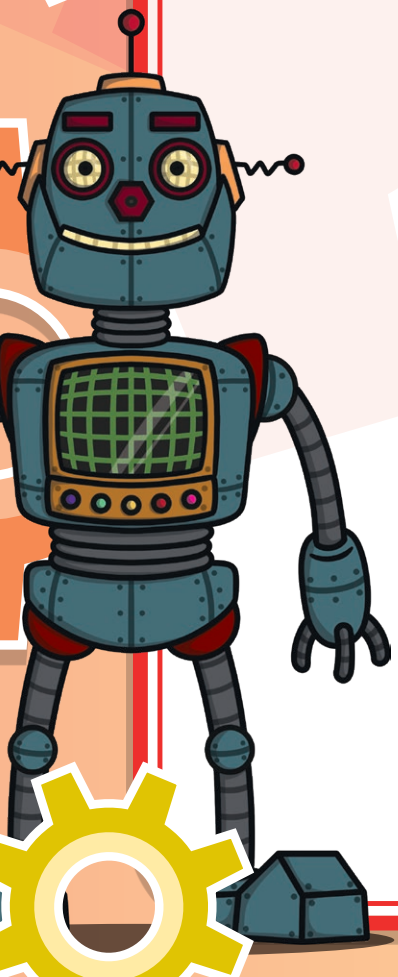
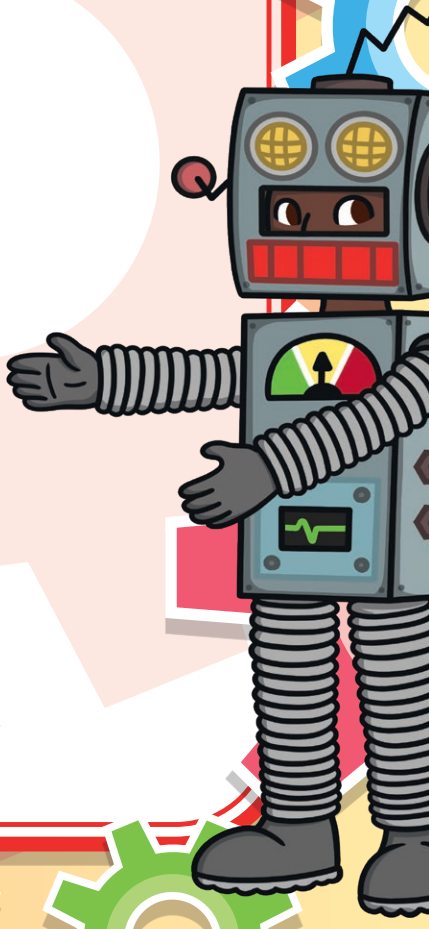
CAPS

Robotics and Coding

Answer Booklet

Grade 2





Terms 1 - 4

Term 1

Patterns with Multiples of 2 and 3

Complete this pattern. These are multiples of 2

2	4	8	2	4	8	2	4	8	2	4	8	2	4	8

Complete this pattern. These are multiples of 3

12	9	6	12	9	6	12	9	6	12	9	6	12	9	6

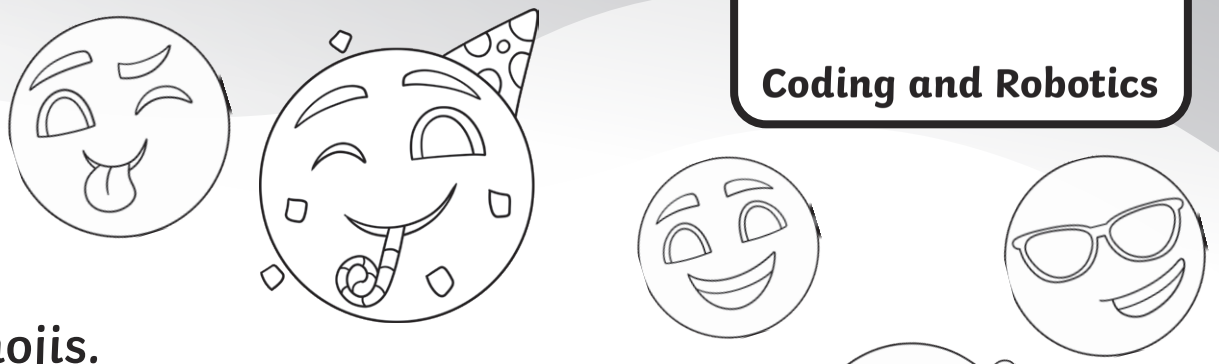
Complete this pattern. These are multiples of 2

2	3	4	6	8	2	3	4	6	8	2	3	4	6	8

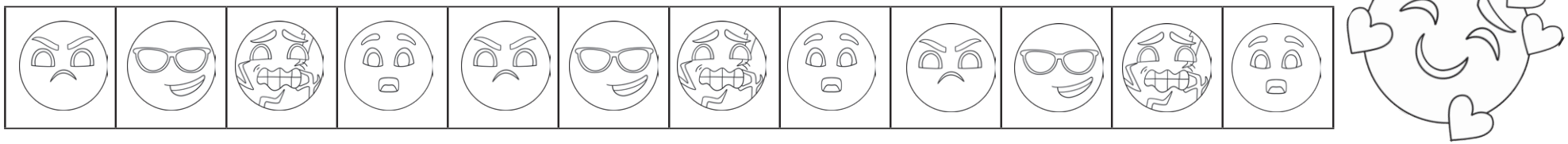
Complete this pattern. These are multiples of 3

6	12	18	6	12	6	12	18	6	12	18	6	12	18	6

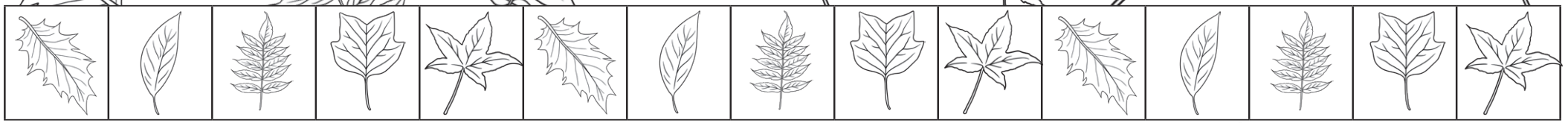
Create a Pattern



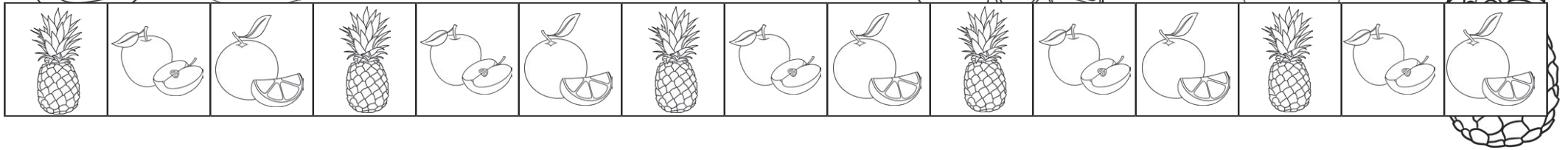
Create a pattern using 4 different emojis.



Create a pattern using 5 different leaves.

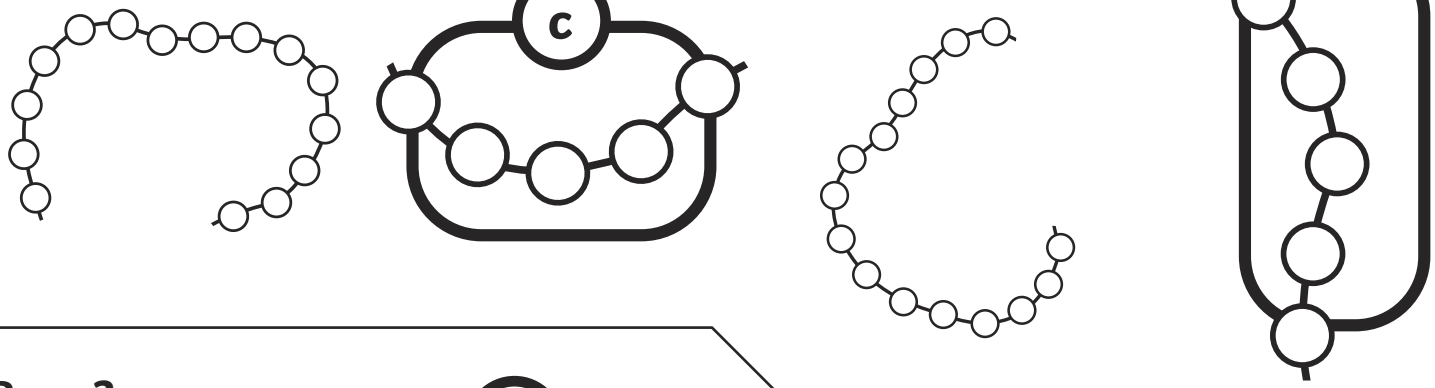


Create a pattern using 3 different kinds of fruit.

