Cubetto in Ancient Egypt - Unit 1

Year 1, Ages 5 to 6, UK National Curriculum

Subjects covered:

Science

PE

Art / Design

Humanities

English

Resources provided:

Cartouche Template

Directions Template

Materials required:

6x Cubettos

6x Boards

6x Sets of Blocks

6x Standard Maps

Introduction

The Cubetto Playset is a Montessori inspired coding toy that allows children ages 3 to 6 to program a friendly wooden robot without screens and is powered by a programming language you can touch.

New technology can sometimes be overwhelming to understand and adopt. The activities contained in this guide were created by educators for educators.

We want to make it simple for you to integrate the Cubetto Playset and its tangible programming language into your teaching.

Development and learning in other key areas

Beyond coding

The collaborative nature of Cubetto makes it an extremely versatile tool for the classroom. Cubetto fosters learning in key development areas that go beyond programming.

Communication

Children practice listening through a range of stories and narratives in relation to Cubetto, accurately anticipating key events and responding with comments, questions or actions. They also develop their own narratives and explanations.

Dexterity

Children develop coordination in large and small movements around the playset. They negotiate the placement of obstacles around the world map and place blocks on our tangible interface.

Social-Emotional

Children become confident by trying new, open-ended activities that remove “wrong” outcomes, and easily encourage group work. The open nature of the maps allows them to choose the resources they need for their play session.

Mathematics

Children add and subtract blocks to a sequence. They solve problems, including doubling and halving to get Cubetto from A to B. They discuss size, shapes and patterns, distance, position, and time to solve problems.

Logical reasoning

The blocks allow children to create and debug simple programs with their hands. They use technology purposefully to create, organise, store, manipulate and retrieve meaningful sequences.

Introducing the Playset

Introducing Cubetto

Introduce Cubetto as a friendly robot that children can program. Children should be told that Cubetto cannot think for himself, and can only move as programmed by the child, just like any other machine. If in a group setting, sit children in a circle, and allow them to pass Cubetto around to one another, saying hello or acknowledging the presence of the object.

Doing so forms a bond with Cubetto, in the same way they would with a stuffed animal, or a toy, and solving problems through narratives later on is more engaging.

Introducing the Board

Introduce the Board as a remote control that children can use to send instructions to Cubetto.

Without the Board, there is no way of sending Cubetto his instructions.

It is important for children to understand Cubetto is only able to move with a human's command. This is not only empowering, but also key to understanding computing.

Encourage children to also explain what other objects in their homes and lives function within a similar paradigm. A television needs a human to change its channels for example, or a washing machine needs a human to select its settings.

These examples, like Cubetto, are machines that need human programming to do their job.

Introducing the Blocks

Introduce the Instruction Blocks as the directions Cubetto follows when inserted in the Board and sent by pressing the action button.

Different Blocks represent different instructions, and an unambiguous, distinct command. These Blocks are what make up Cubetto's hands on coding language, and are key in the learning of computational thinking.

When each block is inserted in the Board, a child should be encouraged to predict what Cubetto will execute before pressing the "Go" button.

This is key in understanding concepts like program design, and it helps develop abstraction.

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Unit 1 Overview

Year 1

By the end of the unit pupils will be able to:

- Understand what an algorithm is, how it is implemented on devices, and that programs execute by precise instructions.

- Pupils will also be able to create and debug a simple algorithm and use logical reasoning to predict the behaviour of simple programs.

	Lesson 1	Lesson 2	Lesson 3	Lesson 4
NC Computing Objectives	To control a digital device	To understand that programs execute by precise instructions	To understand that programs execute by precise instructions	To create a simple program
Outcomes	• I can identify different squares on the Egypt Map • I can say one fact about Ancient Egypt	• I can put instructions in the right order • I can follow instructions to make paper	• I can say what each block does • I can work with a partner to trade	• I can write a simple algorithm • I can play in a team
Cross-curricular Subject	Humanities	Art/Design	Humanities	PE
Computational Thinking	Tinkering	Logic, Tinkering	Logic, Persevering	Algorithms, Collaborating
Main Activities	Cubetto's Discovery 1. Introduce Ancient Egypt and archaeology through video and images. Dig and discover objects buried in sand. 2. Meet Cubetto and the Egypt Map. Identify the squares and explore how to make Cubetto move.	Cubetto's Papyrus 1. Order instructions to make paper, learning that a set of ordered instructions is called an algorithm. 2. Make paper just like Egyptians made papyrus and when it's dry, write a message and take home.	Cubetto's Trade 1. Work in small groups to find out the purpose of each block that controls Cubetto. When you have worked out each one, write a key for Cubetto. 2. Play a trading game in the hall, working in pairs to end up with one of each of the four blocks.	Cubetto's Crocodiles 1. Explore how to get Cubetto to the crocodiles on the map, using as few blocks as possible. 2. Play 'Jump the Nile' in two large groups: one rides camels trying to avoid the other team of crocodiles and hippos.
Challenge	Can you open up Cubetto and explore the parts inside?	Can you write or draw a set of instructions to get home from school?	Can you make Cubetto turn around?	Can you test out and evaluate someone else's algorithm?
Creative Play	Create a sand scene with crayons, glue & sand.	Make up your own written language using symbols.	Role play trading along the Nile for animals and plants.	Make a crocodile or camel from an egg carton and paint it.
Resources	Map of Africa, Images of pyramids, Sand boxes, Objects & brushes	Instructions to make paper, Glue, water, paper bags & kitchen towel	Direction cards, Drum beat music	Masking tape/cones, Pieces of fabric/ ribbon in one colour
Assessment	Photos, Verbal statements, Observation	Papyrus paper, Photos, Verbal statements, Observation	Trading, Photos, Verbal statements, Observation	Algorithms, Photos, Verbal statements, Observation

