Cubetto in the Sea - Unit 1

Reception, Ages 4 to 5, UK National Curriculum

Subjects covered:

Number

Space, Shape & Measure

Problem Solving

Materials required:

6x Cubettos

6x Boards

6x Sets of Blocks

6x Ocean Maps

Resources provided:

Hand fish example

Counting octopus template

Sea number cards

‘H’ algorithm

Anchor rope sheet

Sea animals tracing template

Introduction

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

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

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

Development and learning in other key areas

Beyond coding

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

Communication

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

Dexterity

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

Social-Emotional

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

Mathematics

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

Logical reasoning

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

Introducing the Playset

Introducing Cubetto

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

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

Introducing the Board

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

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

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

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

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

Introducing the Blocks

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

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

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

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

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Unit 1 Overview

Reception

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

- Create and debug a simple algorithm and use logical reasoning to predict the behaviour of simple programs.

	Lesson 1	Lesson 2	Lesson 3	Lesson 4
NC Computing Objectives	To create an algorithm	To create an algorithm	To create an algorithm	To create an algorithm
Outcomes	• I can count to 8 • I can use the negation block	• I can draw up to eight objects • I can write an algorithm	• I can make maths sentences • I can write an algorithm	• I can solve maths sentences • I can test an algorithm
EYFS Focus	ELG 11 (Number)	ELG 11 (Number)	ELG 11 (Number)	ELG 11 (Number)
Computational Thinking	Algorithms, Tinkering	Algorithms, Tinkering	Logic, Tinkering	Logic, Tinkering
Main Activities	Cubetto's Jellyfish Sting 1. Cubetto got stung by a jellyfish and it's making him do the opposite of what you tell him to! Help Cubetto escape. 2. Explore how to use the opposite block to help Cubetto move away from the jellyfish. 3. Count the number of legs on Cubetto's sea friends. 4. Create hand fish to make a class display. 5. Pick up Cubetto's sea friends on a journey across the map. 6. Make a counting octopus. 7. Make eight legs for Cubetto and stick them on.		Cubetto's Messy Message 1. Watch the message Cubetto draws. Work out what he's trying to tell you! 2. Write rescue messages in sand. 3. Make and solve maths sentences to help Cubetto get to the compass. 4. Trace over the names of Cubetto's underwater friends. 5. Move Cubetto to collect cards around the map to make a number sentence. 6. Draw numbers using shaving foam for a partner to guess. 7. Draw messy messages using Cubetto!	
Challenge	Can you make Cubetto do the opposite of a partner's algorithm?	Can you use the opposite block to make Cubetto go backwards?	Can you move Cubetto between the two jellyfish squares?	Can you add more pens to Cubetto's sides?
Resources	Hand fish example, Counting octopus, Sea number cards, Pictures of jellyfish and octopus with 8 tentacles, Craft materials (incl. sequins)		'H' algorithm, Large paper with large island outline, Sand pit, Shaving foam trays, Number sentence cards (e.g. 1,2,3,4,+,=), Number lines, Whiteboards	
Assessment	Counting octopus, Algorithms with negation block, Verbal statements, Photos, Observation of counting		Messages, Number sentences, Verbal statements, Photos, Observation of sharing	

	Lesson 5	Lesson 6	Lesson 7	Lesson 8
NC Computing Objectives	To predict the behaviour of simple programs	To predict the behaviour of simple programs	To debug a simple algorithm	To debug a simple algorithm
Outcomes	• I can say which is shorter/longer • I can make Cubetto take a longer journey	• I can measure length • I can predict how Cubetto will move	• I can solve a maths problem • I can fix an algorithm	• I can solve a maths problem • I can explain the random block
EYFS Focus	ELG 12 (Shape, space and measure)	ELG 12 (Shape, space and measure)	ELG 11 (Number – problem-solving)	ELG 11 (Number – problem-solving)
Computational Thinking	Algorithms, Collaborating	Algorithms, Collaborating	Algorithms, Creating	Algorithms, Creating
Main Activities	Cubetto's Sea Snakes 1. Explore measuring sea snakes using different tools and items. 2. Find and take photos of items longer and shorter than the sea snake. 3. Colour in the shortest and longest anchor ropes. 4. Compare two algorithms on the board. Which is the longest? How do you know? 5. Move Cubetto to find the longest sea snake on the map. 6. Work in pairs to make Cubetto go on a longer journey. 7. Use window pens to draw short and long sea snakes!		Cubetto's Funny Fish 1. Cubetto's going fishing! Help catch fish around the map and fix the algorithm. 2. Play the Memory game: look and then cover up the fish. How many are there? 3. Fix Cubetto's algorithm moving to the underwater castle. 4. Count out the fish into different numbered nets. 5. Throw different numbers of bean bags onto different squares of the map. 6. Make fish patterns with increasing numbers. 7. Touch and draw different real fish!	
Challenge	Can you make two Cubettos have a race?	Can you describe what the function block does?	Can you describe what each block does?	Can you move from the pirate to desert island, avoiding the jellyfish?
Resources	Anchor rope sheet, Rope/string (ideally green), Cameras, Window pens, Tools for measuring (incl. tape measure & cubes)		Large sheet of paper (A1 or roll of wallpaper), Adhesive numbers to stick on Cubetto, Clipboard and pens, Masking tape, Different objects	
Assessment	Measuring, Algorithm comparisons, Photos taken by children, Verbal statements , Observation		Fish in nets & bean bag throws, Algorithms using random block, Observation, Photos, Verbal statements	

Lesson 1: Cubetto's Jellyfish Sting! (1 of 2)

EYFS Focus: Maths

NC Objectives

To create an algorithm

Outcomes

- I can count to 8
- I can use the negation block

Resources Needed

- Pictures of jellyfish and octopus with 8 tentacles
- Craft materials (incl. sequins)

Prep Needed

- Check batteries.
- Make sad face for Cubetto and stick this on him.

