purple mash

Computing
Scheme of Work

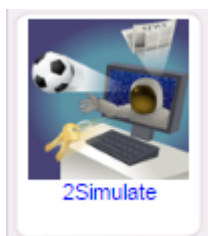## Unit 3.7 – Simulations

Year Group: 3
Number of Lessons: 3

From 2simple

Contents

Introduction

The tool used for simulations during these lessons is 2Simulate. This can be found on the Games tab in Purple Mash.

The lesson plans will guide you using this tool in a computing context. To find further details, click on the

button which opens a screen with help videos.

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

Within each activity there is a Resources section where you can find additional ideas if you wish to take the ideas in the simulations further, away from the computer.

These lesson plans make use of the facility within Purple Mash to set activities for pupils which 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 pupils 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 teacher's guide to 2Dos can be found in the Teacher section: 2Dos Guide.

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'.

Year 3

Lesson	Aims	Success Criteria
1	To consider what simulations are.	• Children know that a computer simulation can represent real and imaginary situations. • Children can give some examples of simulations used for fun and for work. Children can give suggestions of advantages and problems of simulations.
2	To explore a simulation.	• Children can explore a simulation. • Children can use a simulation to try out different options and to test predictions. Children can begin to evaluate simulations by comparing them with real situations and considering their usefulness.
3	To analyse and evaluate a simulation.	• Children can recognise patterns within simulations and make and test predictions. • Children can identify the relationships and rules on which the simulations are based and test their predictions. Children can evaluate a simulation to determine its usefulness for purpose.

Lesson 1 – What are Simulations?

Aim

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

Success criteria

Children know that a computer simulation can represent real and imaginary situations.

Children can give some examples of simulations used for fun and for work.

Children 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

Simulations Worksheet to be set as a 2Do.

These are both included as worksheets at the end of this document, should you prefer to use them away from the computers. However, they do not include the functionality of the online activities, e.g. word banks, photo galleries and writing prompts.

- Photo prompt sheet
- Simulations worksheet

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.
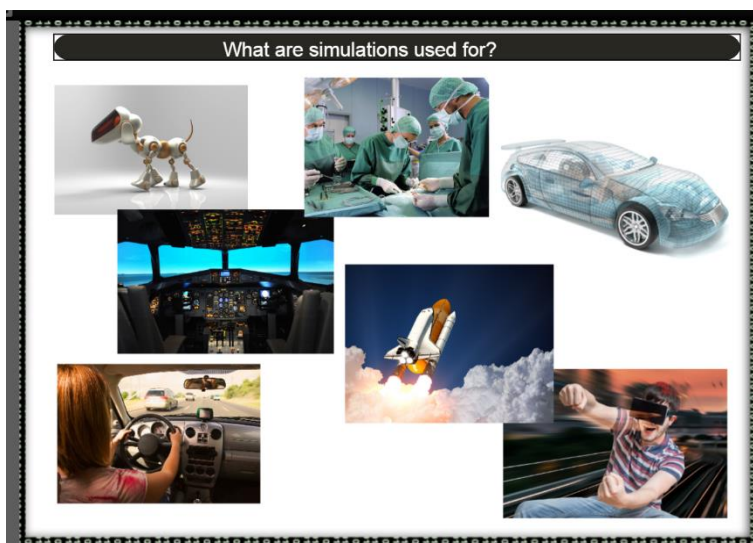
   > A simulation might be used where the real-life situation:
   >
   > Is too dangerous
   > takes too long
   > is too quick to study
   > is too expensive to create.

2. Can children suggest some examples of simulations? Maybe they have computer games at home that are like simulations.

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

4. Can children explain why a simulation is a good thing?

Allows you to train for something without doing it for real; 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 children the word bank which has pop-ups of vocabulary to help them with each question.
Show children 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.

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

Think about −

Simulation

Types

Advantages

Problems

Name

Simulations

What is a simulation?

Click on the green crosses and choose a photo of a simulation example. Write about how this simulation can be used.

Choose one of your simulations. What things could you change or test when using the simulation?

Can you think of one or two problems when compared to real life?

