



Computing Scheme of Work Unit 1.4 – Lego Builders



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Year 1 – Medium Term Plan

Key learning point: This unit encourages children to begin to think logically about scenarios. Children will be introduced to the term ‘algorithm’. This concept is at the core of coding. The next unit (Maze Explorers), builds upon this, linking logical thought processes to the way that computers are programmed.

Lesson	Title	Success Criteria
<u>1</u>	Following Instructions	<ul style="list-style-type: none"> Children know that to achieve the effect they want when building something, they need to follow accurate instructions. Children know that by following the instructions correctly, they will get the correct result. Children know that an algorithm is a precise, step-by-step set of instructions used to solve a problem or achieve an objective.
<u>2</u>	Following and Creating Simple Instructions on the Computer	<ul style="list-style-type: none"> Children can follow instructions in a computer program. Children can explain the effect of carrying out a task with no instructions. Children know that computers need precise instructions to follow. Children know that an algorithm written for a computer to follow is called a program.
<u>3</u>	Following a Recipe	<ul style="list-style-type: none"> Children understand how the order in which the steps of a recipe are presented affects the outcome. Children can organise instructions for a simple recipe. Children know that correcting errors in an algorithm or program is called ‘debugging’.

Please note:

Children who are not familiar with how to log in to Purple Mash and open and save activities will probably need support with this, initially.

These lesson plans make use of the facility within Purple Mash to set activities for pupils that they can then complete and hand in online (2Dos). This enables you to assess their work easily as well as distribute resources to all pupils. If children have not opened 2Dos before, then they will need more detailed instructions about how to do this. If your children do not have individual logins for Purple Mash, we can help you with this. Contact your school Purple Mash administrator or email us at support@2simple.com.

A guide to 2Dos can be found in the Teacher section: [2Dos Guide](#).

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Children who are using computers or laptops for the first time rather than tablets will need extra support with the use of mice, touchpads and keyboards.

To force links within this document to open in a new tab, right-click on the link and then select 'Open link in new tab'.



Lesson 1 – Following Instructions

Aim

- To emphasise the importance of following instructions.

Success criteria

- Children know that to achieve the effect they want when building something, they need to follow accurate instructions.
- Children know that by following the instructions correctly, they will get the correct result.
- Children know that an algorithm is a precise, step-by-step set of instructions used to solve a problem or achieve an objective.

Resources

Unless otherwise stated, all resources can be found on the unit main page. From here, they can be set as 2Dos by clicking on the icon. Use the links below to preview the resources; right-click on the link and 'open in new tab' so you do not lose this page.

- 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.

Activities

Introduction	<p>Display slide 2 and outline the lesson aims.</p> <p>Display slide 3 and outline the success criteria.</p>
Activity 1: What's Gone Wrong with the Model?	<p>Display slide 4. 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.</p>

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Activity 2: Following Instructions	<p>Display slide 5. 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.</p> <p>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.'</p> <p>Compare models and discuss whether the instructions were clear enough or if anything went wrong.</p>
Activity 3: Giving Instructions	<p>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.</p>
Activity 4: Giving Instructions to Your Friend	<p>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.</p>
What is an Algorithm?	<p>Display slide 8. 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.</p> <p>Explain that the children have been giving each other the algorithms to build models with the bricks.</p>
Algorithms in Our Daily Life.	<p>Display slide 9. Can the children give examples of any algorithms that they use during their lives?</p> <p>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?</p> <p>What about making breakfast? What if they poured out the cereal before getting a bowl?</p>
Activity 5: Extension – Drawing shapes	<p>Display slide 10. 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</p>



	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.
Review Success Criteria	Display slide 11 . Review the success criteria from slide 3 . Children could rate how well they achieved this using a show of hands.



Lesson 2 – Following and Creating Simple Instructions on the Computer

Aim

- To follow and create simple instructions on the computer.

Success criteria

- Children can follow instructions in a computer program.
- Children can explain the effect of carrying out a task with no instructions.
- Children know that computers need precise instructions to follow.
- Children know that an algorithm written for a computer to follow is called a program.

Resources

Unless otherwise stated, all resources can be found on the unit main page. From here, they can be set as 2Dos by clicking on the icon. Use the links below to preview the resources; right-click on the link and 'open in new tab' so you do not lose this page.

- 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.** To set any paint projects as 2Dos go to **Tools>Paint Projects>Animals** and click on the icon to set as a 2Do.

Some examples:

[Elephant](#)

[Dinosaur](#)

[Butterfly](#)

[Minibeast](#)

All other activities/icons can be found on the [main page for this unit](#):

- [Bird activity](#) set as a 2Do.
- [Paint by Numbers Instructions](#).
- Paper and coloured pens or pencils.