Resources Provided

- Hand fish example
- Counting octopus template

Key Vocabulary

- Jellyfish
- Tentacle
- Negation
- Opposite

Computational thinking concept

Algorithms

Computational thinking approach

Tinkering

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

1. Show video of exotic jellyfish: www.youtube.com/watch?v=aJUuotjE3u8 and ask: What do you think these are?
2. Explain that jellyfish live in the sea and are really interesting creatures: they have no brain, blood, bones or heart!
3. Show the Ocean Map and ask the children to point to the jellyfish squares.
4. Explain that jellyfish have long tentacles that help them swim. Jellyfish have lots of tentacles – eight or more! Count to eight together.
5. Show Cubetto's sad face and ask: What do you notice that's different? What do you think could have happened? How does Cubetto feel?
6. Explain that Cubetto has been stung by a jellyfish! Jellyfish don't want to sting people but Cubetto touched its tentacle while swimming and got stung. It's making him behave strangely and he's moving in the opposite direction to what you tell him to!
7. Recap the negation block (cream) and ask: What is the opposite of forwards? What is the opposite of left? How do we use this to make Cubetto do the opposite? Put it before the block.

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

Activity 1: Escape the jellyfish!

1. Put Cubetto on one of the jellyfish squares.
2. Where can Cubetto move to safely?
3. Using the negation block, program Cubetto to escape the jellyfish.

Activity 2: Count the legs

1. Count the legs on the different jellyfish and octopus pictures.
2. How many legs would they have if you added one more?
3. How many would they have with one less?

Activity 3: Hand fish

1. Draw around your hand on colourful card and cut it out.
2. Decorate your fish with eyes, lips and patterns.
3. Stick it on a lollipop stick and make a display.

Activity 4: Sea friends [guided]

1. Place two of the jellyfish or octopus pictures on the map.
2. Can you pick up two friends using Cubetto?
3. What blocks do you need to use?

Activity 5: Counting octopus

1. Decorate the octopus' tentacles with increasing numbers of sequins, starting at 1.
2. How many sequins does the last tentacle need?

Activity 6: Cubettopus

1. Draw eight legs for Cubetto.
2. Cut them out and colour them in.
3. Stick them on Cubetto to turn him into an octopus!

Challenge

Can you make Cubetto do the opposite of a partner's algorithm?

Plenary and Assessment

1. Show video of octopus and count to eight together: www.youtube.com/watch?v=CMYa6O68GSg
2. Ask volunteers to share their algorithm using the negation block. Before running algorithm, ask: Which block will do the opposite?
3. Ask volunteers to share their counting octopus pictures and the legs they made to turn Cubetto into an octopus. Count the legs together.

Lesson 2: Cubetto's Jellyfish Sting! (1 of 2)

EYFS Focus: Maths

NC Objectives

To create an algorithm

Outcomes

- I can draw up to eight objects
- I can write an algorithm

Resources Needed

- Pictures of jellyfish and octopus with eight tentacles
- Craft materials (incl. sequins)

Prep Needed

- Check batteries.
- Copy under the sea number cards and numbers 1-8.

Resources Provided

- Sea number cards
- Hand fish example
- Counting octopus

Key Vocabulary

- Numbers 1-8
- Jellyfish
- Octopus
- Tentacle
- Negation
- Opposite

Computational thinking concept

Algorithms

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Play 'Under the Sea' in Disney's Little Mermaid© and encourage children to sing along. Ask: Did you see an octopus? Alternatively, watch the jellyfish scene from Disney's Finding Nemo© and ask: What are the pink creatures? How does Dory work out what to do?
2. Show picture of octopus and ask children to count its eight legs.
3. Ask: Can you draw eight fish? Invite volunteers to the board to draw one at a time, checking after each how many more they need.
4. Hand numbers 1-8 to children at random and ask a volunteer to pick an 'Under the Sea' number card at random.
5. Ask children to count and stand up if they think they have the right number. Repeat, encouraging speed!
6. Recap which block makes Cubetto do the opposite and how to use it.

Lesson 2: Cubetto's Jellyfish Sting! (2 of 2)

Activity 1: Escape the jellyfish!

1. Put Cubetto on one of the jellyfish squares.
2. Where can Cubetto move to safely?
3. Using the negation block, program Cubetto to escape the jellyfish.

Activity 2: Count the legs

1. Count the legs on the different jellyfish and octopus pictures.
2. How many legs would they have if you added one more?
3. How many would they have with one less?

Activity 3: Hand fish

1. Draw around your hand on colourful card and cut it out.
2. Decorate your fish with eyes, lips and patterns.
3. Stick it on a lollipop stick and make a display.

Activity 4: Sea friends [guided]

1. Place two of the jellyfish or octopus pictures on the map.
2. Can you pick up two friends using Cubetto?
3. What blocks do you need to use?

Activity 5: Counting octopus

1. Decorate the octopus' tentacles with increasing numbers of sequins, starting at one.
2. How many sequins does the last tentacle need?

Activity 6: Cubettopus

1. Draw eight legs for Cubetto.
2. Cut them out and colour them in.
3. Stick them on Cubetto to turn him into an octopus!

Challenge

Can you use the negation block to make Cubetto go backwards?

Plenary and Assessment

1. Put children in pairs and hand out three number cards to each pair. Ask pairs to work together to match the number to the array.
2. Ask volunteers to share their algorithm for making Cubetto move to pick up two underwater friends.
3. Before running the algorithm, ask: Where do you think Cubetto will move?
4. Recap the different blocks and what they make Cubetto do.

