PRIMO

Coding with Cubetto - Unit 2

Reception, Ages 4 to 5, UK National Curriculum

Subjects covered:

Maths

Numeracy

Space, Shape & Measure

Materials required:

6x Cubettos

6x Boards

6x Sets of Blocks

6x Standard Maps

Resources provided:

Opposites cards

Number array cards

Food cards

Presents cards

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 2 Overview

Reception

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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.

	Lesson 1	Lesson 2	Lesson 3	Lesson 4
NC Computing Objectives	To explore a digital device	To explore a digital device	To understand how algorithms are implemented on devices	To understand how algorithms are implemented on devices
Outcomes	• I can find number pairs • I can explain how Cubetto is special	• I can use dice and count to 12 • I can make Cubetto move	• I can share objects into equal groups • I can program Cubetto to move	• I can put instructions in order • I can follow an algorithm
Maths Focus	ELG 11 (Number)	ELG 11 (Number))	ELG 12 (Shape, space and measure)	ELG 12 (Shape, space and measure)
Computational Thinking	Tinkering	Tinkering	Logic, Tinkering	Logic, Tinkering
Main Activities	Cubetto's birthday 1. Today is Cubetto's birthday! Guess the teacher's birthday using the calendar map. 2. Tour school to find different computers. Meet Cubetto, a computer! 3. Find Cubetto's birthday and mark on the calendar. Make Cubetto a birthday card. 4. Find all of Cubetto's numbers: count his sides and sort his blocks. 5. Turn Cubetto into a die! Make and label his sides with pictorial cards. 6. Move Cubetto to find your birthday on the calendar map. 7. Draw what makes you special, and what is special about Cubetto.		Cubetto's cake 1. Write a recipe for Cubetto's birthday cake together. 2. Follow different algorithms to make a cake and icing using instant cake mix/icing. 3. Program Cubetto to pick up the instructions on the map in order. 4. Share the cake pieces between your friends. 5. Program Cubetto to pick up the cake slices to make a whole one. 6. Design the decoration for Cubetto's birthday cake. 7. Make the baking equipment (spoon, bowl and oven) from recycled materials.	
Challenge	Can you draw a picture of a computer you found at home?	Can you make Cubetto shake his head?	Does your algorithm still work with a block missing?	Can you build a ramp for Cubetto?
Resources	Happy Birthday music & pupils' birthdays, one month calendar (blank), birthday card template with calendar on, dice, white cards, paper, pens and sticky tack		Candles, lighter, pictures of cakes (and disasters), cake recipe algorithm, play cake slices, instant cake mix, bowl, spoon and tin, sticky tack	
Assessment	School tour, Calendars, Special drawing of Cubetto, Verbal statements about being special, Photos, Observation of counting		Ordered recipe, Cake, Verbal statements , Photos, Observation of sharing, Algorithm picking up cake slices	

	Lesson 5	Lesson 6	Lesson 7	Lesson 8
NC Computing Objectives	To understand what an algorithm is	To understand what an algorithm is	To understand that programs execute by precise instructions	To understand that programs execute by precise instructions
Outcomes	• I can find different opposites • I can use the opposite block	• I can match numbers and pictures • I understand what an algorithm is	• I know left, right, forwards and backwards • I can use the random block	• I can sort and group objects • I can write an algorithm
Maths Focus	ELG 11 (Number)	ELG 11 (Number)	ELG 12 (Shape, space and measure)	ELG 12 (Shape, space and measure)
Computational Thinking	Algorithms, Collaborating	Algorithms, Collaborating	Algorithms, Creating	Algorithms, Creating
Main Activities	Cubetto's presents 1. Collect presents for Cubetto's party and re-order a wrapping algorithm. 2. Try to make Cubetto move backwards. 3. Wrap Cubetto's presents following the algorithm. 4. Collect Cubetto's presents on the map and stack them on top of him as you go. 5. Find big/small opposites of different objects in the classroom. 6. Play snap on the map! Match pictorial numbers of presents to the number. 7. Make wrapping paper using printing and painting techniques.		Cubetto's party 1. Get ready for Cubetto's party! Play 'Cubetto says' using arrow directions. 2. Create an 'arrow language' and travel around the playground. 3. Make a simple dance routine using the arrows and program Cubetto. 4. Make a party bag for Cubetto's friend. 5. Sort Cubetto's presents and party food according to your own criteria. 6. Race the six Cubettos across the map, exploring the function line and random block. 7. Make decorations for Cubetto's party and a hat for Cubetto.	
Challenge	Can you make Cubetto move from Blue B to Purple P?	Can you work out what the blue block does?	Can you describe what each of the blocks does?	Can you move Cubetto from G to Y without touching the water?
Resources	Opposites cards, music, objects, wrapping paper, scissors, tape, large paper and printing materials, present wrapping algorithm		Food and present cards to sort, A3 arrow cards and blank cards, small paper bags, mini 'presents' to sort, craft materials, balloons	
Assessment	Opposites found, Wrapped presents, Photos, Verbal statements ordering words, Observation, Number cards matched		Sorted objects, Arrow language, Algorithms, Observation , Photos, Verbal statements	

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

EYFS Focus: Maths (ELG 11)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To explore a digital device	• I can find number pairs • I can explain how Cubetto is special	• Happy Birthday music & pupils' birthdays • 1 month calendar (blank) • Birthday card template with calendar on • Dice, white cards, paper, pens and sticky tack	• Check batteries. • Cut out pupils' birthdays onto cards • Copy birthday card template with calendar on front. • Turn over a map and make a blank grid using tape. Label each square with numbers 1-31 to turn into a calendar.	• N/A	• Board • Cubetto • Blocks • Feelings • Happy, sad, surprised, worried.

