PRIMO

Coding with Cubetto - Unit 2

Year 1, Ages 5 to 6, UK National Curriculum

Subjects covered:

Maths [calculation, direction, money, time & numbers]

Materials required:

6x Cubettos

6x Boards

6x Sets of Blocks

6x Standard Maps

Resources provided:

Multiples of 2s template

Multiples of 10s template

Opposites cards

x2 Bingo 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

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.

	Lesson 1	Lesson 2	Lesson 3	Lesson 4
NC Computing Objectives	To control a digital device	To use logical reasoning to predict behaviour of simple programs	To create a simple program	To debug a simple program
Outcomes	• I can name a computer • I can make a simple computer	• I can identify the bigger and smaller number • I can make Cubetto move	• I know left, right, forwards and backwards • I can program Cubetto	• I can put instructions in order • I know what an algorithm is
Cross-curricular Subject	Maths	Maths	Maths	Maths
Computational Thinking	Tinkering	Tinkering	Algorithms, Tinkering	Decomposition, Persevering
Main Activities	Cubetto's numbers 1. Begin with a tour of school to find different computers and machines. Meet Cubetto, a computer! Find all his numbers: count his sides and his blocks. 2. Make a computer that generates random numbers out of anything you want!	Cubetto's birthday 1. Today is Cubetto's birthday! Guess when the teacher's birthday is using 'more' or 'less' on the calendar map. Find your birthday and mark it. 2. Put your and Cubetto's birthdays on the map. Can you make Cubetto move from his birthday to yours?	Cubetto's dance moves 1. Explore different computing jobs and learn what programming is. Create an 'arrow language' and make a simple dance routine. 2. Match Cubetto's blocks to the arrow language and program Cubetto to follow the dance steps.	Cubetto's cake 1. Write a recipe for Cubetto's birthday cake together. Make a simple cake using the instant cake mix. 2. Program Cubetto to pick up the instructions on the map in order to make his birthday cake algorithm..
Challenge	Can you draw a picture of a computer you found at home?	Can you make Cubetto shake his head?	Can you make Cubetto move faster?	Does the recipe work if you take out a step?
Creative Play	With an adult, take apart an old keyboard, mouse, clock or toy.	Make Cubetto a birthday card.	Play 'Cubetto says' using the arrow language.	Design the decoration for Cubetto's cake.
Resources	Clipboards, various materials, numbers to 1-10	Calendar templates, pupils' birthdays, sticky numbers 1-31, masking tape	Pictures of programmers, arrow cards, arrow outlines, masking tape	Cake recipe, instant cake mix, bowls, spoons, tins, sticky tack
Assessment	School tour, number generator, photos, observation	Observation of counting, photos, verbal statements	Arrow language, verbal statements, photos, observation	Ordered recipe, algorithm, photos, verbal statements, observation

	Lesson 5	Lesson 6	Lesson 7	Lesson 8
NC Computing Objectives	To understand what algorithms are	To understand what algorithms are	To understand that programs execute by precise instructions	To understand that programs execute by precise instructions
Outcomes	• I understand how to use yesterday, today and tomorrow • I can write an algorithm	• I can count in 2s and 10s • I can put items in order of increasing size	• I understand that algorithms need to be in order • I can use the function block	• I can recognise numbers and their words • I can use the random block
Cross-curricular Subject	Maths	Maths	Maths	Maths
Computational Thinking	Algorithms, Creating	Algorithms, Creating	Logic, Collaborating	Algorithms, Collaborating
Main Activities	Cubetto's party planning 1. Use the words yesterday, today and tomorrow to describe what Cubetto needs to do to prepare for the birthday party. Draw a cartoon of Cubetto's plan. 2. Write a simple algorithm to move between the three words in time order. Now try it backwards	Cubetto's counting 1. Count in 2s and 10s using a number square, then find sweets and presents on the map in ordered multiples. Find opposites and make Cubetto do the same! 2. Make a map for Cubetto with pictures in increasing multiples of two.	Cubetto's presents 1. Re-order an algorithm for wrapping Cubetto's presents. Make a production line to wrap Cubetto's presents following the algorithm. 2. Move Cubetto between the compass and castle, using the function line.	Cubetto's party 1. Match the numbers to their words. Catch the teacher doing it wrong! Play Bingo at Cubetto's party: roll the dice and cross out the matching numbers. 2. Use the random block to play Bingo with Cubetto, matching the words to the numbers.
Challenge	Can you write a shorter algorithm?	Make piles of 10 sweets. How many sweets do you have in total?	Can you work out what the cream block does?	Can you put your Bingo numbers in order from smallest to biggest?
Creative Play	Role play planning for Cubetto's party.	Make sweets from foil and coloured paper.	Make a party bag for Cubetto.	Create a new game to play at Cubetto's party.
Resources	Cartoon template, word signs	2s and 10s cards, number square, A3 6x6 grids, small prizes	Present wrapping algorithm, objects, paper and ribbon	Bingo cards, dice, number square 3x3 grids 1-9
Assessment	Algorithm, photos, verbal statements ordering words, observation	Cards in order, map, photos, verbal statements, observation	Algorithm, wrapped presents, observation, photos, verbal statements	Matching, Bingo game, verbal statements, observation, photos

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

Cross-curricula Area: Maths

NC Objectives

To control a digital device

Outcomes

- I can name a computer
- I can make a simple computer

Resources Needed

- Clipboard (one per group)
- Various materials to make a number generator

Prep Needed

- Check batteries
- Prepare a tour around school to find computers
- Make a number generator

