



Lesson Plans



Hide a Diamond, Find a Diamond

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Lesson Overview

In this lesson, students will use the basic principles of coding to solve a problem in Minecraft. They will then extend this to use physical computing to enhance their program. This lesson is suitable for students who are already familiar with the concepts of sequencing, variables, selection and repetition, are confident using Scratch, have experience using EduBlocks, but have no experience of a text-based programming language. Students may have had previous experience of using libraries, but this is not essential. They do not need to have any experience with physical computing.

Lower ability students may struggle to complete the tutorial but should enjoy tackling a puzzle in an engaging environment such as Minecraft. Extension activities are available for students who finish the tutorial quickly. This lesson works very well if students work together using pair programming



Lesson Objectives

Use EduBlocks to build a program in Python

Use EduBlocks to send instruction to external components

Use the Minecraft Python library

Solve a problem using code

Run an EduBlocks program in Minecraft

Understand how to connect a LED



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Materials & Prep

- Raspberry Pi (We recommend the pi-top CEED for lessons)
- USB mouse, keyboard and power supply (one per Pi)
- Latest EduBlocks
- LED, resistors, wires.
- Powerpoint presentation
- Hide A Diamond, Find A Diamond EduBlocks Worksheets

**AZ**

Key Vocabulary

- **Sequencing** – providing step by step instructions to the computer in order
- **Variables** – the process of storing data
- **Selection** – making a decision on what happens next based on a condition
- **Repetition** – the process of running a program a certain number of times or until a condition is met
- **EduBlocks** – a visual coding language based in Python
- **Library** – a collection of precompiled routines that a program can use
- **Raspberry Pi** – a computer
- **Physical Computing** – adding external elements to a computer program
- **LED** – light emitting diode



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Summary

Introduction – 5 minutes

Explanation – 5 minutes

Activity – 15 minutes

Explanation – 5 minutes

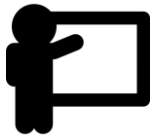
Activity – 20 minutes

Plenary – 10 minutes



Introduction (5 Minutes)

Students are introduced to the lesson by explaining that they are going to use code to solve a problem in Minecraft. They will use familiar concepts such as sequencing, variables, selection and repetition (recap on what these are), but that they will be using a language called EduBlocks, which works in a very similar way to Scratch, but uses the Python language to send instructions to Minecraft.



Explanation (5 Minutes)

Students will also be introduced to the concept of a library, which they will use to communicate with Minecraft. The Minecraft API Library gives the user a list of commands to do common tasks in Minecraft, such as getting the type of block used at a particular location or setting the player's position to another location in the world. Libraries are developed to make common tasks easier to do.



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ACTIVITY (15 MINUTES)

Students should follow pages one to five of the workbook, EduBlocks – Minecraft: hide a diamond, find a diamond.

In this section of the tutorial, students will create a program which creates a diamond block and positions it at a random location in the Minecraft world. After placing the diamond block, the player will briefly be shown the location of the block before being instructed to try and locate it.



Extension

Should students complete the tutorial, they may be set a number of extension challenges;

- Change the type of block that is hidden
- Reduce the amount of time where the player is shown the location of the block
- Personalise the messages displayed to the player



Explanation (5 Minutes)

Students will then be introduced to the concept of Physical Computing, by adding LED's to the Minecraft game to make it more interesting. The students will need to program the lights to flash if the player gets within a certain distance of the hidden block.



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ACTIVITY (20 MINUTES)

Students should work through pages six to ten of the workbook. While the additional code is very simple, the majority of time should be spent connecting the external elements to the Raspberry Pi.



Extension

Should students complete the tutorial, they may be set a number of extension challenges;

- Change the location of the block (remember to change the coordinates in all relevant places)
- Make the lights flash faster or slower
- Make the lights flash faster the closer the player gets



Plenary (10 minutes) Continued on next page...

Students should be asked to reflect on their learning. What did they learn? What did they enjoy about the lesson?

Students can discuss what other external elements might be used in a computer program, perhaps relate this to elements being either inputs or outputs.

Students should be given time to ask any questions they may have relating to the lesson.



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Plenary continued

The next steps following this lesson are to develop further learning involving physical computing, integrating the theory of hardware computer components to programming.

Ask the students to fill in a 140 character tweet. Use the tweet template below to write on.



EduBlocks (@edu_blocks)