Computational thinking approach

Tinkering

Teacher-led Introduction (introducing Board, Blocks and Cubetto – not the map just yet)

1. Play Happy Birthday music as children enter the room. Tell the children that today is a special day: it's Cubetto's birthday!
2. Introduce Cubetto and ask: What do you think Cubetto does? Hand out the blocks and the Board to handle, then collect them.
3. Explain that Cubetto is a computer and they can make him do special things. Ask: What can we do that's special? What do you think might be special about Cubetto?
4. Show the calendar grid on the board and ask: What date is it today? Ask a volunteer to mark on Cubetto's birthday.
5. Ask the children to guess what date your birthday is (or the class mascot's) and mark it on the calendar.
6. Lay out the children's birthdays at the front of the room and ask them to collect their name and birthday in small groups.
7. Ask children to turn to a partner and tell them their birthday date (focusing on the number, not the month).
8. Ask: Can you find your date on the calendar? Pairs to take it in turns to match and stick their birthdays on the calendar.
9. Explain that when they match their number, they have found a number pair.

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

Activity 1: Computer hunt

1. Go on a tour of school with an adult to find different computers and machines (e.g. printer, washing machine, ICT room, phone).
2. What does the computer help us do?
3. Write down all the computers you find.

Activity 2: Birthday card

1. On the birthday card template, find Cubetto's birthday date and circle it. Write the number in a large number on the front.
2. Decorate Cubetto's birthday card!

Activity 3: Counting Cubetto

1. Find all of Cubetto's numbers: count its sides, wheels and different coloured blocks.
2. How many holes are in the Board?
3. How many water squares are on the map?

Activity 4: Dice

1. Take a die. How many sides does it have? How many spots?
2. Draw one spot on a card and stick it to one of Cubetto's sides.
3. Draw two spots on a card and stick it to a different side.
4. Repeat until you have turned Cubetto into a die!

Activity 5: Birthday dash

1. Find your birthday on the calendar map.
2. Place Cubetto one square away in any direction, facing your number.
3. Can you make Cubetto move to land on your birthday?

Activity 6: What makes me special

1. Take a piece of paper and fold it in half.
2. On one half, draw a picture of yourself and write three things that make you special around your picture.
3. On the other half, draw Cubetto and label what makes it special.

Challenge

Can you draw a picture of a computer you found at home?

Plenary and Assessment

1. Hand out number cards around the class and ask pupils to jump up when they hear their number.
2. Say numbers at random and encourage pupils to support each other to listen for their number.
3. Show Cubetto and ask: What numbers did you use with Cubetto? How many sides does Cubetto have? How many holes are in the Board?
4. Ask: Who made Cubetto move today? What did you need to do to make him move? Can Cubetto move on his own?
5. Ask volunteers to share their pictures of them and Cubetto and ask: What have you found out that's special about Cubetto?

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

EYFS Focus: Maths (ELG 11)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To explore a digital device	• I can use dice and count to 12 • I can make Cubetto move	• 1 month calendar (blank) • Large dice • Dice spots on cards 1-12 • Birthday card template with calendar on • Dice, white cards, paper, pens and sticky tack	• Check batteries. • Check sound. • Copy birthday card template with calendar on front. • Turn over a map and make a blank grid using tape. Label each square with numbers 1-31 to turn into a calendar.	• N/A	• Birthday • Dice • Special • Calendar

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Show the calendar grid on the board and ask: What date is it today? Ask a volunteer to point out today's date.
2. Ask: Do you remember what date your birthday is? Ask five volunteers to mark their birthdays on the board.
3. Ask: How many birthdays do we have on the board? How many more birthdays would we need to add to make ten?
4. Count upwards from five and ask five more pupils to stand up and mark on their birthdays. Ask: How could we make it twelve?
5. Ask all the pupils with birthdays on the board to stand at the front. Hand out a card with dice spots on to each pupil at random.
6. Ask: Can you tell these pupils which order they need to stand in? Support by asking who should stand at beginning and end.
7. Tell pupils to sit in a circle with the map, blocks and Cubetto in the middle. Ask a volunteer to roll one die.
8. Ask a volunteer to place the corresponding number of die spots somewhere on the map. Place Cubetto two squares away.
9. Ask: How can we make Cubetto move to this number? Take suggestions and ask what they think each block does.
10. Model placing the forward blocks in the Board and press the Go button.
11. Repeat for another number on the die and encourage pupils to place blocks in the Board to test out their ideas.

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

Activity 1: Computer hunt

1. Go on a tour of school with an adult to find different computers and machines (e.g. printer, washing machine, ICT room, phone).
2. What does the computer help us do?
3. Write down all the computers you find.

