

**purple
mash**

Computing Scheme of Work

Unit 3.7 - Simulations



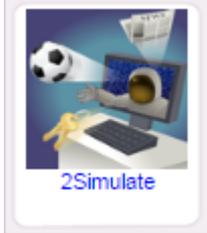
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Introduction

The tool used for simulations during these lessons is 2Simulate. This can be found [within the English tools in Purple Mash](#).



The lesson plans will guide you using this tool in a computing context.

The two simulations used in these lessons are 'Locked Out' and 'The Dark Side of Elpmis'.

With each simulation there is a Teacher Guide in which you can find additional ideas if you wish to take the ideas in the simulations further and use as part of other curriculum areas such as English.

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'.

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Medium Term Plan

Lesson	Aims	Success Criteria
1	To consider what simulations are.	<ul style="list-style-type: none"> • Pupils know that a computer simulation can represent real and imaginary situations. • Pupils can give some examples of simulations used for fun and for work. • Pupils can give suggestions of advantages and problems of simulations.
2	To explore a simulation.	<ul style="list-style-type: none"> • Pupils can explore a simulation. • Pupils can use a simulation to try out different options and to test predictions. • Pupils can begin to evaluate simulations by comparing them with real situations and considering their usefulness. • Pupils can analyse choices made using a branching database.
3	To analyse and evaluate a simulation.	<ul style="list-style-type: none"> • Pupils can recognise patterns within simulations and make and test predictions. • Pupils can identify the relationships and rules on which the simulations are based and test their predictions. • Pupils can evaluate a simulation to determine its usefulness for purpose. • Pupils can create their own [simple] simulation.



Lesson 1 – What are Simulations?

Aim

- To find out what a simulation is and understand the purpose of simulations.

Success criteria

- Pupils know that a computer simulation can represent real and imaginary situations.
- Pupils can give some examples of simulations used for fun and for work.
- Pupils can give suggestions of advantages and problems of simulations.

Resources

Unless otherwise stated, all resources can be found on the [main unit 3.7 page](#). From here, click on the icon to set a resource as a 2do for your class. Use the links below to preview the resources; right-click on the link and 'open in new tab' so you don't lose this page.

- [Simulations Photo Prompts](#)
- [About Simulations: Writing template](#) to be set as a 2Do.
- Extension: [Why Simulate? Table writing frame](#). Set this as a 2do if you wish to use it.

Activities

1. Explain that a computer simulation is a program that models a real-life situation. They let you try things out that would be too difficult or dangerous to do in real life.
2. Can pupils suggest some examples of simulations? Maybe they have computer games at home that are like simulations.

A simulation might be used where the real-life situation:

- Is too dangerous
- takes too long
- is too quick to study
- is too expensive to create.



3. Select Use the photo prompt sheet to prompt further discussion of simulations used in



real life.

4. Can pupils explain why a simulation is a good thing?
- It allows you to train for something without doing it for real.
 - It allows you to test out dangerous situations, e.g. travel into space.
 - You can test out the effect of different actions, e.g. in a flight simulation you can test what will happen if you turn at a certain angle, speed up/slow down, etc. In a virtual pet simulation, you can change the amount of exercise/food/attention you give your pet and see the effect on the pet.
5. Are there any problems with simulations?
- They are often too simple; unexpected problems can still occur in real life.
 - They can be very expensive.
6. Introduce the worksheet.
- First, they need to explain what 'Simulation' means. Show pupils the word bank which has pop-ups of vocabulary to help them with each question.
 - Show pupils how to access the photos; these are the same ones as in the prompt sheet. They could also add their own photos that they have downloaded from the Internet.

The last sections ask pupils to write about any problems with simulations.

Extension:

Pupils complete the 'Why Simulate?' table – deciding what reason(s) a simulation is used for (recall parts 1 and 2 of lesson) and give their reasons for thinking that. Pupils can use the provided simulation ideas or choose their own ideas based on earlier in the lesson, and their own knowledge.



Lesson 2 – Exploring a Simulation

Aim

- To explore a simulation, making choices and discussing their effects.

