood to hold the wet concrete in place as it settled. The measurements of the form work is how he calculated the volume of these sections.

Volume in three sections

To order the right amount of cement, he needed to find the volume of each section of the entry, including the ramps on either side of the slab. Let's look at the slab first.

	Safety Tip Building ramps into buildings is a big part of Don's work. It enables people who have difficulties with mobility to enter buildings safely.
	Thinking Can you see the three separate pieces of verandah that Don had to find the volume of?
	More Info Volume is the amount of space occupied by an object. You use the height, width and length to calculate the volume.
	Volume of a Prism *The slab is a prism. To find the volume of a prism, you need to multiply the area of the base by the height. The base is the part of the prism that shows a cross section of the entire prism. If you were to cut the slab in line with this 'base' anywhere along its height, you would get the same shape.*
	Thinking Think of a stack of paper. To find out the volume of paper you would multiply the area of one sheet by the number of sheets in the stack. The base is like the sheet of paper, and the height shows how many bases there are stacked together. To find out the volume of any prism you multiply the area of one side by the height. What are some objects in your classroom that are prisms?

	More Info A prism is a 3D shape: it has three dimensions, rather than two (such as a floor or a wall). The entry way slab in this picture has height, width and length.
	Volume of the Slab *The length and width of the base are multiplied to give the area of the base, just like a wall or a floor. This base's measurements are 75 cm long and 20 cm wide. The 'height' of the slab is the measurement that runs towards the wall.*
	Class Discuss Where else have you seen measurements in cm^3? The capacities of dump trucks and excavator buckets are measured in cubic units.
	Thinking You did the area calculation in Activity 2 to measure walls and floors. Can you see how the length x width is finding the area of a flat surface?
	More Info It may seem odd, but if the slab was up standing on what is called the 'base' here, then the 'height' is what would be the highest dimension. As long as all three dimensions of the prism are included in the calculation, then volume will be correct.

	Volume of the Ramps The ramps are prisms too. The base of these prisms are the triangles you can see at the ends facing you. If you cut into the prisms anywhere along the height of the entry you would get the same cross section of the triangular prism as you see on the base.
	Thinking If the slab was a stack of paper, the ramps are stacks of triangles. They have a series of triangular cross sections. Finding the area of the base and multiplying it by how many cross sections there are in the height will give us the amount of space the entire ramp takes up, or its volume.
	More Info The height of the slab is the same measurement as the height of the ramp.
	Volume of the Ramps *To find the volume of the ramps, Don has to find the area of the base, which is a triangle. To find the area of a triangle, you multiply ½ of the base of the triangle by it's height. This triangle has a base of 90 cm and is 20 cm high.*
	Volume of the Ramps *To find the volume of the ramp, you multiply the area of its base by its height. So the area of the triangle is multiplied by 185 cm, the height of the entry way. Multiplying this number by 2 will give you the total volume of both ramps.*

	More Info The height of the slab is the same measurement as the height of the ramp.
	Total Volume of the Entry *The amount of concrete Don has to order is calculated by adding the ramp volume to the slab volume.*
	Converting to Cubic Metres *Cement is usually sold in cubic metres. To convert the cubic centimetres to cubic metres, Don divides the number by 1 million.*
	More Info If you work out the amount of concrete in cm^3, you need to divide by 1 000 000 to get the volume in cubic metres. There are 100cms in a metre, so a cubic metre is 100cm x 100cm x 100cm = 1 000 000cm^3.
	Activity Calculate the Volume of the slab. Type in the answer.

	More Info Volume = length x width x height
	Activity Find the Area of the triangle base of the ramp. Type in the answer.
	More Info Area = ½ of the base x height of the triangle
	Activity Find the Volume of the ramps. Type in the answer.
	More Info $600cm^2$ x height of the ramp (measurement to the wall) = the volume of one ramp. Remember to multiply the volume x 2 to find the volume of BOTH ramps.
	Activity Find the Total Volume of the Entry. Type in the answer.

	Activity

Convert the measurement to cubic metres so Don can order the concrete. Type in the answer. |
| | $1\ 314\ 400\text{cm}^3$ divided by $1\ 000\ 000 = 1.3144\ \text{m}^3$ |
| | Key Points

This activity has focused on:
- Finding the volume of two sections of a concrete entry way
- Converting volume in cm^3 to m^3 to order concrete

You've found the volumes of different 3D objects, and converted their cubic measurements to different units to help Don order the right amount of concrete. |
| | Reflection

Could you be accurate with your calculations?
Are you good at checking your work to make sure you don't order the wrong amount?
Would you like Don's job? |
| | Activity Complete. Well Done! |