Resources Provided

- N/A

Key Vocabulary

- Computer
- Information
- Cubetto
- Machine
- Random

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Ask the class to close their eyes and think about their first day of school. What did it feel like? Who did you meet?
2. Ask: When we meet people for the first time, what should we say and do? . Emphasise: to be polite and find out about them.
3. Introduce Cubetto to the class (try not to give anything away other than its name). Ask: What would you like to find out about Cubetto? Collect the pupils' questions on the board to refer back to at the end.
4. Explain that their task is to find out what Cubetto can and can't do, and write (or draw) what they find out in a diary.
5. Show the diary template and model completing the boxes about you (e.g. I can write my name. I can't fly!)
6. Introduce the board and the blocks. Ask for a volunteer to come to the front and to explore what Cubetto can do. Based on what they discover, model completing a box in the diary.
7. Ask the class to stand up and do a left turn. Repeat for right turn. Explain that they will need to remember these to use Cubetto.
8. Emphasise that the class need to respect and be kind to Cubetto just as they respect each other. Refer to class rules.

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

Creative Play

Can you take apart an old keyboard, mouse, clock or toy?

Guided Activity

1. Explain that the children are going to build a type of computer! Their computer needs to give out a random number – this means a number that you cannot guess and that isn't in order (like rolling a die!).
2. The pupils can use anything they find in the classroom but there are some rules: they cannot use a computer to build a computer and they cannot use their brains to get the number!
3. Show your prepared example and ask: Can you guess what number it will land on? Are you using your brain to get the number?
4. If necessary, give other examples (e.g. throwing a dice, flipping a coin, but encourage children to be as creative as possible).
5. Discuss with the children how they could make a random number, just like on The National Lottery!
6. Allow time for the pupils to work independently to make their number generator using anything from bouncy balls, string, toys

Independent Activity

1. Look at Cubetto, the blocks, the Board and the map.
2. How many sides does Cubetto have? How many holes are in the Board?
3. How many blocks can you see? How many green blocks do you have? How many purple ones are there?
4. On the map, how many squares can you count? How many trees are there? How many green (grass) squares can you see?
5. Can you work out what these parts do and how they work together?

Challenge

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

Plenary and Assessment

1. Ask volunteers to share their 'computers' with the class. Ask: How is this like a computer?
2. Ask: What is a random number? Can you guess what number this computer will make?
3. Show images of different objects and ask: Which of these are a type of computer? Which aren't? Why do you think that?
4. Show Cubetto and ask: What numbers did you find out about Cubetto? How many sides does it have? How many holes are in the Board?

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

Cross-curricula Area: PSHE

NC Objectives

To explore a digital device

Outcomes

- I can identify the bigger and smaller number
- I can make Cubetto move

Resources Needed

- Happy Birthday music and pupils' birthdays
- One month calendar grid templates
- 6x sticky back numbers 1-31 and tape

Prep Needed

- Check batteries
- Make six calendar grids: turn the Primo maps over, use tape to mark the grid and place on numbers 1-31.
- Print and cut out children's birthdays (e.g. Grace: 5 May)

Resources Provided

- N/A

Key Vocabulary

- Calendar
- Birthday
- More
- Less
- Bigger
- Smaller

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Tell the class that you think that the sky will be green tomorrow. Collect their reactions. Ask: Why don't you agree?
2. Explain that we use what has happened before to tell us what will happen in the future. This is called predicting.
3. Ask: Can you think of something you can predict will happen? (E.g. If you are hungry and you eat, then you will feel better.)
4. Show the board with one red block to the class. Ask: What do you think will happen when we press the action button?
5. Ask a volunteer to complete the sentence based: "If I use a __ block, I predict that Cubetto moves __."
6. Today the class will be thinking about feelings: what makes us feel certain things and how our face shows our feelings.
7. Introduce the map. Ask: Where on the map do you think Cubetto feels happy? Collect ideas e.g. Cubetto feels happy in the desert because it's quiet. Repeat for where it feels sad e.g. Cubetto feels sad in the mountains because it's cold.
8. Decide as a class on how Cubetto feels in the sea, in the grass, in the city and in the desert, and why.
9. Write these up, modeling drawing the happy/sad face next to the relevant square e.g. sand = sad; grass = happy. (Optional: use mirrors to explore what pupils' faces look like with different feelings, including your eyebrows, mouth and eyes).
10. Explain that their task is to move Cubetto around the map to the places it feels happy or sad. When it arrives, change its face!

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

Creative Play

Make Cubetto a birthday card.

Guided Activity

1. Ask one child to find their birth date and mark it with an object of their choice.
2. Choose a square a couple of places in front of Cubetto on the map and place Cubetto on it, facing the other object.
3. Ask: Can you make Cubetto move to your birthday?
4. Ask children to begin by working out how many squares Cubetto needs to move.
5. Support children to choose which blocks to try out, pressing the Go button after each one to test and check them.
6. Allow time for pupils to explore which blocks perform which commands and what happens if they miss out a block.

Independent Activity

1. Look at the first calendar grid and mark your birthday. Now find Cubetto's and mark the date.
2. Which number is bigger? Circle the date.
3. Now mark your birthday on each calendar.
4. Ask a friend what their birthday is and mark it on the second calendar so you have two dates.
5. Which is smaller? Mark an 'S' in the square.
6. Repeat with other people in the class, marking on their birthdays so you have two dates marked on each calendar.
7. Mark which date is bigger with a circle.

