Moon Landing
Ages 7+ Lesson Plan (Part 2)
Program Each Other (PEO) Extension Activities

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Learning Intention

Design, write, and test an algorithm to program a robot to collect moon rocks to bring back to Earth!

Learning Outcomes

- Design and record an algorithm to achieve a goal
- Debug an algorithm
- Choose an option using selection
- Say how repetition makes the algorithm more efficient
- Work well in a group

Resources

- Moon Landing Coding Adventure Show
- Printable moon pictures, or use your own items
- Printable robots, or use your own items
- Materials to create a 3 x 4 grid on the floor e.g., rubber dots, paper, chalk, or A3 table-top grids
- Teaching guide PowerPoint, other guides (.pdfs)
- Moon Landing PEO explainer video
- Pens, paper, or whiteboards
- (Optional) Printable arrows
- (Optional) Bee-Bots
- (Optional) Printable worksheets and certificates

Key Learning Goals*

Pupils should be taught to:

- design, write, and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

*These learning goals align to the National Computing Curriculum in England - Key Stage 2 (ages 7-11)

Keywords

- Algorithm
- Design
- Input
- Test
- Debug
- Repetition
- Selection

Health and Safety

Ensure an open, safe space for children to move around in, clear of any obstacles. Supervise children carefully if using scissors to cut out pictures.

Introduction

Recap previous lessons/activities and the Moon Landing Coding Adventure Show. Explain that today's activities are going to introduce some more challenging steps to make the algorithms more complicated.

Watch the Extension Challenges explainer video. Discuss how the activities are similar but now we are introducing repetition and selection. How is our loop going to end? Will there be a time limit or will the items run out? What selection will need to be made? Use the PowerPoint teaching guides and/or demo slides for support.

Split the class into groups of three, differentiating accordingly. Recap the three main roles: Designer, Scribe, and Robot, and allow children to take turns in roles if time permits. Grids may be set up on the floor, at a table, or using printable worksheets.

Main Activity

Challenge 1: Collect the moon rocks and bring them back. Create an algorithm that includes a loop to collect the different moon rocks one at a time and put them in the Lunar Lander. Remind children that they must ensure the robot goes back to the same starting point, facing the same direction again before each loop.

Challenge 2: Collect the moon rocks and see if there is an alien hiding underneath. Using selection, create an algorithm to select the moon rocks and distribute them to the Lunar Lander if they have an alien, or a crater if they don't.

Challenge 3: The moon rocks will be the input for the algorithm. Place the crater anywhere on the grid. Can you design a route (algorithm) for AL to carry all the rocks with no aliens to the crater, and leave the ones with aliens on a spot next to the lander?

Plenary

As a class discuss the successes and challenges of the tasks. What does selection mean? What input did they use? Optional additional activities – complete the reflection worksheet.

Assessment Questions

- What does repetition mean?
- What did IF stand for?
- How many loops were you able to make?
- What challenges did you face?