Activity 2: Birthday card

1. On the birthday card template, find Cubetto's birthday date and circle it. Write the number on the front of the card.
2. Decorate Cubetto's birthday card!

Activity 3: Counting Cubetto

1. Find all of Cubetto's numbers: count his sides, wheels and different coloured blocks.
2. How many holes are in the Board?
3. How many water squares are on the map?

Activity 4: Dice

1. Take a die. How many sides does it have? How many spots?
2. Draw one spot on a card and stick it to one of Cubetto's sides.
3. Draw two spots on a card and stick it to a different side.
4. Repeat until you have turned Cubetto into a die!

Activity 5: Birthday dash

1. Find your birthday on the calendar map.
2. Place Cubetto three squares away in any direction, facing your number.
3. Can you make Cubetto move to land on your birthday?

Activity 6: What makes me special

1. Take a piece of paper and fold it in half.
2. On one half, draw a picture of yourself and write three things that make you special around your picture.
3. One the other half draw Cubetto and label what makes him special.

Challenge

Can you make Cubetto shake his head?

Plenary and Assessment

1. Sit in a circle with the calendar map, dice spot cards and two large dice in the middle.
2. Ask a volunteer to roll the dice and add up the numbers (support using number line if necessary).
3. Ask: Can you find this number on the calendar? Ask a volunteer to place Cubetto on this number.
4. Ask: How did you make Cubetto move today? What does the Board do? Does the Board work without blocks?
5. Show different blocks and ask: What does this make Cubetto do? Do all the red blocks make Cubetto do the same thing?
6. Explain that each block tells Cubetto to do something different and that the Board is like a remote control for Cubetto.

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

EYFS Focus: Maths (ELG 12)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To understand how algorithms are implemented on devices	• I can share objects into equal groups • I can program Cubetto to move	• Candles and lighter • Pictures of cakes (and disasters) • Sticky tack • Cake recipe algorithm • Play cake slices	• Check batteries. • Copy and cut up cake algorithm.	• N/A	• Share • Equally • Same • Even • Odd

Computational thinking concept

Logic

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Show the candle and ask: How do we light this? Take pupils' ideas and light the candle carefully, removing the lighter from reach afterwards.

2. Stick two birthday cake images to the wall and show two candles. Ask: How can we share these candles equally between the two cakes?

3. Allow time for pupils to discuss and share, then ask a volunteer to come to the front and stick the candles to the cakes using sticky tack.

4. Now show four candles and repeat the task, modelling the 'one for this one, one for that one' method.

5. Ask: How many candles does each cake have? Count together. Ask: How many candles are there in total?

6. Explain that when we share something equally, both need to have the same number.

7. Hand out small numbers of candles to pairs and ask them to share them out equally.

8. Ask: Does everyone have the same number of candles as their partner? Ask pupils to stand up if they have the same number.

9. Explain that some numbers can be shared equally – these are called even numbers, and others can't – these are odd numbers.

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

Activity 1: Cake baking (teacher led)

1. Look at the cake mix packet.
2. Collect the equipment you will need.
3. Follow the instructions to make the cake (with adult support).
4. Go with an adult to put the cake in the oven to bake.
5. Alternatively, make icing and decorate mini cakes.

Activity 2: Recipe algorithm

1. Read and put the cake recipe algorithm in order.
2. Place the steps next to each other on squares of the map.
3. Program Cubetto to move along the steps to make a cake.

Activity 3: Sharing slices

1. Work in pairs and lay out the cake slices on the table.
2. How many slices do you have in total?
3. Share the slices equally between you and your partner, then count them.

Activity 4: Whole cakes

1. Put four equal slices of cake on the map.
2. Program Cubetto to pick up all four slices to make a whole cake.

Activity 5: No disasters!

1. Draw a cake on a big piece of paper.
2. Decorate the cake for Cubetto.
3. What might Cubetto like on his cake? What colours could you use?

Activity 6: Baking tools

1. Collect some recycled materials.
2. Make a spoon and bowl from your materials.
3. Can you make an oven? Decorate with dials and buttons, and a light!

Challenge

Does your algorithm still work with a block missing?

Plenary and Assessment

1. Gather the six Cubettos and ask two pupils to stand at the front. Ask: Can you share these Cubettos equally between you?
2. Hand out the blocks to pupils and ask children to share them equally between pairs. Ask: Who has an even number? Who has an odd number?
3. Reiterate that sharing equally between people means that both people have the same number each.
4. Ask volunteers to explain how they shared the cake slices between them. Ask: How many slices do you have each? How many slices are there in total?

