

# PRIMO

## Coding with Cubetto - Unit 3

Reception, Ages 4 to 5, UK National Curriculum

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### Subjects covered:

Personal and Social Health

Literacy

Expressive Arts and Design

Maths

### Materials required:

6x Cubettos

6x Boards

6x Sets of Blocks

6x Standard Maps

## Introduction

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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

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### 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

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### 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 3 Overview

### Reception

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

- Understand what an algorithm is and that programs execute by precise instructions.
- Pupils will also be able to create a simple algorithm and use logical reasoning to predict the behaviour of simple programs.

	Lesson 1	Lesson 2	Lesson 3	Lesson 4
<b>NC Computing Objectives</b>	To explore a digital device	To create and execute a simple program	To create and execute a simple program	To create and execute a simple program
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>I can make Cubetto move</li> <li>I can talk about the features of different 2D shapes</li> </ul>	<ul style="list-style-type: none"> <li>I can take turns</li> <li>I can talk about what each of the coloured blocks does</li> </ul>	<ul style="list-style-type: none"> <li>I can make Cubetto move to a particular place</li> <li>I can talk about the features of different 3D shapes</li> </ul>	<ul style="list-style-type: none"> <li>I can say what an algorithm is</li> <li>I can identify shapes within my environment</li> </ul>
<b>EYFS Focus</b>	Maths - space & shape (ELG 12)	Maths - space & shape (ELG 12)	Maths - space & shape (ELG 12)	Maths - space & shape (ELG 12)
<b>Computational Thinking</b>	Algorithms, Tinkering	Algorithms, Collaborating	Algorithms, Creating	Algorithms, Creating
<b>Main Activities</b>	Cubetto the 2D shape detective <ol style="list-style-type: none"> <li>Guess which 2D shape is missing in Cubetto's memory game.</li> <li>Make a Shape Robot, moving Cubetto around the map collecting 2D shapes.</li> <li>Take a 2D shape from a feely bag using a puppet and talk about its features.</li> <li>Cross the playground using 2D shape carpet tiles.</li> <li>Write a letter to Cubetto explaining what you would do together if you took him home for the weekend.</li> <li>Cubetto keeps missing the castle and landing in the sea! Can you help?</li> <li>Make print patterned algorithms for Cubetto with coloured stamps and paint.</li> </ol>		Cubetto's 3D shape hunt <ol style="list-style-type: none"> <li>Feel and describe a 3D shape behind your back: Can you guess what it is?</li> <li>Build Cubetto a house to sleep in at night using construction blocks.</li> <li>Make a 'random' hat for Cubetto to wear when exploring using the random block.</li> <li>Select 3D shapes at random and label each one with its name.</li> <li>Go on a shape hunt! Record all of the shapes you can find in the playground.</li> <li>Talk about which animals would like to live on the mountains, in the city, in the sea or near the castle. Transport the animals around the map on Cubetto.</li> <li>Roll a shape die and collect the matching shape using Cubetto.</li> </ol>	
<b>Challenge</b>	Can you talk about what happens when Cubetto goes wrong?	Can you make an algorithm using all of the blocks? Where does it end up?	Play 'I spy' with a friend. Can you make Cubetto move towards the object?	Cubetto keeps forgetting a shape! Can you move him backwards to help?
<b>Resources</b>	2D shape stickers, 2D plastic shapes, hand puppets, 2D shaped carpet tiles, blank letter template, poster paint, stamps in shape of Cubetto blocks		Paper cones, 3D plastic shapes, hand puppets and feely bag, white sticky labels, paper or card, clipboards and shape hunt grid, remote control car, toy animals, dice	
<b>Assessment</b>	Algorithm painted prints, observation of role play and mirror activities, verbal statements and photos		Labels and shape hunt template sheet, verbal statements about block functions, photos and observation	