	Lesson 5	Lesson 6	Lesson 7	Lesson 8
NC Computing Objectives	To understand that programs execute by precise instructions	To use logical reasoning to predict behaviour of simple programs	To debug a simple algorithm	To create a simple program
Outcomes	• I understand that an algorithm is a set of ordered instructions • I can use symbols to create words	• I can predict what a program will do • I can investigate floating and sinking	• I can debug a simple algorithm • I can describe how to plant a seed	• I can create a simple algorithm • I can make a 3D model
Cross-curricular Subject	English	Science	Music	Science
Computational Thinking	Algorithms, Creating	Logic, Perseverance	Algorithms, Debugging	Algorithms, Creating
Main Activities	Cubetto's Cartouche 1. Order instructions to make Cubetto move to the hieroglyphics square, exploring the function block. 2. Make a cartouche spelling out Cubetto, placing the symbols in the correct order, similar to an algorithm.	Cubetto's Nile 1. Predict where Cubetto will end up when following different algorithms. 2. Predict which items will float and which will sink, then experiment to find out and record the results.	Cubetto's Seeds 1. Debug the algorithm for growing seeds and test out different Cubetto algorithms to work out what's wrong. 2. Discuss why the soil near the Nile was called the 'Black Land', then follow the instructions for planting a seed.	Cubetto's Jewels 1. Discuss what could be found in a tomb and create algorithms to make Cubetto collect jewels on his way to the pyramid. 2. Use different materials to create and decorate jewels.
Challenge	Can you move Cubetto around the map to draw the letter 'C'?	Can you use four random blocks in & predict where Cubetto will go?	Can you write a problem algorithm for someone else to debug?	Can you make your own map for Cubetto to explore?
Creative Play	Write hieroglyphics on paper stuck to the wall.	Design and make an Egyptian mask.	Role play being a Pharaoh (a King) in Egypt.	Make Cubetto into a pyramid!
Resources	Cubetto cartouche and key, Mixed up algorithms, Cartouche template	Rubber, Ball, Feather, Prepare algorithms , Bowls and objects, Float materials	Instructions , Sunflower seeds, Algorithms to debug, Pictures	Pictures of tombs, Shiny objects, Craft materials, Pyramid template
Assessment	Cartouches, Photos, Verbal statements, Observation	Algorithms & testing, Photos, Verbal statements, Observation	Seeds & algorithms, Photos, Verbal statements, Observation	Pyramid templates, Photos, Verbal statements, Observation

Lesson 1: Cubetto's Discovery (1 of 2)

Cross-curricular area: Humanities

NC Objectives

To control a digital device

Outcomes

- I can identify different squares on the Egypt Map
- I can say one fact about Ancient Egypt

Resources Needed

- Map of Africa
- Images of pyramids etc.
- Sand boxes, objects to bury & brushes

Prep Needed

- Check batteries.
- Check sound and video.
- Set up sand boxes with buried objects and brushes.

