Subject: Purple Mash unit 1.4 Lego Builders

Key Concept/ Theme: • To compare the effects of adhering strictly to instructions to completing tasks without complete instructions. • To follow and create simple instructions on the computer. • To consider how the order of instructions affects the result.

Prior Learning links: EYFS: Children have been exposed to the layout of purple mash and have had experience of using a variety of technology including interactive whiteboards, ipads and using a keyboard.

Cycle 2

Unit 1.5 Maze explorers

• Concept of computers following given instructions • Program logic and structure.

Unit 2.4   Questioning

• Logical decision processing. • Forward planning to achieve a solution

Vocabulary:

Key Vocabulary

Algorithm
A precise, step-by-step set of instructions used to solve a problem or achieve an objective.

Code
Instructions that a programmer enters into a computer that cause the computer to perform a certain way.

Computer
An electronic device for storing and processing data.

Debugging
To find and remove errors from computer hardware or software.

Instructions
Detailed information about how something should be done or operated.

Program
An algorithm that has been coded into something that can be run by a machine, e.g., a computer or a robot.

Key Images:

Paint Projects

Resources needed for each lesson – 2dos to set.

Lesson 1:

• Two small identical Lego models and some Lego instructions (ideally for the same model, but not essential). One model should have been assembled by following the instructions correctly and one should not, e.g. in a model car, one could be missing the doors and wheels, or have the windscreen on the roof. In a model tree, one could have the trunk on top.

• If you do not have Lego, then you could use generic-coloured cubes such as multilink; one set with a correctly followed repeating pattern and one with errors. • A selection of Lego (small or Duplo) OR a selection of generic building cubes. children will be using these to build with.

• Extension: Print copies of the shape cards so each child can have one.

Lesson 2

• Paint projects containing outlines for colouring. There are a few such examples; select those that your class will enjoy. Set one or two as 2Dos for the class. Do not use the bird one, as this is used in a different way in this lesson. Some examples shown: Elephant Dinosaur Butterfly Minibeast

• Bird activity set as a 2Do.

• Paint by Numbers Instructions.

• Coders and Robots.

• Paper and coloured pens or pencils.

Before the lesson you will need to create two display boards. From your Purple Mash home screen, click on 'Sharing' at the top and then the cog on the right-hand side. Follow the instructions to create two display boards, one named 'pictures' and one named 'birds'. Make sure you deselect 'hide pupil name' so the names will be visible.

You can select the following suggested computing objectives when setting the 2Do to make future assessment easier:

Lesson 3

The 'Wrong Sandwich' activity. This can be found on the main page for this unit: This will be completed as a class on the whiteboard.

• Category Instruction Writing. Children can find this in the English section of Purple Mash, or you could set some of the sequencing games as 2Dos for them.

• There are also writing activities within this topic that you could use if you wish the children to write the instructions for the recipes as a follow-up.

You can select the following suggested computing objectives when setting the 2Do to make future assessment easier:

Edit Objectives   ✕

Year:	Y1	⌄
Subject:	Computing	⌄
Strand:	Computer Science	⌄

Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.	✓
Create and debug simple programs.	☐
Use logical reasoning to predict the behaviour of simple programs.	☐

| 1.

Unit 1.4

Lesson 1 | **Deeper learning questions: Why algorithms do we use in our daily lives? Why do we need clear instructions?**

Reconnection: Go over online safety rules and why these are important.

LO: To emphasise the importance of following instructions

Activity: Outline the lesson aims.

Go over new vocab for the lesson

Talk to children about the instructions for a Lego model. Show the two models and discuss what could have happened to the one built incorrectly. Hopefully, the children will suggest that the instructions were not followed correctly.

Choose a volunteer to sit with their back to you beside one of the selections of Lego. You are going to give them some instructions for what to do with the Lego while you also follow your own instructions. Explain the person making the model can't ask any questions to clarify what they are doing.

Ensure that the rest of the class can see both of you, but that you cannot see each other's model. Give some simple instructions, e.g. 'Take a red rectangular (cuboid) block and place a green square block on top, in the middle of the red block. Place a yellow square block on the top.'

Compare models and discuss whether the instructions were clear enough or if anything went wrong. |

	Display **slide 6**. Repeat this activity this time getting the child to give instructions to you. Discuss with the children the need for the instructions to be clear and concise.
	Display **slide 7.** Now, children could pair off (or play in small groups, depending on the quantity of bricks that you have) and play the game together to get used to the need for precise instructions. Discuss whether the children are getting better at giving precise instructions as they continue to play the game.
	Bring the class back together. What have they learnt about giving instructions? Display the word algorithm and the definition. Explain that the children have been following algorithms today when they listened to the instructions.
	Explain that the children have been giving each other the algorithms to build models with the bricks.
	Can the children give examples of any algorithms that they use during their lives?
	One example is getting ready for school in the morning: usually, they will follow a correct order for doing things, but what would happen if they put their trousers on before their pants, for example?
	What about making breakfast? What if they poured out the cereal before getting a bowl?
	Go over main vocab.
	Extension: Handout worksheet 'Shape Card'. As children have been working in pairs, continue with a paired task. One child is given a shape card. Another child has a blank sheet. Sitting back-to-back, can clear instructions be given to ensure that the blank sheet is labelled correctly? For example, "There is a red triangle in the top left corner. It is pointing upwards", "There is a purple-coloured upside-down rainbow shape in the bottom left-hand corner," or, "There is a purple smiling shape in the bottom left-hand corner", etc. Are there any other instructions that they could give that would help? For example, "There are four shapes on the card, they are all the same size," or, "None of the shapes touch each other." Remind the children those receiving the instructions can't speak.
2. Unit 1.4	**Deeper learning questions: Why are all the photos different? Why can things go wrong when giving instructions to a computer?** **Reconnection:** Go over online safety rules and why these are important. Review and introduce new vocabulary. The vocabulary is repeated at the end of the lesson where it can be used to review lesson vocabulary.