	Lesson 5	Lesson 6	Lesson 7	Lesson 8
<b>NC Computing Objectives</b>	To create and execute a simple program	To create and execute a simple program	To create and execute a simple program	To create and execute a simple program
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>I can describe how to make Cubetto move</li> <li>I can create a shape and describe it</li> </ul>	<ul style="list-style-type: none"> <li>I can compare two toys</li> <li>I can use the opposite block</li> </ul>	<ul style="list-style-type: none"> <li>I can write a simple algorithm</li> <li>I can order shapes according to size</li> </ul>	<ul style="list-style-type: none"> <li>I can write an algorithm</li> <li>I can sort shapes</li> </ul>
<b>EYFS Focus</b>	Maths - space & shape (ELG 12)	Maths - space & shape (ELG 12)	Maths - space & shape (ELG 12)	Maths - space & shape (ELG 12)
<b>Computational Thinking</b>	Algorithms, Creating	Algorithms, Creating	Patterns, Persevering	Patterns, Persevering
<b>Main Activities</b>	Cubetto the shape creator <ol style="list-style-type: none"> <li>Collect 2D and 3D shapes with Cubetto then find the matching name card in the classroom.</li> <li>Build Cubetto a safety wall from cubes so that he doesn't fall off the map's edge!</li> <li>Collect lollipop sticks from the map and make 2D shapes out of them.</li> <li>Explore using the opposite block - does it work on its own?</li> <li>Play shape bingo! Select shapes randomly and cross them off your card.</li> <li>Draw and colour block algorithms and ask a friend to guess where Cubetto would move to.</li> <li>Make Cubetto a passport including stamps of where he has travelled to.</li> </ol>		Cubetto sorts it <ol style="list-style-type: none"> <li>Make Cubetto collect different sized circles and order them according to size.</li> <li>Use the wooden train track to build a track from Cubetto's home to the map.</li> <li>In a group, order yourselves according to size, starting with the shortest.</li> <li>Make algorithms starting with three forward blocks and see where Cubetto moves to.</li> <li>Make a building out of recycled materials for Cubetto to visit in the city.</li> <li>Roll, cut out and name 2D shape cookies from modelling clay for Cubetto.</li> <li>Cubetto transports smaller 2D shapes to its corresponding larger 2D shape on the map.</li> </ol>	
<b>Challenge</b>	Can you make Cubetto pick up the class mascot?	Roll a die and write an algorithm using that number of blocks.	Can you move Cubetto forwards the number of sides of a pentagon?	Can you describe the different shapes on the boat?
<b>Resources</b>	Plastic 2D and 3D shapes; feely bag, shape name cards, construction blocks, lollipop sticks, shape bingo grids, Cubetto block cards for pairs game, passport template		2D shapes of various sizes, 3D shapes, train set, recycled materials, modelling clay, 2D shape cutters	
<b>Assessment</b>	Algorithm predictions, photos, verbal statements and observation		Created algorithms, photos, statements and observation of shapes	

## Lesson 1: Cubetto the 2D Shape Detective (1 of 2)

EYFS Focus: Maths (ELG 1)

### NC Objectives

To explore a digital device

### Outcomes

- I can make Cubetto move
- I can talk about the features of different 2D shapes

### Resources Needed

- 2D shape stickers and plastic shapes
- Hand puppets
- 2D shaped carpet tiles
- Blank letter template
- Poster paint and stamps in shape of blocks

### Prep Needed

- Check batteries.
- Hide 2D shapes around the room.
- Create stamps in shape of Cubetto blocks.

### Resources Provided

- N/A

### Key Vocabulary

- 2D shape names
- Flat
- Properties
- Backwards

### Computational thinking concept



Algorithms

### Computational thinking approach



Tinkering

### Teacher-led introduction

1. Ask pupils to look around the classroom and see if they can spot 2D shapes that Cubetto has hidden. Emphasise that 2D means flat.
2. Allow time for children to find and collect the 2D shapes. When brought back to the carpet, stick them on the board.
3. Discuss each shape: What is this shape called? What is special about this shape? Can you describe what it looks like?
4. Choose four shapes and explain that they are going to play a memory game. Ask: Can you remember the names of these shapes?
5. Ask pupils to close their eyes. Remove one of the shapes from the board and tell the children that Cubetto has taken one of the shapes.
6. Ask: Which shape is missing? Can you describe that shape?
7. Repeat for other shapes, introducing the word 'properties' for the way we describe what a shape looks like.
8. Explain that today the pupils will be helping Cubetto hunt for all the 2D shapes around the map!



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## Lesson 1: Cubetto the 2D Shape Detective (2 of 2)

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### Activity 1: Shape Robot

1. Choose a shape sticker placed on the map.
2. Move Cubetto to land on a 2D sticker on the map.
3. What shape have you collected? Can you describe it?
4. Attach the shape sticker to Cubetto and repeat.