Resources Provided

- N/A

Key Vocabulary

- Ancient Egypt
- History
- Pyramid
- Archaeology

Computational thinking approach

Tinkering

Teacher-led Introduction

1. As children enter, play short video introduction to Ancient Egypt (from 30 secs in - https://goo.gl/6QmvZh) and ask: What did you see?
2. Introduce Ancient Egypt as a time in history that was very, very long ago – thousands of years ago.
3. Ask: Do you know where Egypt is? Show the pupils its location on a map and ask them to locate the UK as a reference point.
4. Explain that in Ancient Egypt, some parts of its history can be seen with our eyes but some parts are hidden, waiting to be discovered.
5. Show images of pyramids and explain these were built from stone a very long time ago by the Ancient Egyptians to put the bodies of the kings after they died. They are still standing in the Egyptian desert today, after thousands of years!
6. Show the Egypt Map and ask pupils to point out where the pyramid is. Ask: What else can you see on the map? Statues/river/desert.
7. Introduce the word archaeology as how we learn about what people did in the past by exploring what is hidden away.
8. Show Cubetto, the Board and the blocks, and explain that pupils will be exploring what Cubetto can do as well as being archaeologists!

Lesson 1: Cubetto's Discovery (2 of 2)

Creative Play

Create a sand scene with crayons, glue and sand.

Guided Activity

1. Hand the group Cubetto, the Board and the blocks and allow enough time for exploration and discussion between the children.
2. Ask: What do you think the Board does? What are the blocks for? Why are they different colours? Note children's responses/ questions.
3. Lay out the map and ask the children to place Cubetto on one square of their choice.
4. Ask: Can you make Cubetto move? Allow time and space for trial and error – try not to answer their questions but let pupils discover for themselves.
5. Ask children to find different squares on the map by placing Cubetto on the square (e.g. find the river, dune buggy, jewels, temple).

Independent Activity

1. Explain that hidden in the sand are different objects that the children need to find BUT they can only move them when they have revealed the object completely, as the objects are very fragile!
2. Model very gently brushing away the sand to glimpse an object, then brushing around it to uncover. Carefully lift it out.
3. Children take it in turns to use a brush to find an object then carefully brush away all the sand on top and around it.
4. When pupils find an object they must pass the brush to another person for their turn.
5. When all objects have been uncovered, pupils sort the objects into groups depending on their own criteria.

Challenge

Can you open up Cubetto and explore the parts inside?

Plenary and Assessment

1. Ask: What did we find out about Egypt today? Can you tell me one fact about Ancient Egypt?
2. Ask: What does archaeology mean? What did we discover hidden in the sand?
3. Show the map and ask two pupils to stand at the front. One pupil calls out something they can see on the map and the other must point quickly to it. Repeat with other volunteers and clarify what all squares are on the map.
4. Ask: How does Cubetto move? Can Cubetto move on his own? What surprised you about what Cubetto can do?

Lesson 2: Cubetto's Papyrus (1 of 2)

Cross-curricula Area: Art / Design

NC Objectives

To understand that programs execute by precise instructions

Outcomes

- I can put instructions in the right order
- I can follow instructions to make paper

Resources Needed

- Five-step instructions to make paper (drawings and pictures)
- Glue, water, brown paper bags cut into strips & kitchen towel
- If possible, papyrus paper

Prep Needed

- Check batteries.
- Print copies of the paper-making instructions and cut into strips for children to order.
- Cover tables in newspaper.

Resources Provided

- N/A

Key Vocabulary

- Papyrus
- Algorithm

Computational thinking concept

Logic

Computational thinking approach

Tinkering

Teacher-led Introduction

1. [If possible, hand out papyrus paper for children to feel and discuss].
2. Show short video explaining how to make papyrus paper: www.youtube.com/watch?v=mBnEMUvlNvI&t=99s and ask: What is papyrus? A plant. What did Ancient Egyptians use papyrus for? What is the paper that we use today made from?
3. Introduce the word 'algorithm' as a set of instructions in the right order. Ask: When do we follow instructions? Can you think of examples of instructions that have to be in the right order? Recipes, how to lace shoes, how to swim.
4. Show the five steps for making paper on the board, mixed up (e.g. lay down kitchen towel; dip strips of brown paper into glue mix; lay strips across kitchen towel overlapping each other; dip and lay more strips going downwards; dry paper).
5. Ask: What is the first thing that we have to do to make paper like the Ancient Egyptians?
6. Write five numbers descending on the board and ask for a volunteer to move the first step to number 1.
7. Explain that the children will be making their own papyrus paper today by following instructions.

Lesson 2: Cubetto's Papyrus (2 of 2)

Creative Play

Make up your own written language using symbols.

Guided Activity (in hall/playground)

1. Read the instructions for making papyrus paper together.
2. Ask: What is special about the way that papyrus is made? Strips laid across and then down.
3. Ask: Why do we need to put down kitchen towel?
4. Allow time for the children to follow the instructions at their own pace, supporting as necessary.
5. While pupils are working, ask: Why do you think they put the paper across one way and then downwards?
6. When finished, pupils can write their name carefully on the kitchen towel and leave to dry (ideally hanging up).
7. When it's dry, children can write a message about what they have learnt to take home.