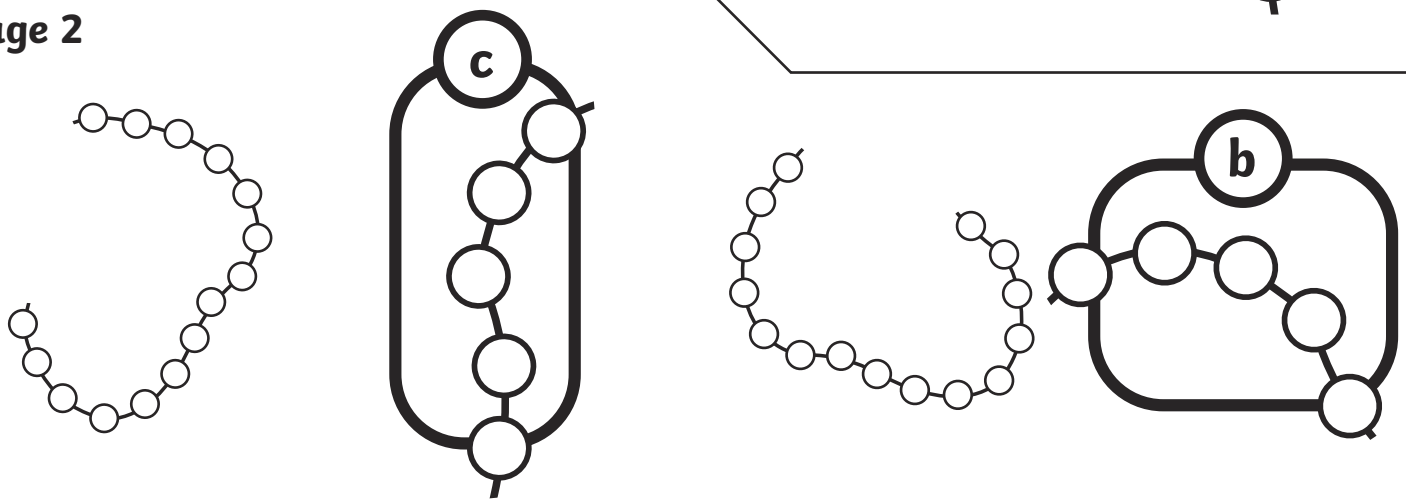


Recognising the Correct Pattern Answers

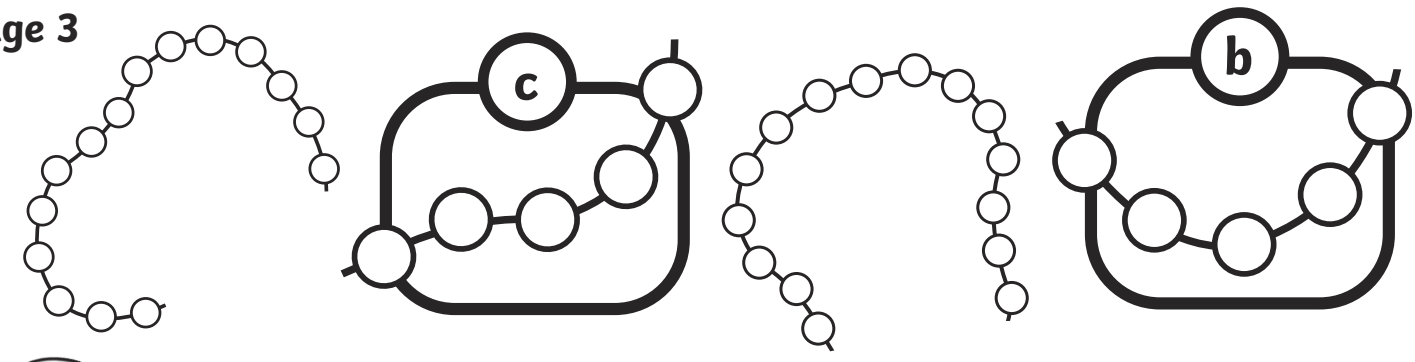
Page 1



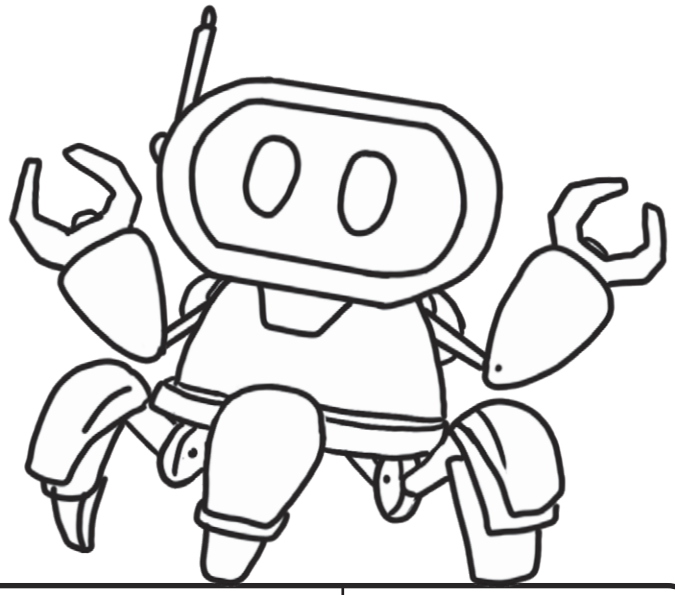
Page 2



Page 3



Draw the next step

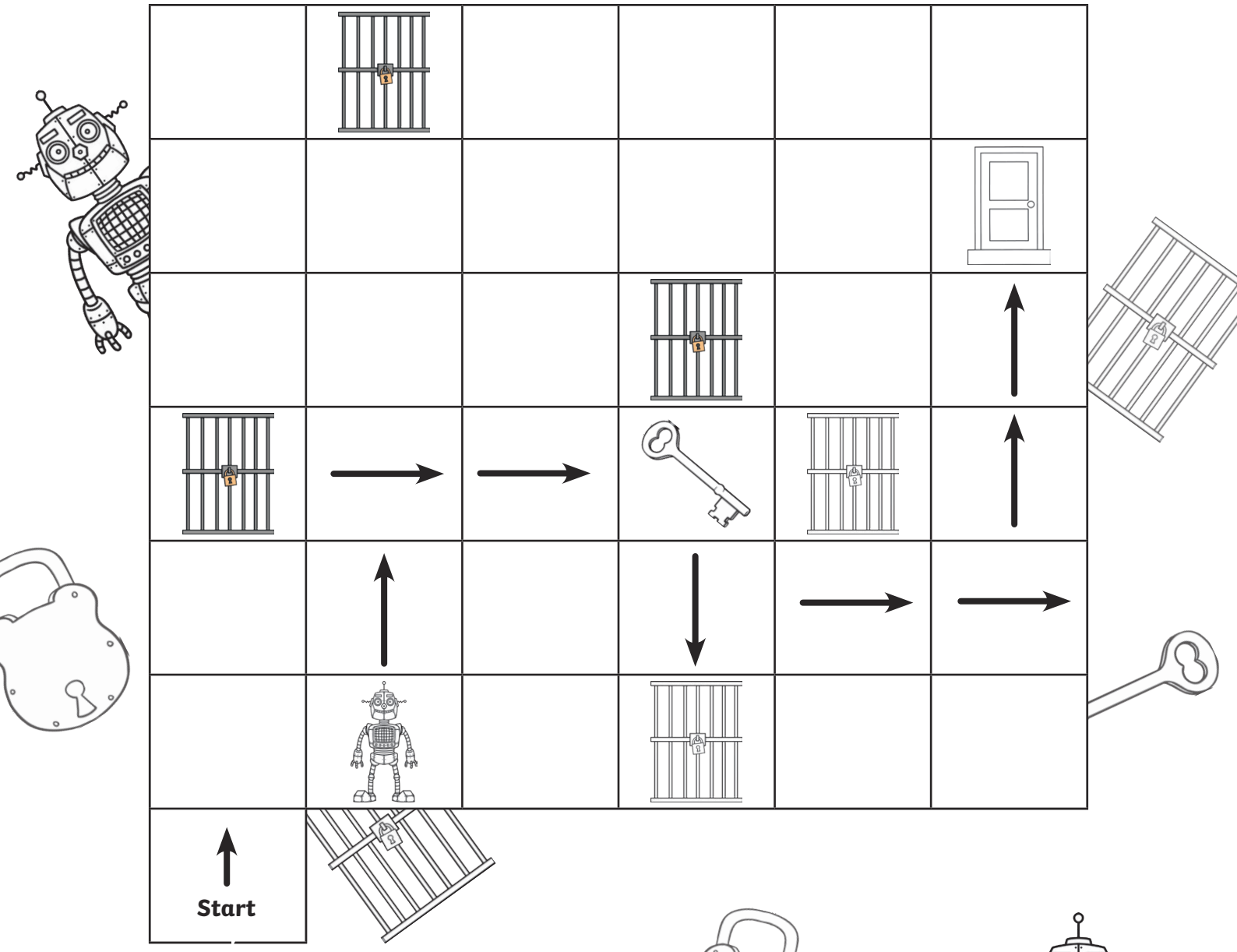


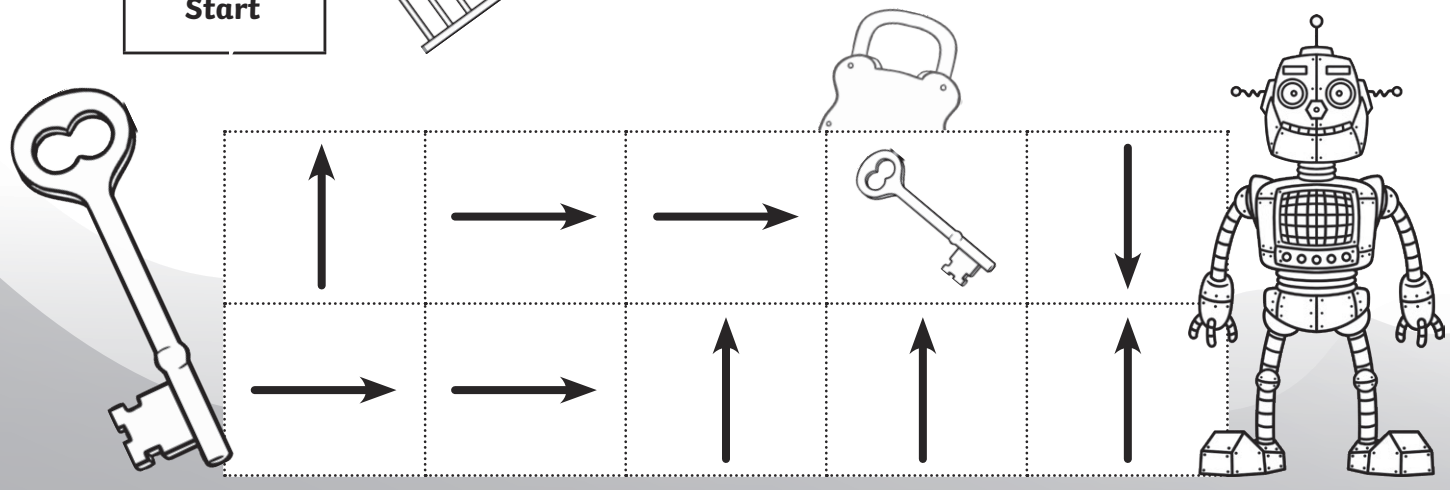
Complete the next pattern.

Pattern Recognition

Algorithms – Two in One

Draw the robot's movements with your pencil. Where does he end up?

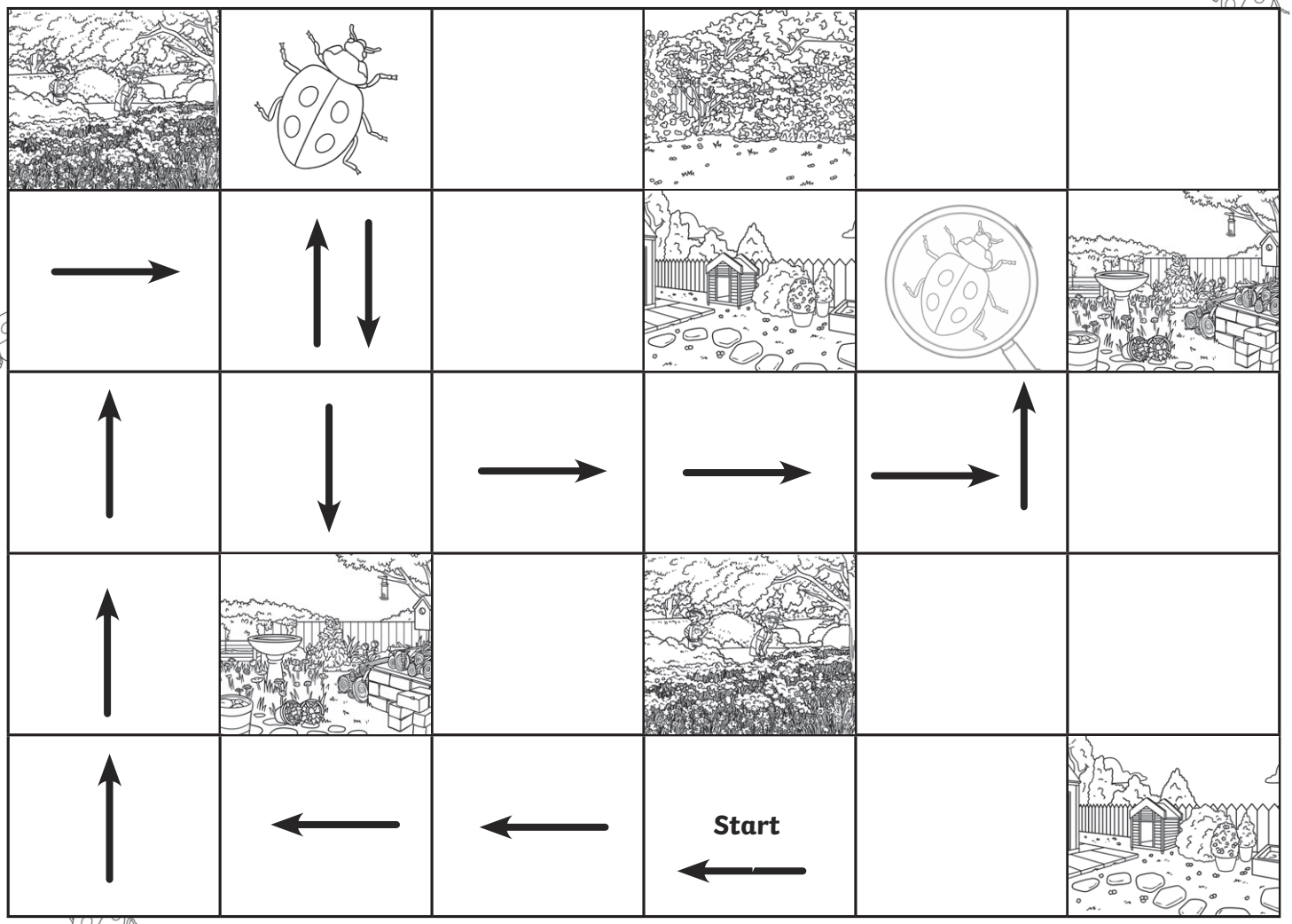


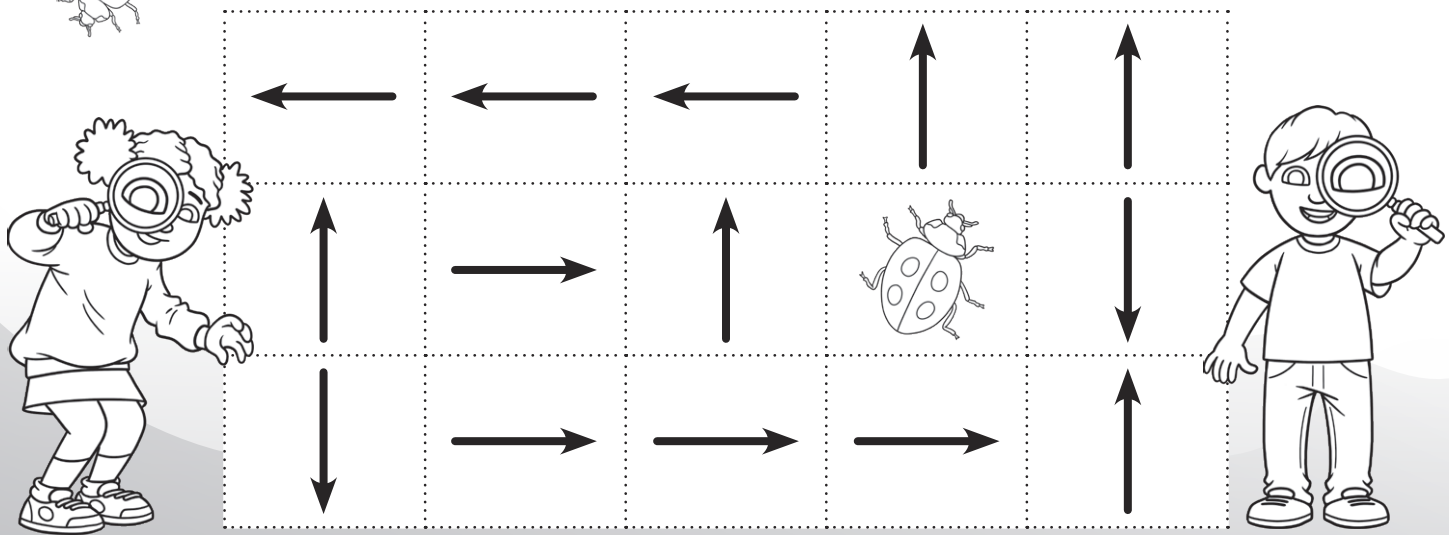


Pattern Recognition

Algorithms – Two in One

The teacher wants the learners to study a bug under the magnifying glass, but first, they have to find one. Which way must they go? Draw it with your pencil.

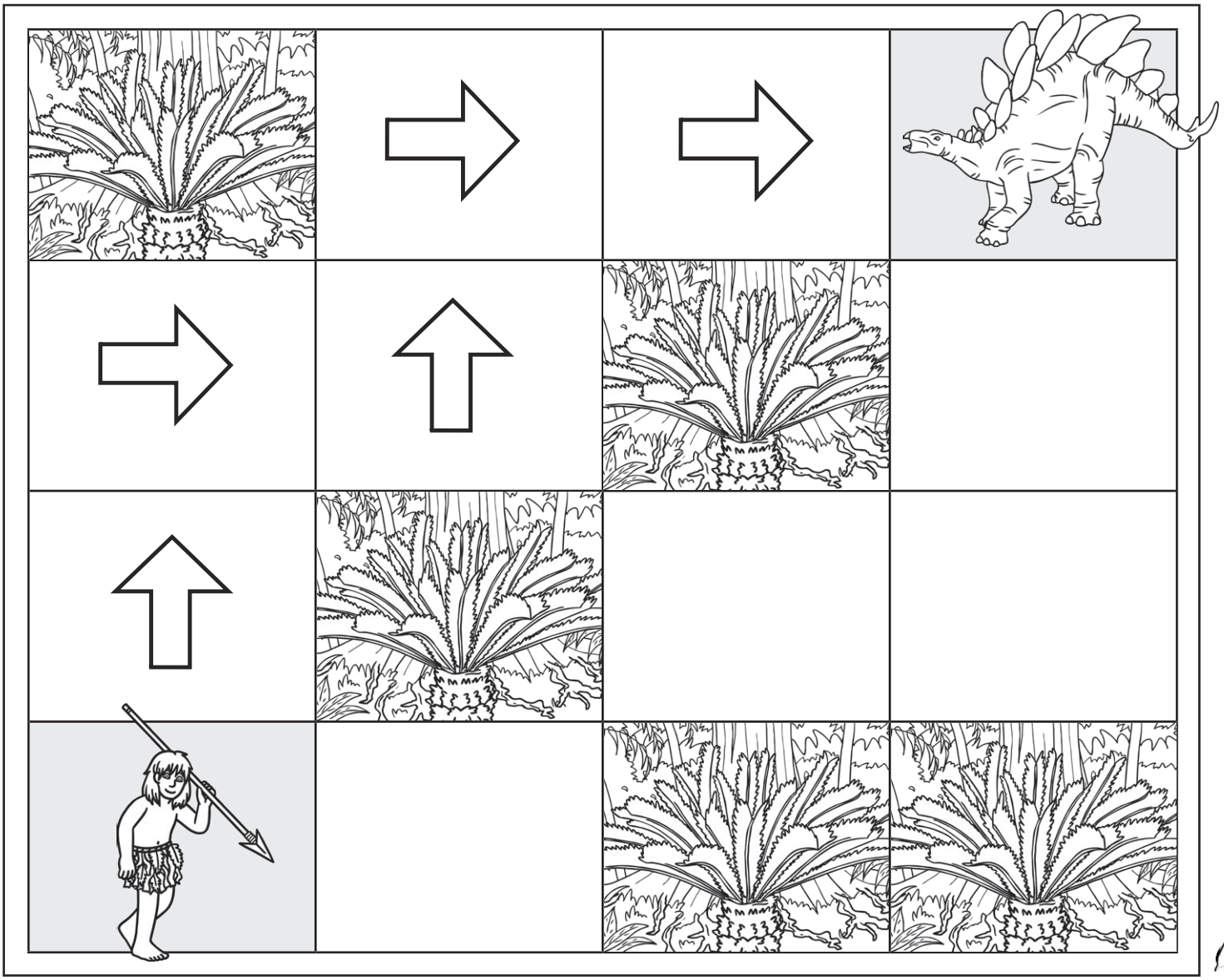




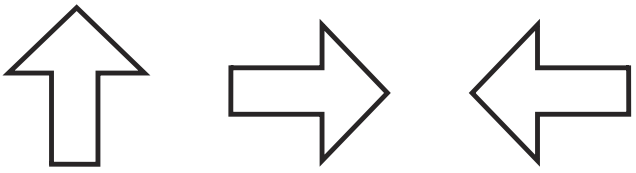
Coding and Robotics – Algorithms

Step-by-Step

Which way should the caveman go to get to the dinosaur?



Use the arrows below to create your algorithm.

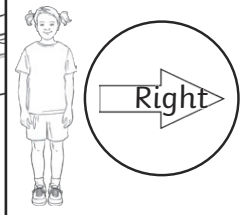
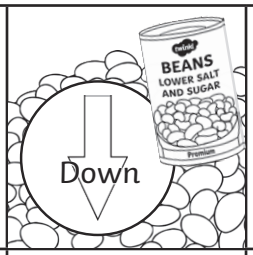
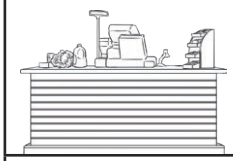


Our algorithm looks like this:

At the Supermarket Coding

Instructions:

Your goal is to create an algorithm to help the child collect first collect the can of baked beans, then the bread and take them to the till to pay. Cut out the cards below and use them to create the correct path for the child. They must all be used to form part of the path. The x 2 cards mean that the child moves 2 squares in that direction. You cannot go on a square that is blocked by other shoppers or a shopping basket, but you can use a x 2 to jump over an obstacle.