Success criteria

- Pupils can explore a simulation.
- Pupils can use a simulation to try out different options and to test predictions.
- Pupils can begin to evaluate simulations by comparing them with real situations and considering their usefulness.
- Pupils can analyse choices made using a branching database.

Resources

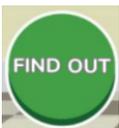
- [2Simulate Locked Out simulation.](#)

Introduction (for teachers)

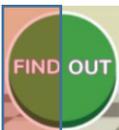
This is a whole-class activity, best done using an interactive whiteboard rather than individual computers.

The Locked-Out simulation has three different endings to mimic real life where a situation may have several solutions.

You (the teacher) are in control of the outcome, using this button which will appear whenever the outcome of a question might or might not help.



When a question is posed, you (the teacher) can click on the left side of this button to make the answer 'yes'.



You can click on the right side of the button and the answer will be 'no'.



This tool helps to ensure that pupils explore several solutions before finding one that works.

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You will also find printable resources for the simulation in the [Locked Out home page](#) that you can use away from the computer to role-play the scenarios and explore different solutions if you wish.

If you wish to know all of the possible outcomes and choices within Locked Out, you can find these in the [user guide](#).

Activities

1. Explain that the class is going to be exploring a simulation about making choices and problem solving. We will be able to explore the situation from each character's point of view, then we will try to help one or more of the characters to solve the problem.
2. Open the activity on the whiteboard and click on 'Intro with text'.
3. Most text is read aloud.
4. Click on the arrows to navigate through the simulation forwards and backwards.
5. When you get to a screen called 'What is everybody thinking?', discuss what the characters might be thinking and then click on them to find out.
6. When there are choices about what to do, characters in the simulation will be clickable.
7. At this point, you (the teacher) can use the Find Out button to set whether this question will lead to the solution. Click the left side for 'yes' or the right side for 'no'. Use these options to enable the class to explore various scenarios before coming to a solution, rather than solving the problem straightaway.
8. Once the solution is reached, you can try the simulation again, making different choices by using the



button.

9. Before the end of the lesson and during the simulation, spend some time discussing in which ways this simulation was or was not realistic, e.g. by how animated the graphics were.

Extension:

After the first run through, some of the pupils may notice that the structure of choices is similar to how their branching databases (Unit 3.6) worked. Could they present the 'Locked Out' simulation as a branching database on a large sheet of paper?



Lesson 3 – Analysing and Evaluating a Simulation

Aim

- To work through and evaluate a more complex simulation.

Success criteria

- Pupils can recognise patterns within simulations and make and test predictions.
- Pupils can identify the relationships and rules on which the simulations are based and test their predictions.
- Pupils can evaluate a simulation to determine its usefulness for purpose.
- Pupils can create their own [simple] simulation.

Introduction (for teachers)

This simulation allows pupils to explore space. They are on a mission where something goes wrong, and their task is to save the stranded astronauts.

They will need to investigate the planet's conditions, decide upon what equipment needs to be taken and solve challenges on the planet.

The simulation should be displayed on the interactive whiteboard for the whole class and pupils should work in groups within the class when solving the mission without using computers.

At one point, explorers are instructed to exit and look at the message centre to continue. At this point, exit the simulation screen using the red arrow at the top right and open the message centre; this is a simulated email flow. At the end of this, exit and then open part 2 of the simulation to continue.

Some groups might not make it to the end of the mission because they have not brought the correct equipment. In this situation, you might decide to allow them the Emergency Resource Cards – a kind of get-out-of-jail-free resource, in case groups have left behind a piece of equipment they later deem to be essential to the mission.

There are several resources listed; these should not be given out until referred to in the lesson plan.

This lesson plan provides a brief overview of the simulation. If you wish to use it in more detail over two or three sessions, there is detailed activity information in the [user guide for the simulation](#).

You have the option of scoring each group at the end to determine the winning group. This is determined by the success of their solutions to the challenges, by the usefulness of the

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equipment they choose to take and by speaking and listening rewards for good class participation. You can award these at your discretion.

Resources

Unless otherwise stated, all resources can be found on the [main unit 3.7 page](#). From here, click on the icon to set a resource as a 2do for your class. Use the links below to preview the resources; right-click on the link and ‘open in new tab’ so you don’t lose this page.