Challenge

Can you make Cubetto shake his head?

Plenary and Assessment

1. Sit in a big circle with a calendar map in the middle and two Cubettos.
2. Ask two volunteers each to place a Cubetto on their birthday square. Ask the class: Which number is smaller? Which number is bigger?
3. Ask the class to guess when Cubetto's friend's birthday is (pick a date but keep it secret). Respond with, "more" or "less" until they guess correctly.
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: What do the blocks do? Why are the blocks different colours?
6. Clarify that each coloured block makes Cubetto do something different and they will be exploring what each one does next lesson.

Lesson 3: Cubetto's Dance Moves (1 of 2)

Cross-curricula Area: Maths

NC Objectives

To understand how algorithms are implemented on devices

Outcomes

- I know left, right, forwards and backwards
- I can program Cubetto

Resources Needed

- Diverse images of Computer Programmers
- Large arrow cards
- Arrow outlines and coloured pens/ pencils
- Masking tape

Prep Needed

- Check batteries
- Print four large arrows on cards.
- Colour in and cut out some arrow outlines to use in guided activity.

Resources Provided

- N/A

Key Vocabulary

- Computer
- Programmer
- Code
- Left
- Right

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Show one image of a computer programmer and ask: What do you think this person does for a job? Collect responses and repeat for other pictures of men and women of different backgrounds.
2. Show all the images together and explain that all these people work with computers. They are computer programmers.
3. Explain that the children will become computer programmers today, starting with programming their teacher!
4. Ask: What languages can we speak in this class? Collect pupils' answers, and explain that all computers follow a special language called code.
5. Show an upwards arrow on the board and tell the children that this code makes you walk one step forward.
6. Repeat for three other arrows, focusing on left and right and write the instruction by each arrow until you have the coding language.
7. Ask volunteers to come to the front, show you one card at a time, and watch what it makes you do.
8. Ask pupils to make you dance by putting several arrows in order at once!

Lesson 3: Cubetto's Dance Moves (2 of 2)

Creative Play

Play 'Cubetto says' using the arrow language.

Guided Activity

1. Show the four coloured arrows and explain that children will be using them to make Cubetto dance!
2. Ask: What moves would you like Cubetto to do on the mat?
3. Give pupils time to discuss and create a program by putting up to five blocks in an order of their choice.
4. Ask: What do you think Cubetto is going to do when we press the Go button?
5. Test out their dance moves algorithm.

Independent Activity

1. Look at the different arrow outlines and find four pens/pencils in red, yellow, green and purple.
2. Take four blocks: one yellow, red, purple and green.
3. Match the block to the arrow.
4. Colour in the arrows to match the block colours.
5. Which colour makes Cubetto move forward? Which colour is left and which is right?
6. Can you work out a way of remembering what each coloured block does?

Challenge

Can you make Cubetto move faster?

Plenary and Assessment

1. Ask: What is a computer programmer? Who can be a computer programmer?
2. Ask a volunteer to show their dance moves program and copy in large arrows on the board.
3. Ask the class to follow the arrows and do the dance moves! Can they do it all together? Optional: play music to dance to.
4. Ask: Can you jump to the left? Can you jump to the right? How can we remember which is which? (e.g. 'L' with left forefinger and thumb).
5. Take four coloured blocks in your hand and shake them to mix them up. Close your eyes and when you hold one up, children

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

Cross-curricula Area: Maths

NC Objectives

To understand what algorithms are

Outcomes

- I can put instructions in order
- I know what an algorithm is

Resources Needed

- Instant cake mix
- Bowl, spoon, tin, oven, etc.
- Recipe steps on paper and sticky tack

Prep Needed

- Check batteries
- Copy sets of cake recipe instructions and cut out to place on map.
- Preheat oven.
- Check allergies.

Resources Provided

- N/A

Key Vocabulary

- Recipe
- Order
- Algorithm

Computational thinking concept

Decomposition

Computational thinking approach

Persevering

Teacher-led Introduction

1. Show a picture of a birthday cake and explain that Cubetto's party is coming up and they need to make a cake.
2. Ask: Does anyone know how to make a cake? Collect and note down children's ideas for a recipe.
3. Ask: Can we do these steps in any order? For example, should we put the flour in the oven first?
4. 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!
5. Show cake making video from 40 seconds in: https://goo.gl/0gFbDl and ask: What was the first thing the chef did?
6. Compile a list in numbered steps (e.g. mix butter and sugar, mix in eggs, fold in flour, add vanilla and milk, put in oven for 20 minutes).
7. Explain that a recipe needs to be in order, just like when programming a computer.
8. Introduce the word algorithm as a set of ordered instructions for a computer.

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

Creative Play

Design the decoration for Cubetto's cake.

Guided Activity

1. Ask children to look at the cake mix box and find the instructions.
2. Ask: How many instructions can you see?
3. Read the first instruction and give pupils time to carry out the first step.
4. Repeat for the next steps until pupils have completed the mix and put it into a tin.
5. Take a small group of pupils to the oven and ask: How do we know when the oven is hot? Do you know what temperature the oven is at?
6. Back in the classroom, put a big timer on and tell the children that they need to tell you when it gets to zero. Ask: What will happen if we forget the cake in the oven?
7. Serve the cake to the children (allergies permitting).