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

EYFS Focus: maths (ELG 12)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To understand how algorithms are implemented on devices	• I can put instructions in order • I can follow an algorithm	• Candles • Pictures of cakes (and disasters) • Sticky tack • Cake recipe algorithm • Play cake slices	• Check batteries. • Copy and cut up cake algorithm	• N/A	• Programming • Recipe • Order • Algorithm

Computational thinking concept

Logic

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Show images of cake disasters (e.g. http://www.cakewrecks.com/home/2017/3/8/peek-a-who.html) and ask: Have you ever made something that went wrong?
2. Explain that often things go wrong because we forget to do something, or we do things in the wrong order.
3. Explain that making and decorating a cake is like programming Cubetto – we have to do the steps in the right order.
4. Ask: Does anyone know how to make a cake? Collect and note down children's ideas for a recipe.
5. Ask: Can we do these steps in any order? For example, should we put the flour in the oven first?
6. Emphasise that a recipe needs to be followed carefully and in order. If a step is missed, the cake won't taste or look nice!
7. Show this cake making video from 40 seconds in: https://goo.gl/0gFbDl and ask: What was the first thing the chef did?
8. Compile a list in numbered steps (e.g. mix butter and sugar, mix in eggs, fold in flour, add vanilla and pour milk, put in oven for 30 minutes).
9. Explain that a recipe needs to be in order, just like when programming a computer.
10. Introduce the word 'algorithm' as a set of ordered instructions for a computer.

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

Activity 1: Cake baking (teacher led)

1. Look at the cake mix packet.
2. Collect the equipment you will need.
3. Follow the instructions to make the cake (with adult support).
4. Go with an adult to put the cake in the oven to bake.
5. Alternatively, make icing and decorate mini cakes.

Activity 2: Recipe algorithm

1. Read and put the cake recipe algorithm in order.
2. Place the steps next to each other on squares of the map.
3. Program Cubetto to move along the steps to make a cake.

Activity 3: Sharing slices

1. Work in pairs and lay out the cake slices on the table.
2. How many slices do you have in total?
3. Share the slices equally between you and your partner, then count them.

Activity 4: Whole cakes

1. Put four equal slices of cake on the map.
2. Program Cubetto to pick up all four slices to make a whole cake.

Activity 5: No disasters!

1. Draw a cake on a big piece of paper.
2. Decorate the cake for Cubetto.
3. What might Cubetto like on his cake? What colours could you use?

Activity 6: Baking tools

1. Collect some recycled materials.
2. Make a spoon and bowl from your materials.
3. Can you make an oven? Decorate with dials and buttons, and a light!

Challenge

Can you build a ramp for Cubetto?

Plenary and Assessment

1. Ask: Why is it important to do things in the right order? What would happen if we didn't? What else do we do every day that needs to be in order?
2. Ask pupils to tell the person next to them how to brush your teeth, starting with putting toothpaste on the brush.
3. Ask pupils to share how they programmed Cubetto to collect the recipe steps. Ask: What did you find difficult?
4. Show the recipe on the board with one step missing and ask: Would this work? Why/why not?
5. Place steps on consecutive squares on the map, with Cubetto starting on the first step. Ask pupils to write an algorithm to make Cubetto follow the steps.

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

EYFS Focus: Maths (ELG 11)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To understand what an algorithm is	• I can find different opposites • I can use the opposite block	• Music • Wrapping paper, scissors and tape • Objects to wrap • Large paper • Printing materials	• Check batteries. • Check sound. • Copy and cut up opposites cards.	• Opposites cards	• Fast/slow • Loud/quiet • High/low • Big/small • Opposite

Computational thinking concept
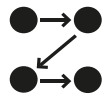
Algorithms

Computational thinking approach

Collaborating

Teacher-led Introduction

1. Ask pupils to stand up and run as fast as possible on the spot. Now ask pupils to move as slowly as possible. Repeat for go high/low.

2. Play a loud piece of music and ask: How can I play it quietly? Turn it down on the speaker.

3. Explain that words such as fast/slow, loud/quiet and high/low are all opposites.

4. Ask: What other words do you know that are opposites? Children to discuss and feedback ideas.

5. Sing the opposites song: "If I say big, Will you say small? If I say short, Will you say tall? If I say fast, Will you say slow? If I say high, Will you say low? If I say left, Will you say right? If I say day, Will you say night".

6. Hand out the opposites cards and ask pupils to walk around and find the person with the opposite card.

7. When all pupils have found their partners, ask them to sit down next to them.

8. Explain that Cubetto can also do the opposite of what you tell him to!

9. Introduce the opposite block (cream) and model using it before the block you want to change. Ask pupils to guess what Cubetto will do before pressing the Go button. Repeat with other blocks to show a range of movement.

10. Ask: If we put the opposite block before the forward block, what will Cubetto do? Show the algorithm and collect pupils' ideas. Explain that Cubetto will move backwards.

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

Activity 1: Cubetto in reverse

1. Look at the different blocks with a partner.
2. Which one makes Cubetto do the opposite of the next block?
3. Explore the blocks to make Cubetto go backwards.

Activity 2: Wrapping up

1. Look at the algorithm for wrapping presents. Are the steps in the right order?
2. Collect some wrapping paper, a gift, scissors and tape.
3. Follow the steps to wrap the present carefully.

Activity 3: Pass the parcel

1. Place two presents near each other on the map.
2. Write an algorithm to make Cubetto pick up the first parcel and carry it on his head.
3. Can you write an algorithm that picks up both parcels?
4. Stack them up on Cubetto as you go!

Activity 4: Opposites hunt

1. Work in pairs. One pupil sits in the corner and the other one hunts!
2. The hunter takes a card and finds an object that is the opposite of what's on the card (e.g. small = chair, big = figurine) then takes it to their partner.
3. Swap roles and repeat, taking a card and finding the opposite.