- [Equipment Requisition](#) – see step 8 and decide whether to set this as a 2do for the class.
- [Equipment Cards for Groups](#) – one set per group.
- [Emergency Resource Cards](#) – one or two per group.
- [Speaking and Listening Reward Cards](#) – if you wish to use them to determine a winning team, then between two and five copies of each card, depending how generous you are with your rewards!
- [Equipment Scoring Sheet](#) – you could display this on the whiteboard or print and distribute **AFTER** the mission. They can be used to discuss the effectiveness of the equipment selected.
- [Group Scorecard](#) – one per group, if you wish to score the groups.
- [Simulation Evaluation](#) – sheets to be set as a 2Do.

Activities

1. Explain the scenario of this simulation and organise the class into groups of four to six pupils.
2. Explain that ‘With the help of this computer, we are going on a journey far, far away from earth and far, far into the future. You are now space cadets [trainee astronauts if you prefer!] and I am your ship’s Vice Captain. You are on your final training mission. If you succeed, you will become qualified astronauts. Are you ready?’
3. Watch the first two scenes. Ask the pupils to work out how far into the future we are.



4. Use the  buttons to move to the next page.
5. Continue to the point that you are presented with a choice to save yourself or the crashed crew.

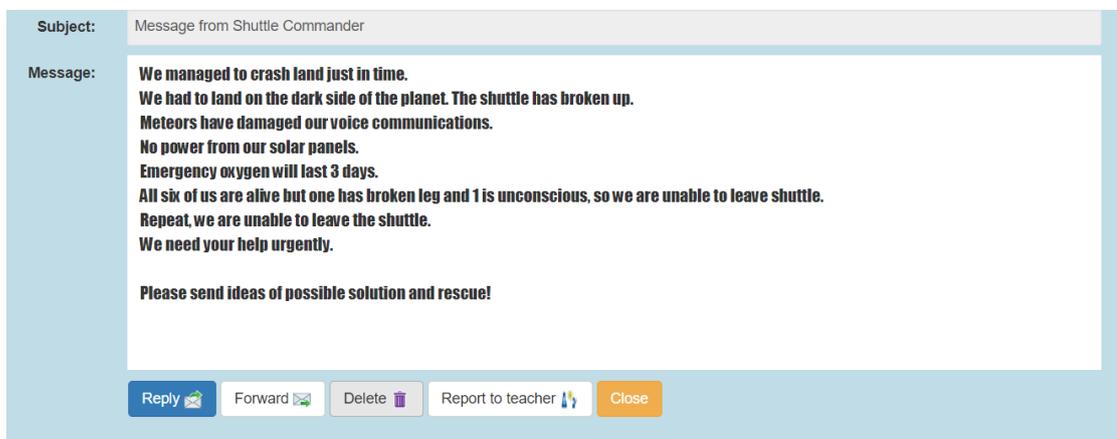


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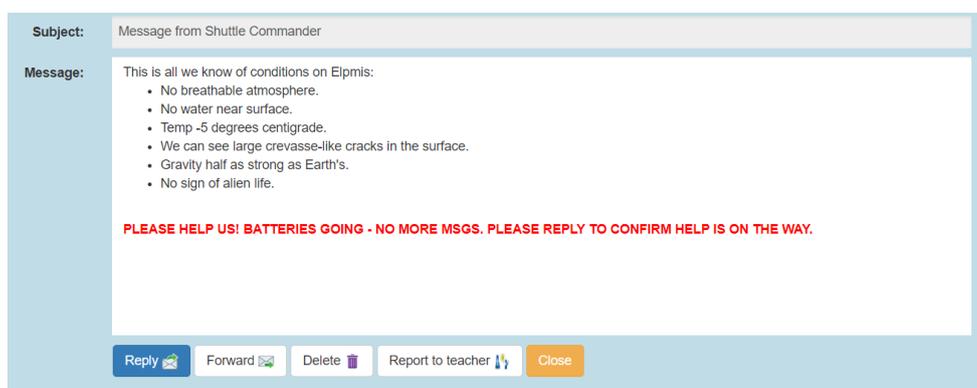
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10. This is the key decision to be made – save our own skins or rescue our stranded comrades! It will need to be a whole-class decision, but individual groups may come up with a range of reasons. ‘Can you justify your decision?’
11. Hopefully, they will decide to help the crew; otherwise their mission is over, and they have failed! You can explore this aspect of the simulation if you wish, and then return to this point to explore the outcome if you make a different decision.
1. When you reach the screen with the incoming message from the shuttle, listen carefully to the soundtrack to find out what happens. “What do you think has happened? Are they still alive?”
2. Click on the button to be taken to an email simulation the ‘Shuttle Messaging Centre’. Suggest that the pupils take notes.
3. Ask the pupils to clarify why they need our help. Why are they unable to leave the shuttle, or take off again?