Independent Activity

1. Look at the map. Can you find step one in the recipe? What does it say?
2. Put some sticky tack on the recipe step and stick it to the top of Cubetto so he has collected an instruction. Place Cubetto on this square.
3. Can you move Cubetto to collect step two? What blocks do you need to make the right algorithm?
4. Stick step two to the side of Cubetto.
5. Repeat for the other steps until Cubetto has collected all five and knows how to make the cake.

Challenge

Does the recipe work if you take out a step?

Plenary and Assessment

1. Ask: What is an algorithm?
2. Ask: What else do we do every day in order?
3. Ask pupils to tell the person next to them how to brush your teeth, starting with toothpaste.
4. Ask pupils to share how they programmed Cubetto to collect the recipe steps. Ask: What did you find difficult?

Lesson 5: Cubetto's Party Planning (1 of 2)

Cross-curricula Area: Art & Design

NC Objectives

To understand what algorithms are

Outcomes

- I understand how to use yesterday, today and tomorrow
- I can write an algorithm

Resources Needed

- Cartoon template: yesterday, today, tomorrow.
- Yesterday, today, tomorrow signs

Prep Needed

- Check batteries
- Copy and cut out three party planning actions (e.g. invite people, buy food, play music). One set to be numbered 1-3, one set without.

Resources Provided

- N/A

Key Vocabulary

- Yesterday
- Today
- Tomorrow
- Backwards
- Order

Computational thinking concept

Algorithms

Computational thinking approach

Creating

Teacher-led Introduction

1. Play song: Yesterday, Today, Tomorrow: https://goo.gl/FBamDJ and model pointing behind you when singing yesterday, down for today, and in front of you for tomorrow.
2. Show the calendar from lesson two and ask: Can you find today's date? What date was it yesterday? What date will it be tomorrow?
3. Explain that Cubetto's planning a birthday party and needs the children's help as he's got all muddled!
4. Show the three word signs in backwards order and explain that Cubetto is getting everything backwards. Introduce the backwards block and place the thee signs on the map next to each other. Model programming Cubetto to move backwards from tomorrow to yesterday.
5. Ask the children to close their eyes and think of the best party they have been to. Ask: What was it like? Was there a theme? What food did you eat? What games did you play?
6. Note down all the children's ideas in a mind map them on the board. Ask: What do you think is the most important thing?
7. Agree as a class on five actions that Cubetto needs to do to (e.g. buy food, invite people, plan games, make party bags, play music, etc.)
8. Ask: Which of these things do you think Cubetto needs to do first? Put the actions in order.

Lesson 5: Cubetto's Party Planning (2 of 2)

Creative Play

Role play planning for Cubetto's party

Guided Activity (two Cubettos and Boards will be needed per game)

1. Recap the things that Cubetto needs to do to organise the birthday party.
2. Ask pupils to choose three of the things and discuss which order they need to be done in and why.
3. Show the cartoon template and model deciding which activity goes in the first box: yesterday. Repeat for the other two boxes.
4. Allow time for pupils to draw a cartoon showing the three stages of Cubetto's party planning in order.
5. When pupils have finished, they can colour in their cartoon.

Independent Activity

1. Look at the three things needed to plan for Cubetto's party.
2. Put them in the right order: 1 - 3.
3. Place each one on the map anywhere you like.
4. Work with a partner to move Cubetto from one step to the next, collecting each of the three actions.
5. Can you use the backwards block in your algorithm? What happens to Cubetto?

Challenge

Can you write a shorter algorithm?

Plenary and Assessment

1. Ask three pupils to come to the front and hand out the three signs at random for them to hold.
2. Ask: Do you remember the song we learnt at the beginning? What order should the children stand in?
3. Ask: What did you do yesterday? What have you done today? What will you do tomorrow?
4. Ask pupils to show an algorithm they wrote to move Cubetto around the map collecting the party plan.
5. Ask: How many blocks does this algorithm have? Did anyone work out what the blue block does?

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

Cross-curricula Area: Math

NC Objectives
To understand what algorithms are

Outcomes
- I can count in 2s and 10s
- I can use the opposite block

Resources Needed
- Large number square
- Masking tape
- A3 6x6 grids
- Prizes (e.g. raisins/ sweets)

Prep Needed
- Check batteries
- Turn over the map and use masking tape to make a blank grid.
- Copy pictures of presents in multiples of 2 and sweets in 10s.

Resources Provided
- Multiples of 2s and 10s pictures
- Opposites cards

Key Vocabulary
- Count
- Multiples
- Opposite
- Algorithm

Computational thinking concept

Algorithms

Computational thinking approach

Creating

Teacher-led Introduction

1. Show the Primo map on the board and ask: How many blue squares can you count? Ten (including the boat).
2. Ask children to find this number on the number square and ask: Can you count in 10s? Point to the multiples as they say them aloud.
3. Hand out the pictures of sweets in multiples of 10 and allow time for children to count the number on their card.
4. Count in 10s up to 50 as a class and ask the pupils to come and stand at the front when they hear their number.
5. Show picture cards placed randomly on the board and ask: Can you put the pictures in order from smallest to biggest? Invite pupils to come to front.
6. Take the biggest and smallest card and write 'Big' and 'Small' above them. Explain that these words are opposites.
7. Ask: What other words do you know that are opposites?
8. Hand out the opposites cards and ask pupils to walk around to find their opposite partner.
9. Explain that Cubetto can also do the opposite of what they tell him to! Introduce the opposite block 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 range of movement.