 Right	x2 Right		 Down		
			x2 Down		
					
	Left		x2 Right		Down
			Down		x2 Left
	x2 Up		x2 Left		

At the Supermarket Coding

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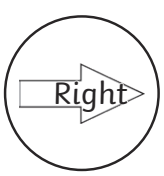
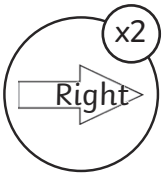
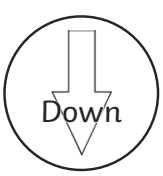
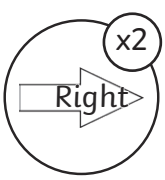
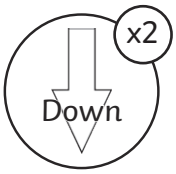
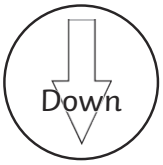


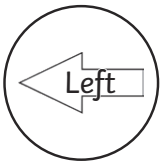


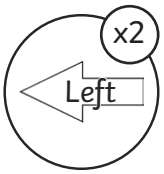


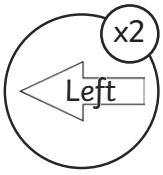












Read these sentences, and circle True or False for each one.

1. You can download things without your parents' permission.
   True / <u>False</u>

2. You should create a strong password.
   <u>True</u> / False

3. You must accept friend requests from people you don't know.
   True / <u>False</u>

4. You can share your personal information with strangers.
   True / <u>False</u>

5. Everything you read on the Internet is true.
   True / <u>False</u>

6. You must share all your photos.
   True / <u>False</u>

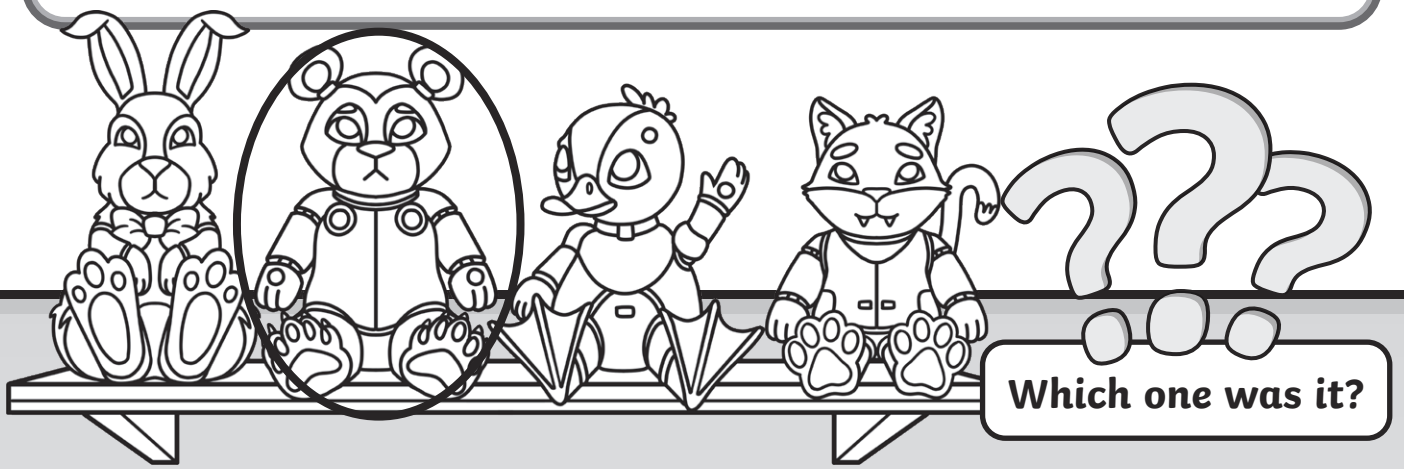
7. You should only visit sites approved by your parents.
   <u>True</u> / False

8. You can arrange to meet people you have met on the Internet in person.
   True / <u>False</u>

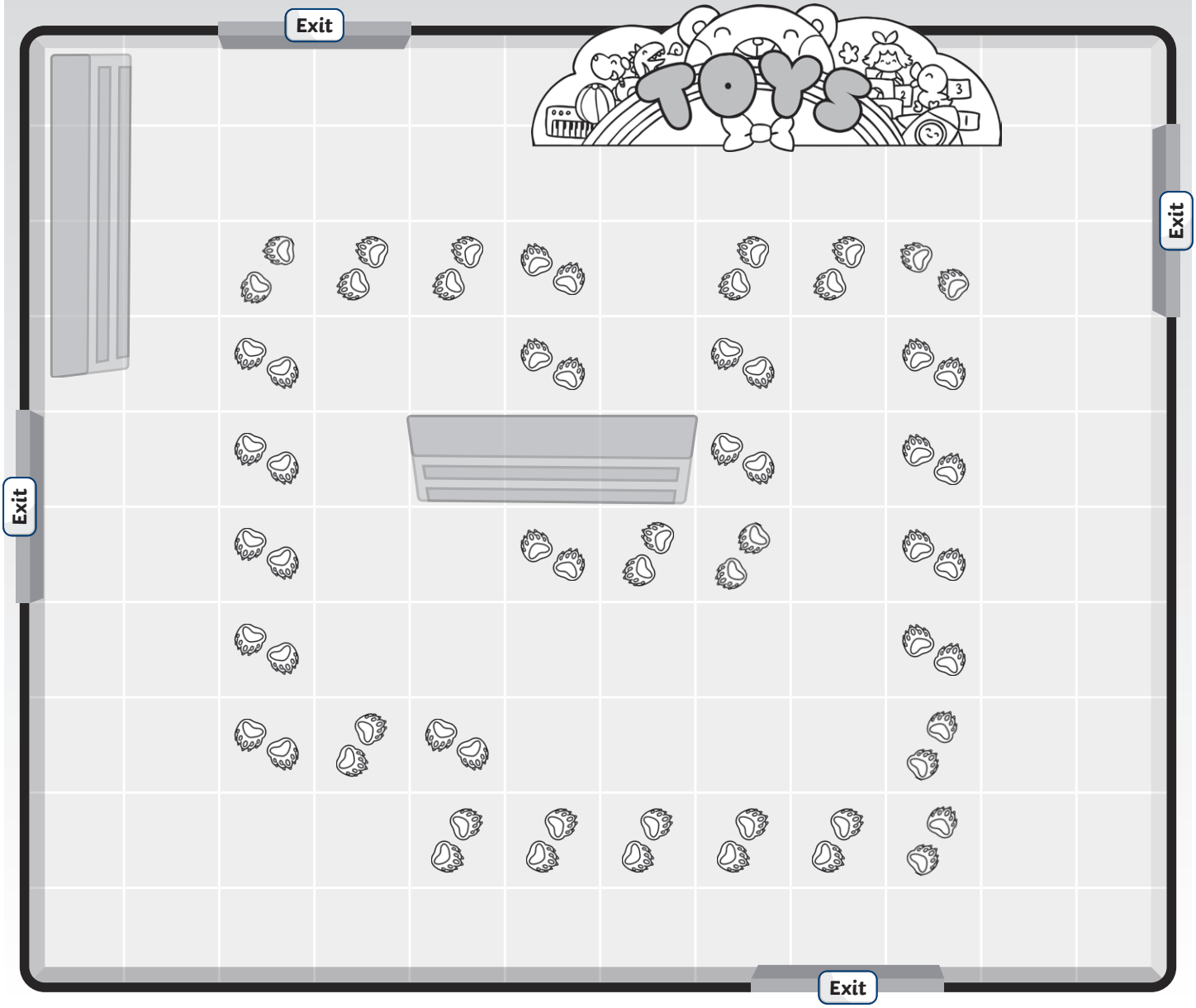
Term 2

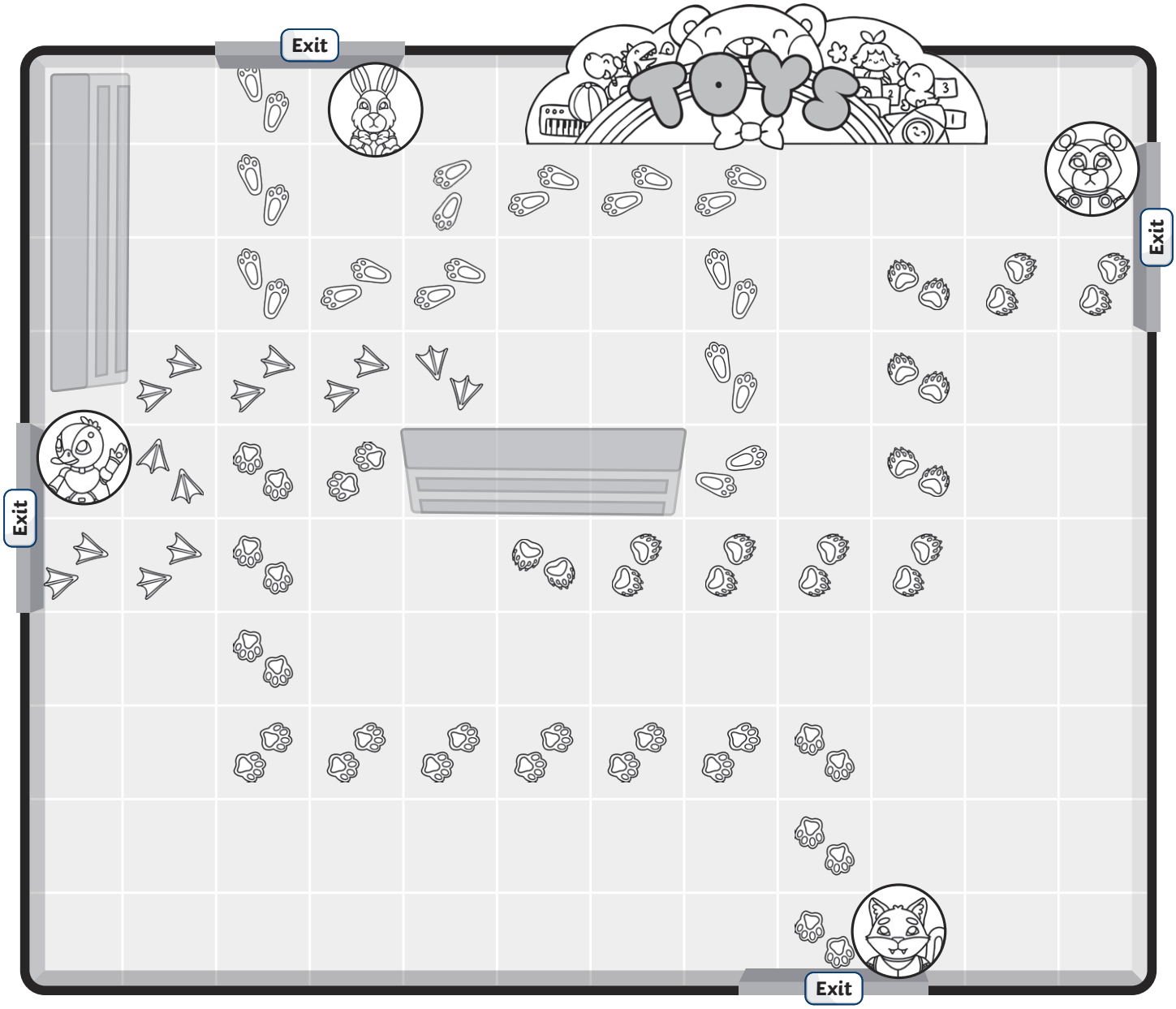
Robot Footprints

There are four robot animals in the shop, a duck, a rabbit, a bear and a cat. One of them secretly walked around the shop at night.



Which one was it?





Answer the following questions:

1. How many blocks did each robot use to reach their exit?

   Bear **10** Duck **7** Rabbit **12** Cat **13**.

2. Who would reach their exit first? **Duck**

3. Who would reach their exit last? **Cat**

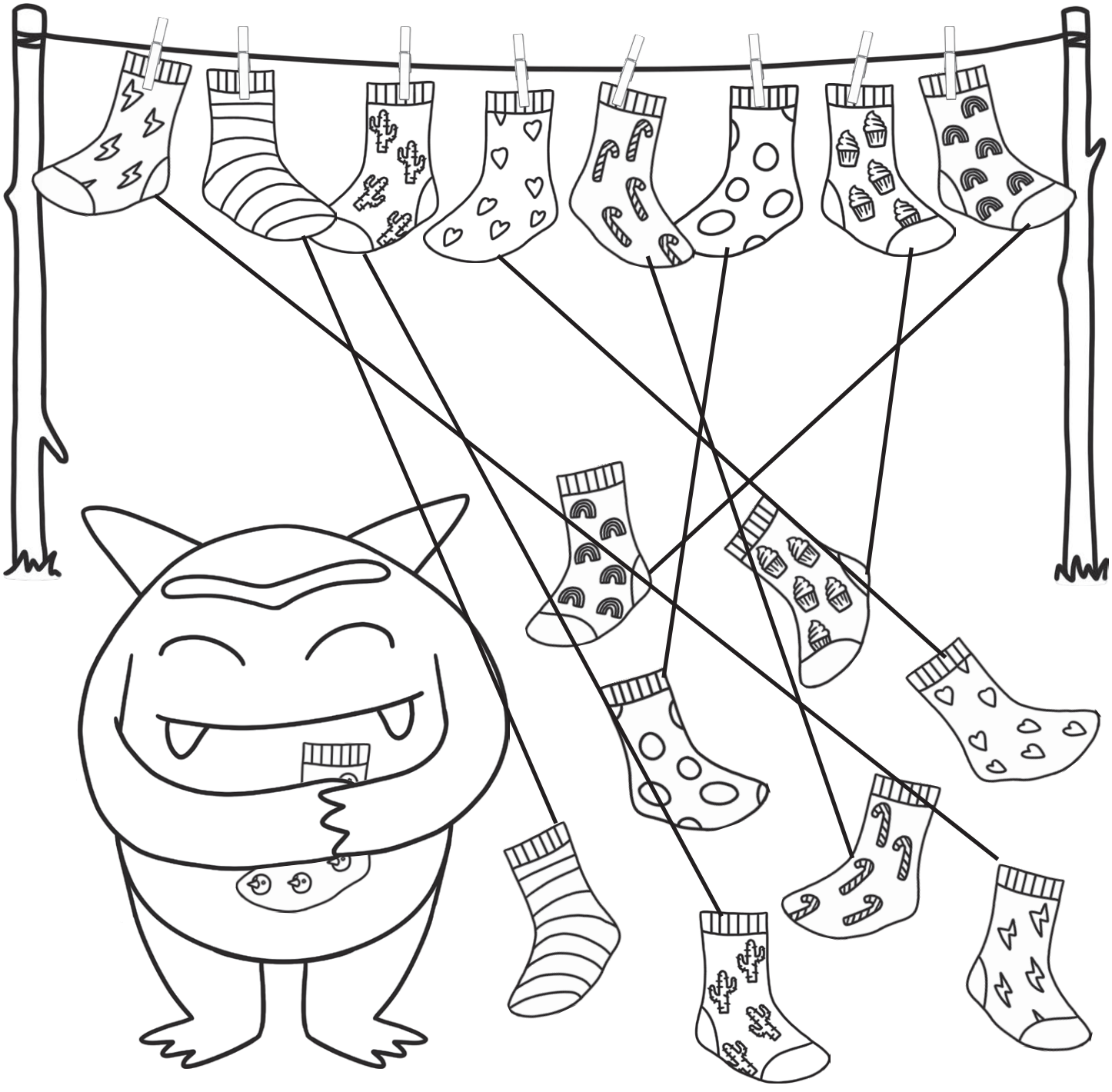
4. Could any of the animals have picked a better route? _____

   Learners own answer

Algorithmic Thinking

Sock Monster

Instructions: Find the matching socks that the sock monster stole from the washing. Draw a line to the matching socks. Use a different colour for each pair.