Lesson 3: Cubetto's Messy Message (1 of 2)

EYFS Focus: Maths

NC Objectives

To create an algorithm

Outcomes

- I can make maths sentences
- I can write an algorithm

Resources Needed

- Large paper with large island outline
- Sand pit
- Shaving foam trays

Prep Needed

- Check batteries.
- Create algorithm that draws a 'H' (see reverse).
- Attach pen to front of Cubetto.

Resources Provided

- 'H' algorithm

Key Vocabulary

- Message
- Algorithm
- Number sentence
- Plus
- Equals

Computational thinking concept

Logic

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Sit in a circle with Cubetto on the paper. Explain that Cubetto is stuck on a desert island and needs their help!
2. Show children the long algorithm on the Board and tell pupils that Cubetto is going to write a message for them on the paper.
3. Pick blocks for the children. Ask them to name these and describe what they make Cubetto do.
4. Run the algorithm while pupils watch Cubetto write the letter 'H'! Identify the letter with the children.
5. Ask: What message do you think Cubetto is sending? 'H' for...?
6. Ask children to find the desert island (where Cubetto is stuck) and the compass ('home') on the Primo map.
7. Explain that the children need to make number sentences to help Cubetto. Show the number sentence cards and explain that when they make a number sentence, Cubetto gets one square closer to his home!
8. Model using the cards to make the number sentence: 1 + 2 = 3. Ask: Is this correct? How do you know? Model checking using the line.
9. Explain that today pupils will be using Cubetto to make messy messages and maths sentences.

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

Activity 1: Holiday Stories

1. Look at the three pictures that tell a holiday story.
2. Work together to put the pictures in the right order.
3. Can you number them: 1, 2, 3?

Activity 2: Dancing

1. Work out which blocks make Cubetto turn. Which colours?
2. Put different turn blocks in the board.
3. Can you make Cubetto dance? – He is on holiday!

Activity 3: Consequences

1. At the top of a piece of paper draw Cubetto (a simple square).
2. Fold the paper down to hide it and pass to a friend who then draws where Cubetto goes on holiday.
3. Fold the paper over again and finally draw how the holiday ends.
4. Open up your story and tell it to each other in order, using the word then after each stage.

Activity 4: Holding Hands

1. Draw round your hand on a piece of paper and cut it out.
2. Draw round your other hand and cut this out too.
3. Which is your left hand? Which is your right hand? Label them.
4. Stick each hand to the right and left side of Cubetto to remind it which way it is turning.

Activity 5: Footprints

1. Cut out two sets of right and left foot templates. Which foot is right and which is left?
2. Work with a partner to put sets of footprints around the room in order to show a walking route.

Activity 6: Role play

1. Role play one of Cubetto's holiday stories using props.
2. What happens to Cubetto? Where does Cubetto go and what does it do?

Challenge

Can you make Cubetto dance forever?

Plenary and Assessment

1. Show one of the stories on the Board in mixed up order. Ask: Which picture goes first? Ask for volunteers to try.
2. Ask the class to read out what order they go in together: 1, 2, 3.
3. Ask volunteers to share their Consequences story with the class using the word then.
4. Ask: Why is it important to tell a story in the right order? What else do we do in the right order? (E.g. putting on clothes.)

Lesson 4: Cubetto's Messy Message (1 of 2)

EYFS Focus: Maths (Number)

NC Objectives
To create an algorithm

Outcomes
- I can solve maths sentences
- I can test an algorithm

Resources Needed
- Large paper with large island outline
- Sand pit
- Shaving foam trays

Prep Needed
- Check batteries.
- Attach pens to front of each Cubetto.

Resources Provided
- Sea animal tracing template

Key Vocabulary
- Message
- Algorithm
- Number sentence
- Plus
- Equals

Computational thinking concept

Logic

Computational thinking approach

Tinkering

Teacher-led Introduction

1. Play 'mix up' with the children: tell them all to stand up and when you call out a number, get into groups of that number.
2. Explain that if they are left over, they can stand with you at the front and can choose the next number (under 5).
3. Call out numbers and allow time for children to get into groups. Reiterate importance of being kind to and helping each other.
4. Ask two groups to stay standing and the rest sit down.
5. Ask: How many children are standing up? Model counting the first group, then the second, then adding the two together.
6. Ask: How could I write this as a number sentence? Model __ + __ = __.
7. Hand out number cards to the groups and play the game again, asking groups to show the correct number card when finished grouping.
8. Select two groups to stand up again and ask the rest of the pupils to write the number sentence on their mini whiteboards.

Lesson 4: Cubetto's Messy Message (2 of 2)

Activity 1: Sand messages

1. At the sandpit, write a message to a friend.
2. What happens when you add water?
3. What else can you use to make different marks?

Activity 2: Cubetto's escape [guided]

1. Place Cubetto on the desert island.
2. Make a maths sentence using the cards.
3. Work with a partner and number line to check it's correct.
4. If you're right, move Cubetto one square towards the compass.

Activity 3: Word tracing

1. Trace over the sea animal words carefully using a pencil.
2. What words have you spelt?

Activity 4: Adding up [guided]

1. Teacher to place +, = and two number cards on the map near each other.
2. Program Cubetto to collect the cards in any order.
3. Make a number sentence and check it's correct!

Activity 5: Foam numbers

1. Draw a number using shaving foam.
2. Can your partner guess what you've drawn?

Activity 6: Messy messages

1. Use a Cubetto with a pen attached on paper.
2. Put random blocks in the board and press "Go".
3. What does Cubetto draw? What could it be saying?
4. Can you make Cubetto write a longer message?

Challenge

Can you add more pens to Cubetto's sides?

Plenary and Assessment

1. Ask: What is a number sentence? What do we need to write a number sentence?
2. Ask volunteers to share their number sentences and algorithms written for Cubetto.
3. Show a maths sentence on the board with the answer missing.
4. Ask: How could we work this out? Collect ideas and solve together.