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

Creative Play

Make sweets from foil and coloured paper.

Guided Activity

1. Ask the children to choose whether they want to help Cubetto count in 2s or 10s.
2. Place the set of picture multiples on the map at random.
3. Ask: Can you find the smallest number? Place Cubetto on this number.
4. Ask: What's the next number, counting in 2s/10s?
5. Support the children to write an algorithm that moves Cubetto to the next multiple.
6. When Cubetto reaches the square, hand out the corresponding number of small prizes (raisins/sweets).
7. Repeat, taking turns until all multiples have been collected.
8. Place one of the cards on the map and ask: Can you use the opposite block in your algorithm to make Cubetto collect the card?

Independent Activity

1. On the blank grid, make a map for Cubetto to move around.
2. Choose five squares to draw pictures in.
3. Each square must have a picture in a multiple of 2 (e.g. two trees, four spiders, six monkeys, etc.)
4. You might want to think of a theme for your map (e.g. holiday, party, school, etc.)

Challenge

Make piles of 10 sweets. How many sweets do you have?

Plenary and Assessment

1. Put multiples of 2s and 10s in a feely bag and ask a pupil to pull out one number.
2. Ask: What is this number? Is this number a multiple of 2 or 10? What are we counting in? Repeat for other numbers.
3. Show three multiples on the board in sequence, with one number missing (e.g. 8, 10, __, 14).
4. Ask: What are we counting in? Can you work out which number is missing? Refer to the number square if helpful.

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

Cross-curricula Area: Science

NC Objectives

To understand that programs execute by precise instructions

Outcomes

- I understand that algorithms need to be in order
- I can use the function block

Resources Needed

- Wrapping paper/ newspaper
- Ribbon/string
- Objects to wrap
- Calculations printed large: - and +

Prep Needed

- Check batteries
- Prepare a wrapped object as an example.
- Source images of NACA/NASA African American Human Computers.

Resources Provided

- N/A

Key Vocabulary

- Algorithm
- Function
- Problem solving

Computational thinking concept

Logic

Computational thinking approach

Collaborating

Teacher-led Introduction

1. Sit in a big circle with a 'present' to wrap, ribbon and sticky tape in the middle.
2. Explain that next week is Cubetto's party and the presents need wrapping!
3. Start wrapping the object (badly and in the wrong order), starting by sticking tape to the present, then wrapping the paper round it.
4. Ask for the pupils to suggest a better way and decide together on a present wrapping algorithm.
5. Explain that the pupils will be working in pairs as part of a big team to wrap as many presents as they can, and each pair will take responsibility for a different part of the algorithm. Explain that computer programmers often work together, working to solve a small problem that is part of a much bigger problem.
6. Show the blue block and ask: Do you know what this block does? Model putting it in the Board, press the Go button and ask: What happens?
7. Explain that this is a special block called a function. It is like a rucksack because it can carry up to four blocks 'inside' it.
8. Show the Board and function line. Model putting two green blocks in the function line, then a function block on the main Board.
9. Explain that today pupils will be solving problems using the function block, just like computer programmers.

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

Creative Play

Make a party bag for Cubetto

Guided Activity

1. Split the group in half, then each half gets into pairs.
2. Explain that each half will be competing against the other, and the best way to win is to work together.
3. Hand out one step in the algorithm to each pair (if there are five steps, have five pairs in each team) and ask them to read their task.
4. Support pairs to sit at the table in order of their algorithm (with pairs facing each other so they can work together more easily).
5. Hand out the resources needed.
6. Explain that they will have 10 minutes to wrap as many presents as they can and start the timer.

Independent Activity

1. Place Cubetto on the compass and find the castle.
2. Work in a pair to make Cubetto move to the castle. Which blocks did you use?
3. Move Cubetto back to the compass. How many blocks can you put in the function line?
4. You can now only use two green blocks and two blue blocks. Can you make Cubetto move to the castle?
5. Can you move Cubetto from the compass to the mountains using two blue, three green and one red block?

Challenge

Can you work out what the cream block does?

Plenary and Assessment

1. Ask pupils to show their wrapped presents and ask: How did you work together to do it quickly? How many presents did you wrap?
2. Show image of Dorothy Vaughan who was a computer programmer at NACA/NASA in the 1940s-70s. Show her in the team of African American women and emphasise that by working together, these women helped design planes to win WW2 and build rockets to land on the moon!
3. Sitting in a circle with the map, Board and Cubetto, ask: How can you move Cubetto across the map from one side to the other?
4. Collect suggestions and encourage use of the function block. Allow pupils to suggest and try out their ideas.

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

Cross-curricula Area: English

NC Objectives

To understand that programs execute by precise instructions

Outcomes

- I can recognise numbers and their words
- I can use the random block.

Resources Needed

- Dice (and digital dice on board)
- Number line/square
- 3x3 grids on back of maps with numbers 1-9.

Prep Needed

- Check batteries
- Decorate classroom with balloons!
- Copy bingo cards.
- Turn over the maps and make a 3x3 grid using the same size squares (15cm). Label each with a number 1-9.