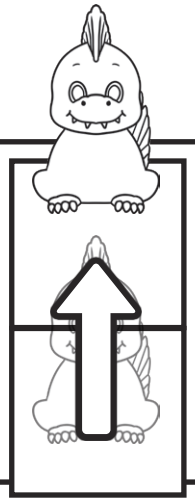


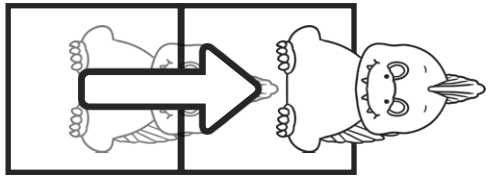
Pattern Recognition - Algorithms

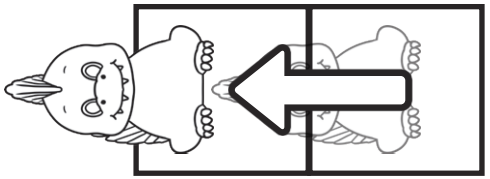
Follow the Instructions

Instructions

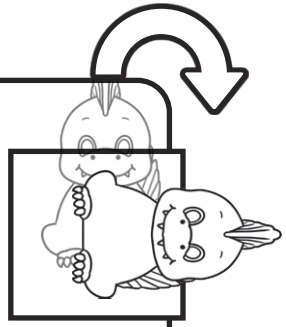
Move forward means to advance 1 square.



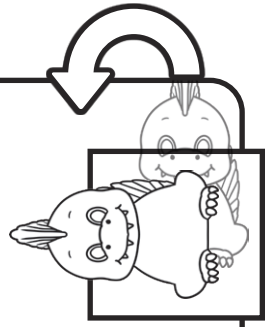




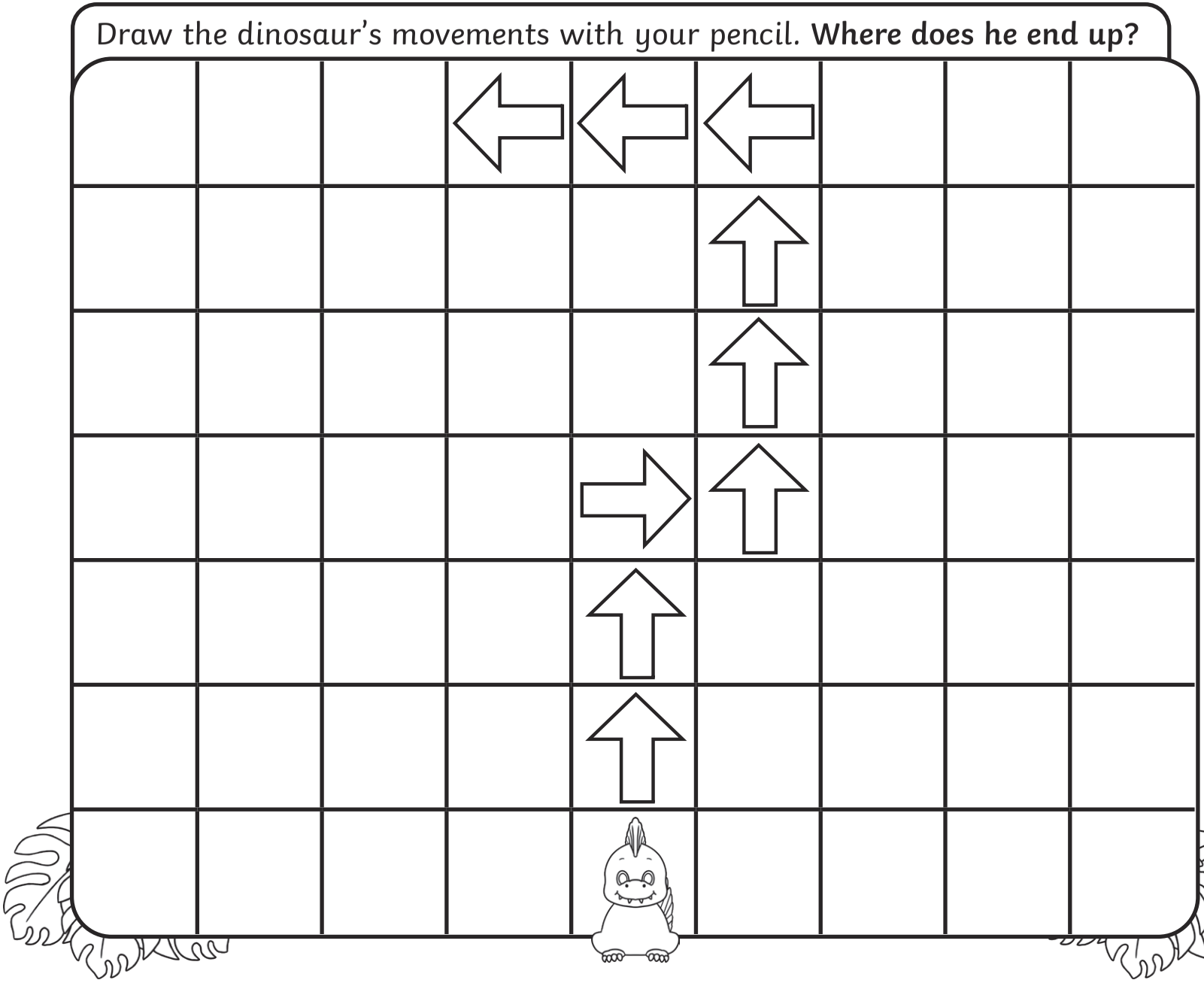
Turn right means to have the dinosaur turn to your right while staying in the same square.

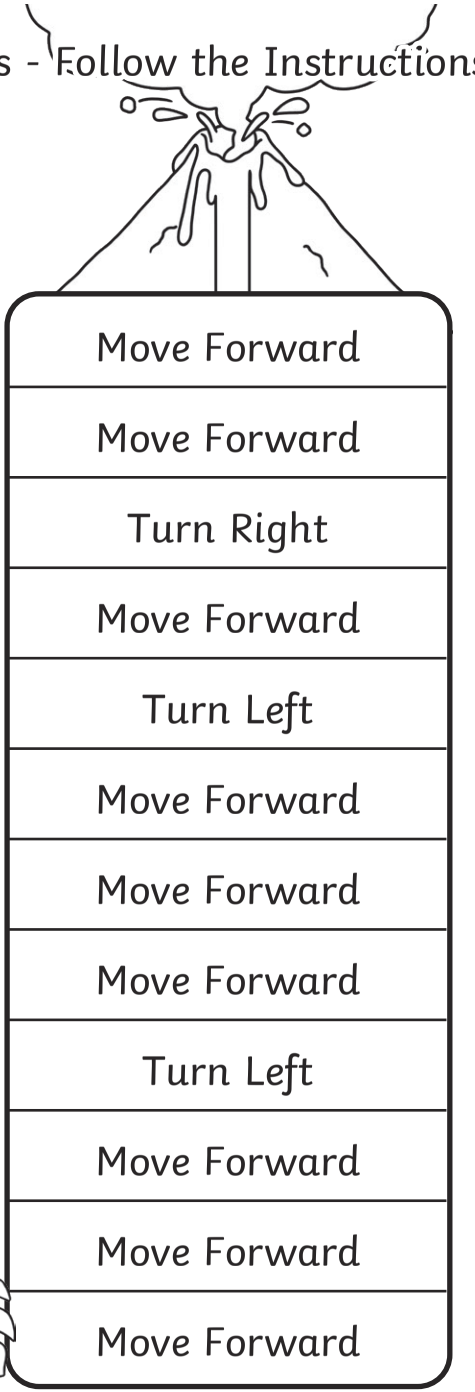


Turn left means to have the dinosaur turn to your left while staying in the same square.

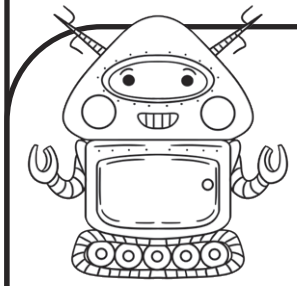


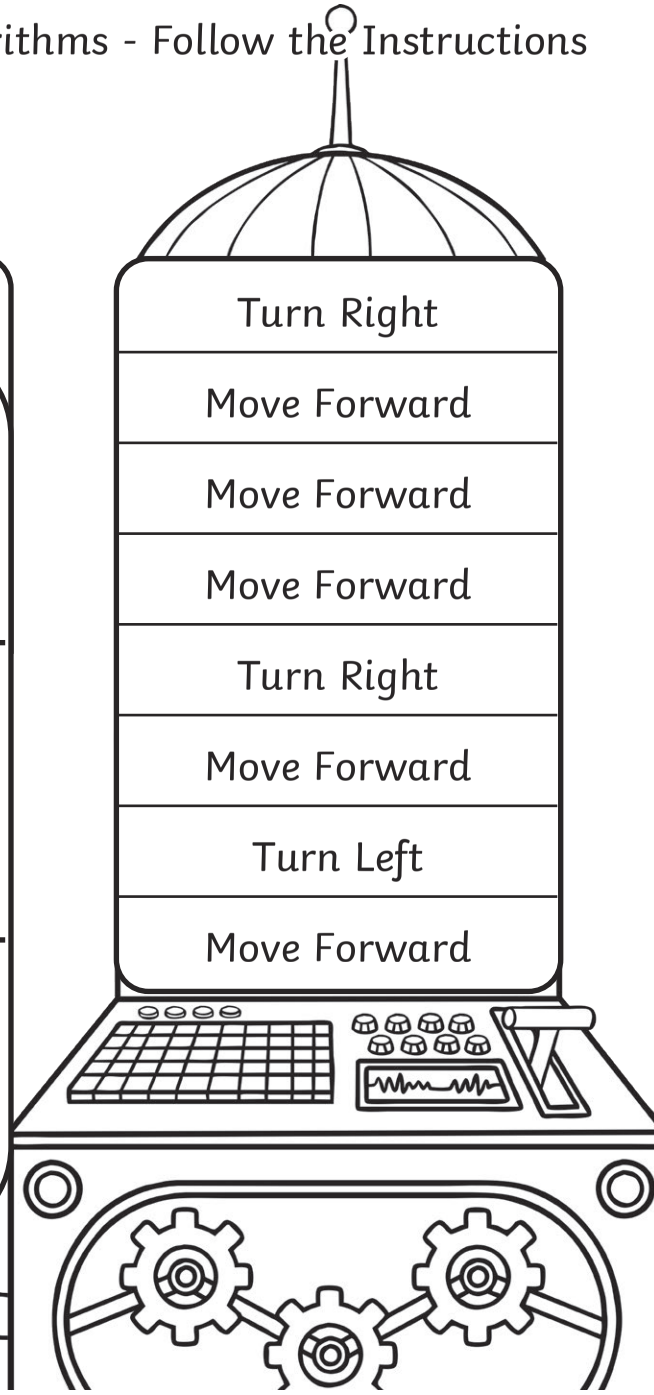
Draw the dinosaur's movements with your pencil. **Where does he end up?**



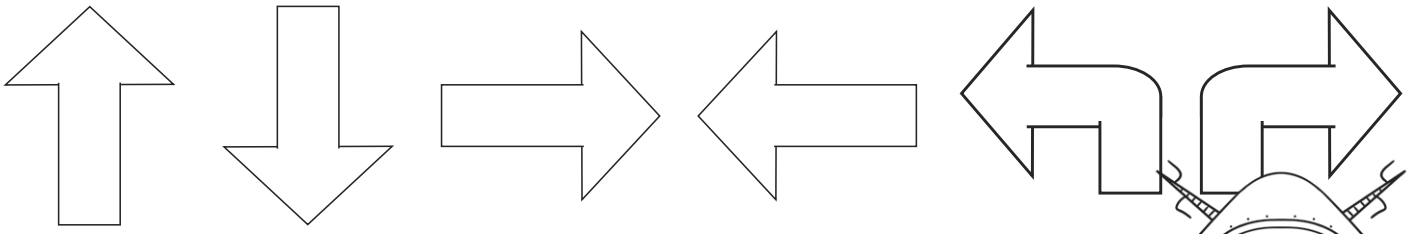


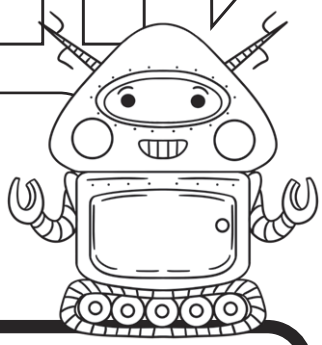
Draw the robot's movements with your pencil. **Where does he end up?**





Introducing the Turning Arrow

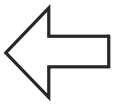
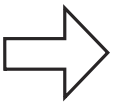




Instructions:

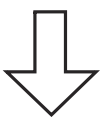
The butterfly must reach the flower using 6 instructions.

Draw the arrows onto the grid.

The bird must reach the nest using 6 instructions.

Draw the arrows on the grid.

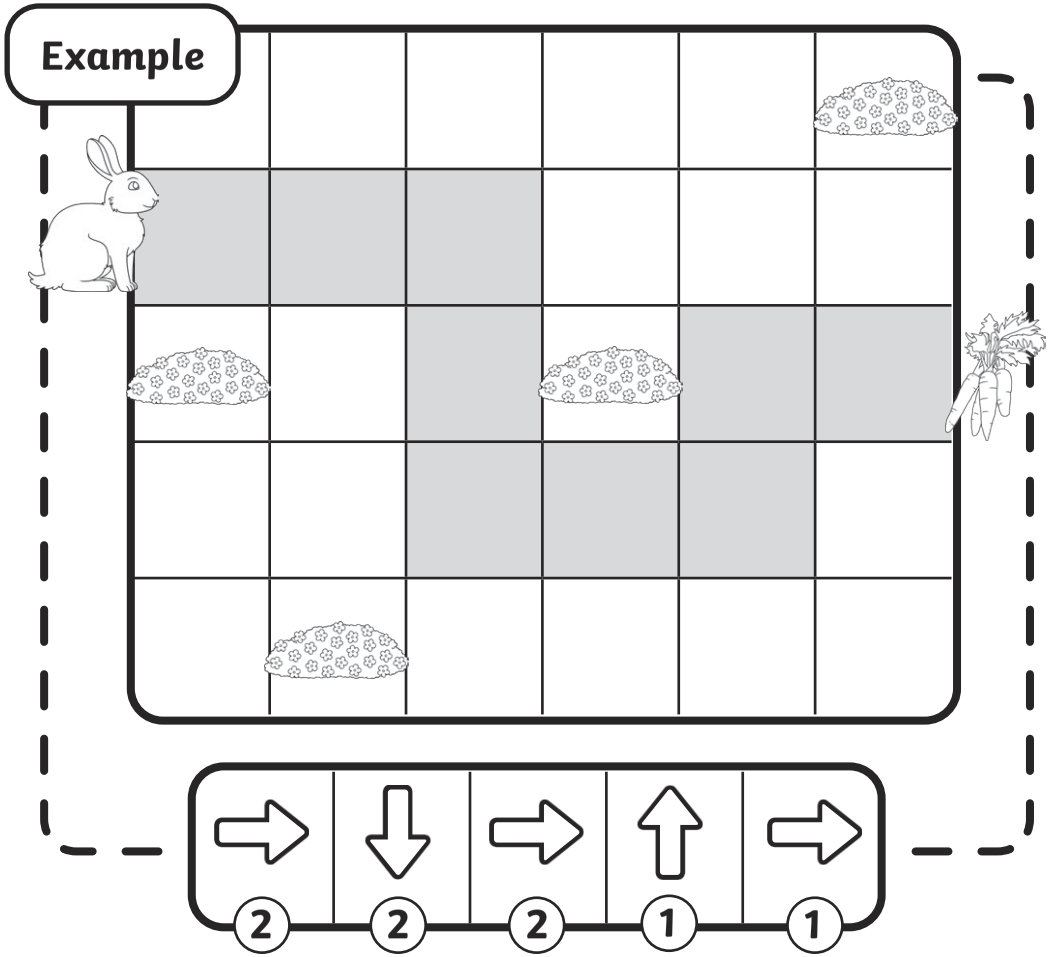
			
			
			
			