4. **Task:** compose a message to the shuttle. What do you most need to know about conditions on the planet? In groups, decide on the two or three questions to be asked. (It may or may not be necessary for some or all groups to have the equipment cards in advance, to help them frame their questions.) A selection of the best questions from each group can be entered here and sent to the stranded astronauts.
5. Send the message and you will receive answers. If any questions are not answered and are particularly deserving of an answer, you might have to make up the answers and could ‘receive’ them via your own mobile phone.



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6. Reply to confirm that help is on the way and you will then receive a message from the Captain:

Subject: Captain's Briefing

Message: Space crew, we have communicated the situation with Earth's engineers and have the following mission for you.

Your Mission:
Land the emergency shuttle and rescue the survivors.
You cannot land on the dark side of the planet - the emergency craft needs solar power.
You have just ten minutes to find out about conditions on the planet and select equipment for rescue.

Reply to confirm that you have received this message and stand by for further information.

Buttons: Reply, Forward, Delete, Report to teacher, Close

7. Reply to confirm that the message has been received and you will then receive further mission information from the Captain:

Further Mission information from Captain

The lunar buggy can carry a maximum of seven of these items:

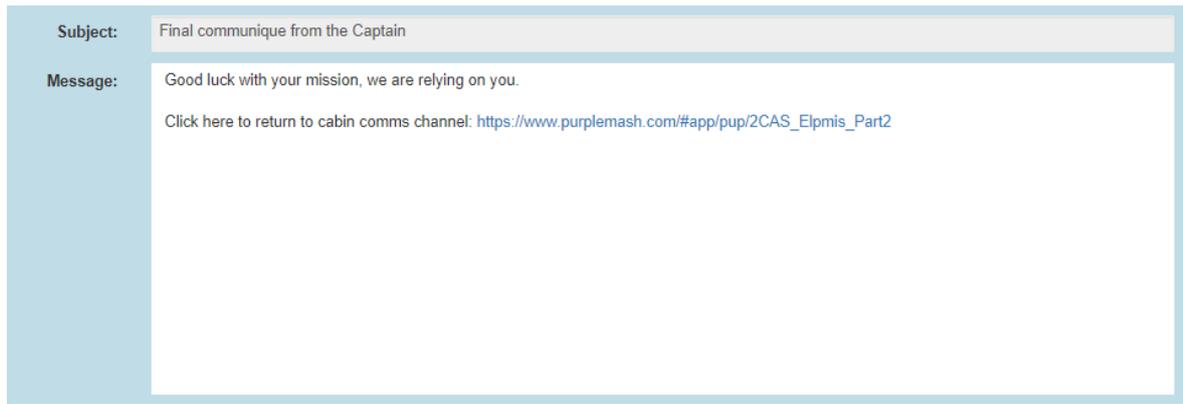
- Backup communicator
- Oxygen tanks
- Metal rods
- Batteries
- Rope (70m long)
- Space blanket
- Space food
- Tent
- Water
- Torches
- Matched
- Cooking stove

Use the equipment requisition which we have assigned to you to decide upon your equipment quota. **RIGHT-CLICK ON THE LINK AND OPEN IN NEW TAB TO KEEP THIS MESSAGING SERVICE OPEN.**
Fill in and save then reply with the required information for the engineering crew to prepare the lunar buggy.
https://www.purplemash.com/site#app/pup/dark_side_elpmis_equipment