Resources Provided

- 2x bingo cards examples for each activity

Key Vocabulary

- Consequences
- Evaluate
- Efficient

Computational thinking concept

Algorithm

Computational thinking approach

Collaborating

Teacher-led Introduction

1. As children enter, play party music and explain that after weeks of waiting patiently, it's now the holidays and Cubetto can celebrate his birthday – finally! Explain that the children will be playing party games today with Cubetto.
2. Show a bingo card on the board (guided example). Explain that the aim of the game is to cross out three words on your card.
3. Point to random numbers written in words and ask pupils to read the words aloud together.
4. Roll the digital dice and ask: What two numbers do I have? What number do I have in total? Add the two numbers together.
5. Ask: Do I have any of these numbers on my bingo card? If not, roll again and model crossing out a word. Do it wrong! Do they notice?
6. Remind the children that they can cross out a number on one die or the total when the two are added together.
7. Explain that the first person to cross out three words is the winner and has to shout BINGO! (Or CUBETTO!).
8. Ask: If I roll two dice, what is the highest number I could get? Support children to work out 6 + 6 using number line/square. What is the smallest number I could get? Could I get zero, or one?

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

Creative Play

Create a new game to play at Cubetto's party.

Guided Activity

1. Introduce the bingo card with the numbers written in words. Read the words together as a group.
2. Explain that the aim of this game of bingo is the same but the children have to match the numbers to the words.
3. Show the map with the grid numbered 1-9, and choose one number. Ask: Who has the number __ on their bingo card?
4. Explain that pupils will be using the random block to make Cubetto move to different numbers. When Cubetto lands on a number that they have on their bingo card, they can cross it out. The first person to cross out three numbers shouts CUBETTO and is the winner!
5. Ask: Which block is the random one? Recap that random means we can't guess what it will make Cubetto do.
6. Ask the youngest person to start: place Cubetto anywhere they like and use the green blocks and the random block to move Cubetto.
7. Ask: Has Cubetto landed on a number on your bingo card? If so, cross it off. If not, move to the next player. Repeat until one child wins.

Independent Activity

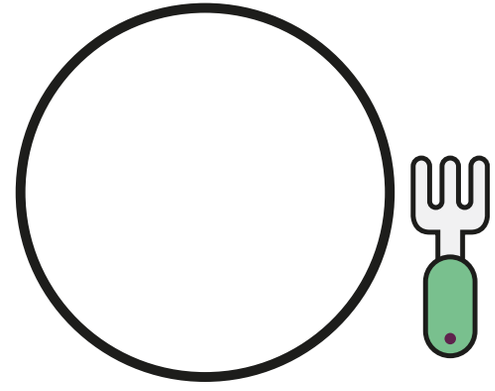
1. Take one bingo card and play with up to four other people. Take one die per group.
2. The person who has the most brothers and sisters goes first and rolls the die.
3. Look at the die. What numbers do you have on each die? What number do you have in total?
4. Look at your bingo card. Do you have any of these three numbers on your card? If you do, cross out that number. If you don't, you must wait until your next turn.
5. Pass the die to the person on your left. Repeat until someone crosses out three numbers on their card and shouts CUBETTO!
6. If someone gets stuck adding up their numbers or can't see their number on the card, try to help them.

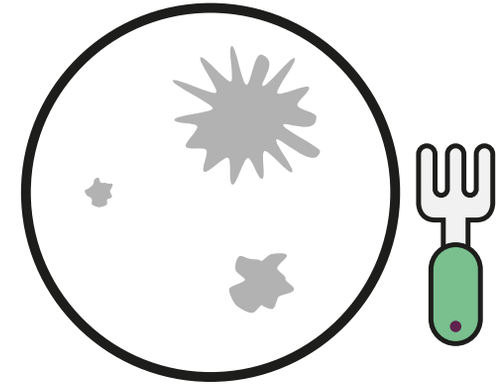
Challenge

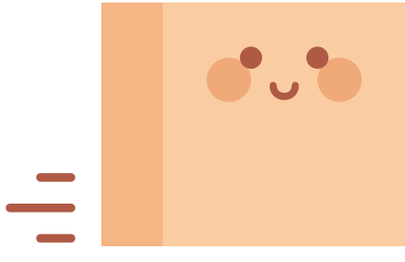
Can you put your bingo card numbers in order from smallest to biggest?

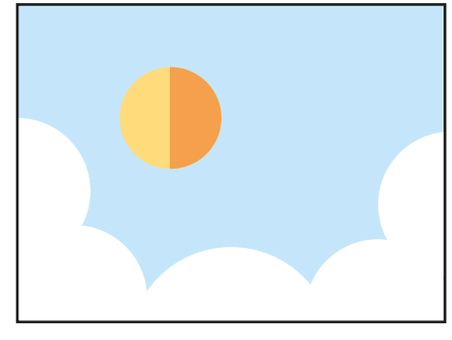
Plenary and Assessment

1. Show an independent activity bingo card and roll two digital dice.
2. Ask: Who can come to the front and point to one of these numbers? Repeat.
3. Ask: How do we find the total number? Adding two numbers together (e.g. 3 + 6 = 9).
4. Show each block in turn and ask the children to show you with their bodies what it makes Cubetto do. They can invent their own moves!







