3. AUTOSUB6000'S OCEAN FLOOR MISSION

AGE 9-11

Resources

Access to computers with internet access

Introduction

Show children a picture of Autosub6000. Do any of the children know what it is? What will it do? How is it controlled?

Explain that Autosub6000 is an autonomous underwater vehicle and will be programmed where to go, what to measure and how deep to go.

Look at National Oceanography Centre's video of Autosub6000 being brought safely back on board the expedition ship **https://www.youtube.com/watch?v=-YENHk9UYKk**

Explain that the children will be using Scratch to create a project which will control Autosub6000 on an underwater mission in the Antarctic to analyse specimens found on the ocean floor.

Activity

Give children the Scratch link: **https://scratch.mit.edu/projects/161272628/**. Ask them to complete the mission.

Discussion

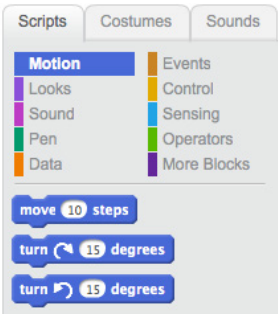
Ask the children to think about the components they would need to build the program. A background, Autosub6000 sprite and six sample sprites. Explain that to make the mission possible we need to create algorithms for each sprite so they behave in the way we want them to.

Activity

Ask the children to work in groups to write a list of instructions they think are needed to give to program Autosub6000. Ask them to act the instructions out to check they have them right. Groups then report their instructions to the class. Do they all agree?

Demonstration

Open **https://scratch.mit.edu/projects/161272628/** and use the 'See Inside' button to investigate the algorithms for each of the sprites. Discuss what each block does and where we would find them in the Scripts tab.



Activity

Ask the children to open the project **https://scratch.mit.edu/projects/166843083/** and click the button See inside. Explain that they are going to debug the program as it has missing blocks – they may want to run the program and observe any unexpected behaviour. Tell the children that they will need to think about the Autosub6000 sprite from our discussion and create the same algorithms they saw, adding in the missing blocks and testing their work as they go.

After that, explain that the sample sprites also need debugging. Show that the crab sprite has the correct algorithm to refer to; it is important that they can explain what each block in the working model does. The others have missing blocks. As the children work through the sprites, there are progressively more blocks missing, until they are building the majority of the final sprite (fish 4).

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Once the children have completed the coding, they should test their work by attempting the mission. They may need to debug the programme further.

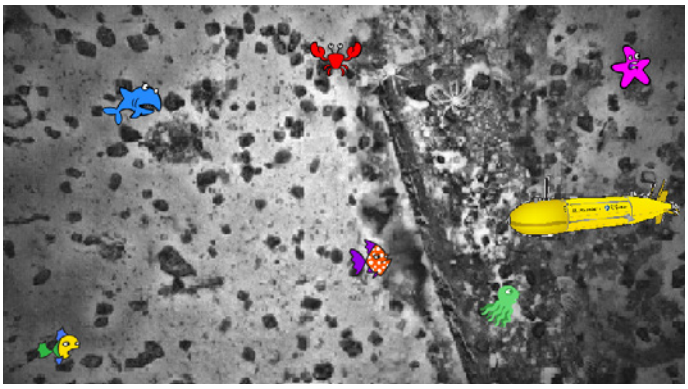
Challenge

Explain that although we had programmed Autosub6000 in the previous activity, he was not autonomous like the real Autosub6000. To make Autosub6000 autonomous, we need to create an algorithm which moves him around the ocean floor, after the touch of one button.

Ask the children to open **https://scratch.mit.edu/projects/166845705/**. Read the instuctions and then press the space bar. Discuss how Autosub6000 moved autonomously, however, he did not complete the mission. The program is unfinished.

Use the See inside button to look at the algorithm already coded. Talk about what has been used so far and why the Glide rather than Move block has been used (you can control the speed it moves).

Show the childen how they can see the x and y value on the screen, needed for the Glide block. To do this, place the curser on the stage where you want Autosub6000 to move to. The x and y value will appear under the stage.



Challenge the children to complete Autosub6000's algorithm to move autonomously to all six samples. No other sprites will need altering.

Children check their coding through attempting the mission.

Plenary

Ask the children to think about the positive and negatives of Autosub6000 being autonomous. Can the children think of any other autonomous devices? Examples include, Curiosity Mars Rover and production line robots.

Autosub6000

More information: **http://noc.ac.uk/news/marine-snow-fuels-life-sea-floor**

http://www.bbc.co.uk/news/science-environment-16493787