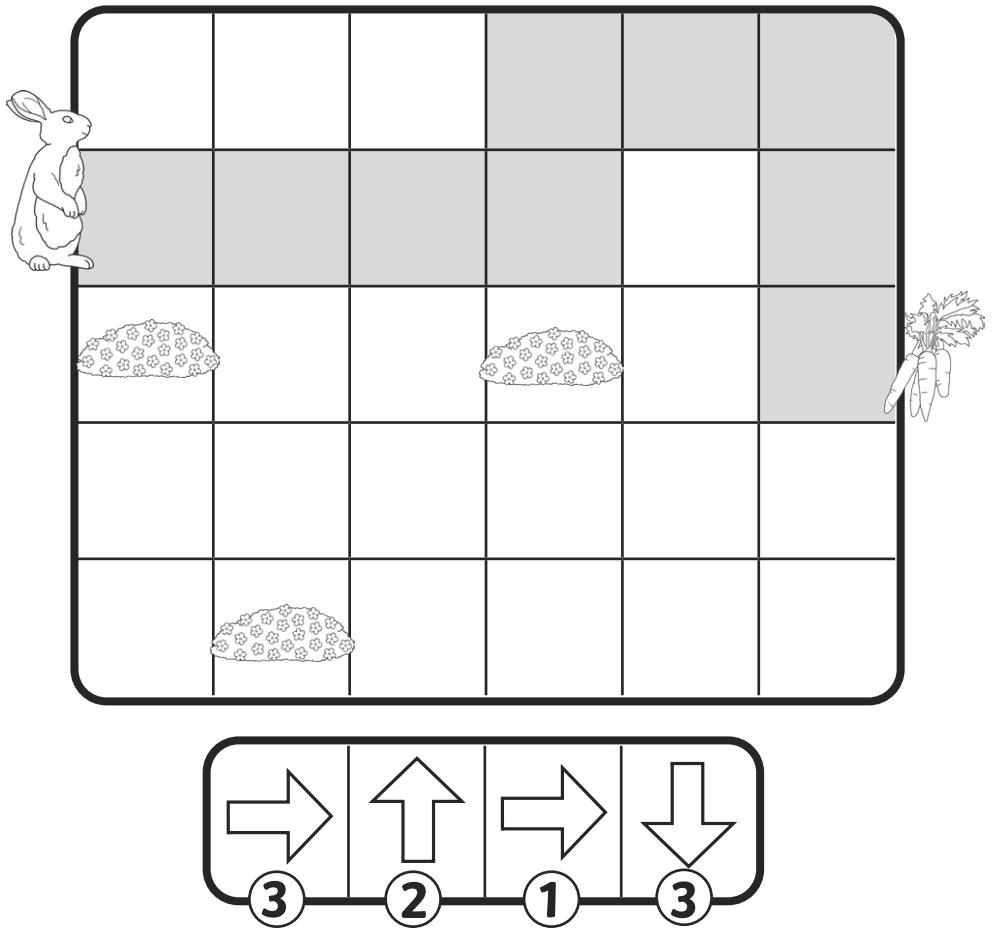
Robotics and Coding

How Many Arrows?

Moving only one block at a time, how many of each arrow will you use?

Example





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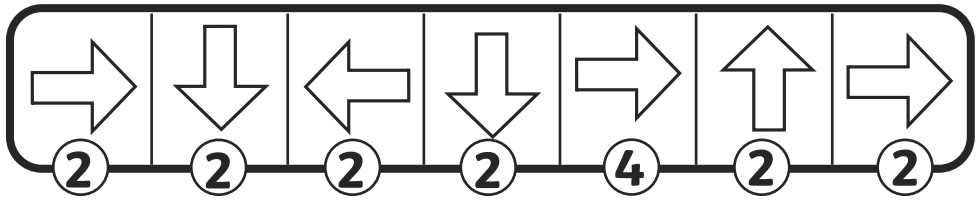
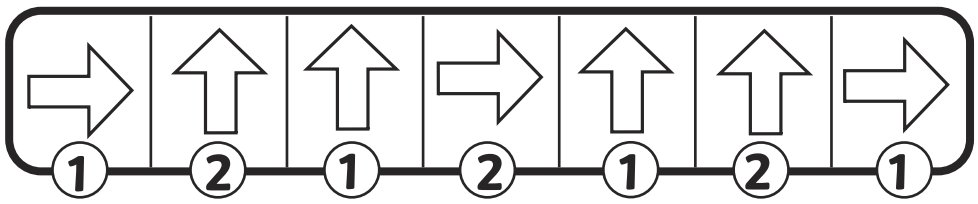
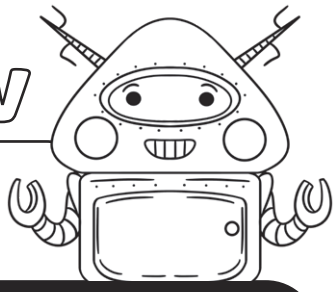
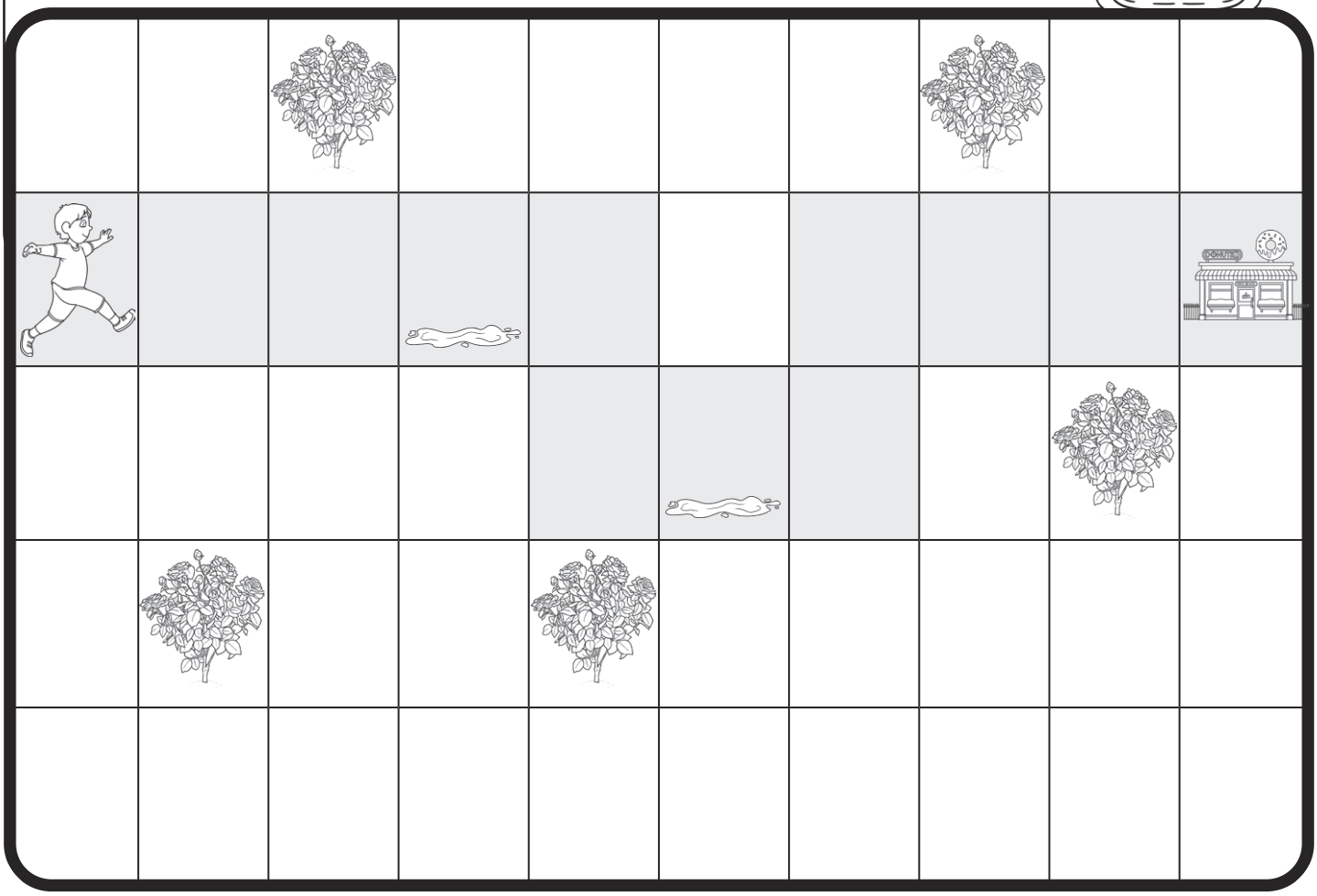




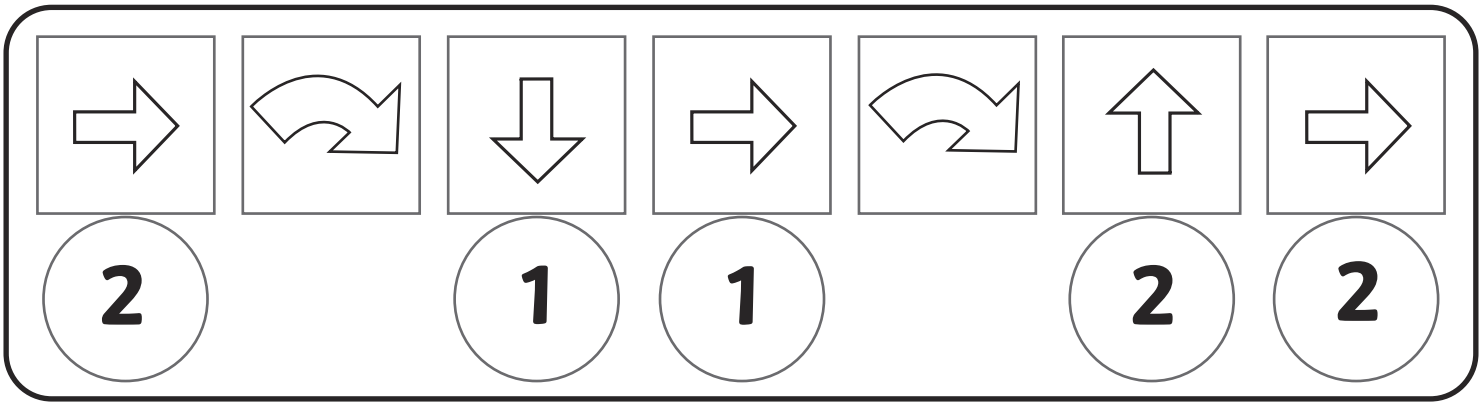
Using the Jump Arrow

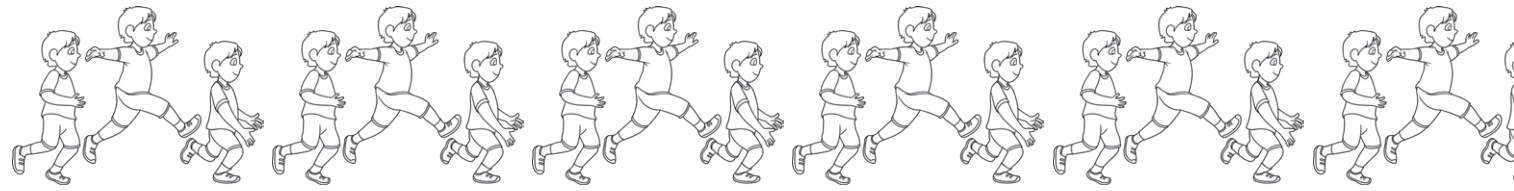


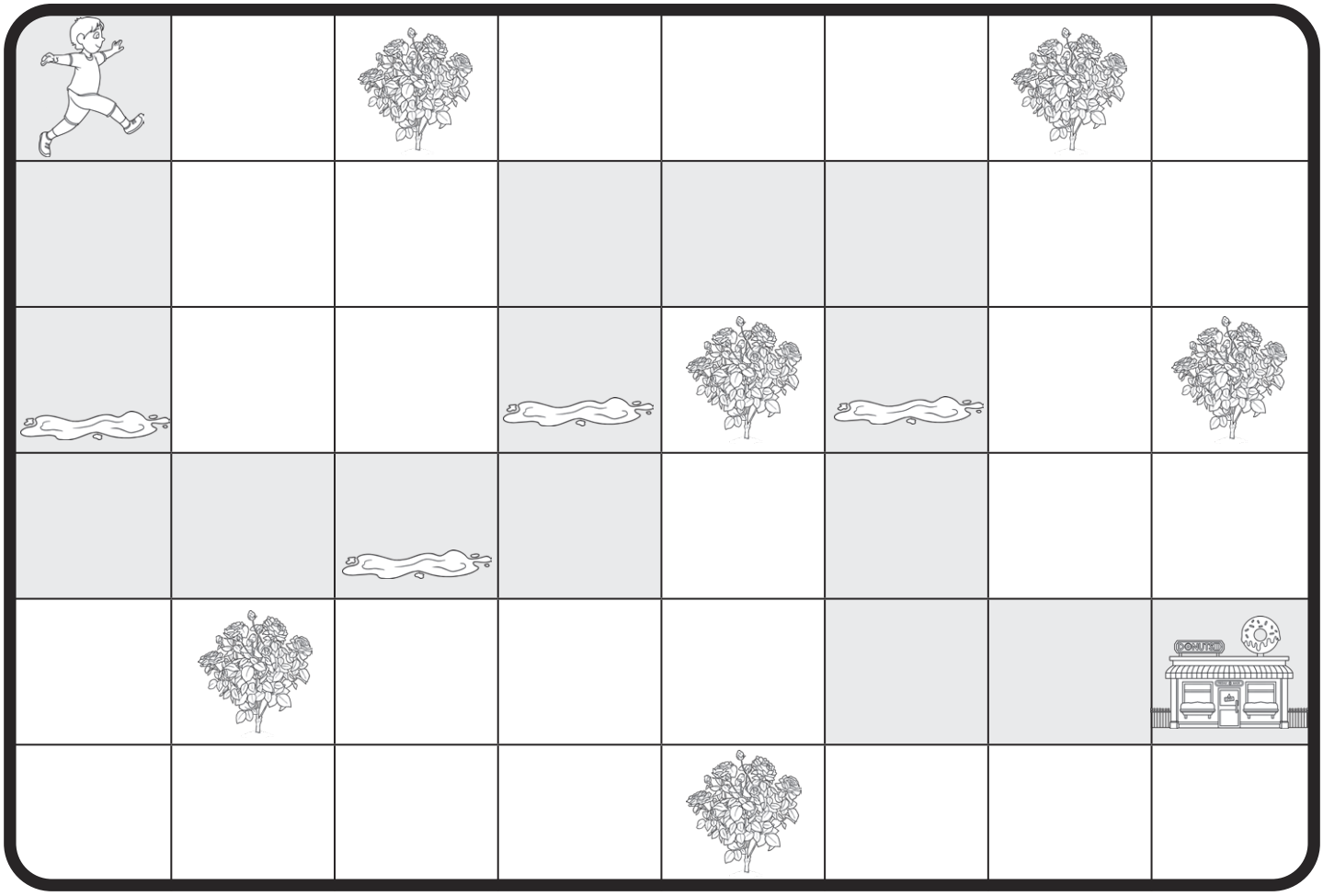
Instructions: Fill in the arrows on the grid. Jump over the puddles. Then complete the table below.