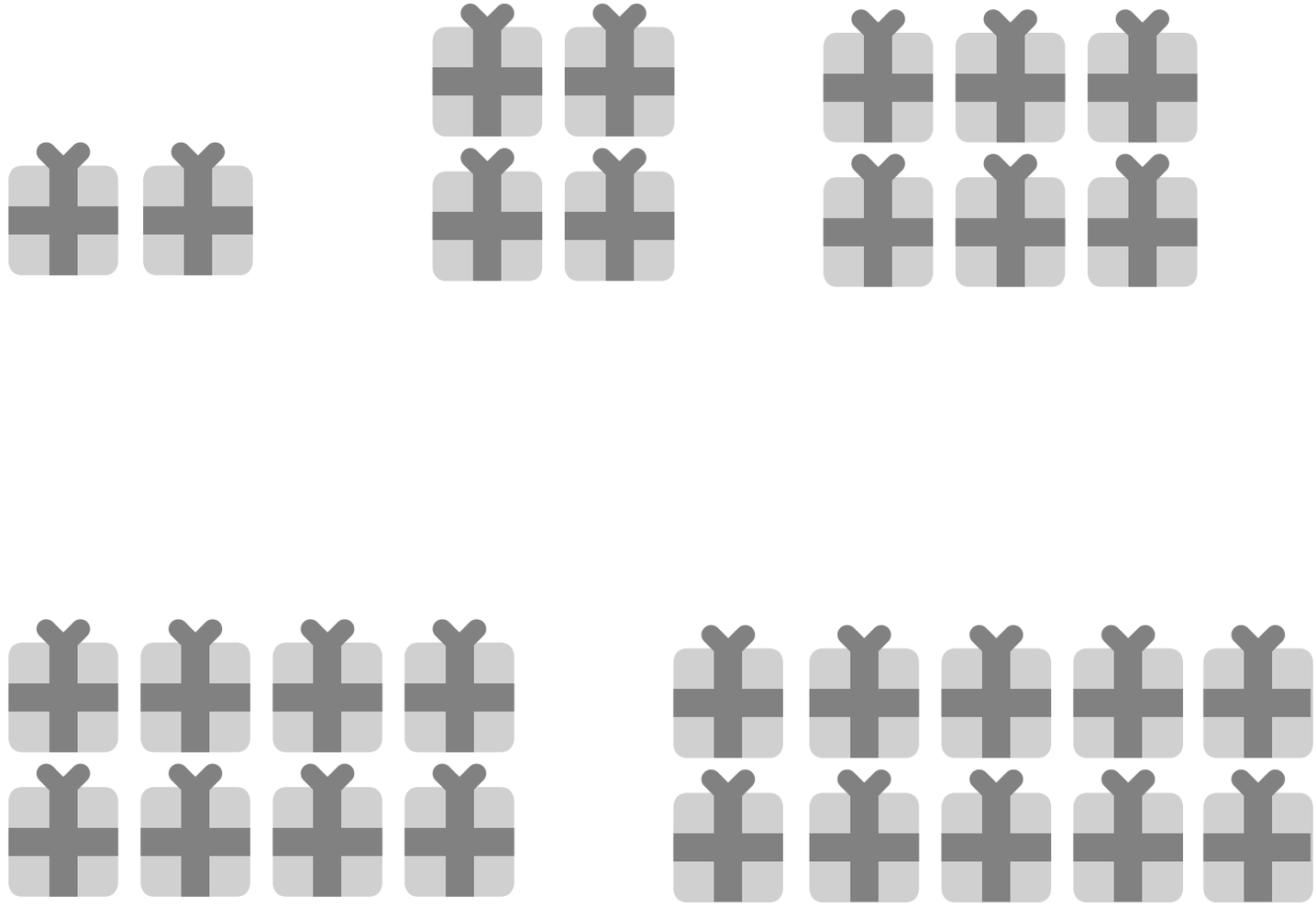


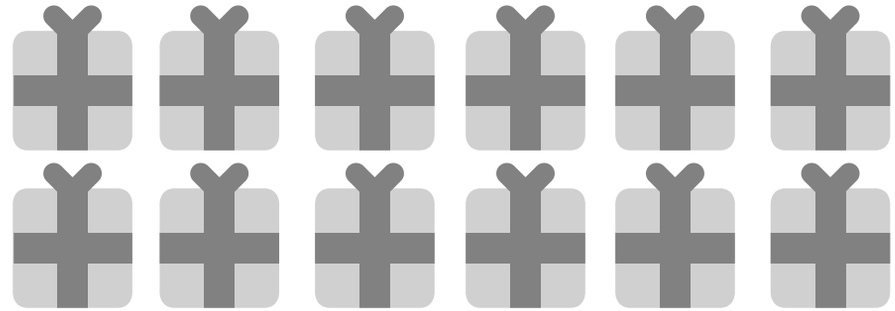
Three	Seven	Six
Nine	Zero	Four

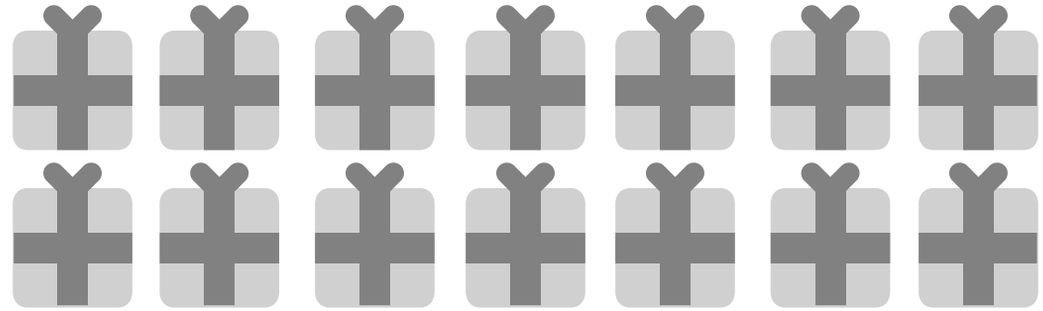
Nine	Six	Ten
Two	Twelve	Four

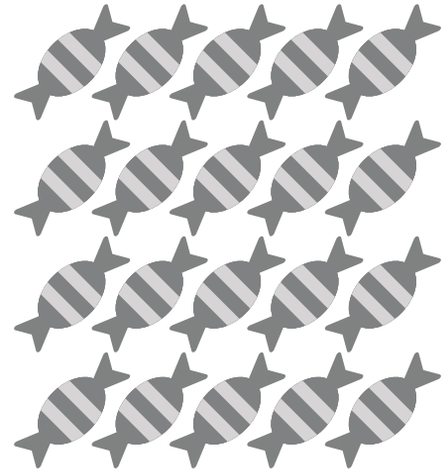
Five	Eight	Eleven
Six	One	Three

