



Learning Intention

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



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



Keywords

- Algorithm
- Design
- Test
- Debug



Introduction

Watch the Moon Landing Coding Adventure Show with the class. Then show the children the video explaining how to do the Program Each Other activity, and/or use the PowerPoint teaching guides for support.

Get children into groups of three and differentiate accordingly. Recap the three main roles: **Designer** plans out the algorithm, or route, for AL the Robot to take. **Scribe** records the algorithm using arrows as shown. **Robot** follows the algorithm.

Each group is to set up their 3 x 4 grid to represent their 'moon surface', either as a grid on the floor using mats/paper/chalk, as a tabletop activity using paper/pens/whiteboards, or using Bee-Bots. Remind children of the correct vocabulary to use and encourage them to alternate roles during the challenges.



Plenary

Discuss with the class how successful they were in completing the tasks. Invite children to share some of their creative coding additions. What did they find the most challenging and why?
When children have completed the challenges move on to the extension activities lesson.



Learning Outcomes

- Say what an algorithm is
- Understand that a robot needs clear and precise instructions
- Create and debug a simple algorithm
- Work well in a group



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 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)



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.



Main Activity

Challenge 1: Collect a moon rock and see if there's an alien hiding under it! The designer starts by placing the lunar lander (starting point) and a moon rock (finish point) somewhere on the moon (grid). The scribe records an algorithm/route for the robot to take which allows them to cross the lunar surface successfully.

Challenge 2: Collect the moon rock and avoid the craters! The designer places a moon rock to collect, and craters to avoid around the moon surface (grid). The scribe records the algorithm, and the robot tests the route.

Challenge 3: Collect the moon rocks and avoid the craters, creatively adding new actions, including perhaps a jump or dance, thumbs up or thumbs down.



Assessment Questions

- What is an algorithm?
- How does AL know which way to go?
- What does debugging mean?
- How did you debug the algorithm if you needed to?