Activities

Introduction	<p>Display slide 2 and outline the lesson aims.</p> <p>Display slide 3 and outline the success criteria.</p>
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What is an Algorithm?	<p>Show slide 4. Revise the meaning of the word ‘algorithm’ from last lesson. Can the children remember what it means? To consolidate learning show the definition again.</p>
Activity 1: Opening a 2Do and Colouring a Picture.	<p>Show slide 5. 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.</p>  <p>Explain that they should colour in the picture using the paint colours. If they have not used the tools before, you might need to show them how to select a colour and how to alter the pen width.</p> <p>Once they have had adequate time to finish this, show them how to save their work and exit.</p>
Looking at Examples	<p>Show slide 6. Open the handed-in 2Dos (via your own Notifications icon) on the whiteboard. You might need to alter the view to see the thumbnails.</p> <p>The class will be able to see all their pictures as little thumbnail images. You can double-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.</p>
Activity 2: Following Instructions	<p>Show slide 7. 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.</p> <p>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 through the algorithm.</p> <p>Give children time to complete this on their own computers and then ‘Save’, ‘Exit’ and ‘Hand in’ their finished piece.</p>
Comparing work	<p>Show slide 8. Compare the pieces of work as before. This time the work should all look very similar (if children have followed the algorithm).</p>



	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.
What is Meant by Program?	Open slide 9 . Introduce and define the word 'Program'.
Activity 3: Extension – Following Instructions.	<p>Show slide 10. Set a 2Do for the "Hansel and Gretel House" Task (Home -> Art -> Fairytales).</p> <p>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,</p> <ul style="list-style-type: none"> (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.
Review Success Criteria	Show slide 11 . Review the success criteria from slide 3 . Children could rate how well they achieved this using a show of hands.



Lesson 3 – Following a Recipe

Aim

- To consider how the order of instructions affects the result.

Success criteria

- Children understand how the order in which the steps of a recipe are presented affects the outcome.
- Children can organise instructions for a simple recipe.
- Children know that correcting errors in an algorithm or program is called 'debugging'.

Resources

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.

Activities

Introduction	<p>Display slide 2 and outline the lesson aims.</p> <p>Display slide 3 and outline the success criteria.</p>
What is a Recipe?	<p>Display slide 4. 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.</p>
Activity 1: The Wrong Sandwich.	<p>Display slide 5. Open the 'Wrong Sandwich' activity on the whiteboard. There is a gallery of photos accessed by clicking on the green crosses. 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?</p> <ul style="list-style-type: none"> 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.

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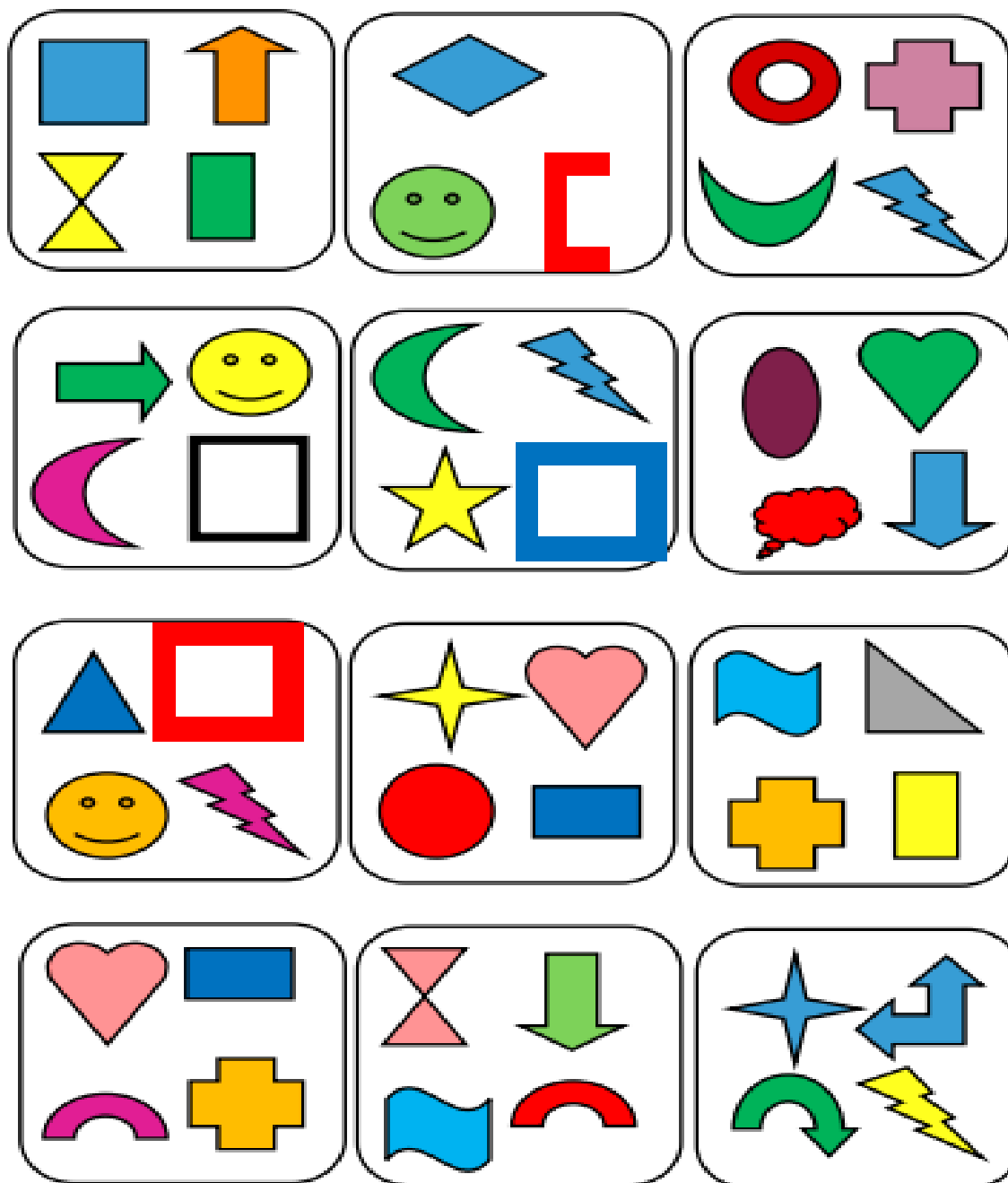