### Activity 2: Puppets

1. Work in pairs, each with a puppet.
2. The puppets choose their favourite shapes from the bag.
3. Each puppet tells the other all about the shape's properties.

### Activity 3: Shape stepping stones

1. Work in two teams, each with a set of large 2D carpet tiles.
2. Compete to get from one side of the playground to the other.
3. Only one child can stand on one shape at a time.
4. How quickly can you get to the other side?

### Activity 4: Cubetto's pen pal

1. Where on the map would you like to travel to on an adventure?
2. What would you take with you? What would you do when you got there?
3. Write a letter to Cubetto explaining your adventure.

### Activity 5: Silly Cubetto!

1. Which block makes Cubetto move backwards?
2. Cubetto wants to get to the castle but keeps missing it and ending up in the sea next to it - silly Cubetto!
3. Place Cubetto on the sea next to the castle: can you use the backwards block to get Cubetto to the castle?

### Activity 6: Printing

1. Use coloured stamps and poster paint to print patterned algorithms for Cubetto to follow.
2. Can you describe your algorithm?

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### Challenge

Can you talk about what happens when Cubetto goes wrong?

### Plenary and Assessment

1. Show a 2D shape and ask: Cubetto thinks this is a rectangle, is he right? No. Ask: How do you know it is not a rectangle?
2. Ask a volunteer to show the class one of their printed block patterns and ask: Can you describe what each of the blocks does?
3. Ask a volunteer to read one of the letters they have written to Cubetto, detailing the adventure they would like to have together.

## Lesson 2: Cubetto's Favourite Shapes (1 of 2)

EYFS Focus: Maths (ELG 1)

### NC Objectives

To understand that programs execute by precise instructions

### Outcomes

- I can take turns
- I can talk about what each of the coloured blocks does

### Resources Needed

- 2D shape stickers and plastic shapes
- Hand puppets
- 2D shaped carpet tiles
- Blank letter template
- Poster paint and stamps in shape of blocks

### Prep Needed

- Check batteries.

### Resources Provided

- N/A

### Key Vocabulary

- Order
- Program
- Computer programmer
- 2D shapes
- Take turns

### Computational thinking concept



Algorithms

### Computational thinking approach



Collaborating

### Teacher-led Introduction

1. Show on the board all of the ingredients to make a pizza: pizza base, tomato sauce, cheese, ham, mushrooms and an oven.
2. Tell the pupils that our mascot thinks this is how to make a pizza: "First of all, put the tomato sauce in the oven. Next put the cheese on the table and sprinkle the mushrooms on top. Finally put the pizza base on your head!" Discuss.
3. Ask: Has the class mascot got the right order of how and when things should happen?
4. Ask the children to talk in pairs about the correct order of events when making your very own pizza.
5. Share and write the correct order together on the board.
6. Explain that the order we do things in is very important because otherwise we would make mistakes. Understanding which order things must go in helps us to program computers. We need to be able to do this to program Cubetto. You are becoming computer programmers - something many adults cannot do!
7. Explain that today pupils are going to take turns to create a series of steps/instructions to find the correct 2D shapes on the maps.
8. Play the 2D shape song: <https://www.youtube.com/watch?v=WTeqUejf3D0> and recall the names of common 2D shapes.

## Lesson 2: Cubetto's Favourite Shapes (2 of 2)

### Activity 1: Shape Robot

1. Choose a shape sticker placed on the map.
2. Move Cubetto to land on a 2D sticker on the map.
3. What shape have you collected? Can you describe it?
4. Attach the shape sticker to Cubetto and repeat.

### Activity 2: Puppets

1. Work in pairs, each with a puppet.
2. The puppets choose their favourite shapes from the bag.
3. Each puppet tells the other all about the shape's properties.

### Activity 3: Shape stepping stones

1. Work in two teams, each with a set of large 2D carpet tiles.
2. Compete to get from one side of the playground to the other.
3. Only one child can stand on one shape at a time
4. How quickly can you get to the other side?

### Activity 4: Cubetto's pen pal

1. Where on the map you would like to travel to on an adventure?
2. What would you take with you? What would you do when you got there?
3. Write a letter to Cubetto explaining your adventure.

### Activity 5: Silly Cubetto!

1. Which block makes Cubetto move backwards?
2. Cubetto wants to get to the castle but keeps missing it and ending up in the sea next to it - silly Cubetto!
3. Place Cubetto on the sea next to the castle: can you use the backwards block to get Cubetto to the castle?