Independent Activity

1. Look at the set of five instructions for making papyrus paper.
2. Discuss with a partner which goes first and why.
3. Put the instructions in the right order to make an algorithm.
4. When you have finished, stick them on paper to use in the next activity.

Challenge

Can you write or draw a set of instructions to get home from school?

Plenary and Assessment

1. Ask: What is an algorithm? What algorithms did we write today? Ask: What was easy and what was more difficult about programming?
2. Show a simple algorithm of four or five blocks on the IWB and ask: Who can show me how this would make Cubetto move?
3. Ask a volunteer to program Cubetto with the algorithm on the IWB using the Primo blocks and Board.
4. Ask: What does balance mean and what does it help us do? Why do astronauts need good balance?

Lesson 3: Cubetto's Trade (1 of 2)

Cross-curricula Area: Humanities

NC Objectives

To understand that programs execute by precise instructions

Outcomes

- I can say what each block does
- I can work with a partner to trade

Resources Needed

- Drum beats (e.g. military)

Prep Needed

- Check batteries.
- Check sound.
- Pin the Egypt Map on the wall at the front of the class.
- Copy and print direction cards.
- Book use of the hall/playground.

Resources Provided

- Direction cards

Key Vocabulary

- Left
- Right
- Quarter turn
- Direction
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Computational thinking concept

Logic

Computational thinking approach

Perseverance

Teacher-led Introduction

1. Ask: Does anyone know how to recognise which is their left and which is their right hand? (E.g. make an 'L' with your left forefinger and thumb.)
2. Ask children to stand up and start the drum beat music.
3. Model marching on the spot and ask the children to join in.
4. Announce, "Turn left!" and model turning to the children's left. Repeat with quarter turns, always coming back to the centre.
5. Ask for a volunteer who feels confident with their left and right to stand at the front, facing in the same direction as the rest of the class.
6. Class follows the volunteer's instructions while the drums play.
7. Show the Egypt Map on the wall and the direction card. Ask: If I am facing forward at the sphinx, which direction do I need to turn to face the dune buggy?
8. Repeat for other squares on the grid, prompting children to refer to the direction card if they are unsure.

Lesson 3: Cubetto's Trade (2 of 2)

Creative Play

Role play trading in a marketplace with gold, animals and plants.

Guided Activity

1. In small groups, look at all the coloured blocks.
2. What do you think the green one does? Try putting the green block in the Board and press the Go button.
3. What do you think the yellow one does? Try it out, then try out the red block too.
4. Do all the green blocks do the same thing? What about the yellow and red blocks?
5. Try another group's blocks. Does the red do the same?
6. Try to memorise what each block does. Can you think of a way to remember that left is yellow and red is right?

Independent Activity

1. Put the class into mixed ability pairs.
2. Explain that the class is going to play a trading game. Trading means giving something you have and getting something you want.
3. Explain that the Ancient Egyptians used to trade with other people by sailing along the River Nile. They would give gold, papyrus, cloth and grain and in exchange they would receive things like wood, metal and oils that they didn't have.
4. Introduce the aim of the game: to end up with only three blocks, one left, one right and one forward. When the achieve this, they can stand to the side of the game and watch the others.
5. Model showing your two left and one right blocks, then find and ask a pair for their forward block in exchange for one left.
6. Explain that the children won't get all three blocks after the first turn, they will have to ask different pairs and keep trying again.
7. Hand out one, two, three or four coloured blocks to each pair, at random, making sure no pair has all three colours.
8. Begin the trading! After 5 minutes, stop the group and ask: Who has managed to trade a block? How did you do it?

Challenge

Can you make Cubetto turn around?

Plenary and Assessment

1. Ask pupils to stand up and show them the yellow block. Ask: Which direction would Cubetto turn if we used this block? Children turn left.
2. Repeat for other blocks and ask pupils to come to the front to do the same, picking a block at random for the class to model.
3. Explain that each block of the same colour tells Cubetto to do one particular thing. All yellow blocks turn left and all red blocks turn right.

Prep Needed

- Check batteries.
- Book use of hall/ playground.