Lesson 5: Cubetto's Sea Snakes (1 of 2)

EYFS Focus: Maths (Shape, Space & Measure)

NC Objectives

To predict the behaviour of simple programs

Outcomes

- I can say which is shorter/longer
- I can make Cubetto take a long journey

Resources Needed

- Rope/string (ideally green)
- Cameras
- Window pens
- Tools for measuring (incl. cubes)

Prep Needed

- Check batteries
- Source images of recycled models
- Prepare algorithms of 3-4 blocks as treasure hunt 'clues'
- Print snake and ladder templates onto card

Resources Provided

- N/A

Key Vocabulary

- Algorithm
- Recycled
- Materials
- Treasure

Computational thinking concept

Logic

Computational thinking approach

Collaborating

Teacher-led Introduction

1. Start a conga with the class! Tell pupils to stand up and join the line as you move through, joining together by holding shoulders.
2. When everyone is part of the conga, form a circle and ask five volunteers to form a wiggly line in the centre.
3. Ask: How long is this line? Five children. How else could we measure it? Collect ideas.
4. Ask another four children to stand up and form a separate line.
5. Ask: Which is longer? How do you know?
6. With all children sat in a circle, show two lengths of rope folded up and tell the class that these are sea snakes!
7. Explain that Cubetto needs to work out which is shorter and longer. Ask: Can you help Cubetto?
8. Model laying both out next to each other to compare and decide which is longest/shortest.

Lesson 5: Cubetto's Sea Snakes (2 of 2)

Activity 1: Photos

1. Take one of the sea snakes with a partner.
2. Find things in the classroom (or outside!) that are shorter than the snake.
3. Take a photo of the items you find. Can you find longer things?

Activity 2: Anchor away

1. Look at the different pairs of anchors on the sheet.
2. In the first pair, which do you think is the shortest anchor rope?
3. Circle the shortest and repeat for the other pairs.

Activity 3: Are we there yet? [guided]

1. Look at the pair of algorithms.
2. Which do you think will take Cubetto longer to complete? Why?
3. Test out your prediction. Were you right?

Activity 4: Sea snakes [guided]

1. Teacher places two sea snakes on two squares of the map.
2. Write an algorithm to collect both the sea snakes.
3. Which of the sea snakes is longer? How can you measure it?

Activity 5: Long journey [two Cubettos required]

1. You and your partner have a Cubetto and Board each.
2. Each write an algorithm to make Cubetto go as far as you can.
3. Run your algorithms at the same time. Who went furthest?

Activity 6: Underwater windows

1. Use window pens to draw sea snakes on the windows.
2. Can you draw a longer one than your friend?
3. Can you draw a shorter one?

Challenge

Can you make two Cubettos have a race?

Plenary and Assessment

1. Ask volunteers to show their window sea snakes. Point to one and ask: Can you find a longer sea snake? How do you know?
2. Show a pair of algorithms to the class and place two Cubettos on the map. Ask: Which Cubetto will take a longer journey? How do you know? Discuss counting blocks and how they could measure the Cubettos' routes.
3. Ask: How could we make Cubetto move even further? Recap function block and test out pupils' ideas.

Lesson 6: Cubetto's Sea Snakes (1 of 2)

EYFS Focus: Maths (Shape, Space & Measure)

NC Objectives

To predict the behaviour of simple programs

Outcomes

- I can measure length
- I can predict how Cubetto will move

Resources Needed

- Rope/string (ideally green)
- Cameras &indow pens
- Tools for measuring (incl. tape measure & cubes)

Prep Needed

- Check batteries.
- Cut rope into different lengths for pupils to measure using different tools.
- Prepare different pairs of algorithms for pupils to predict which will make Cubetto make longer/shorter journeys.

Resources Provided

- Anchor rope sheet

Key Vocabulary

- Length
- Measure
- Longer
- Longest
- Shorter
- Predict

Computational thinking concept

Logic

Computational thinking approach

Collaborating

Teacher-led Introduction

1. Sit the children in a circle with Cubetto on the map in the middle and the prepared algorithm on the Board.
2. Show the board to the children and ask: What do you think will happen if I press the Action button? How and where will Cubetto move? Collect pupils' ideas.
3. Ask for a volunteer to press Action and tell the class to watch Cubetto move.
4. Ask: Were you right? Did Cubetto move how you thought it would?
5. Explain that trying to work out what will happen is called predicting.
6. Move two of the Blocks around on the Board and ask: How do you think Cubetto will move now?
7. Ask for another volunteer to press Action and discuss their predictions.

Lesson 6: Cubetto's Sea Snakes (2 of 2)

Activity 1: Photos

1. Take one of the sea snakes with a partner.
2. Find things in the classroom (or outside!) that are shorter than the snake.
3. Take a photo of the items you find. Can you find longer things?

Activity 2: Anchor away

1. Look at the different pairs of anchors on the sheet.
2. In the first pair, which do you think is the shortest anchor rope?
3. Circle the shortest and repeat for the other pairs.

Activity 3: Are we there yet? [guided]

1. Look at the pair of algorithms.
2. Which do you predict will take Cubetto longer? Why?
3. Test out your prediction. Were you right?

Activity 4: Sea snakes [guided]

1. Teacher places two sea snakes on two squares of the map.
2. Write an algorithm to collect both the sea snakes.
3. Which of the sea snakes is longer? How can you measure it?

Activity 5: Long journey [two Cubettos required]

1. You and your partner have a Cubetto and Board each.
2. Each write an algorithm to make Cubetto go as far as you can.
3. Run your algorithms at the same time. Who went furthest?

Activity 6: Underwater windows

1. Use window pens to draw sea snakes on the windows.
2. Can you draw a longer one than your friend?
3. Can you draw a shorter one?

Challenge

Can you describe what the function block does?

