Digital Manufacturing

Slide 1- Introduce yourself and the session, saying that today we are going to be learning about Digital Manufacturing and the role it plays in the world today.

What is digital manufacturing?

Slide 2- Ask if anyone knows what digital manufacturing is? If they do, share their ideas and then ask them to work with a partner and talk about what it could mean, this should only take one minute. Come back together and share these ideas, focussing on the two words; digital and manufacturing.
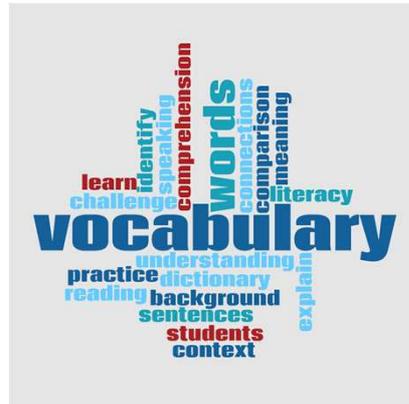
Aims of the session

- To give you an understanding what Digital Manufacturing is

- To understand the benefits of Digital Manufacturing

- To learn about some real life examples

- To be inspired to find out more!

Slide 3- Share the aims of the session. Explain to the group that they might not know about all of this now but will learn more in this session.

Key vocabulary

- Manufacturing
- Production line
- Digital manufacturing
- Digit twin
- Digital brain
- The Cloud

Slide 4- Here is some of the key vocabulary we will be coming across today, in this session. Read them out and tell them not to worry if they don't already know what they mean, they will be explained throughout the session.

Video – what is digital manufacturing

https://www.youtube.com/watch?v=ptDJw98Ds9M

Slide 5- Make sure all the class can clearly see the screen and have a paper and pencil to hand, in case they want to jot down any questions. Tell them you are going to show the video one through and then afterwards, we can look at it in more detail together. PLAY THE VIDEO.

Manufacturing

Slide 6- So now we have watched the video together, we are going to break it down and check our understanding, going into more detail, if it's needed.
It started with manufacturing, ask the group if they now understand what manufacturing is, share the definition and some examples.

Production lines

Slide 7- Ask the group if they can remember when production lines were first used and who by. Take the time to explain in more detail how a production line can speed things up. If time allows, use the children and some Lego to make cars on their own production line, highlighting the benefits of different people doing a different role. See slide 8 for Lego production line idea.
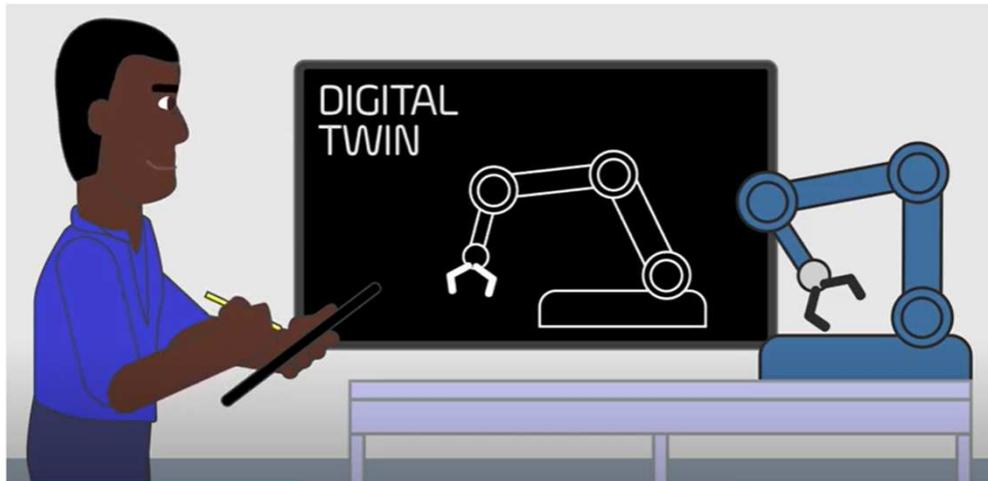
Lego production line

Slide 8- Use Lego bricks and children to form a human production line, one child making the chassis, one adding the wheels, and so on.

Digital manufacturing
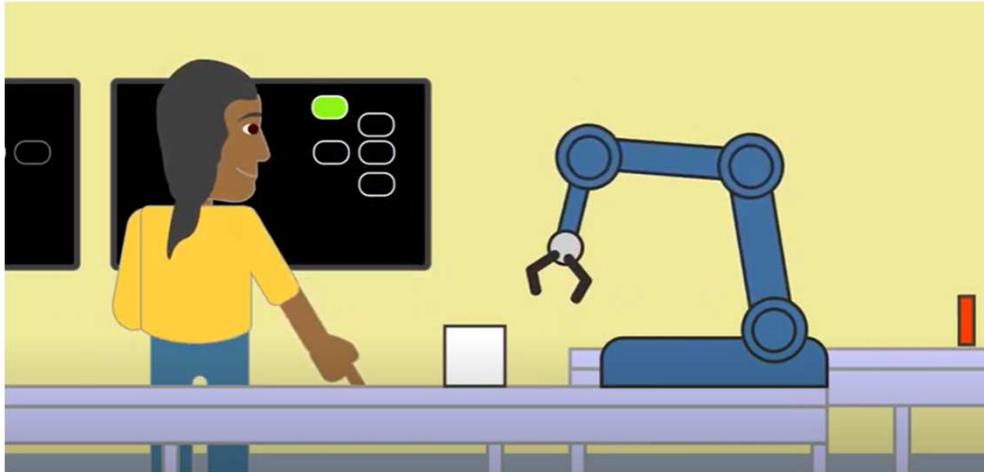
Slide 9- So now we know what manufacturing is, who can explain what digital manufacturing is? Stress the connection of humans and technology working alongside each other.

