Barefoot

Recommended for
SEND

Developing Logical Reasoning Activity

River Crossing

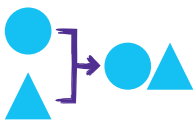
Principal partners

BT Computing at School

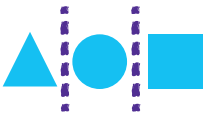
Concepts and approaches covered



Logic



Algorithms



Decomposition



Debugging

Overview

In this lesson, pupils solve the traditional problem of a farmer trying to get a chicken, fox and corn across a river by acting it out. In doing so, they develop their **logical reasoning** skills. If you wish, you can also use the activity to develop understanding of algorithms, decomposition and debugging.

Pupil objectives

- [x] **I can use logical reasoning to solve a problem**

Introduction

- Explain to pupils they will be solving a problem using **logical reasoning**. If appropriate, emphasise that logic is one of the key parts of **computational thinking** (if you wish, show lesson objectives on slide 2 – see presentation in downloads below)
- Introduce the puzzle to the pupils (slide 3)
- Lead a discussion of the puzzle to ensure the pupils fully understand the puzzle and what they need to consider. E.g. "what might happen if the fox and the chicken were left together?"
- Introduce the rules of the puzzle (slide 4). Slide 5 gives a visual which you can use to talk through the task
- Invite the pupils to guess how many trips might be needed
- If appropriate, explain they will be working out the algorithm for getting all the characters to the other side safely

Main activity

- Explain that to solve the puzzle, the pupils are going to take the roles of the different characters and act out the trips to find the solution
- Assign roles to pupils, using props to illustrate their character (see resources for tip)
- If appropriate, some pupils can use the recording sheet to record the different trips made
- Work through and work out the puzzle as a class with the pupils giving their suggestions for the order of the trips and the characters acting their suggestions out
- As pupils make suggestions, ask them to explain why they think that will work. e.g. 'the farmer should take the chicken across first because xxx'. This will help to develop their logical reasoning as will asking them to predict what will happen

- They will likely have to **debug** their solution and will be using logical reasoning to work out why it went wrong and what might work instead
- Slide 6 shows the completed solution to the problem (also shown below). If appropriate, explain this is the **algorithm** to solve the problem – it gives instructions that anyone could follow to get everyone across safely

Plenary

- Revisit the pupils' guesses for how many trips you would need. How far were their predictions away from the number of trips actually needed?
- If appropriate, revisit how they used logical reasoning to work out the puzzle

Differentiation

Support:

You could use the picture cards (see Image Cards download) for pupils to follow the class discussion / work out their own ideas. Ensure you allocate roles according to pupils' levels of understanding and needs. You could also use an **online version** if you wished, or remove one of the characters (e.g. the grain) to make it less complex.

Stretch & Challenge:

You could add additional characters to the scenario for more able pupils (e.g. adding a caterpillar, which the chicken would eat and would in turn eat the corn). You could also ask pupils to work out the rules instead of giving them at the start.

Teaching notes

Concepts and approaches:

Pupils use **logical reasoning** as they work out the puzzle, predicting what will happen and explaining which characters they think the farmer should take across and why. They create an **algorithm** (a set of instructions or rules) to enable everyone to cross safely. They **decompose** the larger problem and consider the different elements in detail to solve it. They **debug** as they solve the puzzle to correct errors and get to the right solution.

Curriculum links

Computing:

Use logical reasoning to explain how simple algorithms work and correct errors in algorithms and programs.

English (spoken language):

All pupils should be enabled to participate in and gain knowledge, skills and understanding associated with the artistic practice of drama.

Resources (see downloads folder)

- Props to turn pupils into the characters (e.g. masks or picture cards of the characters – you could ask the pupils what props they would like to create)
- Presentation
- Recording sheet & character images
- Large picture cards

Solution

Farmer takes chicken across (fox will not eat the corn)

Comes back alone

Farmer takes fox across

Comes back with chicken (so fox and chicken are not left together)

Farmer takes corn across (so chicken and corn are not left together)

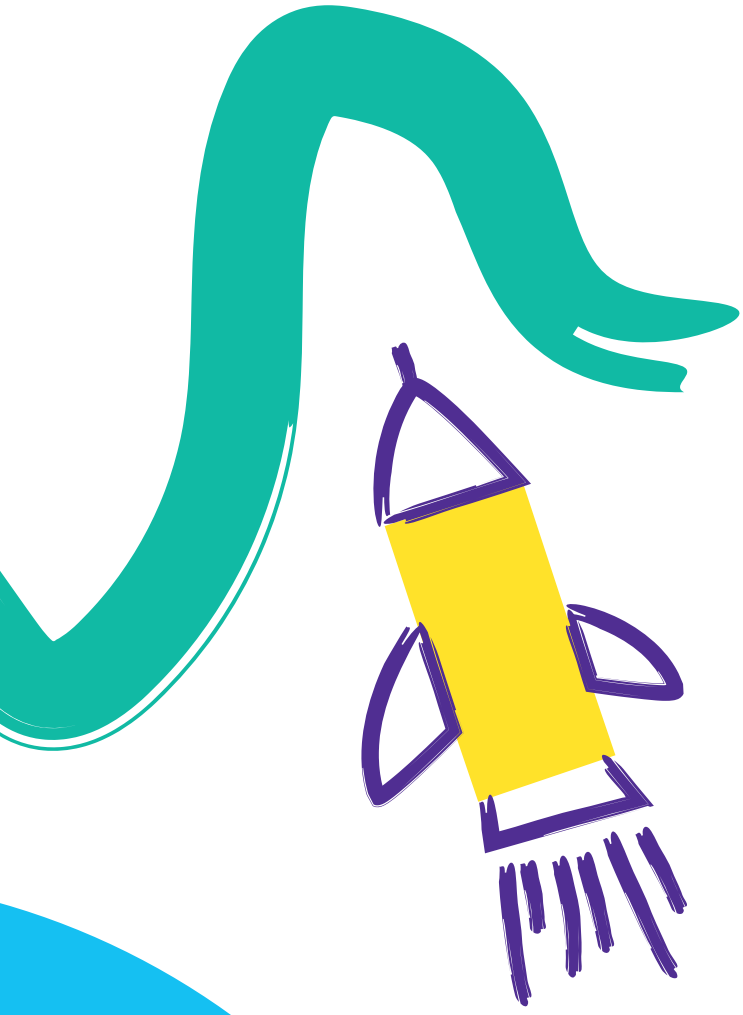
Comes back (fox will not eat the corn)

Farmer takes chicken across

(7 trips)

This activity was designed in collaboration with Matthew Parry and Rachael Walton, specialist teachers of computing in schools for pupils with special educational needs.

Get more **Barefoot**



Have you had a great Barefoot workshop, or delivered a fun computer science lesson? Send us your comments and pictures via our social channels to help get more teachers involved!

@BarefootComp

/barefootcomputing

barefootcomputing.org

You can start your journey here

Principal partners

Supported by

Version 1118 Expires Dec 2021