Lesson 4: Cubetto's Crocodiles (1 of 2)

Cross-curricular area: PE

NC Objectives

To create a simple program

Outcomes

- I can write a simple algorithm
- I can play in a team

Resources Needed

- Masking tape/ cones
- Pieces of fabric/ ribbon in one colour

Resources Provided

- N/A

Key Vocabulary

- Algorithm
- Attackers
- Defenders

Computational thinking concept

Algorithms

Computational thinking approach

Collaborating

Teacher-led Introduction

1. Lay out the Egypt Map in the middle of the classroom and ask the children to sit in a circle around it.
2. Place Cubetto on the compass facing south and ask: How can we move Cubetto to the crocodiles in front? Collect pupils' ideas, asking further questions without correcting.
3. Ask: What is the first block we need to put in the Board?
4. Ask for a volunteer to do as they think and place one of the blocks in the Board.
5. Before pressing the Go button, ask: Where do you think Cubetto will end up?
6. Repeat for the next steps, testing after each block is put in the Board until the program is complete.
7. Ask: What do we call a set of instructions in the right order? Algorithm.

Lesson 4: Cubetto's Crocodiles (2 of 2)

Creative Play

Make a crocodile or camel from an egg carton and paint it.

Guided Activity [in hall/playground]

1. Ask: What is the name of the river in Egypt? The River Nile. Explain that it is the longest river in the world!
2. Split the class into two groups: the attackers and the defenders, just like any team sport.
3. Explain that the attackers are crocodiles and hippos. Ask the group of attackers to choose which animal they want to be.
4. Explain that the defenders are people riding camels along the banks of the Nile.
5. Hand out one piece of coloured ribbon to the defenders and model putting a piece in the back of your waistband so that half is visible.
6. Explain that the crocs and hippos (attackers) have to pull the ribbon gently from the back of the people riding camels (defenders) who will try to escape! The aim is for defenders to keep their ribbons and attackers to collect as many as they can.
7. Ask the two groups to stand at different ends of the hall and quietly discuss how they will try to win.
8. Play the game and stop after 10 minutes. Ask the teams to regroup and discuss what they could do differently. Repeat.

Independent Activity

1. Work in a small group.
2. Place Cubetto on the compass facing north.
3. Write an algorithm to get Cubetto from the compass to the crocodiles (you choose which crocodiles!).
4. Test out your algorithm after every block to see whether it is working and discuss what you might need to change with your partner.
5. When you have gotten Cubetto to the crocodiles, place him back on the compass facing north.
6. Now write an algorithm to get Cubetto to the other crocodiles square.

Challenge

Can you test out and evaluate someone else's algorithm?

Plenary and Assessment

1. Sitting in a circle with the map in the middle, ask pupils to bring their Board and Cubetto in the middle to show their algorithm.
2. Before pressing the Go button, ask the class: How many blocks are in this algorithm? Do you think it will work? Why? Press "Go".
3. Ask: Did you work out the algorithm the first time? What did you find easy or difficult?

Lesson 5: Cubetto's Cartouche (1 of 2)

Cross-curricular area: English

NC Objectives

To understand that programs execute by precise instructions

Outcomes

- I understand that an algorithm is a set of ordered instructions
- I can use symbols to create words

Resources Needed

- Mixed up algorithm to move from the compass to the hieroglyphics (top right/F1)
- Cartouche template (oval)

Prep Needed

- Check batteries.
- Put the hieroglyphics key on the board, mixed up, so that each symbol can be moved.
- Print and cut up copies of the mixed up algorithm and hieroglyphics for children to reorder.
- Print copies of key.

Resources Provided

- Cubetto cartouche and key

Key Vocabulary

- Hieroglyphics
- Cartouche
- Function block

Computational thinking concept

Algorithms

Computational thinking approach

Creating

Teacher-led Introduction

1. Show the Cubetto cartouche on the board (just the vertical symbols in the yellow oval without the key).
2. Ask children to tell you what they can see and discuss which symbols are similar and different, for example the birds.
3. Explain that this is how the Ancient Egyptians wrote down their language. The language is written in hieroglyphics. Ask: What do you think it says?
4. Introduce the 'key' mixed up on the board and ask the children to work together to put the symbols in the right order.
5. Ask: Can anyone read what this says now? Cubetto! Explain that when hieroglyphics spell out a person's name downwards, this is called a cartouche.
6. Explain that Cubetto's blocks are like hieroglyphics because they are a language that computers understand.
7. Show the function (blue) block and ask: Has anyone tried using this block? What do you think it does?
8. Introduce the function block as a 'backpack' that keeps up to four other blocks inside it.
9. Model using the function block by placing it in the Board, then putting two green blocks in the function line below. Before pressing the Go button, ask the children what they think will happen.

Lesson 5: Cubetto's Cartouche (2 of 2)

Creative Play

On brown/yellow paper stuck to the wall, write in hieroglyphics.