Activity 5: Snap!

1. Lay out the opposites cards at random on different squares on the map, face down so you can't see the pictures.
2. Work with a partner: the first turns over two cards and sees if they are opposites. If they are, keep them. If not, put them back.

Activity 6: Printing paper

1. Take a large piece of paper and printing materials, including paint.
2. Choose a pattern to make on your paper, dip it in paint and print.
3. Repeat your pattern on your paper and leave it to dry.

Challenge

Can you make Cubetto move from Blue B to Purple P?

Plenary and Assessment

1. Play opposites snap as a class: compete against the teacher to see who gets the most cards!
2. Ask volunteers to share how they used the opposite block today.
3. Model putting the opposite block in the wrong place (after the block you want to change) and allow time for pupils to test out and fix.
4. Clarify that the opposite block makes Cubetto do the opposite of the next block in the Board.

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

EYFS Focus: Maths (ELG 11)

NC Objectives

To understand what an algorithm is

Outcomes

- I can match numbers and pictures
- I understand what an algorithm is

Resources Needed

- Number cards 1-20
- Feely bag
- Wrapping paper, scissors and tape
- Objects to wrap
- Large paper
- Printing materials
- Mini whiteboards

Prep Needed

- Check batteries.
- Check sound.
- Copy and cut up opposites and number array cards.
- Create a simple algorithm for wrapping presents.
- Display large version of Cubetto's map with numbers on squares.

Resources Provided

- Opposites cards
- Number array cards

Key Vocabulary

- Algorithm
- Instructions
- Order
- Numbers 1-20
- Opposite

Computational thinking concept
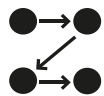
Algorithms

Computational thinking approach

Collaborating

Teacher-led Introduction

1. Show an algorithm on the board and ask: Can anyone read this algorithm to me? (e.g. forward, turn left, forward).
2. Recap that an algorithm is a set of instructions in the right order.
3. Show wrapping presents algorithm in the wrong order.
4. Read the steps together and ask: Would this look nice? Would you be happy if your birthday present was wrapped like this?
5. Ask pupils to come up to the board to re-order the algorithm so it make sense.
6. Show large version of Cubetto's map on the board with different number cards placed randomly on it.
7. Ask a volunteer to pick a number picture card from the feely bag, then to find the corresponding number on the map.
8. Mark a square on the map for Cubetto to start (near the number card) and ask: Can you write an algorithm to get Cubetto to number _?
9. Hand out mini whiteboards and pens for children to write their ideas on – they can use arrows, words or pictures.
10. Collect pupils' ideas and encourage them to come up and try out their algorithm on Cubetto.

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

Activity 1: Cubetto in reverse

1. Look at the different blocks with a partner.
2. Which one makes Cubetto do the opposite of the next block?
3. Explore the blocks to make Cubetto go backwards.

Activity 2: Wrapping up

1. Look at the algorithm for wrapping presents. Are the steps in the right order?
2. Collect some wrapping paper, a gift, scissors and tape.
3. Follow the steps to wrap the present carefully.

Activity 3: Pass the parcel

1. Place two presents near each other on the map.
2. Write an algorithm to make Cubetto pick up the first parcel and carry it on his head.
3. Can you write an algorithm that picks up both parcels?
4. Stack them up on Cubetto as you go!

Activity 4: Opposites hunt

1. Work in pairs. One pupil sits in the corner and the other one hunts!
2. The hunter takes a card and finds an object that is the opposite of what's on the card (e.g. small = chair, big = figurine) then takes it to their partner.
3. Swap roles and repeat, taking a card and finding the opposite.

Activity 5: Snap!

1. Lay out the opposites cards at random on different squares on the map, face down so you can't see the pictures.
2. Work with a partner: the first turns over two cards and sees if they are opposites. If they are, keep them. If not, put them back.

Activity 6: Printing paper

1. Take a large piece of paper and printing materials, including paint.
2. Choose a pattern to make on your paper, dip it in paint and print.
3. Repeat your pattern on your paper and leave it to dry.

Challenge

Can you work out what the blue block does?

Plenary and Assessment

1. Play number array snap as a class: compete against the teacher to see who gets the most card pairs!
2. Ask: What is an algorithm? What is important when writing an algorithm?
3. Hide the number cards around the room and hand out the array cards. Ask pupils to hunt for the matching card, then count the number.
4. Ask: How many numbers can you count up to?

PRIMO

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

EYFS Focus: Maths (ELG 12)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To understand that programs execute by precise instructions	• I know left, right, forwards and backwards • I can use the random block	• A3 arrow cards • Blank cards • Paper bags • Mini presents • Craft materials	• Check batteries. • Prepare very simple algorithms using random block.	• Food cards • Present cards	• Direction • Random • Forwards, backwards • Left turn, right turn

Computational thinking concept

Algorithms

Computational thinking approach

Creating

Teacher-led Introduction

1. Play 'Simon Says' with the class.

2. Tell the children that you have a new game for them today: 'Cubetto Says'! Explain that it's the same rules but they can only move in the directions that Cubetto can.