### Activity 6: Printing

1. Use coloured stamps and poster paint to print patterned algorithms for Cubetto to follow.
2. Can you describe your algorithm?

### Challenge

Can you make an algorithm using all of Cubetto's blocks? Where does it end up?

### Plenary and Assessment

1. Explain that Cubetto thinks he can get from one side of the map to the other by moving forwards six steps. Ask: Do you agree? There are six squares but we only have four green blocks to use. Ask: How would we make Cubetto move across the map?
2. Ask a volunteer to pull out a 2D shape from the feely bag and describe its properties.
3. Ask: How did you take turns today? Can you tell me about another person in the class who waited nicely for their turn?

## Lesson 3: Cubetto's 3D Shape Hunt (1 of 2)

EYFS Focus: Maths (SSM ELG)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To create and execute a simple program	<ul style="list-style-type: none"> <li>I can make Cubetto move to a particular place</li> <li>I can talk about the features of different 3D shapes</li> </ul>	<ul style="list-style-type: none"> <li>Paper cones and 3D plastic shapes</li> <li>Hand puppets and feely bag</li> <li>White sticky labels and paper or card</li> <li>Clipboards and shape hunt grid</li> <li>Toy animals and large dice</li> </ul>	<ul style="list-style-type: none"> <li>Check batteries.</li> <li>Put 3D shapes in feely bag for introduction.</li> <li>Decorate large dice with different shape names and images.</li> <li>Place shapes randomly on maps.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>3D shapes</li> <li>Solid</li> <li>Blocks</li> <li>Random</li> <li>Algorithm</li> </ul>

### Computational thinking concept



Algorithms

### Computational thinking approach



Creating

### Teacher-led Introduction

- Show video of car made from 2D shapes: <https://www.youtube.com/watch?v=bMUgOsKNDJs> and ask: Could we play with this car?
- Explain that we couldn't because 2D shapes are flat, but we could if it was made from 3D shapes - they are solid.
- Stand with your back to the class and your hands behind your back. Ask a volunteer to place a shape from the bag into your hands for you to feel (you don't look but the class can see).
- Model feeling and describing the shape without using its name to work out which shape it is.
- Bring your hands to the front and ask: Was I right? What shape is this? Is this shape 2D? Why/why not?
- Ask a volunteer to stand up with their back to the class and hand them a shape to hold and feel. Ask: Can you guess this 3D shape?
- When guessed correctly, ask the volunteer to place their shape on the map. Place Cubetto a couple of squares away.
- Ask: Can you work out which blocks you will need to move Cubetto to collect the shape? Remind children about the pizza instructions that must be in the right order, just like Cubetto's blocks.
- Collect ideas and try out children's suggestions on Cubetto. Recap what the random (black) block does and what the word 'random' means.
- Introduce the word 'algorithm' to describe a set of instructions in the right order, just like Cubetto's blocks.

## Lesson 3: Cubetto's 3D Shape Hunt (2 of 2)

### Activity 1: Building blocks

1. Build a house for Cubetto to sleep in at night using materials.
2. Can you write an algorithm to move Cubetto in and out of the house?

### Activity 2: Random!

1. Decorate a cone hat with the random block shape.
2. Put the shape hat on Cubetto and use the random block in an algorithm.  
What does it make Cubetto do?

### Activity 3: Puppet pull

1. Use a puppet to randomly pull out a 3D shape.
2. Write its name on a sticky label and stick it to the shape.
3. Count its sides and write this number on the shape's label.

### Activity 4: Shape hunt

1. Use a clipboard and grid in a small group.
2. Go outside and hunt for shapes you can see in the environment.
3. Record which shapes you found and where you found them.

### Activity 5: Cubetto's animals

1. Look at a selection of plastic animals and decide which ones could live in the mountains, in the sea, or in the city.
2. Place the animals on the corresponding square on the map.
3. Make Cubetto collect the animals by moving to those squares.

### Activity 6: Shape dice

1. Roll a shape die and find that matching shape on the map.
2. Make Cubetto move to collect that shape.

### Challenge

Play 'I spy' with a friend.  
Can you make Cubetto move towards the object?

### Plenary and Assessment

1. Ask: What does the random block do? Ask pupils to show their 'random hats' for Cubetto and describe what happens when using the block.
2. Ask a pupil to pull a shape from the feely bag and hide it from the class. Ask the child to describe it for the class to guess. Repeat.
3. Ask: What have you enjoyed about using Cubetto so far? If you got stuck during one of the activities, who or what was able to help you?
4. Discuss any mistakes pupils made using Cubetto and discuss why making mistakes can often be a good thing.