Lesson 2	**LO:** To follow and create simple instructions on the computer
	Activity: Outline the lesson aims.
	Go over new vocab for the lesson
	Revise the meaning of the word 'algorithm' from last lesson. Can the children remember what is means? To consolidate learning show the definition again.
	Show the children how to open one of the 2Dos that you set for them of the outline picture (not the bird). They should all open the same one. They will need to log on and look for the bell at the top of their screen next to their picture.
	Open the handed-in 2Dos via your notifications icon or by clicking on 2Dos at the top of your home screen. Click 'See Work', tick the box at the top to select all the paint projects, then click on the three dots on top right-hand side. Click '2Displayboard' and select the 'pictures' display board you created earlier (See the resource section for more details). Then find this display board by clicking on 'Sharing' from your home screen.
	The class will be able to see all their pictures as little thumbnail images. You can click on them for a closer look. Emphasise how each picture is unique; hopefully, the children will have used different colours and methods to colour in their animals because you did not give them any specific instructions about how to do it.
	Explain that they are going to repeat this exercise, but this time you are going to give them an algorithm for colouring in the animal.
	Open the bird algorithm on the whiteboard. The algorithm is presented as a key/paint-by-numbers so that literacy levels do not affect the children's ability to complete the exercise. Emphasise how important it is to number the order of the steps because an algorithm is a set of instructions completed in an ordered way. Talk though the algorithm.
	Give children time to complete this on their own computers and then 'Save', 'Exit' and 'Hand in' their finished piece.
	Compare the pieces of work as before, selecting the work and adding it to the newly created 'birds' display board. This time the work should all look very similar (if pupils have followed the algorithm).
	Explain that when they follow instructions they are behaving like a computer; it cannot think for itself, so we (humans) need to provide very precise instructions so that it can do anything.
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Introduce and define the word 'Program'.

Explain to the children that they need to complete a task where they need to write their own program code for a robot to complete. In pairs, one child will be the coder writing instructions on how to colour the given images on the resource for their robot to follow. Children should then swap over. Prompt children to think about the accuracy of their programs and also how well the robot followed them.

Go over main vocab.

Extension: Set a 2Do for the "Hansel and Gretel House" Task (Home ->Art -> Fairytales).

Children to paint the house, and then create a simple program telling another child how to paint the house identically using a range of the special paint tools (food effects) available. For example,

(1) Paint the chimney using cookie dough.

(2) Paint the roof using jellybeans.

(3) Paint the door using chocolate.

(4) Paint the walls using sprinkles.

(5) Leave the windows unpainted.

3. Unit 1.4 Lesson 3	**Deeper learning questions: Why do we need recipes** **Reconnection:** Go over online safety rules and why these are important. Review and introduce new vocabulary. The vocabulary is repeated at the end of the lesson where it can be used to review lesson vocabulary. **LO:** To consider how the order of instructions affects the result **Activity:** Outline the lesson aims.

Go over new vocab for the lesson

Talk about what a recipe is. What is included in a recipe? Why do we need them? Look at the example recipe and highlight the key features. Point out the clear method so someone can follow the instructions.

Open the 'Wrong Sandwich' activity on the whiteboard. There is a gallery of photos accessed by clicking on image box and then add image. The algorithm is not very good, so a robot making the sandwich would probably make some mistakes. Can children suggest which 'wrong' photos could occur?

- Instruction 2 does not say to spread the butter on the bread; there is a photo of the butter spread on the plate.

- Instruction 3 does not say to cut slices of cheese; there is a photo of the whole block of cheese on the bread.

- Instruction 4 does not say to put the top piece of bread butter-side down; there is a photo with the butter-side up on top.

- Instruction 5 does not say how to cut up the sandwich; there is a photo of a haphazardly cut-up sandwich.

Look at what is means to debug something.

Explain to the children we are going to 'debug' the instructions to help the robot make the sandwich.

Load up the 'Wrong Sandwich' activity again and 'debug' the instructions so they are clear and allow the robot to follow them.

Direct the children to the recipe sequencing games' in the 'Instruction Writing' category.

Children should spend some time working through some of these, then come back together to discuss the correct order for the recipes. What could go wrong with each recipe if the algorithm is incorrect?

Can the children make up an algorithm for how to make cereal that a robot could follow? Can others debug any errors?

Go over main vocab.

Extension: Can you make a wrong set of instructions for something then swap and debug your partners!

End of unit quiz & reflect on gaps from the unit:

Unit 1.4 Quiz – found on unit page on PM

 Questions:

What is an instruction?

What is an algorithm?

An algorithm must be.....
Which of these are examples of an 'algorithm'?
Put this algorithm for getting up in the morning in the correct order.
What does 'program' mean?
If you are debugging an algorithm, what are you doing?

End Points:

What is an instruction? An instruction takes you through something step by step so that you can successfully complete a task. Why do we need to debug code? When you write code, it won't always work correctly first time. When you search for the errors and correct them, this is known as debugging.

Evaluation: What have the end of unit quizzes, pupil self-reflections and termly work told you about what the children can remember and recall? What are the gaps? Ensure that the areas that need further reinforcement are documented in the next subject unit MTP. **Plan in time to revisit gaps within units, determined by the quizzes.**

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