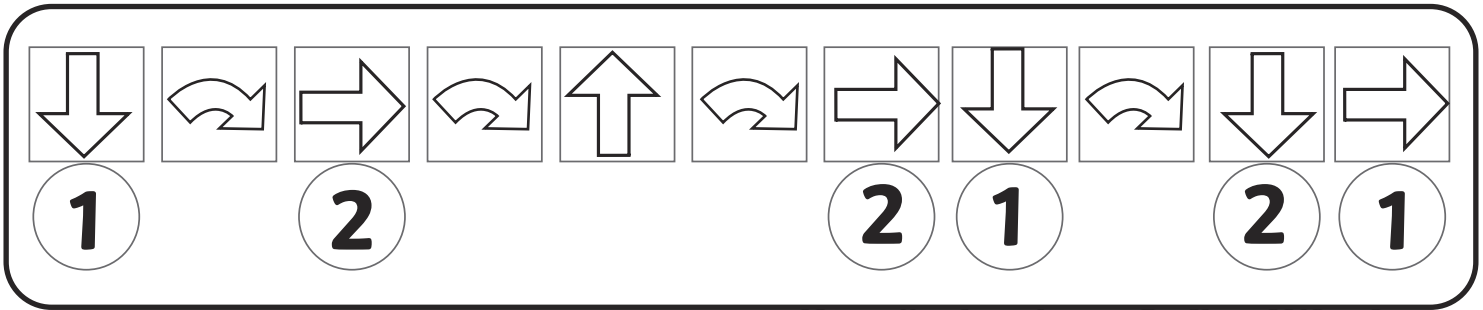
How many steps did the boy take to get to the shop? _____





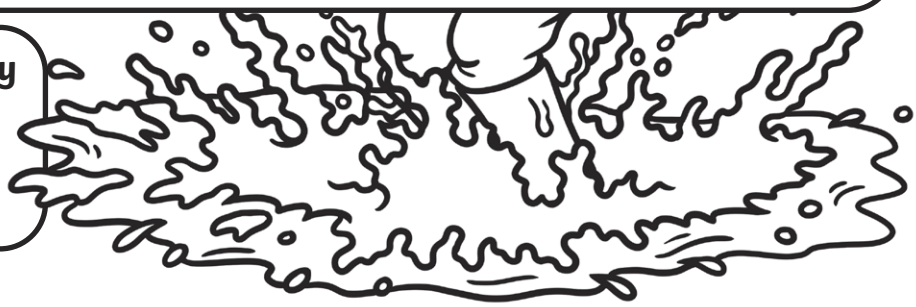


Fill in the arrows and numbers.



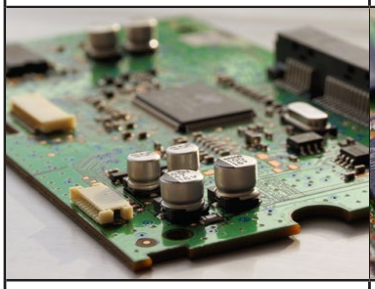
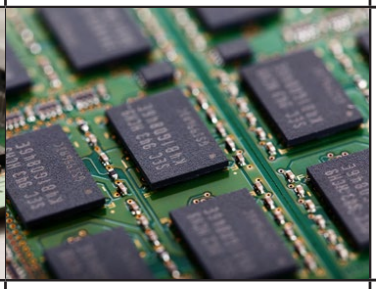
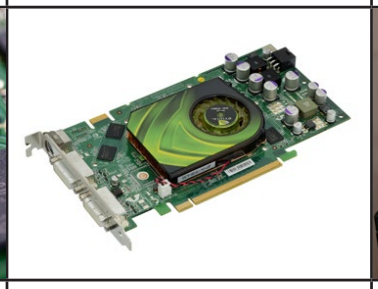
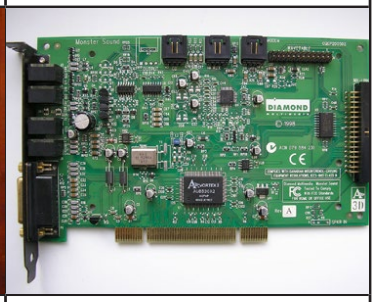
How many steps did the boy take to get to the shop?

10



Parts of a Computer

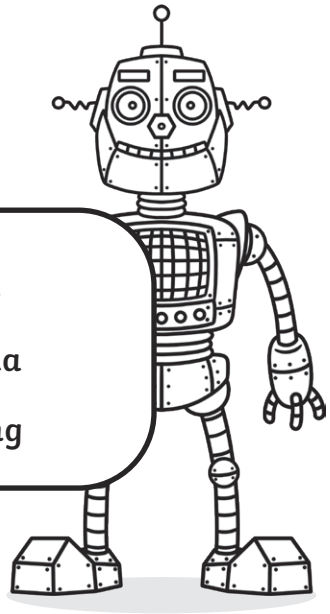
Cut out and stick the correct names below the parts of a computer.

			
keyboard	mouse	monitor	speakers
			
mousemat	printer	router	central processing unit (C.P.U.)
			
sound card	random access memory (R.A.M.)	video card	power supply
			
hard drive	USB port	computer case	motherboard

keyboard	mousemat	central processing unit (C.P.U.)	motherboard
monitor	router	random access memory (R.A.M.)	USB port
mouse	printer	power supply	computer case
speakers	video card	hard drive	sound card

e-Communication

Electronic communication or e-Communication is how we communicate digitally online.

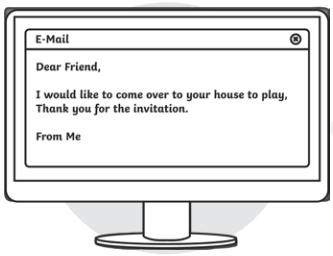


There are different types of e-communication:

1. E-mail
2. Cell phones
3. Blogs
4. Instant messaging
5. Video-calling
6. Podcasts
7. Chat rooms
8. Social media
9. Conferencing

Instructions:

1. Discuss in class what each of these types of communications are used for.
2. Write next to each picture what kind of e-communication is being demonstrated.



E-mail

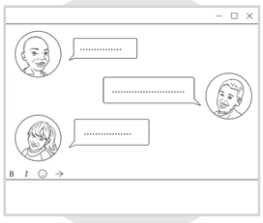
Cell Phones

blogs

Instant Messaging

Video-calling

Podcasts



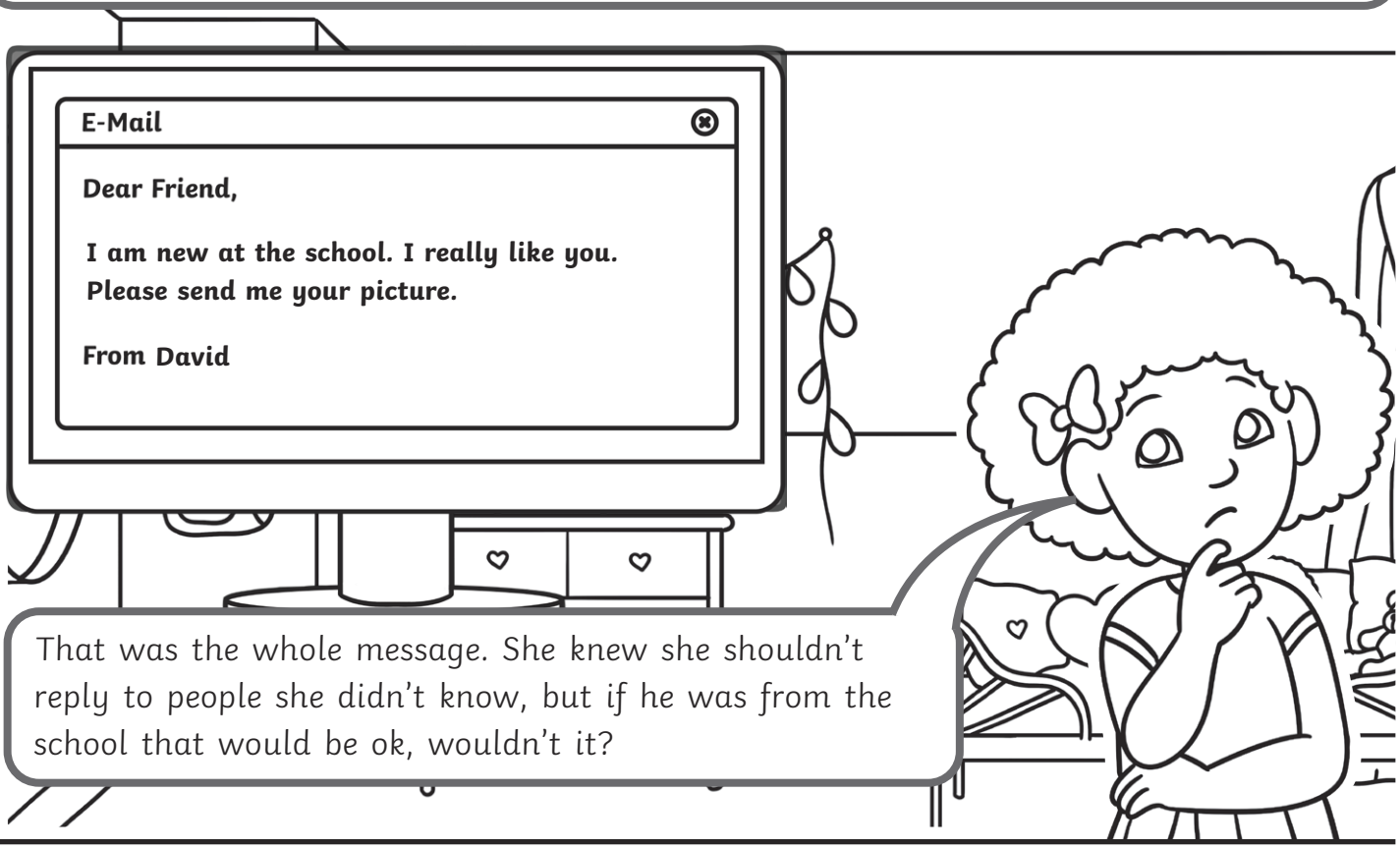
Chat Rooms

Social Media

Conferencing

Email Safety

Nandi has an email account. Every day, when she comes home, she checks to see if she has any new emails. Today, she sat down at her computer and turned it on. She had three new emails. One was from Dad, asking how her test went. One was from her friend Iminathi and one was from David. She wondered who David was. She was sure she did not know anyone called David. The message said:



Think about these things.