Plenary and Assessment

1. Ask pupils to share their algorithm predictions and ask: Were you correct? How did you find out?
2. Show two algorithms and ask pupils to predict which will make Cubetto move further.
3. Test out on two Cubettos and discuss pupils' predictions.
4. Ask: What have you used to measure sea snakes today? What did you find out?

Lesson 7: Cubetto's Funny Fish (1 of 2)

EYFS Focus: Maths (Problem-solving

NC Objectives

To debug a simple algorithm

Outcomes

- I can solve a maths problem
- I can fix an algorithm

Resources Needed

- Fish pictures to place on map
- Fishing nets (some numbered 1-5)
- Toy fish/sea creatures and cloth
- Bean bags, pens, paper and post-its
- If possible, fish from the fishmongers!

Prep Needed

- Check batteries.
- Prepare algorithms ending at underwater castle for children to debug (with block missing).

Resources Provided

- N/A

Key Vocabulary

- Algorithm
- Bug
- Fix

Computational thinking concept

Algorithms

Computational thinking approach

Creating

Teacher-led Introduction

1. Place the fish pictures on the map at random and explain that Cubetto is going fishing! Ask for a volunteer to hold the net.
2. Show the algorithm on the Board and ask: Where do you predict Cubetto will move? Will he get to a fish? Why do you think that?
3. Run the algorithm and ask children to explain what happens. Explain that the algorithm has a bug! A bug is a computer problem that needs to be fixed.
4. Ask: What is the bug or problem? How could we help Cubetto fix it? Take suggestions and test out pupils' suggestions.
5. Run algorithm again and when a fish is 'caught' by Cubetto, ask the volunteer to place it in their net.
6. Explain that pupils will be taking it in turns to fish using Cubetto and the one with the most fish at the end wins! They must be careful though – some algorithms have bugs that need fixing first.

Lesson 7: Cubetto's Funny Fish (2 of 2)

Activity 1: Memory of a fish

1. Look at the fish and sea creatures on the table with a partner.
2. What can you see? How many are there?
3. Ask a partner to hide one and then cover them all with a cloth.
4. Take off the cloth. Which one is missing? Now test your partner.

Activity 2: Underwater castle

1. Look at the prepared algorithm. Will this algorithm get Cubetto to the castle? Why/why not?
2. What is the bug? How could you fix it?
3. Test out your fixed algorithm to get Cubetto to the castle.

Activity 3: Counting fish

1. Look at the numbered fishing nets.
2. Can you put the correct number of fish into each net?

Activity 4: Bean bags [guided]

1. Teacher calls out different squares and number (e.g. whale: two bean bags!)
2. Find the square the teacher has said and throw the number of bean bags onto that square.
3. Can you instruct a friend to do the same?

Activity 5: One by one

1. On a post-it draw one fish and write the number 1 above.
2. On another post-it draw two fish and write the number 2.
3. Repeat until you have drawn five fish!

Activity 6: Fishy business [if able to source real fish]

1. Look at the fish in front of you. What does it feel like? What does it smell like?
2. Draw the fish using a pencil and colour it in.

Challenge

Can you describe what each block does?

Plenary and Assessment

1. Ask: What problems did we solve today?
2. Ask pupils to share their numbered fishing nets and fish post-its in increasing numbers. Count together as a class.
3. Show a prepared algorithm and ask: What do you think the bug is with this algorithm? Do you think Cubetto will get to the castle?
4. Collect ideas and test algorithm, replacing blocks according to pupils' suggestions.
5. Ask: How did we fix this algorithm?

Lesson 8: Cubetto's Funny Fish (1 of 2)

EYFS Focus: Maths (Problem-solving)

NC Objectives

To debug a simple algorithm

Outcomes

- I can solve a maths problem
- I can explain the random block

Resources Needed

- Stickers with numbers on/ number badges
- Fish pictures to place on map
- Fishing nets (some numbered 1-5)
- Toy fish/sea creatures and cloth
- Bean bags, pens and paper and post-its
- If possible, fish from the fishmongers!

Prep Needed

- Check batteries.
- Prepare algorithms ending at underwater castle for children to debug (with random block).

Resources Provided

- N/A

Key Vocabulary

- Lottery
- Numbers
- Random
- Algorithm
- Bug
- Fix

Computational thinking concept

Algorithms

Computational thinking approach

Creating

Teacher-led Introduction

1. Show the National Lottery video: www.youtube.com/user/TheNationalLottery and ask: Do you know what the lottery is?
2. Explain that the lottery is a game where people choose a set of numbers. A computer then selects numbers at random and if they match, the person wins money!
3. Demonstrate the lottery generator: www.lottery.co.uk/lotto/number-generator and ask: Can you predict the lottery numbers?
4. Explain that if we could predict the numbers, we would win each time and be very rich!
5. Hand out the stickers/number badges for each child to wear and place five chairs at the front of the class.
6. Ask the class to mix up and when you say, "Lotto", four children have to sit on the chairs. The children on the seats are the random lottery numbers!
7. Show the random block and recap its function: it makes Cubetto do a random thing – different every time.
8. Ask: What are the different things it could make Cubetto do?

Lesson 8: Cubetto's Funny Fish (2 of 2)

Activity 1: Memory of a fish

1. Look at the fish and sea creatures on the table with a partner.
2. What can you see? How many are there?
3. Ask a partner to hide one and then cover them all with a cloth.
4. Take off the cloth. Which one is missing? Now test your partner.

Activity 2: Underwater castle

1. Look at the prepared algorithm and run it.
2. What is the random block making Cubetto do? What could you replace the random block with to get to the castle?
3. Test out your fixed algorithm to get Cubetto to the castle.

Activity 3: Counting fish

1. Find the numbers 1 – 6 and lay them out in order.
2. Take one number and stick it to one of Cubetto's sides.
3. Repeat for the other numbers until all sides have a number.
4. How many sides does Cubetto have?