Lesson 2 – Exploring a Simulation

Aim

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

Success criteria

- Children can explore a simulation.
- Children can use a simulation to try out different options and to test predictions.
- Children can begin to evaluate simulations by comparing them with real situations and considering their usefulness.

Resources

- 2Simulate tool in Purple Mash Games section

Introduction (for teachers)

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

The 'Locked Out' activity is accessed by opening 2Simulate and clicking on the moving keys.

Locked Out 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.
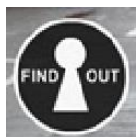
When a question is posed, you (the teacher) can click on the left side of this button to make the answer 'yes'.
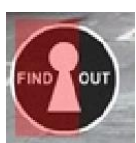
You can click on the right side of the button and the answer will be 'no'.
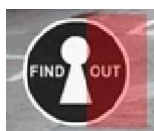
This tool helps to ensure that children explore several solutions before finding one that works.

You will also find printable resources on the Classroom Resources page for the simulation 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 document Ideas for Using 'Locked Out' in the Classroom

which can also be found by opening the activity and clicking on the [Resources] button.

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.   Clicking the [button] button will read the text aloud.

4.   Click on the keys 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 and will highlight in white when you put the mouse over them.

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

9.   button.

10. Before the end of the lesson and during the simulation, spend some time discussing in what ways this simulation was or wasn't realistic, e.g. by how animated the graphics were.

Lesson 3 – Analysing and Evaluating a Simulation

Aim

- To work through and evaluate a more complex simulation.

Success criteria

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

Introduction (for teachers)

This simulation allows children 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 children should work in groups within the class when solving the mission without using computers.

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; this 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 Classroom Resources area of 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 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 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.

> This is included as a worksheet at the end of this document, should you prefer to use it away from the computers. However, it does not include the functionality of the online activities, e.g. word banks, clipart and writing prompts. Simulation Evaluation sheet

Activities

1. Explain the scenario of this simulation and organise the class into groups of four to six children.

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 children to work out how far into the future we are.
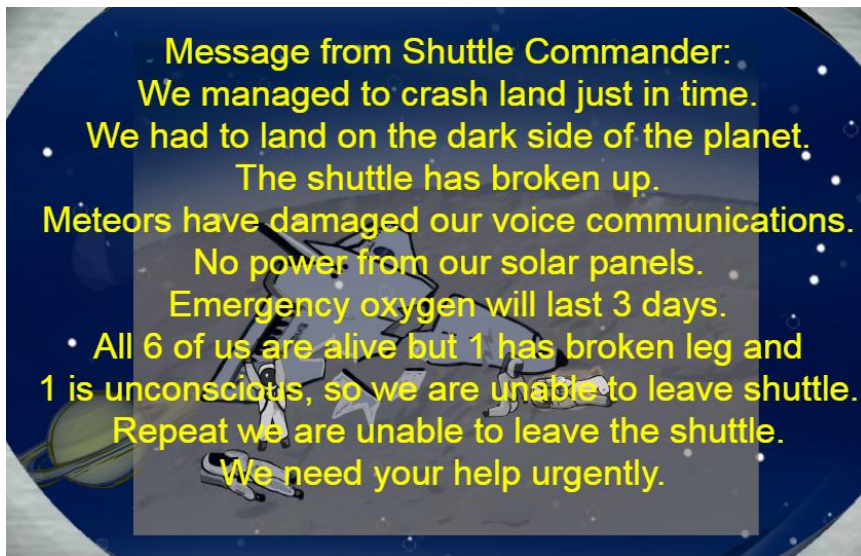