## Lesson 4: Cubetto’s 3D Shape Hunt (1 of 2)

EYFS Focus: Maths (SSM ELG 1)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To create and execute a simple program	<ul style="list-style-type: none"> <li>I can say what an algorithm is</li> <li>I can identify shapes within my environment</li> </ul>	<ul style="list-style-type: none"> <li>Paper cones and 3D plastic shapes</li> <li>Hand puppets and feely bag</li> <li>White sticky labels and paper or card</li> <li>Clipboards and shape hunt grid</li> <li>Remote control car, toy animals and dice</li> </ul>	<ul style="list-style-type: none"> <li>Check batteries.</li> <li>Incorrect algorithm to collect a shape.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Control</li> <li>Signal</li> <li>Algorithm</li> </ul>

### Computational thinking concept



Algorithms

### Computational thinking approach



Tinkering

### Teacher-led Introduction

1. Show the pupils a small remote control car with its control box. Ask: What is this and how does it work?
2. Display a simple path for the car to travel on which has a series of obstacles it must avoid (e.g. classroom chair, pencil pot, book).
3. Ask the pupils to talk to their partner about how they would tell the car to get from the start to the finish line, avoiding these obstacles.
4. Ask: How is this remote control car similar/different to Cubetto? Which do you prefer and why?
5. Explain that the control sends a signal, such as a radio wave, to the car. The receiver, such as an antenna or circuit board, is hidden inside the toy, and takes the signal from the controller. When it gets the signal, the control makes the motors inside the toy move!
6. Show the Board, blocks, Cubetto and the map. Ask: Which part is like the car? Which part is the control box?
7. Explain that Cubetto’s control is the Board and instruction blocks. It can’t move without us! Our job is to place the instruction blocks into the Board in a set order to make Cubetto move, before pressing the Go button to set the robot in motion.
8. Recap that when the blocks are in order this is called an algorithm.

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## Lesson 4: Cubetto's 3D Shape Hunt (2 of 2)

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### Activity 1: Building blocks

1. Build a house for Cubetto to sleep in at night using materials.
2. Can you write an algorithm to move Cubetto in and out of the house?

### Activity 2: Random!

1. Decorate a cone hat with the random block shape.
2. Put the shape hat on Cubetto and use the random block in an algorithm.  
What does it make Cubetto do?

### Activity 3: Puppet pull

1. Use a puppet to randomly pull out a 3D shape.
2. Write its name on a sticky label and stick it to the shape
3. Count its sides and write this number on the shape's label.

### Activity 4: Shape hunt

1. Use a clipboard and grid in a small group.
2. Go outside and hunt for shapes you can see in the environment.
3. Record which shapes you found and where you found them.

### Activity 5: Cubetto's animals

1. Look at a selection of plastic animals and decide which ones could live in the mountains, in the sea, or in the city.
2. Place the animals on the corresponding square on the map.
3. Make Cubetto collect the animals by moving to those squares.

### Activity 6: Shape dice

1. Roll a shape die and find that matching shape on the map.
2. Make Cubetto move to collect that shape.

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### Challenge

Cubetto keeps forgetting a shape! Can you move it backwards to help?

### Plenary and Assessment

1. Ask pupils to share the different shapes they found outside. Ask: Did you find any 2D shapes? What about 3D shapes?
2. Ask: What is special about an algorithm? Can you point to an algorithm in the classroom?
3. Describe a shape to the pupils and ask them to guess which shape you're describing. Ask: Is this a 2D or 3D shape?
4. Place the shape on the map and an (incorrect) algorithm to get Cubetto to pick up the shape. Ask: What will happen? Discuss.
5. Ask: What does the random block do? If you could choose any action for the random block to do, what would it be?