Activity 4: Block numbers

1. Use the different coloured Blocks to make the number one.
2. How many blocks did you use?
3. Can you make the number two? Did you need more or less Blocks? Repeat for other numbers.

Activity 5: Counting the classroom

1. Put a piece of paper on your clipboard.
2. Walk around the classroom counting different objects, for example the windows, plants, tables.
3. Write down the different numbers you have found in the class.

Activity 6: Blue block

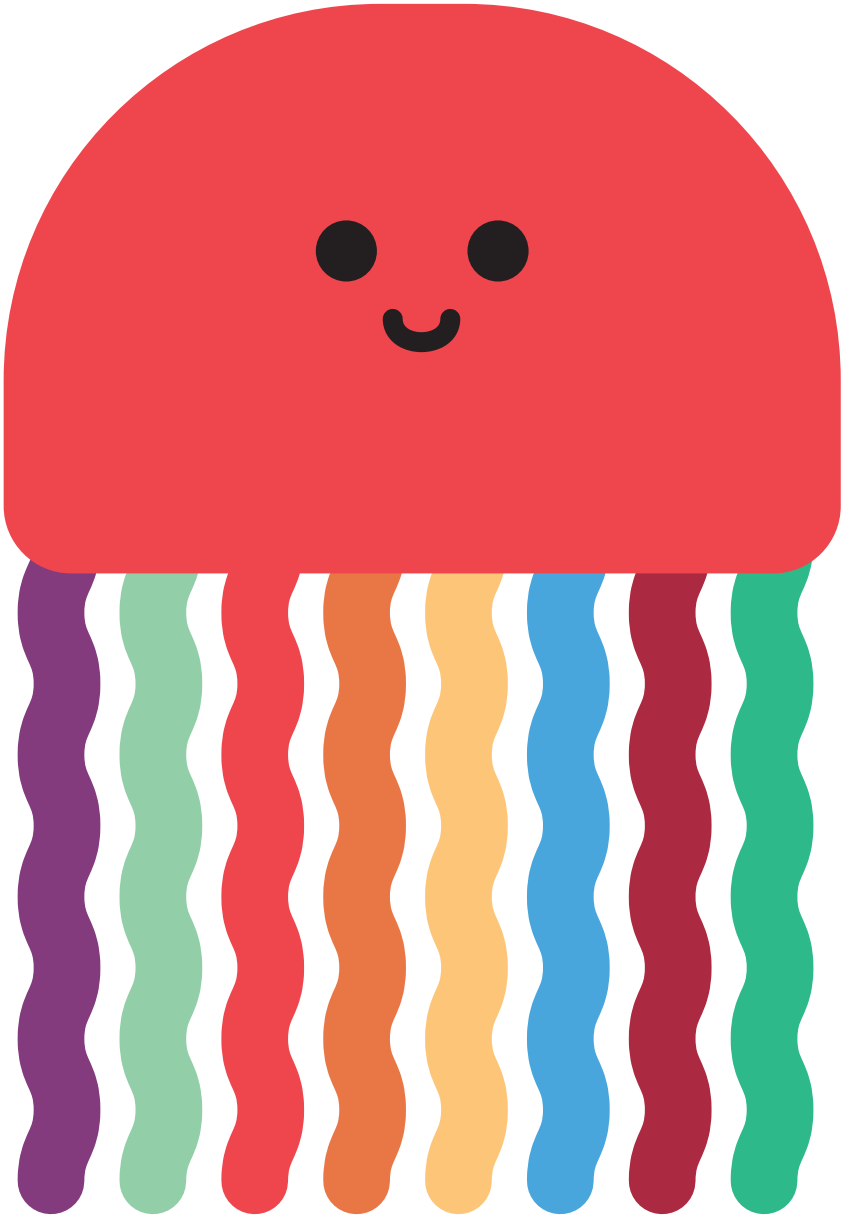
1. Put the function block in the Board & Action. What happens?
2. Keep the blue block in and add a green to the function line.
3. Write an algorithm using the function block. Can you use even fewer Blocks?