4. Use the buttons to move to the next page.

5. Continue to the point that you are presented with a choice to save yourself or the crashed crew.
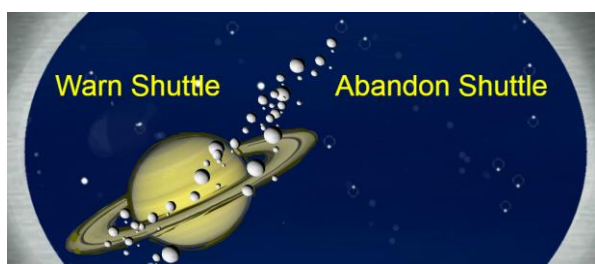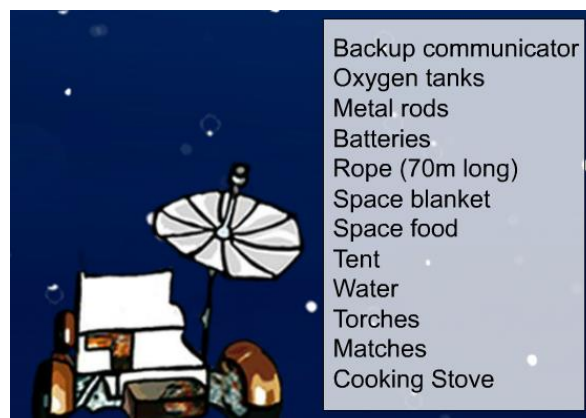
6. This is the key decision to be made – save our own skins or rescue our stranded comrades! It will need to be a whole-class decision, but individual groups may come up with a range of reasons. 'Can you justify your decision?'

7. 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.

8. When you reach the message from the crashed crew, suggest that the children take notes.

9. Ask the children to clarify why they need our help. Why are they unable to leave the shuttle, or take off again?

Message from Shuttle Commander:
We managed to crash land just in time.
We had to land on the dark side of the planet.
The shuttle has broken up.
Meteors have damaged our voice communications.
No power from our solar panels.
Emergency oxygen will last 3 days.
All 6 of us are alive but 1 has broken leg and
1 is unconscious, so we are unable to leave shuttle.
Repeat we are unable to leave the shuttle.
We need your help urgently.

10. Listen to the captain explaining the mission and make further notes if necessary.

11. **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.

12. 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.

13. Move on to the equipment list

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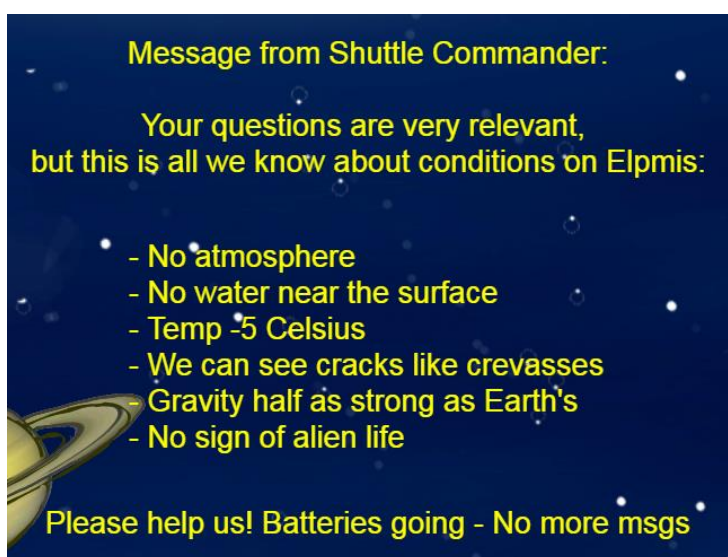Water
Torches
Matches
Cooking Stove

14. The equipment cards should now be given to each group. Only seven items can be taken.

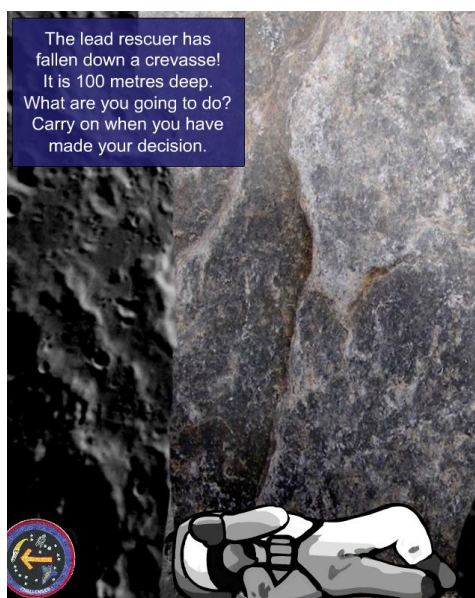   **Task:** In groups, decide which items you are going to take.
    Record your reasons. (It may be helpful to go to the next screen first, if this process needs modelling.)
    The Message Bank button on the bottom left of the screen enables you/the children to look back at the previous messages received for information.

