Logical Number Sequence Activity

LESSON OVERVIEW

In this activity, students explain the rule for a number sequence and predict which number(s) comes next. In doing so, they extend their knowledge of simple rule based algorithms. They also use logical reasoning as they work out and explain their algorithms.

LESSON OBJECTIVES

Students will:

- Use logical reasoning to explain how some simple algorithms work (Computing)
- Recognise and describe linear number sequences (Mathematics)

MATERIALS, RESOURCES AND PREPARATION

- Student L3- Logical Sequence Worksheet + Pens/ pencil

LESSON SEQUENCE

Discuss and share three algorithms (sets of instructions) that you have come across in your daily activities with your adult or mind map these yourself.

Have a look at the words **'logical reasoning'**- What are the root words in here and do you know what they mean? If not, it would be helpful to look these up in a dictionary or online (logic and reason) In this activity you will be looking at rule based algorithms and explaining how they work and to do this, you will be using logical reasoning!

STARTER- CAN YOU SOLVE THE SEQUENCES?

Look at one or both of the sequences;

4, 7, 10, 13 ?? ?? (Easier)

4, 9, 19, 39 ?? ?? (Harder)

- Work out and explain the rule for the sequence
- Predict what number comes next in the sequence
- Write or say the rule out loud – e.g. "multiply the last number by 2" and add in the next number in the sequence. Note: Answers can be found at the bottom of this document.

You have just used 'logical reasoning' to work the sequences out and this is also a basic '**algorithm'** too**.**

You analysed the problem by using your **prior knowledge** (of maths) and the existing information (the numbers that were given). You then used this to **identify the rule** and **predict** what the correct number could be. You then **tested** your rule and the number by working through the **sequence** again, using the rule with your new number to check it produces the next number in the sequence. If it didn't, then you worked through the **process** again

MAIN ACTIVITY – SOLVING MORE SEQUENCES (INDEPENDENTLY OR IN PAIRS)

Work through the **L3- Logical Sequence Worksheet** by doing the following;

1. Look at the sequences presented to you. Can you find the next numbers in the sequences?
2. Can you then explain how you used your logical reasoning skills to explain the rule.
   - What is the rule for the number sequence (algorithm?)
   - How did you work the answer out?
   - What is the missing number?

Remember**:** The most important thing is not working out the answer in this task. It is the process or logical reasoning behind it and the 'how' and 'why' you came up with this answer.

EXTENSION

Can you think of your own sequences that you could give to others to explain?
Go to **https://oeis.org** to explore number sequences and their patterns.
Look at the **L3- Extension Activity Worksheet** for more sequences to work on.

ASSESSMENT OPPORTUNITY

Discussion Point- How did you do the following?

- Did you follow a logical process and use prior knowledge?
- Persevere (Keep trying)
- Collaborate (work together with your grown up or sibling to help solve the algorithms)
- Pattern spotting (Did it get easier or did you find similarities between the sequences?)

ANSWERS

Starter Activity
(Easier) **4, 7, 10, 13, 16, 19** (Rule- Add three onto the last number in the sequence)
(Harder) **4, 9, 19, 39, 79, 158** (Rule- Double the last number in the sequence and add 1)

Commented [1]: Barefoot Copyright terms: https://www.barefootcomputing.org/terms-and-conditions

In accessing our website, you agree:

1. to use the materials on this website only in accordance to the Open Government License

2. not to re-use any images without the permission of the copyright holder

3. to acknowledge Barefoot as the source of the materials if you reuse it elsewhere

If you register and supply your personal details to us through this website then you consent to our maintaining, recording, holding and using such personal data in accordance with our Privacy Policy (see above)