Digital twin

Slide 10- Using a digital twin means that we can test things out on them first. If you wanted to speed things up, then you can try it out on the digital twin before trying it on the machinery. Ask the group if they spotted the red parts on the digital twin when this happened in the video, what do you think that was representing?

Digit Brain
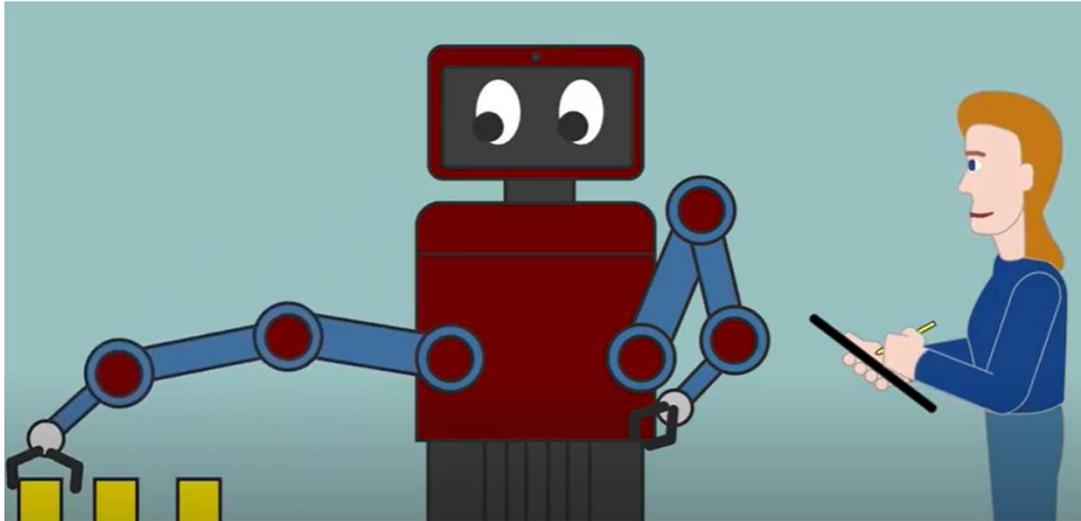
Slide 11-The Digit Brain takes this a bit further, as it tries to learn from it's mistakes and corrects them next time. It tries to remember what was happening when things went wrong so it won't make the same mistake again. Can anyone remember an example from the video?

# Human and robot interactions

Slide 12- Ask the group if they can remember how humans communicate with robots (by pressing buttons & telling them what to do) and talk about how important it is that robots know what humans are thinking and what they are doing. How do robots know this? Talk about the use of heart rate and breathing sensors.

The Cloud

Slide 13- Remind the group that The Cloud can be used to speed things up by 'borrowing' someone else's powerful computers. Check the general understanding on The Cloud and give examples, such as the school's server and icloud, where photos might be stored from your / grown ups phone. Some children might find this concept hard to grasp, as it is so abstract.

Will robots take over manufacturing entirely?
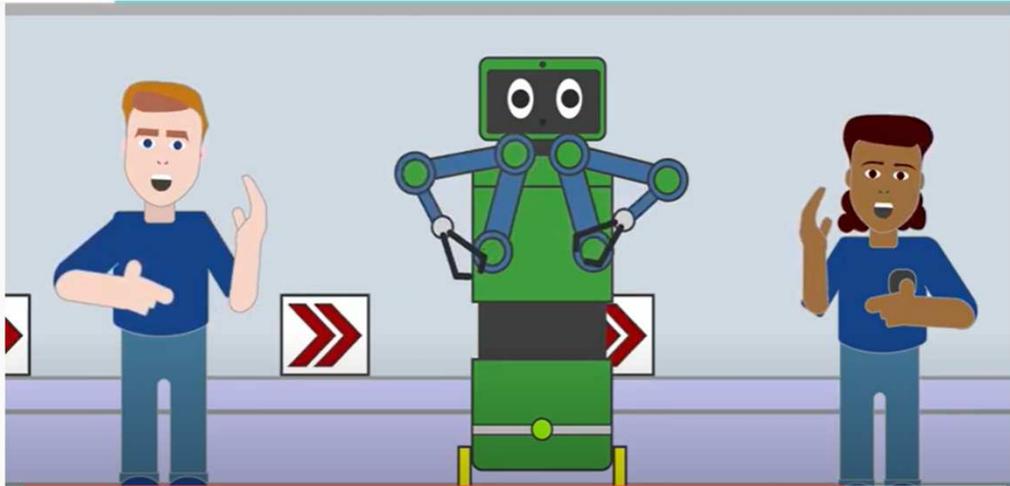
Slide 14- Explain the benefits of humans and robots working together, to make things faster, greener and more cheaply. Digital manufacturing is about people first and how robots and automated systems can help them get their work done. We will always need humans.

What do you think about digital manufacturing?

Slide 15- Ask the group what their thoughts on digital manufacturing are. Can they see the benefits or are they more focussed on robots taking over entirely? If appropriate, discuss the role robots can play in situations where humans aren't able to work or don't want to work. This can be an open discussion.

Quick quiz

1. Name 3 things that can be manufactured.

2. Give an example of digital manufacturing?

3. How can you communicate with a robot?

4. What is the advantage of having a digital twin?

5. What can you store in The Cloud?

Slide 16- a quick quiz as part of the plenary to check understanding in a different way. This could be done as a whole class or in talk partners.

Slide 17- Thank them for listening and their input. If there are still questions, suggest a time or way that these can be followed up on. Distribute the wordsearch for those that want to take one home.