1. Should Nandi send a picture to David?

No

2. Should Nandi reply without a picture?

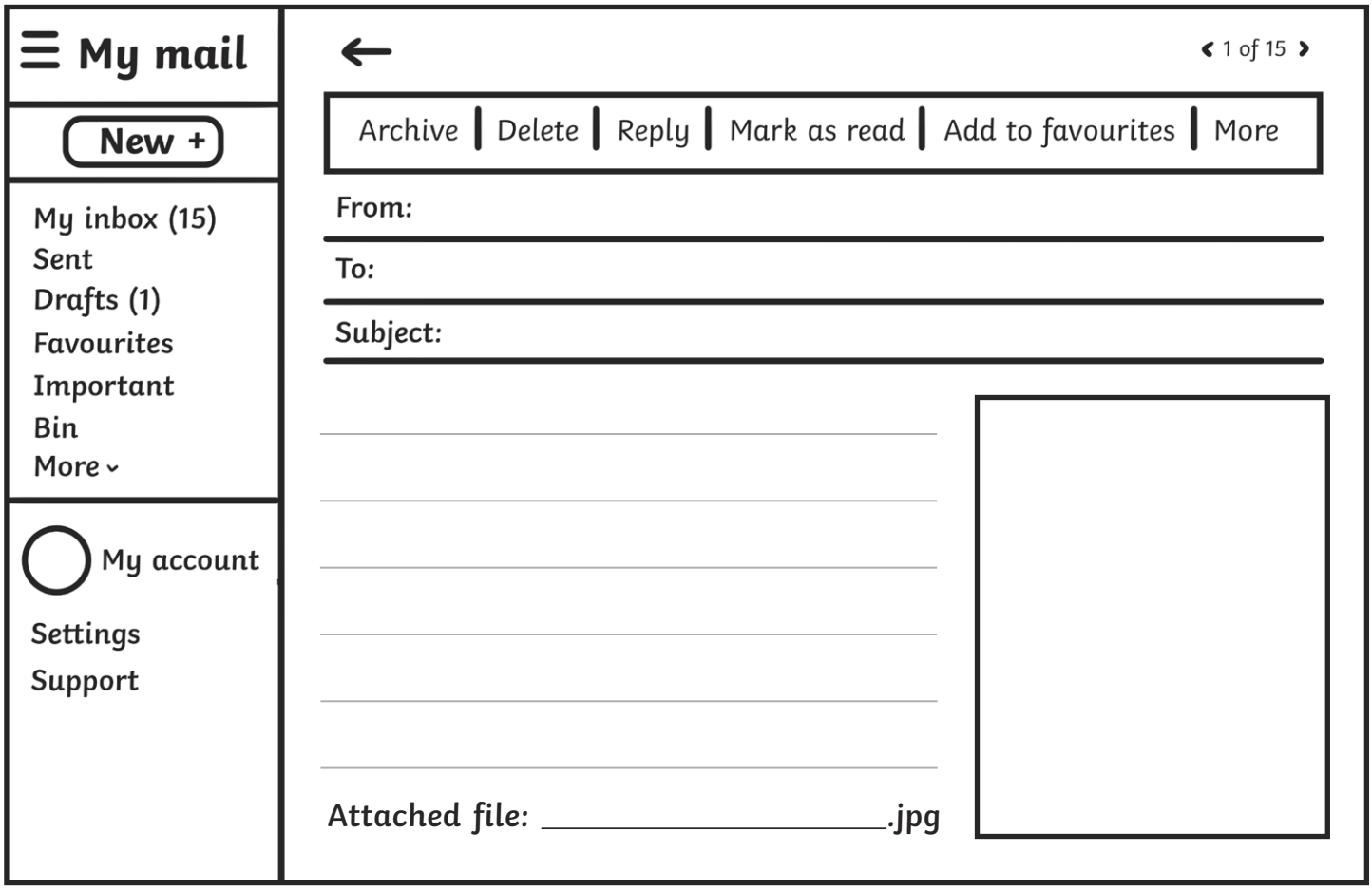
No

3. List some reasons why Nandi should be suspicious of this email.

Relevant Answers

4. Do you have an email account?
   What rules did your parents make for you when using email?

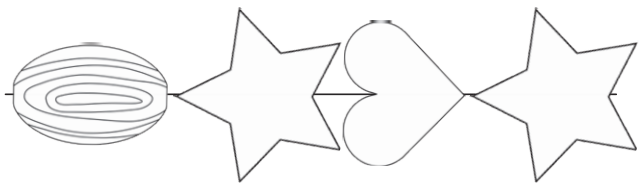
Relevant Answers

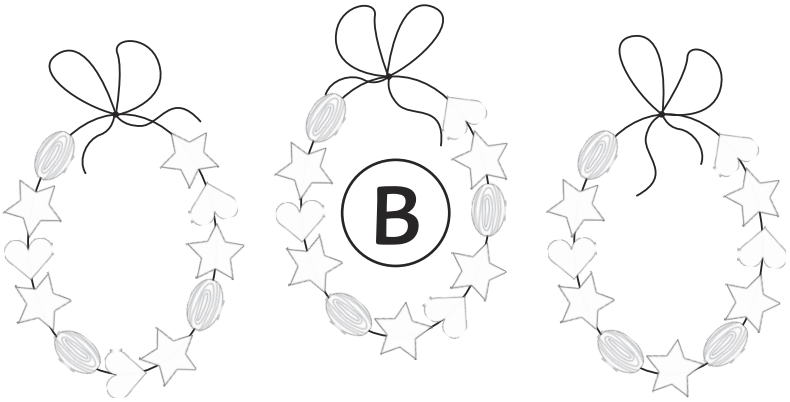


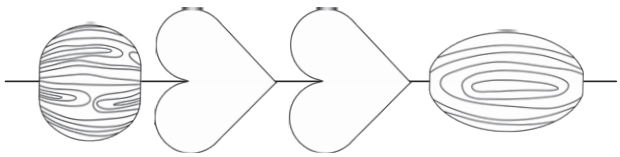
Term 3

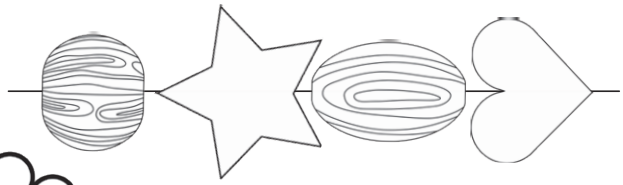
Pattern Recognition

Bracelets Answers

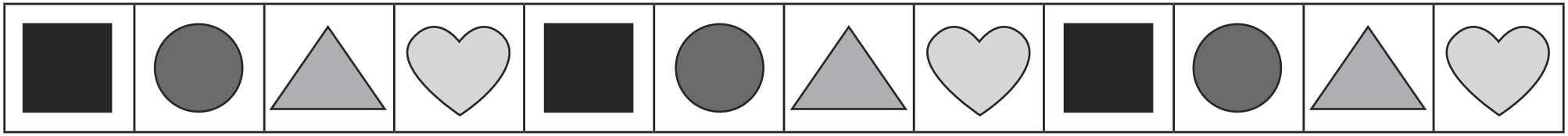






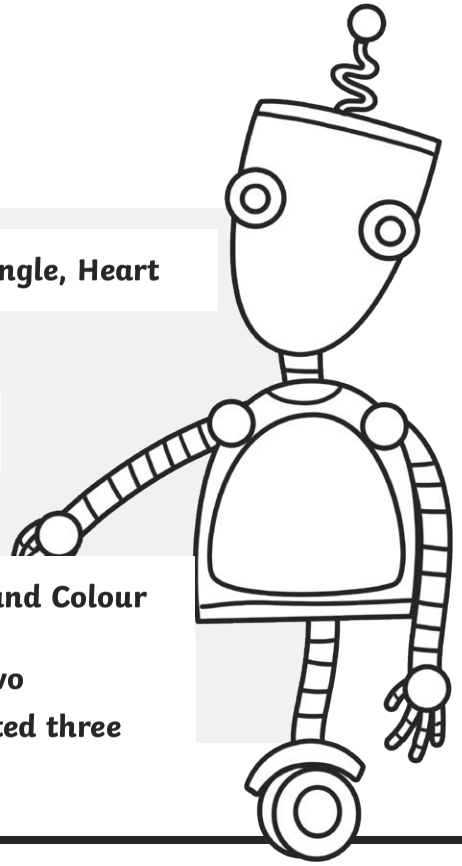


Discuss, Describe, Complete

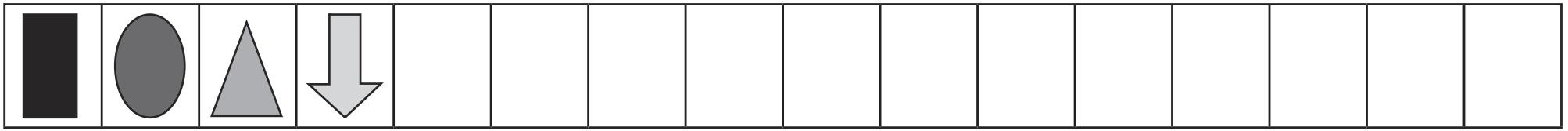


Discuss the following in class:

- What elements are used in this pattern? **Square, Circle, Triangle, Heart**
- How many different elements are there? **4**
- Do the elements have more than one characteristic? **Yes**
- How many repetitions are there? **3**
- What are the characteristics? (colour, shape, size) **Shape and Colour**
- **Describe** the pattern. **This pattern consists of four elements with two characteristics each, shape and colour, repeated three times.**



Complete this pattern of 3 repetitions with 4 elements with two characteristics.



Answer the following questions:

1. How many elements are there in one repetition? **Four elements**
2. How many elements are in the whole pattern? **12 elements in the whole pattern**
3. What characteristics form the pattern? **Characteristics are colour and shape**

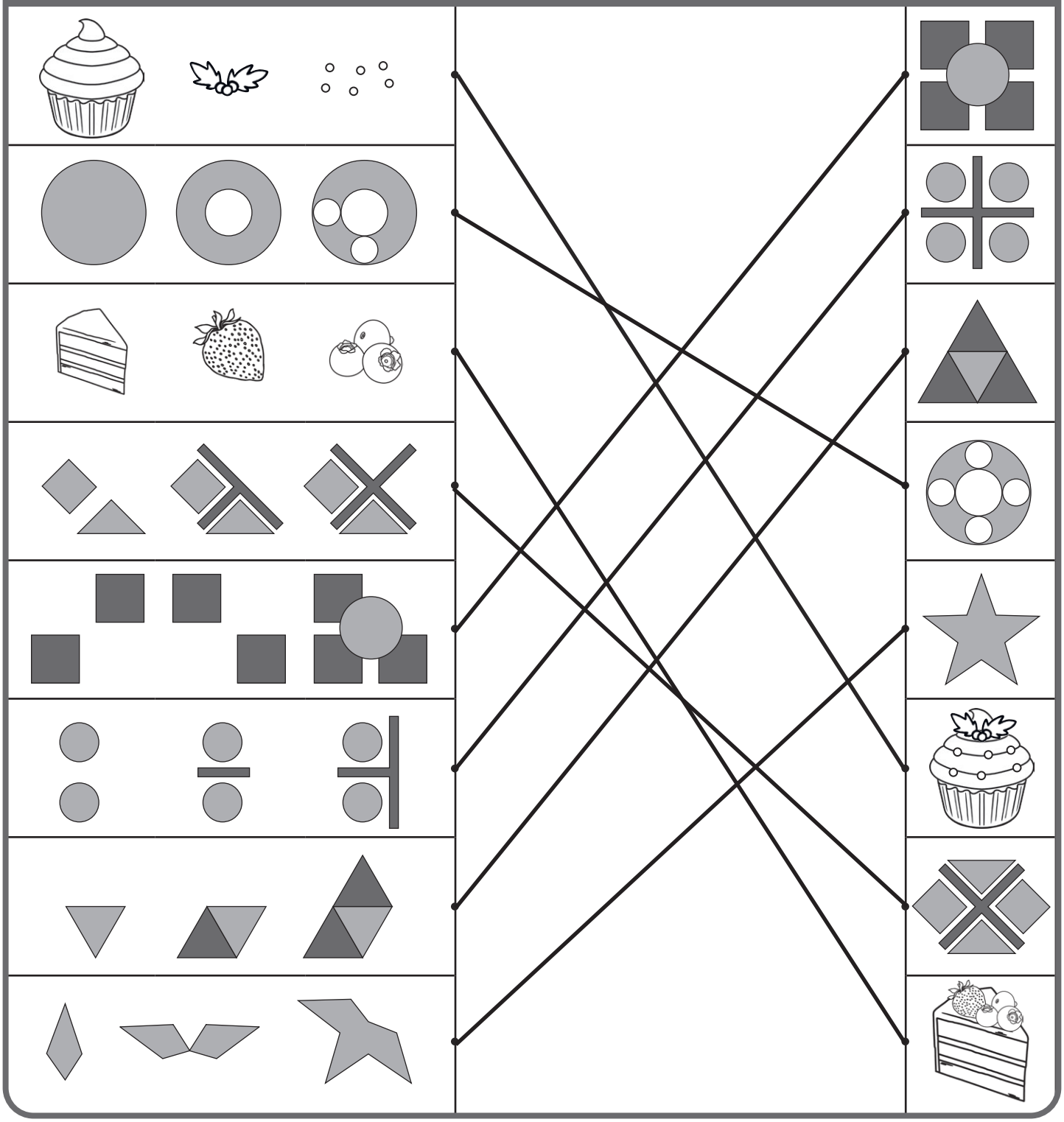
Complete this pattern of 3 repetitions with 4 elements with two characteristics.

Answer the following questions:

4. How many elements are there in one repetition? **Four elements**
5. How many elements are in the whole pattern? **12 elements in the whole pattern**
6. What characteristics form the pattern? **Numbers and colour**

Pattern Recognition: Pattern Matching

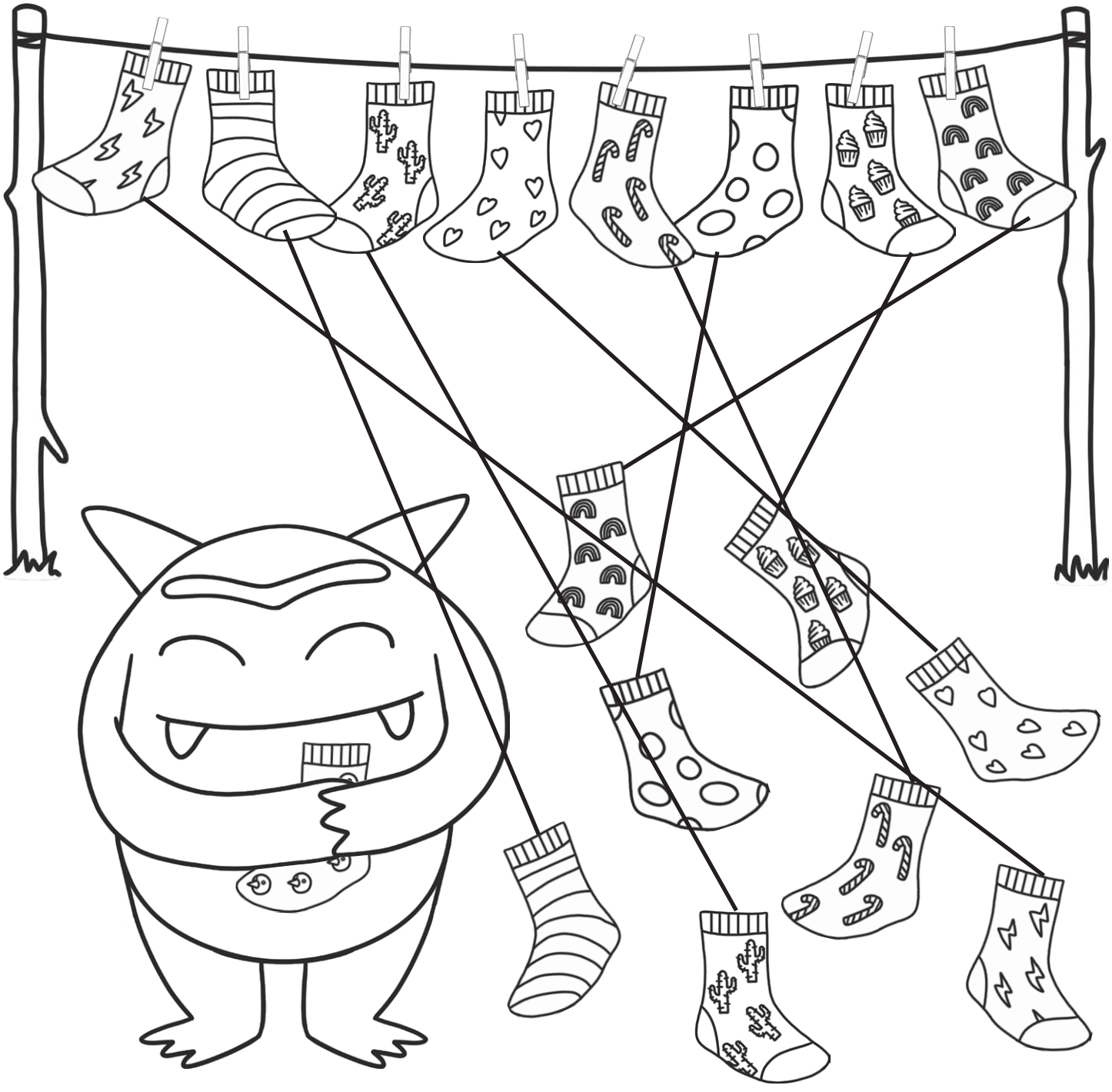
Draw a line to match the pattern to what will come next.
Use a different colour for each one.



Algorithmic Thinking

Sock Monster

Instructions: Find the matching socks that the sock monster stole from the washing. Draw a line to the matching socks. Use a different colour for each pair.

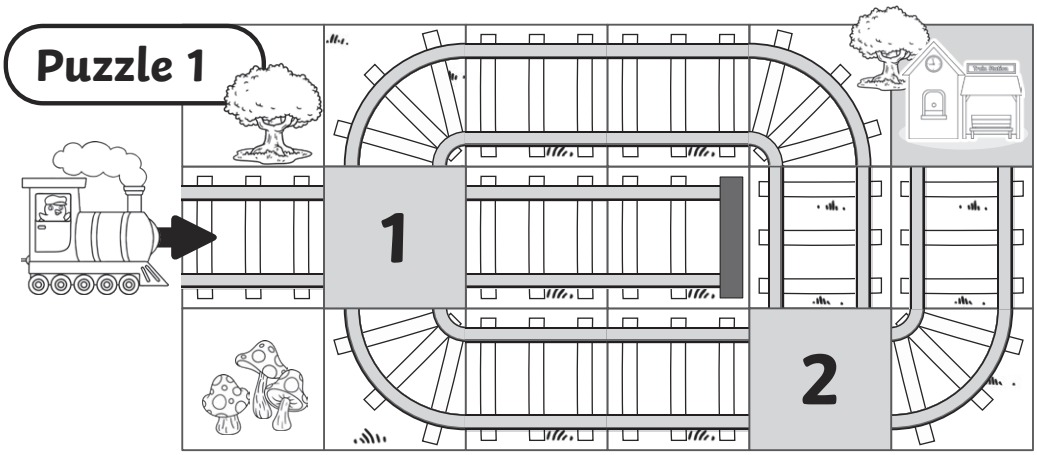


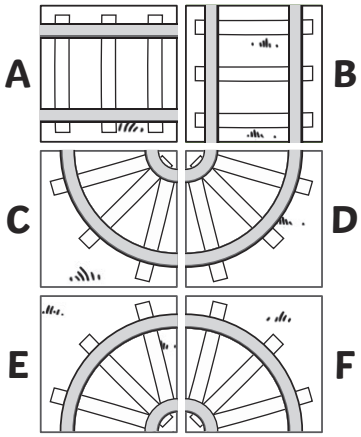
On Track

Instructions

Look very carefully at each of the puzzles below. The train must get to the station but pieces of the track are missing. Write down which 2 pieces of the missing track you think will fit.