Guided Activity

1. Place Cubetto on the compass facing north.
2. Explain that the children will be writing an algorithm to get Cubetto to the hieroglyphics (F1).
3. Starting without the blue block, ask: Which blocks do you need? Allow time for the children to explore and discuss.
4. When pupils have written an algorithm, re-introduce the function block as a backpack that can carry several blocks inside it.
5. Ask: How many blocks have we used so far? How could you use the function block to use fewer blocks in total?
6. Allow time for the children to try out using the function block and to discover what works and what doesn't.
7. If children finish quickly, start Cubetto at the palm tree and ask them to use the function block to reach the hieroglyphics.

Independent Activity (algorithms with blocks missing or no function lines)

1. Look at the seven symbols in hieroglyphics.
2. Look at the key.
3. Put the seven hieroglyphics in order so that it spells out C-u-b-e-t-t-o.
4. Take the cartouche template and place the symbols in order going downwards.

Challenge

Can you move Cubetto around the map to draw the letter 'C'?

Plenary and Assessment

1. Show two different algorithms that the children have created today, one with the function block and one without.
2. Ask: What is the same and different about these? How does the function block help us writing algorithms?
3. Ask children to show their cartouches and ask: Why is it important to put the symbols in the right order?

Lesson 6: Cubetto's Nile (1 of 2)

Cross-curricular area: Science

NC Objectives

To use logical reasoning to predict behaviour of simple programs

Outcomes

- I can predict what a program will do
- I can investigate floating and sinking

Resources Needed

- Rubber, ball, feather
- Variety of algorithms for children to predict
- Water bowls (ideally transparent) & objects to test
- Materials to make floats

Prep Needed

- Check batteries.
- Prepare tanks/ bowls filled with water.

Resources Provided

- N/A

Key Vocabulary

- Prediction
- River Nile
- Float
- Sink

Computational thinking concept

Logic

Computational thinking approach

Perseverance

Teacher-led Introduction

1. Sit the class in a circle with the map and Cubetto in the middle.
2. Ask for three volunteers to stand up and hand out the ruler, ball and feather to each child. Ask pupils to hold them up high.
3. Ask the class: What do you think will happen when they let go of the rubber? Collect ideas and write on the board.
4. Repeat for the ball and feather and ask: Why do you think that will happen? What do you already know that helps you decide that?
5. Explain that when we use our knowledge to think about what will happen in the future, this is called a prediction.
6. Ask the volunteers to drop the objects and compare the pupils' predictions with what happened.
7. Ask: Did anything surprise you?
8. Explain that today pupils will be predicting what happens to different objects in water.
9. Ask: What is the name of the longest river in the world? Introduce the water bowl as the Nile and show the objects that might fall in!

Lesson 6: Cubetto's Nile (2 of 2)

Creative Play

Design and make an Egyptian mask.

Guided Activity

1. In pairs, ask the pupils to describe the properties of the different objects in front of them.
2. Taking each one in turn, ask: If we drop this in the water, what do you predict will happen? Will it float or sink?
3. Encourage pupils to compare two objects and predict which will sink lower. Ask: Which of the objects will sink fastest and slowest?
4. Ask: Why do you predict this will happen? What do you know or have you seen before that helps you?
5. When all their predictions have been made, allow pupils time to test, and retest, their predictions.
6. Ask: Was your prediction correct? If so, how? If not, what happened instead?
7. Pick an object that sank and ask: What could you do to make this object float?
8. Show materials (e.g yoghurt pots) and allow time for pupils to explore making floats for different objects.

Independent Activity

1. Look at the first algorithm to make Cubetto move.
2. Where do you predict Cubetto will end up? Why do you think this?
3. Test out your prediction using Cubetto. Were you right? What happened?
4. Repeat for the other algorithms and test out your predictions.

Challenge

Can you put four random blocks in the board & predict where Cubetto will end up?

Plenary and Assessment

1. Ask volunteers to share their predictions for the algorithms and discuss why they predicted this.
2. Ask: How do we make predictions? Why is it helpful to make predictions when using Cubetto?
3. Ask pupils to share their algorithm predictions and what they found out.

Lesson 7: Cubetto's Seeds (1 of 2)

Cross-curricula Area: Science

NC Objectives

To debug a simple algorithm

Outcomes

- I can debug a simple algorithm
- I can describe how to plant a seed

Resources Needed

- Instructions for planting a seed
- Sunflower seeds and water
- Algorithms to debug
- Pictures of the 'black land' soil

Prep Needed

- Check batteries.
- Check video.
- Ask pupils to bring in a yoghurt pot filled with soil each.
- Cover the tables with newspaper.