15. Select the items and then move on. You see the shuttle moving off. Click on the next button. See the buggy land successfully, then click the arrow button again.

Message from Shuttle Commander:

Your questions are very relevant,
but this is all we know about conditions on Elpmis:

- No atmosphere
- No water near the surface
- Temp -5 Celsius
- We can see cracks like crevasses
- Gravity half as strong as Earth's
- No sign of alien life

Please help us! Batteries going - No more msgs

16. The teams now face another challenge:

The lead rescuer has fallen down a crevasse! It is 100 metres deep. What are you going to do? Carry on when you have made your decision.

17. How are the cadets going to rescue the trapped trainee?

18. 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.

19. 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.

20. 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:
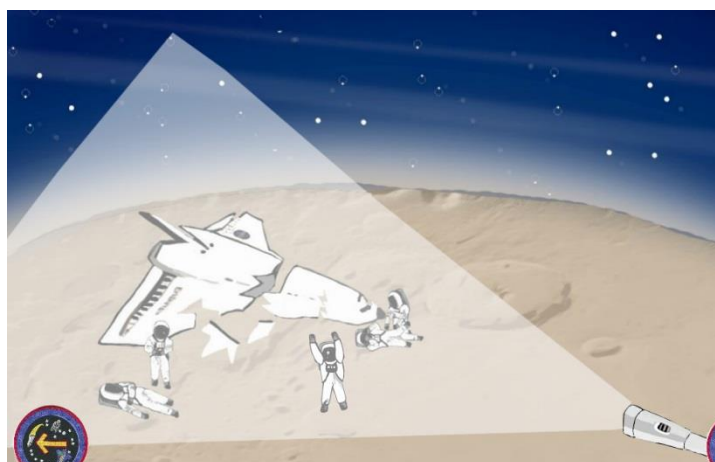
21. Move to the next screen and discuss how you will solve the final problems.

22. After this stage has been completed, 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.

23. Ask children 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.

24. Discuss how effective this simulation is and decide upon its usefulness for purpose. Could it be used to train real astronauts, for example?
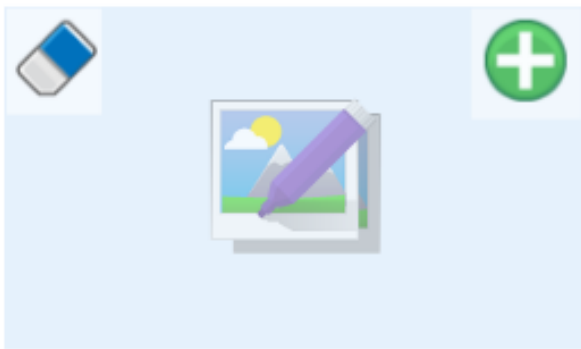
What are simulations used for?
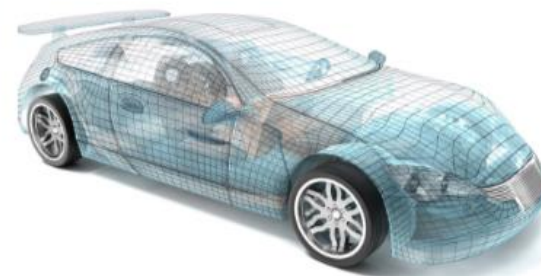
Name

Simulations

What is a simulation?

Click on the green crosses and choose a photo of a simulation example. Write about how this simulation can be used.

Choose one of your simulations. What things could you change or test when using the simulation?

Can you think of one or two problems when compared to real life?

Group/Name:

Evaluating a simulation

List some of the patterns in the simulation.
For example; actions that you needed to take to be successful and actions that would cause you to fail the mission.

Choose clipart of the most useful items for the misson.
Explain why you needed them.

Write in here..

How realistic do you think the simulation was and why?

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, children 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 there 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, children 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 children 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	Children 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). Children 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).