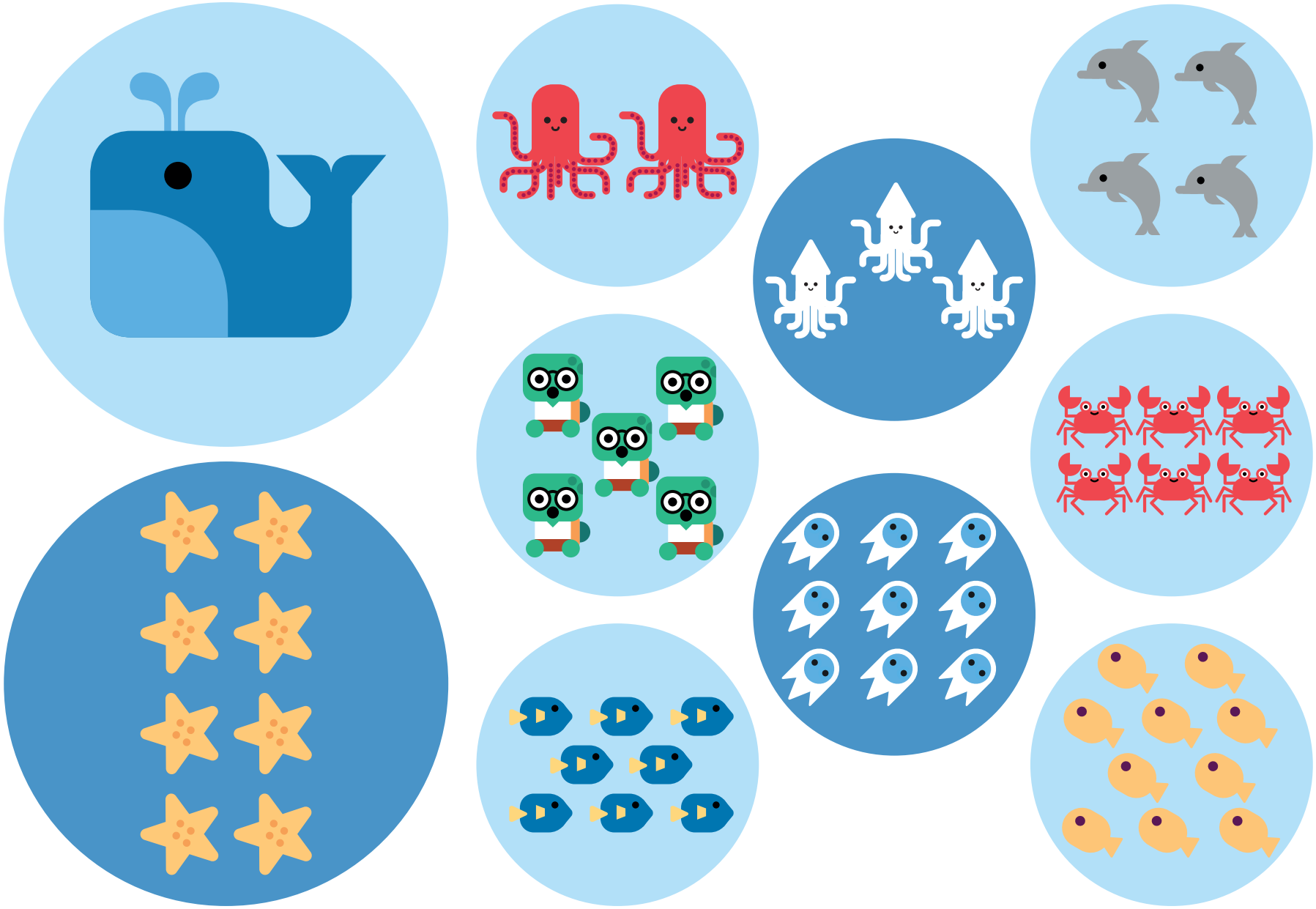
Challenge

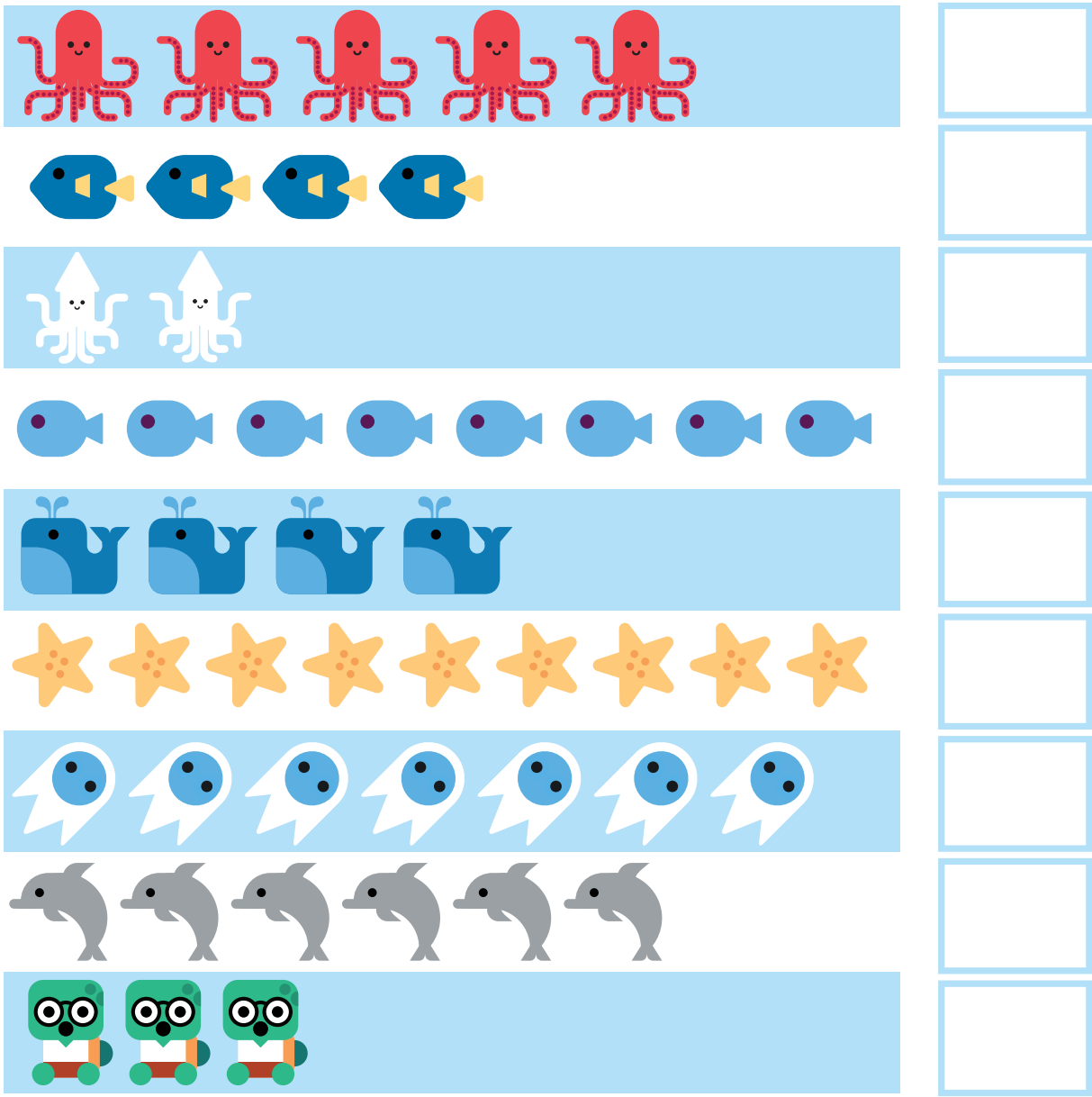
Can you find other objects that have six sides like Cubetto?