## Lesson 5: Cubetto the Shape Creator! (1 of 2)

EYFS Focus: Maths (SSM ELG 1)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To create and execute a simple algorithm	<ul style="list-style-type: none"> <li>I can describe how to make Cubetto move</li> <li>I can create a shape and discuss its key features</li> </ul>	<ul style="list-style-type: none"> <li>Plastic 2D and 3D shapes; feely bag x 15</li> <li>Shape name cards x 15</li> <li>Construction blocks</li> <li>Lollipop sticks and camera</li> <li>Shape bingo grids</li> <li>Passport template</li> </ul>	<ul style="list-style-type: none"> <li>Check batteries.</li> <li>Fill feely bags with a variety of 2D shapes for shape bingo.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Cubetto</li> <li>Describe</li> <li>Opposite</li> <li>2d/3d shapes</li> <li>Algorithm</li> </ul>

### Computational thinking concept



Algorithms

### Computational thinking approach



Tinkering

### Teacher-led Introduction

1. Explain that around the classroom Cubetto has hidden shape cards with the names and pictures of different shapes, both 2D and 3D. Show an example.
2. Tell children that they have one minute to work in pairs to find a card and bring it back to the carpet.
3. When children have returned, show Cubetto's map with 2D and 3D shapes on different squares.
4. Ask volunteers to take it in turns putting their shape card on the corresponding shape on the map. Ask: What is special about your shape? What are its properties? Is your shape 2D or 3D?
5. Hand out lollipop sticks to the children and allow time for them to explore placing them on the floor to make a 2D shape.
6. Ask volunteers to name their shape and explain it to the class.
7. Explain that today we will be using Cubetto to make shapes!



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## Lesson 5: Cubetto the Shape Creator! (2 of 2)

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### Activity 1: Protective wall

1. Cubetto needs a protective wall around the map so he doesn't fall off!
2. Build a wall around the edge of the map using construction materials.
3. Test the wall to see what happens when Cubetto crosses it!

### Activity 2: Cubetto's lollies

1. Put four lollipop sticks in a line of different squares on the map.
2. Write an algorithm to pick up all four sticks.
3. Can you use the sticks to make a 2D shape? Take a photo.

### Activity 3: Opposite block

1. Which block makes Cubetto do the opposite?
2. Does the block work on its own in the Board?
3. Explore and test out the opposite block. What happens when you put it after a red block?

### Activity 4: Shape bingo

1. In a small group, play shape bingo using a feely bag and grid.
2. Take it in turns to pull out a shape from the bag.
3. If you can find the shape on your bingo grid, cross it off! If not, put it back.

### Activity 5: Coloured algorithms

1. Draw round different instruction blocks and colour them in.
2. Create a simple algorithm.
3. Can your friend work out where it would make Cubetto move?

### Activity 6: Travel passport

1. Create a passport for Cubetto!
2. On the template, draw a picture of Cubetto.
3. Draw stamps on the pages to show all of the places he has visited.

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### Challenge

Can you make Cubetto pick up the class mascot?

### Plenary and Assessment

1. Ask: Why do you think our robot is called Cubetto? If Cubetto was a cylinder, what could we call him?
2. Show photos taken of the children's lolly shapes and ask pupils to name each shape.
3. Ask volunteers to share their passports, detailing all of the journeys Cubetto has made. Ask children to match stamps to the map.
4. Ask: Can you tell your partner how Cubetto moves? Can Cubetto move on his own? Show each block and ask the children to name it.

## Lesson 6: Cubetto the Shape Creator! (1 of 2)

EYFS Focus: Maths (SSM ELG 1)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To create and execute a simple algorithm	<ul style="list-style-type: none"> <li>I can compare two toys</li> <li>I can use the opposite block</li> </ul>	<ul style="list-style-type: none"> <li>Plastic 2D and 3D shapes; feely bag</li> <li>Shape name cards x 15</li> <li>Construction blocks</li> <li>Lollipop sticks and camera</li> <li>Shape bingo grids</li> <li>Passport template</li> </ul>	<ul style="list-style-type: none"> <li>Check batteries.</li> <li>Source a mechanical toy for demonstration in introduction.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Opposite</li> <li>2D/3D shapes</li> <li>Algorithm</li> </ul>

### Computational thinking concept



Algorithms

### Computational thinking approach



Tinkering

### Teacher-led Introduction

1. Show a mechanical toy and the map and ask: If I want this toy to start at G and get to the boat, what can I do? Discuss together.
2. Now show Cubetto and ask: If I want Cubetto to start at G and get to the boat, what do I need to do?
3. Ask: What things are the same and what is different about making these two toys move? Emphasise that both toys need your help to move, but Cubetto is controlled by the Board. It is very clever!
4. Play Pac Man game with the class: <http://www.knowledgeadventure.com/games/pac-man/>. Ask: How does Pac Man move? Which directions?
5. Ask: Is Pac Man similar to Cubetto? How? Brainstorm similarities and differences, thinking about which is more clever and why.
6. Show the opposite block and ask: Have you used this block? What does this block make Cubetto do?
7. Recap that the opposite block doesn't do anything on its own, but when you put it before another block, it makes Cubetto do the opposite of it.
8. Demonstrate using it in the Board and before pressing the Go button, ask: What do you think Cubetto will do?
9. Ask: Can you make Cubetto shake his head?