3. Ask: Which directions can Cubetto move in? Ask a pupil to choose a block (remove function and opposite) and tell the class what it does.

4. Introduce the random block (black), and explain that it makes Cubetto move in a direction that we can't guess – it's a surprise every time!

5. Play 'Cubetto Says' by telling children to move forwards (hold up green block), right turn (hold up red block), etc. Remind: don't move if Cubetto doesn't tell you to! Allow children to choose any movement when you hold up the random block.

6. Model using the random block in the Board and allow time for pupils to watch what it does. Each time you press the Go button, ask: What did the random block make Cubetto do this time?

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

Activity 1: Arrow language (in playground)

1. Draw an arrow on four different blank cards and colour them in.
2. Place your arrows in any order you like on the ground.
3. Direct a friend to follow your path using your new language.

Activity 2: Dance!

1. Make up a dance routine that Cubetto could do.
2. You can only use forwards, backwards, left and right.
3. What will your random move be?
4. Write down your routine in an algorithm using arrows.

Activity 3: Party bags

1. Decorate a party bag for a friend at Cubetto's party.
2. You might want to choose a theme.
3. Can you fill it with different small presents?

Activity 4: Sorting presents

1. Look at the present cards.
2. How could you sort them into groups? Explain your reasons.
3. Can you also sort the food cards? Explain your reasons.

Activity 5: Racing Cubetto

1. Work in a group of 6 with a Cubetto each, around one map.
2. Place the Cubettos in squares next to each other along the top.
3. Can you program Cubetto to get to the other side?
4. When you have all written your algorithms, ask an adult to count down

Activity 6: Decorating

1. Choose some craft materials.
2. Make decorations to make Cubetto's party look colourful.
3. Hang / stick them up around the classroom.

Challenge

Can you describe what each of the blocks does?

Plenary and Assessment

1. Ask volunteers to share their dance algorithms for Cubetto – run the algorithm and watch him dance!
2. Ask: What would happen if we put the random block in the algorithm? Allow pupils to replace one block with the random block and test what happens.
3. Ask: What does 'random' mean?
4. Ask volunteers to demonstrate their arrow language with a partner.

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

EYFS Focus: Maths (ELG 12)

NC Objectives	Outcomes	Resources Needed	Prep Needed	Resources Provided	Key Vocabulary
To understand that programs execute by precise instructions	• I can sort and group objects • I can write an algorithm	• A3 arrow cards • Blank cards • Paper bags • Mini 'presents' to sort • Craft materials • Balloons	• Check batteries. • Prepare party bags with small items to sort.	• Food cards • Present cards	• Sort • Groups • Function • Forwards, backwards • Left, right turn

Computational thinking concept

Algorithms

Computational thinking approach

Creating

Teacher-led Introduction

1. Before the session, decorate the classroom with the children's decorations and balloons.
2. As children enter, hand out a party bag to each child.
3. Sit in a circle and ask children to empty their bag carefully in front of them. Ask: What objects do you have?
4. Tell children that Cubetto's gifts have got all muddled up and he needs their help to organise them. Ask: How could you sort the objects?
5. Allow children time to sort the objects any way they like in as many groups as they like.
6. Ask volunteers to share how they sorted and grouped their presents, and why they chose those criteria.
7. Show Cubetto's blocks and ask: How could we sort these? Could we sort them by something other than their colour?
8. Recap the different functions of each block and introduce the function block as a backpack that can carry up to four blocks inside it.
9. Model using the function block and function line to move Cubetto further than four squares.

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

Activity 1: Arrow language (in playground)

1. Draw an arrow on four different blank cards and colour them in.
2. Place your arrows in any order you like on the ground.
3. Direct a friend to follow your path using your new language.

Activity 2: Dance!

1. Make up a dance routine that Cubetto could do.
2. You can only use forwards, backwards, left and right.
3. What will your random move be?
4. Write down your routine in an algorithm using arrows.

Activity 3: Party bags

1. Decorate a party bag for a friend at Cubetto's party.
2. You might want to choose a theme.
3. Can you fill it with different small presents?

Activity 4: Sorting presents

1. Look at the present cards.
2. How could you sort them into groups? Explain your reasons.
3. Can you also sort the food cards? Explain your reasons.

Activity 5: Racing Cubetto

1. Work in a group of 6 with a Cubetto each, around one map.
2. Place the Cubettos in squares next to each other along the top.
3. Can you program Cubetto to get to the other side?
4. When you have all written your algorithms, ask an adult to count down

Activity 6: Decorating

1. Choose some craft materials.
2. Make decorations to make Cubetto's party look colourful.
3. Hang / stick them up around the classroom.

Challenge

Can you move Cubetto from G to Y without touching the water?

Plenary and Assessment

1. Ask volunteers to share how they used the function block to race Cubetto.
2. Ask: How does this block help us? Why is this block like a backpack?
3. Show the food cards and ask: How could we help Cubetto sort the food for his party? Take suggestions and encourage pupils to come up to the front to group them and explain their reasons.
4. Ask: What have we learnt about programming a computer? What is important when we write algorithms? How many directions can Cubetto move in?