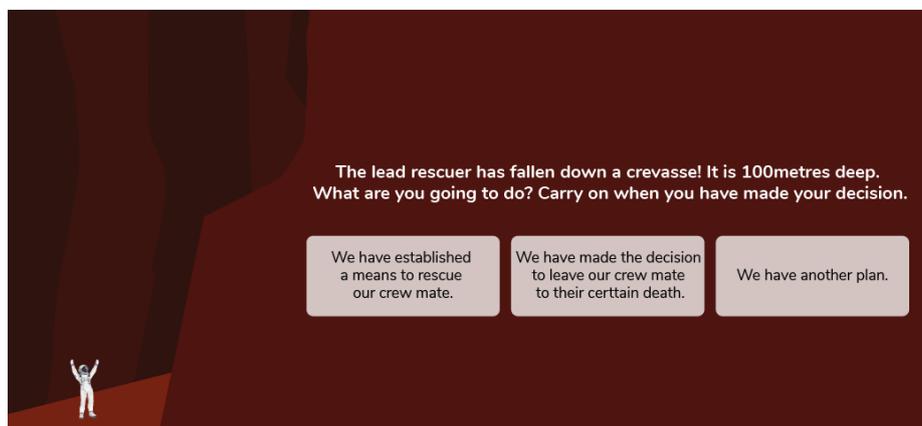
8. The linked equipment requisition is the same requisition that is available in the resources section. Opening in a new tab allows the 'feel' of the simulation to continue. Alternatively, you could set this as 2do for the class.
9. Equipment cards should now be given to each group. Only seven items can be taken.
10. Task: In groups, decide which items you are going to take. Record your reasons. Each group could open and complete the requisition. If you are working as a class together, come up with a class consensus to send to the engineering crew.
11. Reply to the Captain and you will receive one last message:

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12. Use the link to exit from the email simulation and open part 2 of the Dark side of Elpmis simulation. You see the emergency shuttle launching. Click on the 'next' button. See the buggy and crew moving across the light side of Elpmis, then click the arrow button again.
13. The teams now face another challenge:



14. How are the cadets going to rescue the trapped trainee?
15. The key point to note here is the ledge. The crevasse is 100m deep – if the group has brought the 70m rope, they may be able to lower someone down to the ledge. But how will they get back up? Again, weaker gravity will help with throwing things further. They may decide to leave him/her but will lose points at the end.
16. On the next screen, feedback some of the best solutions to the crevasse problem. Then, watch the buggy continue to the dark side of the planet.
17. You will then be asked, 'Did you bring a torch?' If not, an Emergency Resource Card can be used – at your discretion. This will provide a torch to light up the crew on the dark side of the planet:

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You have two final problems to solve:

- 1) How will you help the astronaut with the broken leg?
- 2) How will you transport the unconscious astronaut?

The lunar buggy does not have enough power left to transport anyone.

Carry on when you have solved these problems and detailed them for your report.

18. Discuss how you will solve the final problems.
19. Complete the rest of the simulation and then use the Equipment and Group scoring sheets (the former feeds into the latter) to assess each group's progress and achievements if you are keeping scores.
20. Ask pupils to evaluate the simulation using the evaluation sheet. Groups may wish to explore the other options within the simulation to help them recognise patterns and make and test predictions.
21. Discuss how effective this simulation is and decide upon its usefulness for purpose. Could it be used to train real astronauts, for example?

Extension:

See next page

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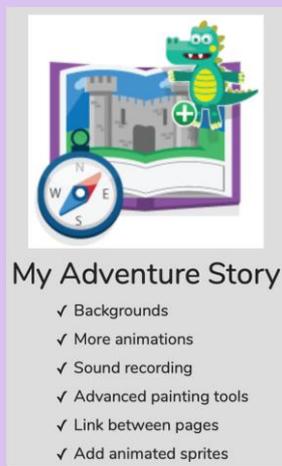
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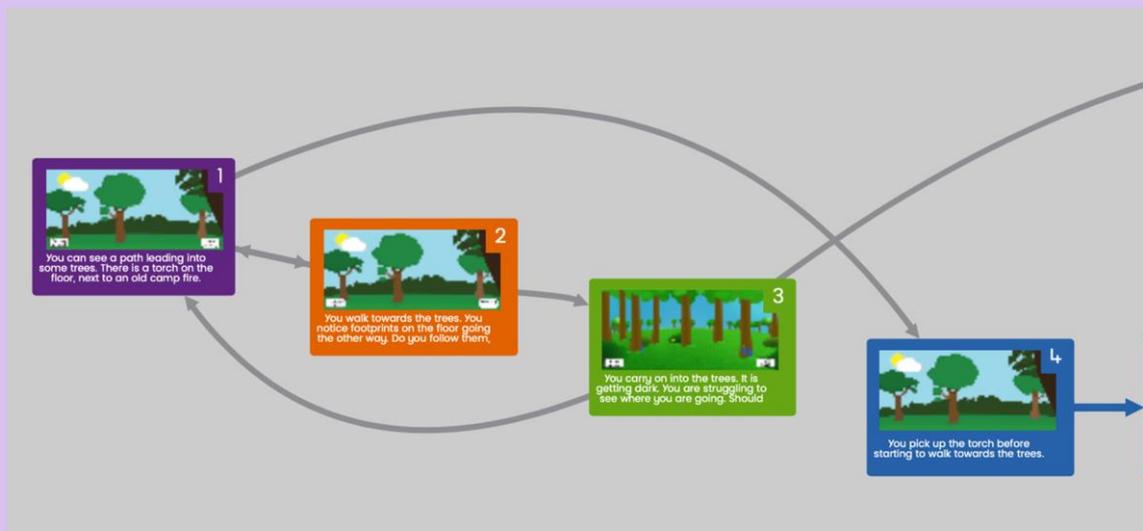
End of unit extending activity:

Pupils should use 2Create A Story and choose ‘My Adventure Story’ to create a multi-page story with choices to make on each page. Use the ‘Add a button’ feature to link to specific pages in the story to create your own simulation activity. For example, “You are in an ice cave and there is a torch on the floor. What do you do?” (Choice is, “Take torch,” or, “Start walking”). Link to two outcomes – the torch helps you find your way out, otherwise you get lost in the forest.

This could also be themed around a decision in part of a well-known story, or a class topic. Simulate what happens if you do / do not make a certain choice.



Pages linked via decision made:

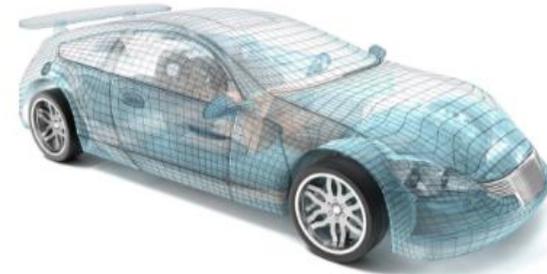


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What are simulations used for?



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Assessment Guidance

The unit overview for year 3 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	With support throughout, pupils are beginning to analyse and evaluate information relating to the situations in the activities within 2Simulate (Unit 3.7 Lesson 2 and 3). They can verbally present their findings as part of a discussion (Unit 3.7 Lesson 2 and 3). Although their understanding may be limited, they are beginning to understand the importance of simulations in relation to real and hypothetical situations (Unit 3.7 Lesson 1. Point 3).
Expected	Using 2Simulate, pupils can analyse and evaluate information relating to the situations in the activities (Unit 3.7 Lesson 2 and 3). They present their findings as part of a discussion and give reasons for the choices they made (Unit 3.7 Lesson 2 and 3). They will understand the importance of simulations to replicate events that could occur in real and hypothetical situations (Unit 3.7 Lesson 1. Point 3). Most pupils can effectively assess their own and others' progress and achievements through a simulation. Additionally, they can evaluate the effectiveness of the simulation (Unit 3.7. Lesson 3 Point 21 to 23).
Exceeding	Pupils demonstrating greater depth, will use 2Simulate to analyse, evaluate, identify patterns and predict the outcomes of simulated scenarios (Unit 3.7 Lesson 2 and 3). They will present their predications and findings as part of a discussion and give detailed explanations for the choices they have made (Unit 3.7 Lesson 2 and 3). Pupils demonstrating greater depth will not only understand the importance of simulations to replicate events but will also identify where simulations are used in everyday life (Unit 3.7 Lesson 1. Point 3).

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