Resources Provided

- N/A

Key Vocabulary

- Soil
- Sunlight
- Water
- Seed
- Debugging
- Program

Computational thinking concept

Algorithms

Computational thinking approach

Debugging

Teacher-led Introduction

1. Show timelapse video of germinating seed: www.youtube.com/watch?v=eKo5F87A8a0
2. Ask: What is happening in this video? Discuss how long it takes before the seedling shows above the soil (about four days).
3. Ask: What do plants need to grow? Sunlight, water and the weather to be not too warm or too cold.
4. Show the algorithm for planting a seed on the board with one step missing or wrong (e.g. fill pot with soil; poke hole halfway down; _____ ; cover with soil; water the seed).
5. Read the instructions together and ask: Are these instructions correct? Collect responses without correcting or confirming.
6. Model following the instructions as shown and check with pupils at each stage. When the problem is reached, ask: Will this work? What's wrong/missing? What should it say instead?
7. Explain that working out and fixing what is wrong with an algorithm is called debugging.
8. Pass round the seeds for pupils to touch and smell.
9. Explain that today the children will be debugging algorithms to program Cubetto and following instructions to plant seeds.

Lesson 7: Cubetto's Seeds (2 of 2)

Creative Play

Role play being a Pharaoh (a King) in Egypt.

Guided Activity

1. Show the pictures of the land on the edge of the River Nile and discuss.
2. Explain that the Ancient Egyptians named it 'Black Land' because of how dark the soil was when wet.
3. Ask: Can you remember the five steps for planting a seed? Collect and discuss.
4. Allow time for pupils to collect their pot, adjust the amount of soil if necessary, poke a hole not too deep and plant their seed.
5. Hand out the water and support the children to pour a small amount onto the soil and write their name on the pot with a pen.
6. Ask: Where is a good place to leave these seeds to grow?
7. Children discuss and decide where to leave their plant, and check on it over a week to note its progress.

Independent Activity

1. Look at the algorithm on the sheet (e.g. Start at sphinx, end at palm tree (facing N): left, forward, forward, left, forward).
2. Do you think this will work? Why/why not? Is there a block missing or a problem? Should read: left, forward, forward, right, forward.
3. If there is a problem, work out what it is and how you can fix it.
4. Do you need to add another block? Do you need to change a block for a different one?
5. Test out your algorithm to see if it now works.
6. Do you need to try again?

Challenge

Can you write a problem algorithm for someone else to debug?

Plenary and Assessment

1. Ask: What does debugging mean?
2. Show two algorithms: one with and one without a problem. Ask: Can you tell me which algorithm has a problem? Why do you think that?
3. Ask: How could you use the function block to use fewer blocks? Discuss.
4. Ask volunteers to share their seedlings and explain how they planted them and why they chose their specific location for the plants to grow in.

Lesson 8: Cubetto's Jewels (1 of 2)

Cross-curricula Area: Art/Design

NC Objectives

To create a simple algorithm

Outcomes

- I can create a simple algorithm
- I can make a 3D model

Resources Needed

- Pictures of inside tomb
- Shiny objects/play jewels
- Materials to make jewels
- Pyramid template for assessment

Prep Needed

- Check batteries.
- Prepare craft materials.
- Print pictures of the tomb treasures.
- Copy pyramid template.

Resources Provided

- N/A

Key Vocabulary

- Check batteries.
- Prepare craft materials.
- Print pictures of the tomb treasures.
- Copy pyramid template.

Computational thinking concept

Algorithms

Computational thinking approach

Creating

Teacher-led Introduction

1. Show video of inside a pyramid in Egypt: www.youtube.com/watch?v=kKsJAgmGAW4
2. Explain that the pyramids were built for people who have died and they were buried inside. This video shows what it looks like inside now (anyone can visit them!) but in Ancient Egypt, they were full of treasures and statues.
3. Show pictures of what the tombs would have looked like thousands of years ago.
4. Ask: What can you see in the photos? Why do you think all those objects are in the tomb?
5. Show the Egypt Map and ask the children to find the jewels and the pyramid.
6. Place the play jewels on B5 and ask: How would you move Cubetto to take the jewels to the pyramid (E5)?
7. Collect answers and invite children to suggest the algorithm. Put the jewels on top of Cubetto and test out the algorithm.
8. Now explain to the children that they will have a problem to solve today: Cubetto can't get wet! Cubetto can't go through or over the squares of the River Nile

Lesson 8: Cubetto's Jewels (2 of 2)

Creative Play

Make Cubetto into a pyramid!

Guided Activity

1. Place Cubetto on B5. Explain that Cubetto is a computer and can't get wet, so they cannot go over the River Nile – they must go around it!
2. Ask: Where is the next square that Cubetto can move to? B4. Place a jewel on B4 and repeat the question until jewels are placed along the route Cubetto can take, avoiding the river.
3. Ask: What blocks do we need to make Cubetto collect the jewels? What are the first two blocks we need?
4. Ask: Can we use the function block? How?
5. Allow time for the children to try out and discuss the algorithm to make Cubetto collect the jewels.