Plenary and Assessment

1. Ask: What numbers did Cubetto draw today?
2. Ask pupils to come to the front to show their number drawings. Which number was the easiest? Which was harder?
3. Show a series of numbered objects mixed up.
4. Ask for volunteers to come to the front to put them in order and then count together.
5. Ask pupils to share their classroom counting with the class. Ask pupils to predict before each one.







Correct ‘H’ algorithm

Forward

Forward

Backwards

Right

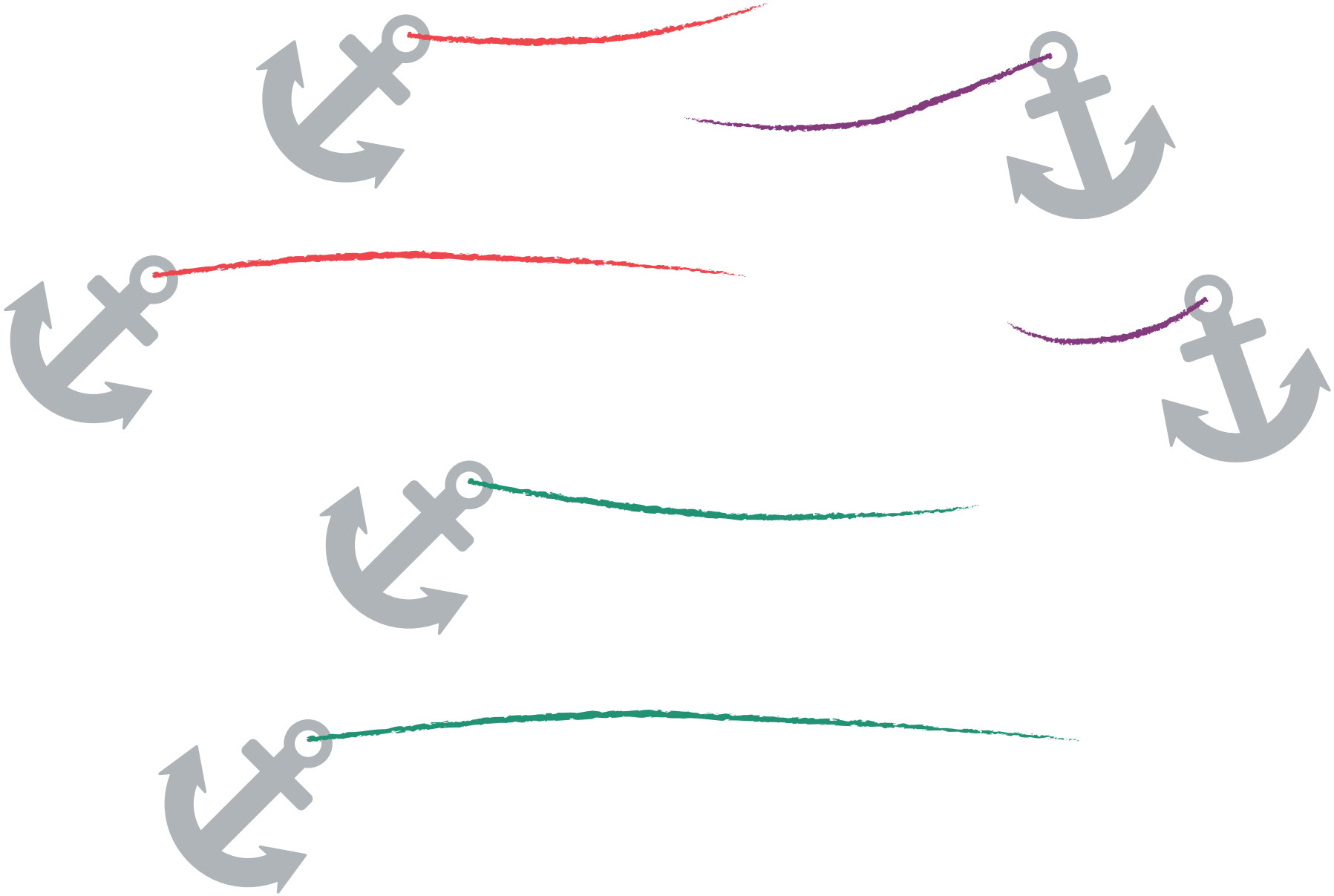
Forward

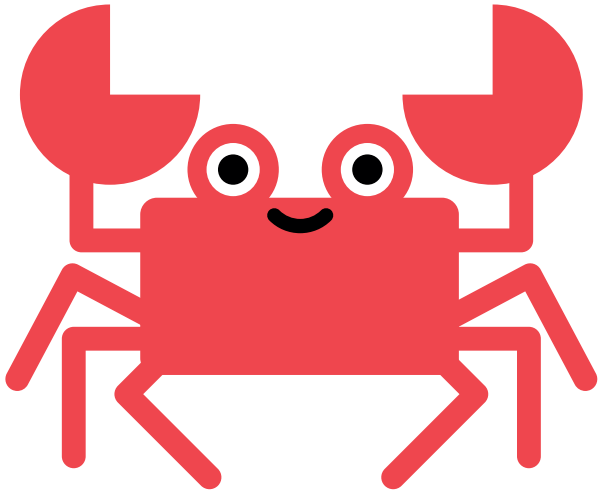
Left Forward

Left

Left

Forward





crab

turtle

sealion

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