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## Lesson 6: Cubetto the Shape Creator! (2 of 2)

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### Activity 1: Protective wall

1. Cubetto needs a protective wall around the map so he doesn't fall off!
2. Build a wall around the edge of the map using construction materials.
3. Test the wall to see what happens when Cubetto crosses it!

### Activity 2: Cubetto's lollies

1. Put four lollipop sticks in a line of different squares on the map.
2. Write an algorithm to pick up all four sticks.
3. Can you use the sticks to make a 2D shape? Take a photo.

### Activity 3: Opposite block

1. Which block makes Cubetto do the opposite?
2. Does the block work on its own in the Board?
3. Explore and test out this block. What happens when you put it after a red block?

### Activity 4: Shape bingo

1. In a small group, play shape bingo using a feely bag and grid.
2. Take it in turns to pull out a shape from the bag.
3. If you can find the shape on your bingo grid, cross it off! If not, put it back.

### Activity 5: Coloured algorithms

1. Draw round different instruction blocks and colour them in.
2. Create a simple algorithm.
3. Can your friend work out where it would make Cubetto move?

### Activity 6: Travel passport

1. Create a passport for Cubetto!
2. On the template, draw a picture of Cubetto.
3. Draw stamps on the pages to show all of the places he has visited.

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### Challenge

Roll a die and write an algorithm using that number of blocks.

### Plenary and Assessment

1. Use the Cubetto map as the bingo grid. Ask a volunteer to lay out four 2D shapes on the map and ask another volunteer to select a shape from the bag. If that shape is on the map, write an algorithm to move Cubetto to that shape.
2. Ask: What toys did we compare to Cubetto? What was similar to Cubetto and what was different? Which did you prefer to use and why?
3. Show some of the photos taken using Cubetto today. Ask those children to describe what they are doing, what they are learning to do and who or what is helping them to learn.

## Lesson 7: Cubetto Sorts It! (1 of 2)

EYFS Focus: Maths (ELG 11)

### NC Objectives

To create and execute a simple algorithm

### Outcomes

- I can write a simple algorithm
- I can order shapes according to size

### Resources Needed

- 2D shapes of various sizes
- Train set
- Recycled materials
- 2D shape cutters
- Modelling clay

### Prep Needed

- Check batteries.

### Resources Provided

- N/A

### Key Vocabulary

- Cubetto
- Order
- Size
- Smallest
- Largest
- 2D shape names

### Computational thinking concept



Patterns

### Computational thinking approach



Persevering

### Teacher-led Introduction

1. Hand out different sized shapes - one to every pupil.
2. Ask pupils to turn to the person next to them and decide whose shape is bigger and whose is smaller.
3. Ask four volunteers holding circles to come to the front and hold up their shape. Ask: Which is smallest?
4. Ask: Can you put these four circles in order, starting with the smallest circle?
5. Ask: Can you see any circles on Cubetto's map? Place Cubetto on a nearby circle and ask: Can you help me write an algorithm to make Cubetto to move to the circle you've chosen?
6. Model writing an algorithm, choosing the blocks and testing it out as you go. Explain that sometimes people who work with computers get it wrong over and over again, but have to keep trying until they get it right.
7. Explain that they will be moving Cubetto around the map to collect different sized shapes and sorting them in order of size.

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## Lesson 7: Cubetto Sorts It! (2 of 2)

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### Activity 1: Train journey

1. Where do you think Cubetto lives on the map?
2. Make a train journey for Cubetto to go on a trip, starting at his home.

### Activity 2: Order!

1. Work in a group of five or six and put yourselves in height order.
2. Who is the shortest? Who is the tallest?
3. What happens if two children are the same height?

### Activity 3: Forward block

1. In a pair, write an algorithm that begins with three forward blocks.
2. After the three forward blocks, you choose the rest!
3. Take it in turns to control Cubetto.
4. Where will he end up?