Independent Activity

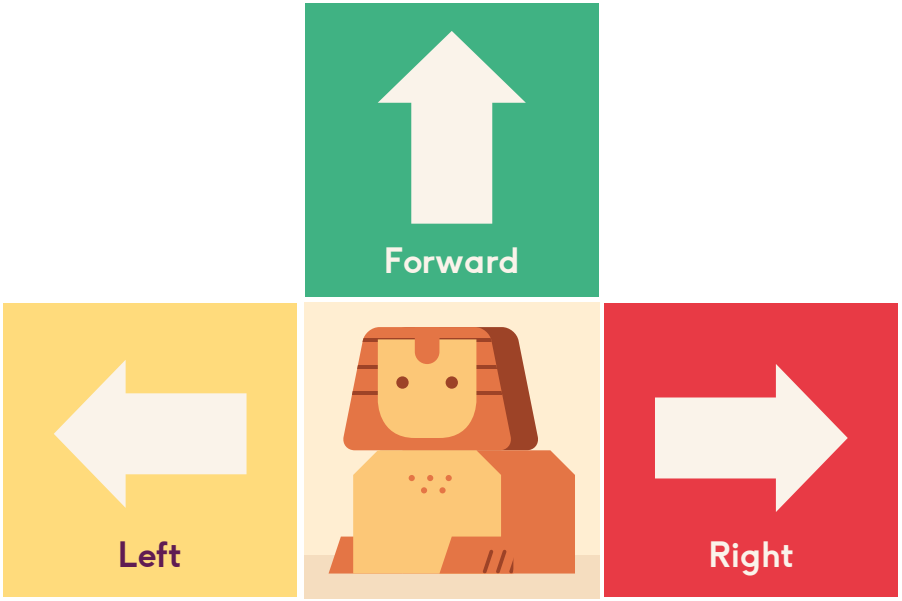
1. Look at the pictures of the jewels found in the pyramids.
2. What colours can you see? What shapes are there?
3. Pick one of the pictures of the jewels you would like to make.
4. Touch and look at the different materials you can use to make the jewels.
5. Use the materials to make jewels for Cubetto to take to the pyramid.

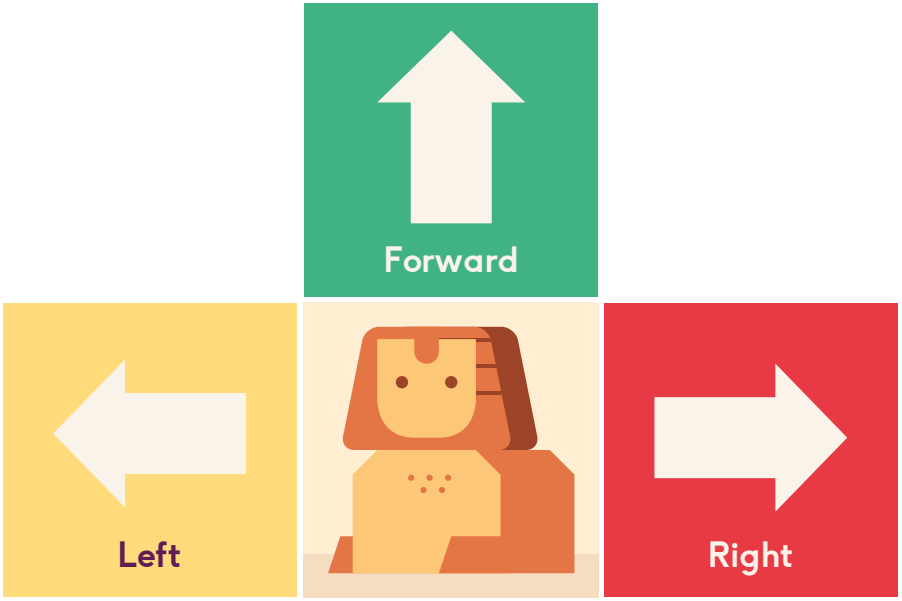
Challenge

Can you make your own map for Cubetto to explore?

Plenary and Assessment

1. Ask: What is inside the pyramids? Ask pupils to share their jewels with the class and to describe them.
2. Ask: What did you find easy when writing the algorithm for Cubetto? What was difficult?
3. Ask: What have we learnt about Ancient Egypt? What have we learnt about algorithms? Invite children to share and record their learning as pictures or writing in pyramid templates.





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