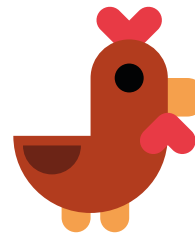# List of Opposites
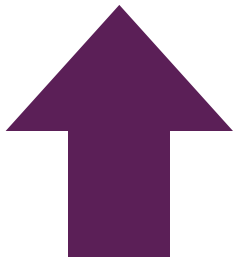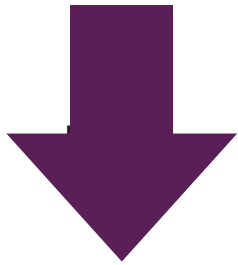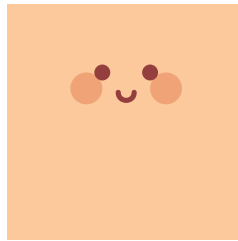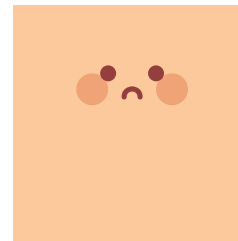
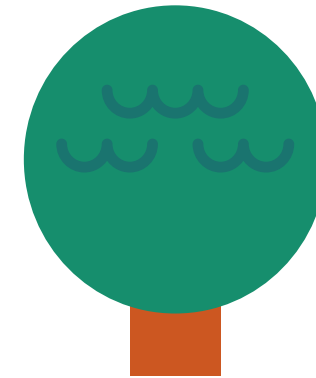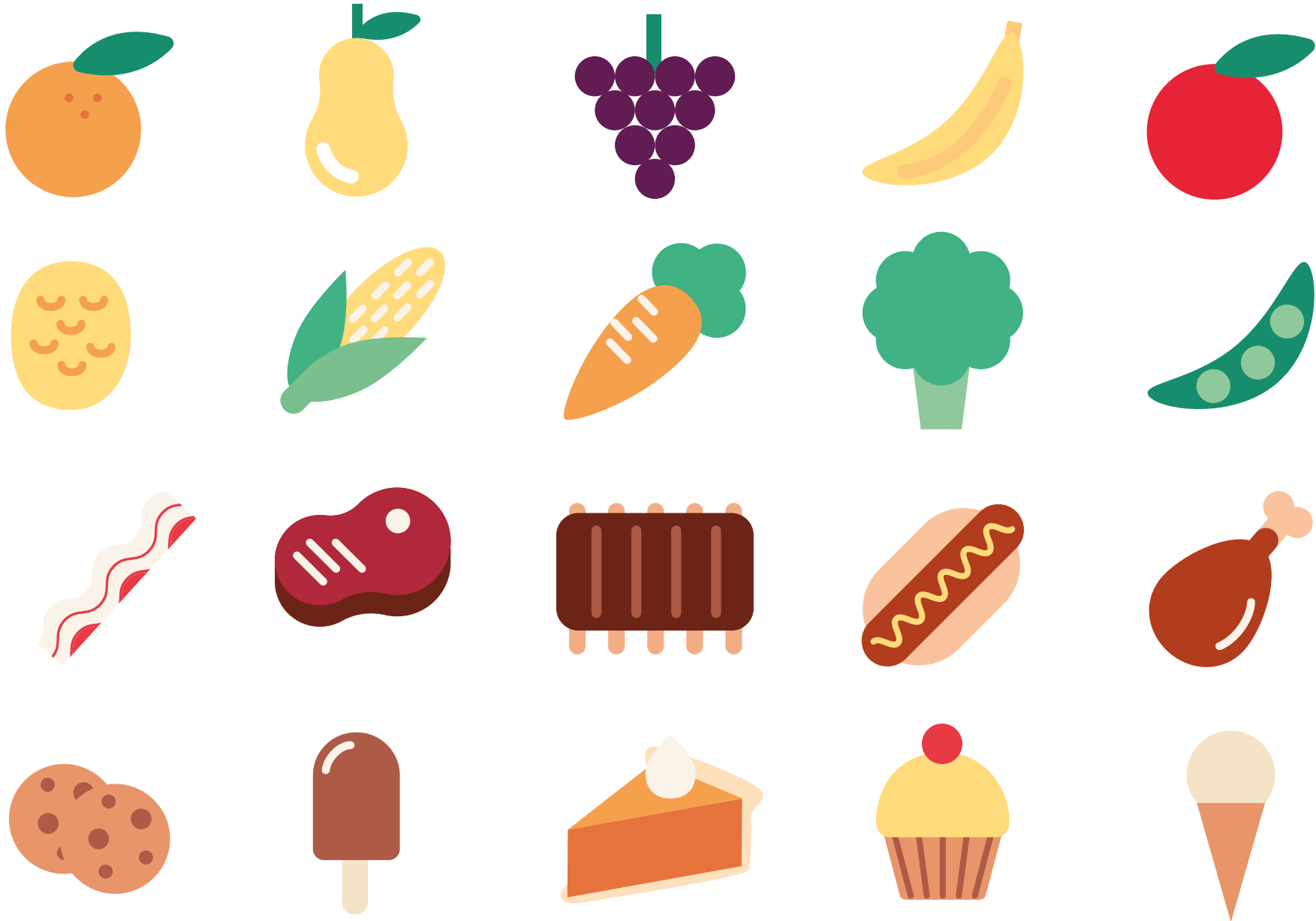UP   DOWN   HAPPY   SAD   CLOSED   OPEN
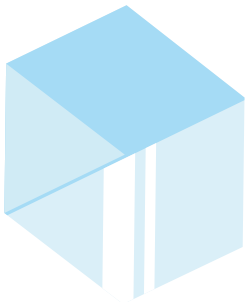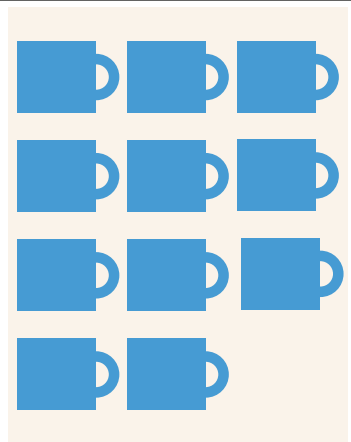