### Activity 4: City break

1. Cubetto is going on a trip to the city! Make a 3D model of one of the buildings in the city on the map.
2. Can you explain how you made your building and what shapes you have used?

### Activity 5: Shape cookies

1. Use 2D shape cutters to make Cubetto some delicious 'shape cookies' to eat!
2. Can you name each shape?

### Activity 6: Small shape to big shape

1. Located on the map are a selection of big 2D shapes
2. Inside a bag are smaller versions of those 2D shapes
3. Pull a shape from the bag and match it with the bigger shape on the map.

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### Challenge

Can you move Cubetto forward the number of sides of a pentagon?

### Plenary and Assessment

1. Today some of you created a train track on which Cubetto could travel to and from the map. Can you describe the journey? What might Cubetto see, and what will he pass on the way?
2. Show the children a selection of triangles of various sizes and explain that Cubetto has put them in order, starting from the smallest to the biggest. Ask: Is Cubetto correct? Discuss the errors and which triangle should go first, etc.
3. Ask volunteers to demonstrate ordering each other in height order.

## Lesson 8: Cubetto Sorts It! (1 of 2)

EYFS Focus: Maths (SSM ELG 1)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To create and execute a simple algorithm	<ul style="list-style-type: none"> <li>I can write an algorithm</li> <li>I can sort shapes</li> </ul>	<ul style="list-style-type: none"> <li>3D shaped items and 3 hoops</li> <li>2D shapes of various sizes</li> <li>Train set</li> <li>Recycled materials</li> <li>2D shape cutters</li> <li>Modelling clay</li> </ul>	<ul style="list-style-type: none"> <li>Check batteries</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Sorting</li> <li>Order</li> <li>Size</li> <li>Smallest</li> <li>Largest</li> <li>Forward</li> </ul>

### Computational thinking concept



Patterns

### Computational thinking approach



Persevering

### Teacher-led Introduction

- Put the three hoops on the ground near each other and show the different shaped items (e.g. cubes, cylinders, pyramid shapes).
- Explain that Cubetto has got all the shapes muddled up and needs helping sorting them.
- Ask: How could we sort these shapes into the hoops? Explain that they don't need to use all three hoops - they can just use two.
- Allow time for children to make suggestions and sort the shapes. Help children to organise by type of 3D shape.
- When a decision is made, ask: Why did you decide to put that shape there?
- Come inside and ask: Which of these shapes would you use to create a castle like on Cubetto's map? Collect ideas and build on the castle square.
- Ask: Which shapes could you use to build a tree? Place on tree square.
- Ask: Which blocks would you use to move Cubetto from the tree to the castle? Invite pupils to test out ideas using the Board.

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## Lesson 8: Cubetto Sorts It! (2 of 2)

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### Activity 1: Train journey

1. Where do you think Cubetto lives on the map?
2. Make a train journey for Cubetto to go on a trip, starting at his home.

### Activity 2: Order!

1. Work in a group of five or six and put yourselves in height order.
2. Who is the shortest? Who is the tallest?
3. What happens if two children are the same height?

### Activity 3: Forward block

1. In a pair, write an algorithm that begins with three forward blocks.
2. After the three forward blocks, you choose the rest!
3. Take it in turns to control Cubetto.
4. Where will he end up?

### Activity 4: City break

1. Cubetto is going on a trip to the city! Make a 3D model of one of the buildings in the city on the map.
2. Can you explain how you made your building and what shapes you have used?

### Activity 5: Shape Cookies

1. Use 2D shape cutters to make Cubetto some delicious 'shape cookies' to eat!
2. Can you name each shape?

### Activity 6: Small shape to big shape

1. Located on the map are a selection of big 2D shapes
2. Inside a bag are smaller versions of those 2D shapes.
3. Pull a shape from the bag and match it with the bigger shape on the map

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### Challenge

Can you describe the different shapes on the boat?

### Plenary and Assessment

1. Ask pupils to share their shape cookies and ask children to guess each shape's name.
2. Explain that Cubetto is a computer. Ask: What else do you think is controlled by a computer?
3. Read out a list and ask children to show thumbs up or down if they think are / not controlled by a computer (e.g. washing machine, cheese sandwich, roller coaster, garden shed, teacher, television remote control, skate board).
4. Ask: What have you learnt about programming Cubetto over the past few weeks? Can Cubetto move on his own? What does the red block do? etc.

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