	<ul style="list-style-type: none"> • Instruction 4 does not say to put the top piece of bread butter-side down; there is a photo with the butter-side up on top. • Instruction 5 does not say how to cut up the sandwich; there is a photo of a haphazardly cut-up sandwich.
What Does Debug Mean?	<p>Display Slide 6. Look at what it means to debug something.</p> <p>Explain to the children we are going to 'debug' the instructions to help the robot make the sandwich.</p> <p>Load up the 'Wrong Sandwich' activity again and 'debug' the instructions so they are clear and allow the robot to follow them.</p>
Activity 2: Putting Instructions in Order.	<p>Display Slide 7. Direct the children to the recipe sequencing games' in the 'Instruction Writing' category.</p> <p>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?</p>
Activity 3: Instructions to Make Breakfast	<p>Display Slide 8. Can the children make up an algorithm for how to make cereal that a robot could follow? Can others debug any errors?</p>
Review Success Criteria	<p>Display Slide 9. Review the success criteria from slide 3. Children could rate how well they achieved this using a show of hands.</p>



Resources

Shape Card



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Assessment Guidance

The unit overview for year 1 contains details of national curricula mapped to the Purple Mash Units. The following information is an exemplar of what a child at an expected level would be able to demonstrate when completing this unit with additional exemplars to demonstrate how this would vary for a child with emerging or exceeding achievements.

Assessment Guidance	
Emerging	<p>Children understand that to achieve the effect they want when building something, they need to follow instructions.</p> <p>They can give another child instruction to build a simple model, but their instructions might not anticipate all possibilities.</p> <p>Children know that computers need instructions to operate.</p> <p>Children can attempt to write instructions for a simple recipe but might not include all required steps.</p>
Expected	<p>Children can assimilate a set of simple Lego model instructions and look at the outcomes produced from these instructions. They can state where an error has occurred on one of the models from the instructions given (Unit 1.4. Lesson 1).</p> <p>Children understand the effect that accuracy of the instructions has on the outcome.</p> <p>Children can give each other precise simple instructions and follow them to create the desired outcomes for their Lego model (Unit 1.4. Lesson1).</p> <p>They can give another child instruction to build a simple model, anticipating the information that the other child will need to make an accurate replica.</p> <p>Children can compare their digital paintings within 2Paint and show an understanding as to why they are different. They can consider that instructions are needed to give the pictures uniformity and as such are able to follow a set of instructions (Algorithm) to achieve this (Unit 1.4. Lesson 2).</p> <p>Children know that an algorithm is a set of instructions used to solve a problem or achieve an objective.</p> <p>Children know that an algorithm written for a computer to follow is called a program.</p> <p>Children can debug a very simple set of printed instructions for a recipe, the approach they use should entail breaking the instructions into smaller parts to support interpretation.</p> <p>Most children can create a set of written instructions for other pupils to follow e.g., the 'coders and robot' game (Unit 1.4. Lesson 2). Children can confidently debug simple errors in other children's written instructions for recipes (Unit 1.4).</p> <p>Children understand that very precise instructions need to be given to a computer for it to accurately carry out intended outcomes. These precise instructions can be broken down into smaller parts. Children can demonstrate this by playing a 'coders and robots' game (Unit 1.4. Lesson 2).</p>

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Assessment Guidance

Exceeding	<p>Children understand the effect that precise accuracy of the instructions has on the outcome.</p> <p>Children can give instructions that demonstrate they are anticipating the outcome.</p> <p>They can give another child detailed instruction to build a simple model, anticipating the information that the other child will need to make an accurate replica at a more detailed level.</p> <p>Children know that an algorithm is a set of instructions used to solve a problem or achieve an objective. Children know that an algorithm written for a computer to follow is called a program. They can work out what is wrong in an algorithm when the steps are out of order and can debug the algorithm. They can write their own algorithm for a recipe.</p>
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