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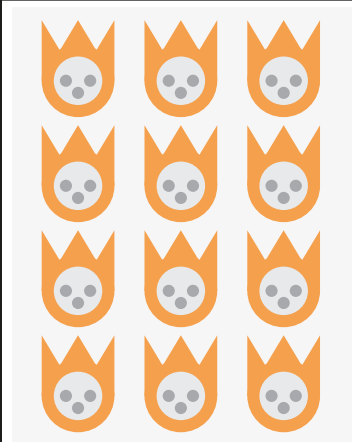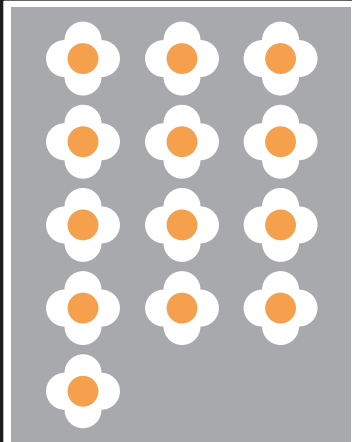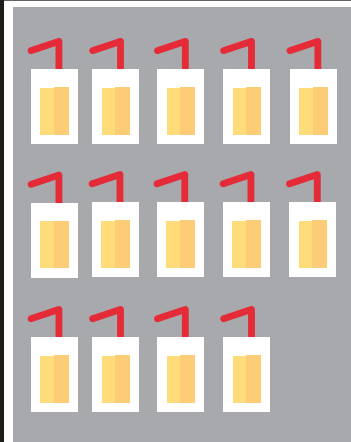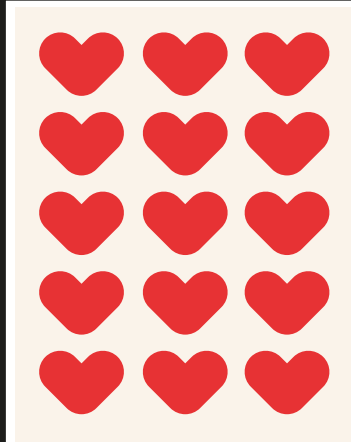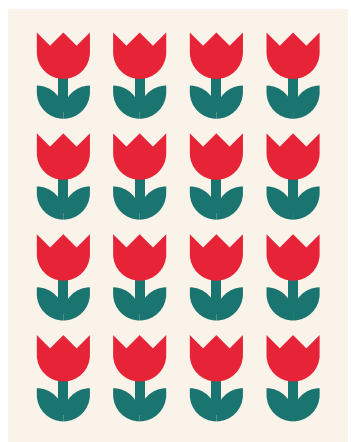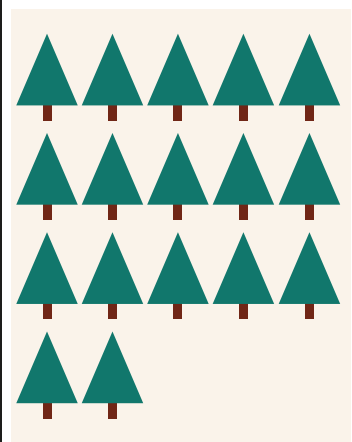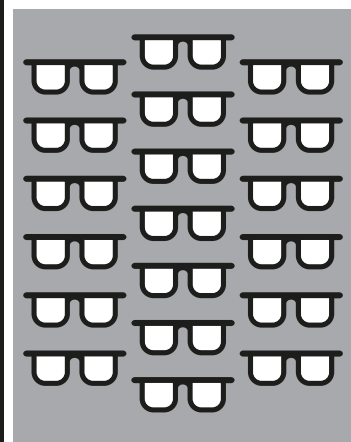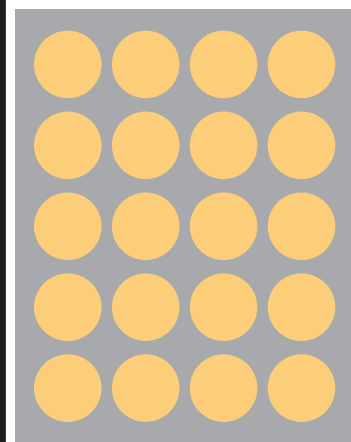
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