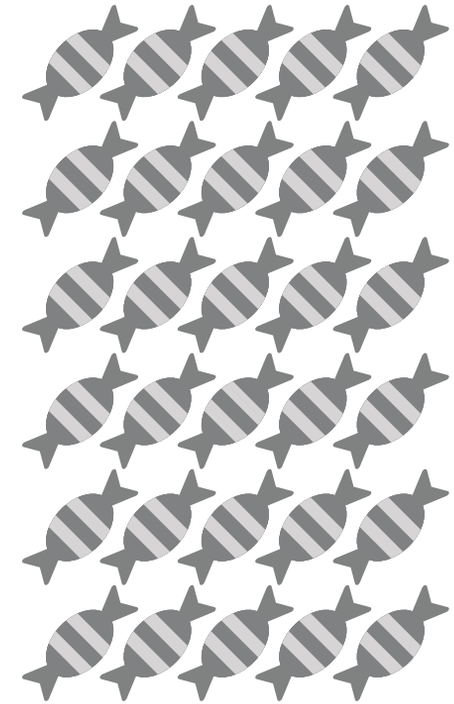
3	7	6
9	0	4
5	8	11
6	1	3
9	6	10
2	12	4

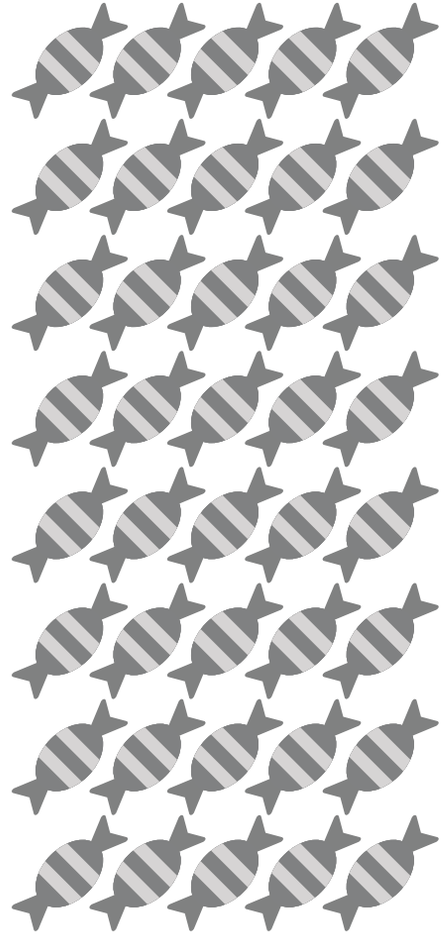


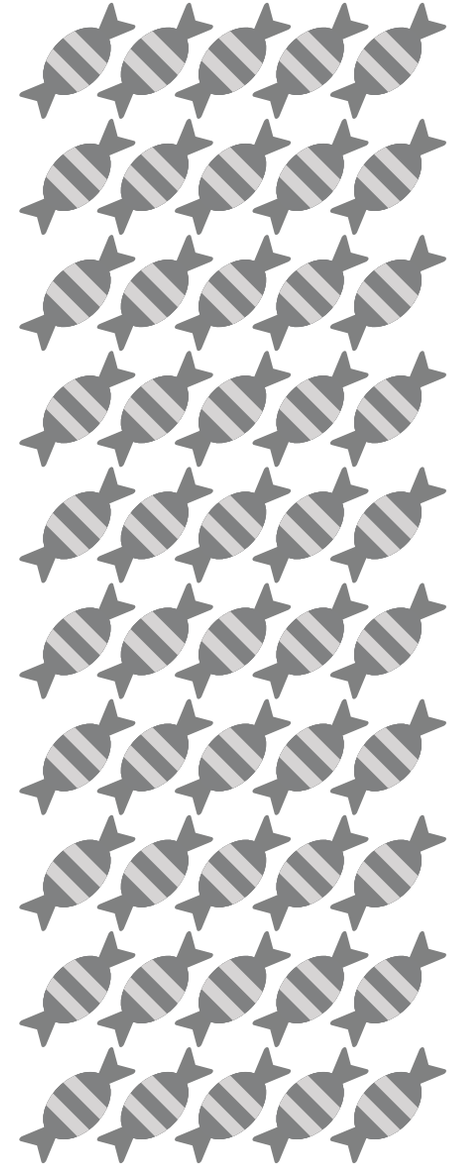












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Visit our website:

www.primotoys.com

Get in touch:

edu@primotoys.com