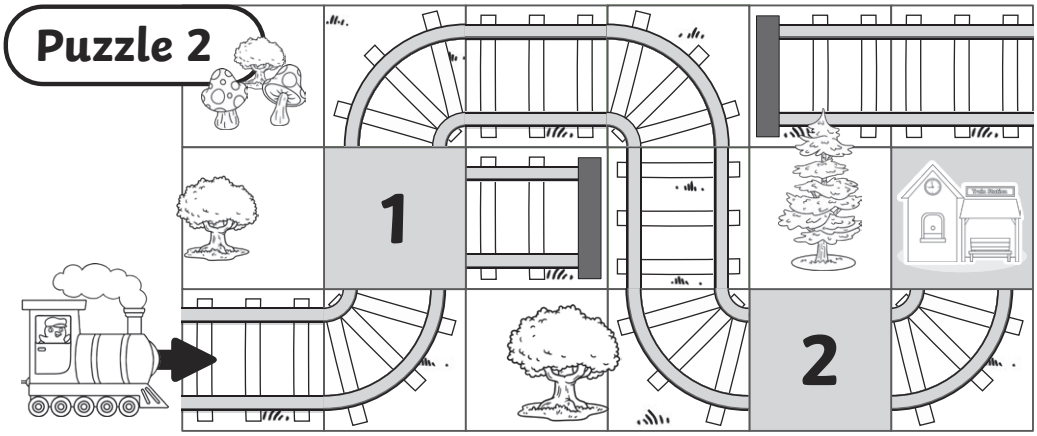
Puzzle 1

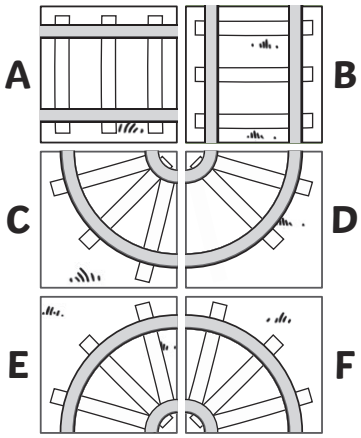




1. D 2. C

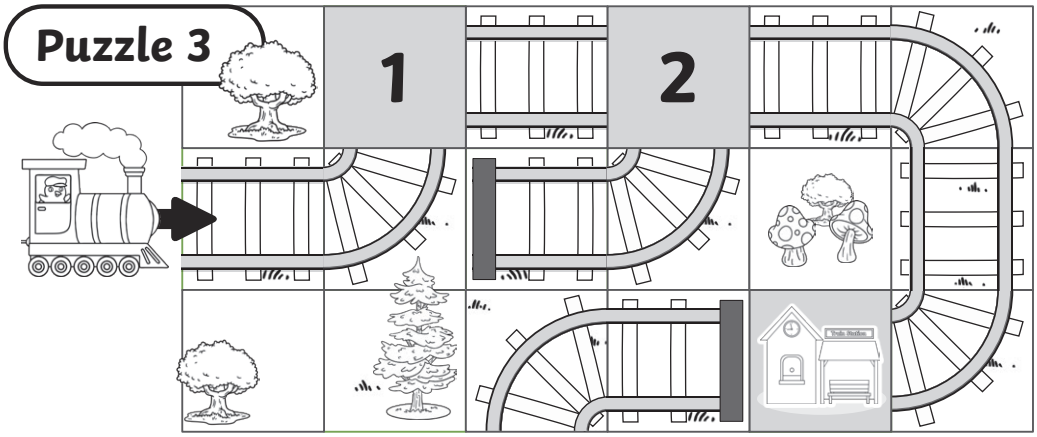
Puzzle 2

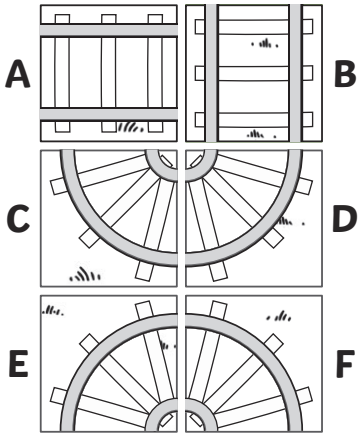




1. B 2. A

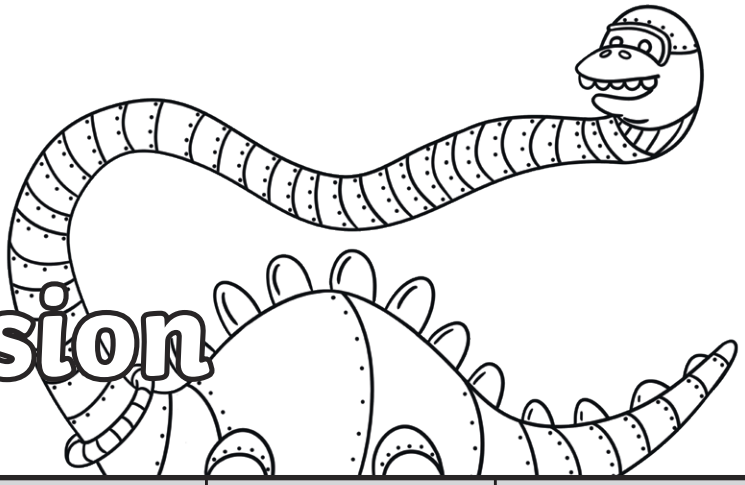
Puzzle 3

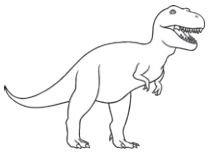




1. E 2. A

Dinosaur Comprehension



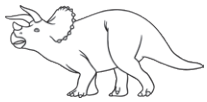
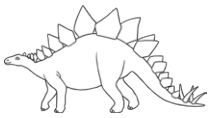
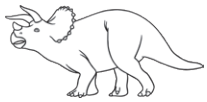
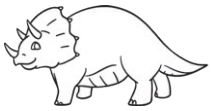
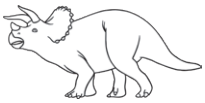
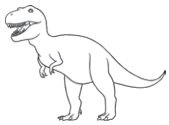
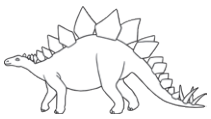
	1	2	3	4
A				
B				
C				
D				

Look at the grid and answer the questions.

Which row has only one dinosaur? **B**

What colour dinosaur occurs twice in the same column? **Yellow**

Write down the coordinates of all the green dinosaurs. **B1, C3, D4**

	1	2	3	4	5
A					
B					
C					
D					
E					

Look at the grid and answer the questions.

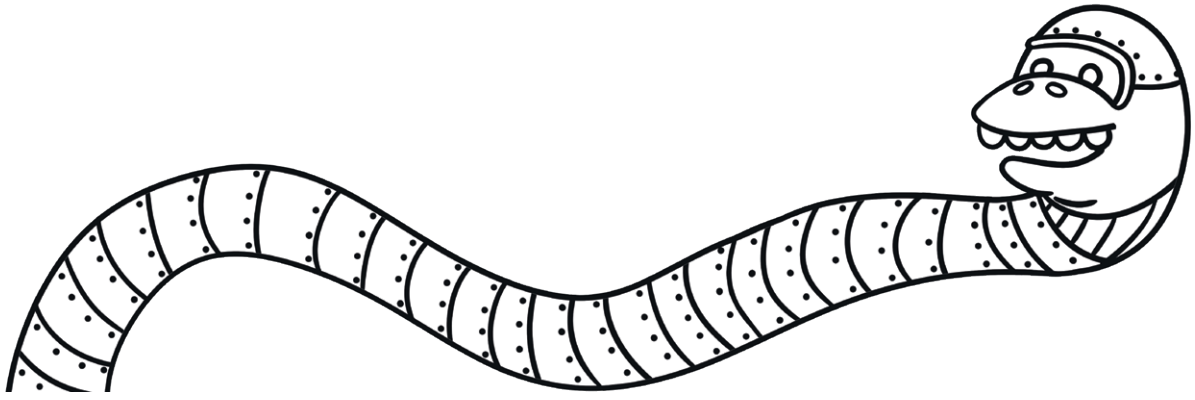
Which column has the most dinosaurs? **Column 3**

Which row has two dinosaurs the same colour? **Row E has two green dinosaurs**

What colour is the dinosaur in block 3D? **Brown**

Write the coordinates of the orange dinosaurs? **B3, C5**

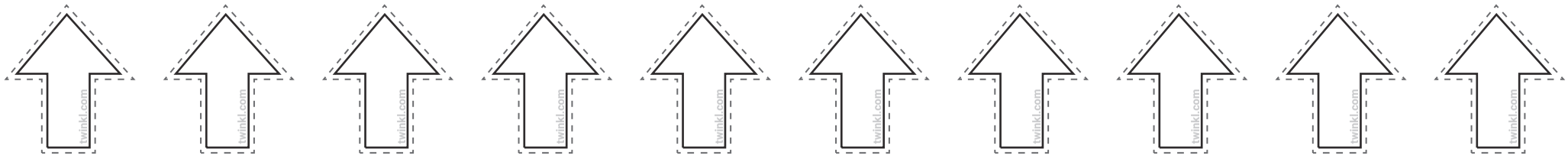
Which column has no dinosaurs? **Column 2 has no dinosaurs**



Cut out the arrows below and stick them in the correct order when you have worked out the route.

Write some comments about the route you chose.

The tour of the museum cannot be complete by following the restrictions.

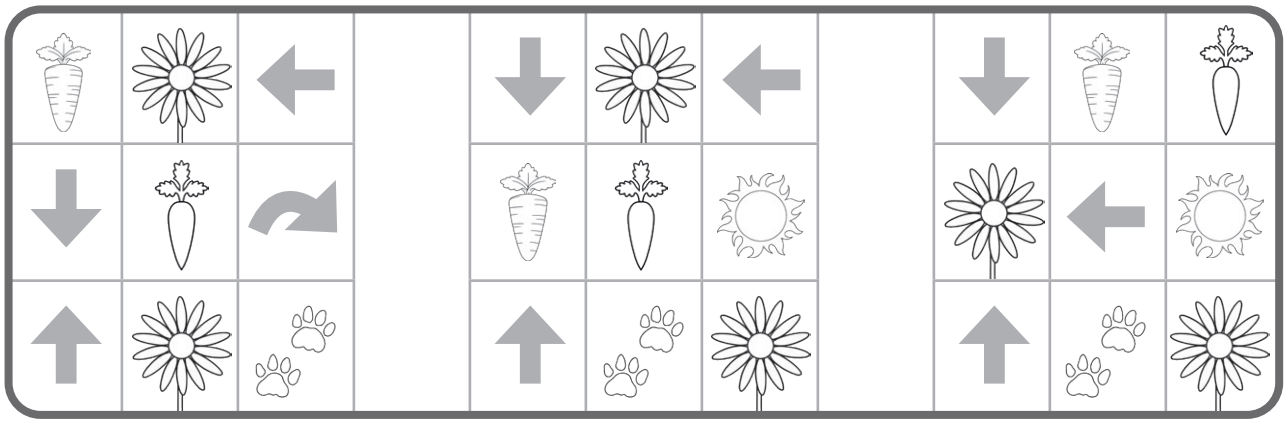


Limitations

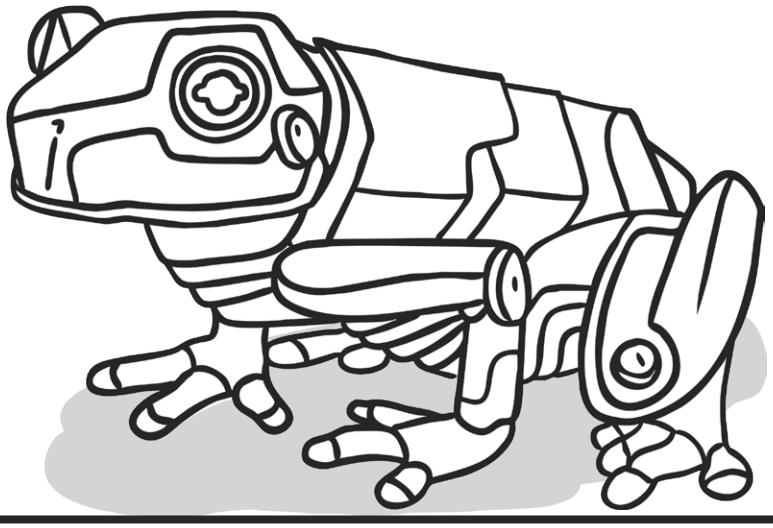
Limitations means that certain rules must be followed.

Look at the grids below and see which do not follow the rules – break the rules for limitations.

1. There may not be 2 arrow symbols in the same row. **B**
2. Flowers may not appear in the same column. **A**
3. There may not be any bow arrow on a grid. **A**

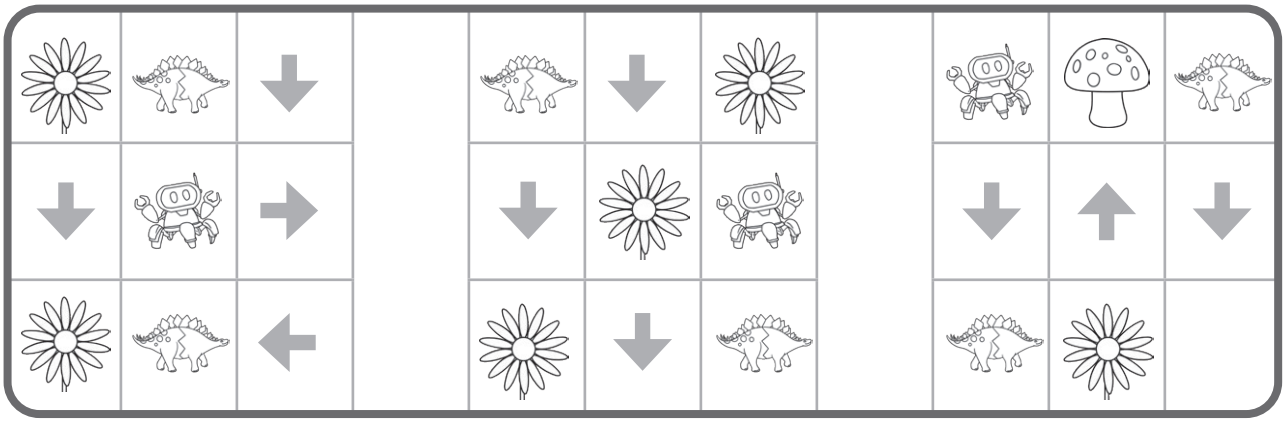


A **B** **C**

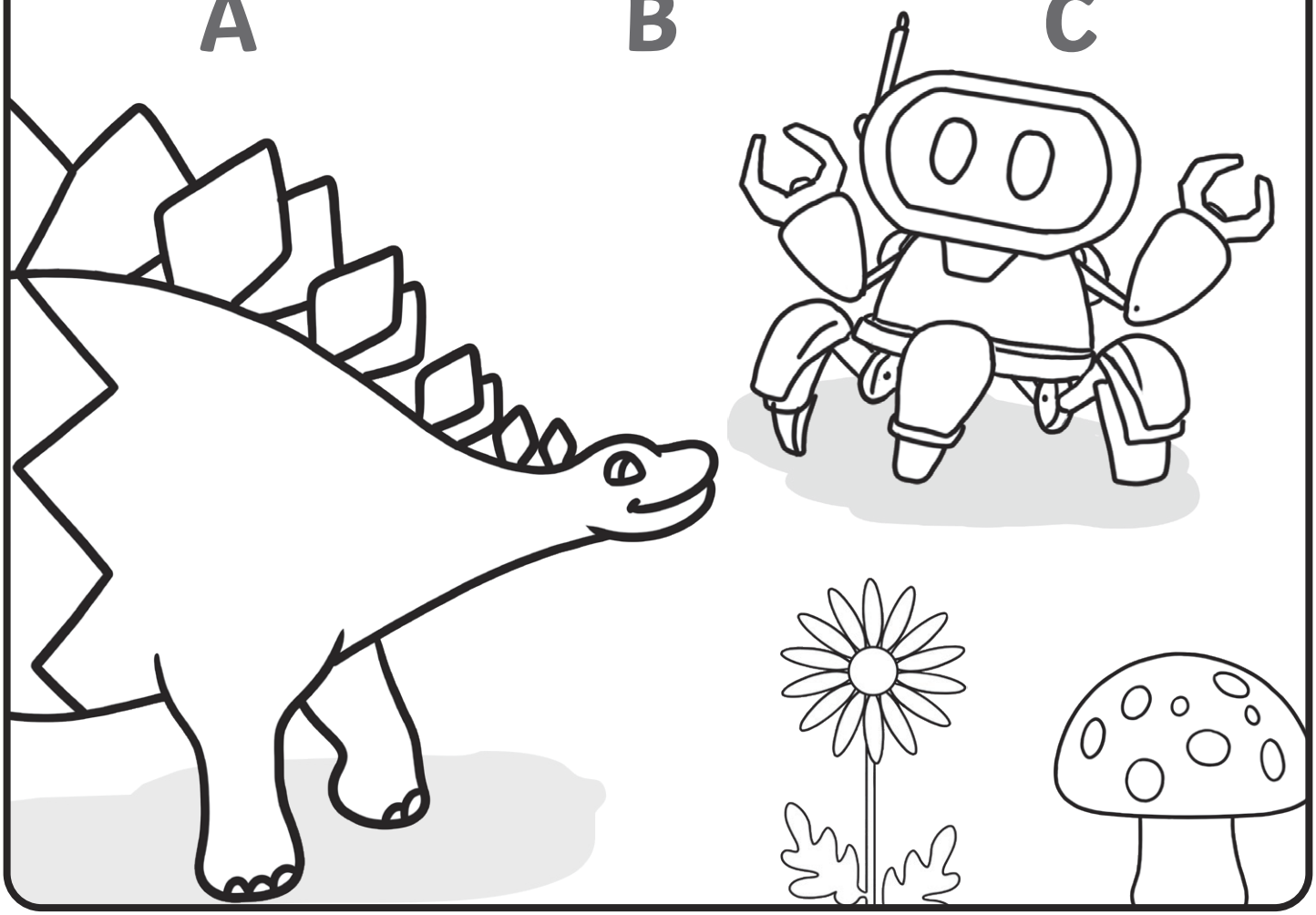


Limitations

1. There may be no up arrows. **C**
2. Only two flowers per grid. **B**
3. Dinosaurs may not appear in the same row or column. **A**



A B C



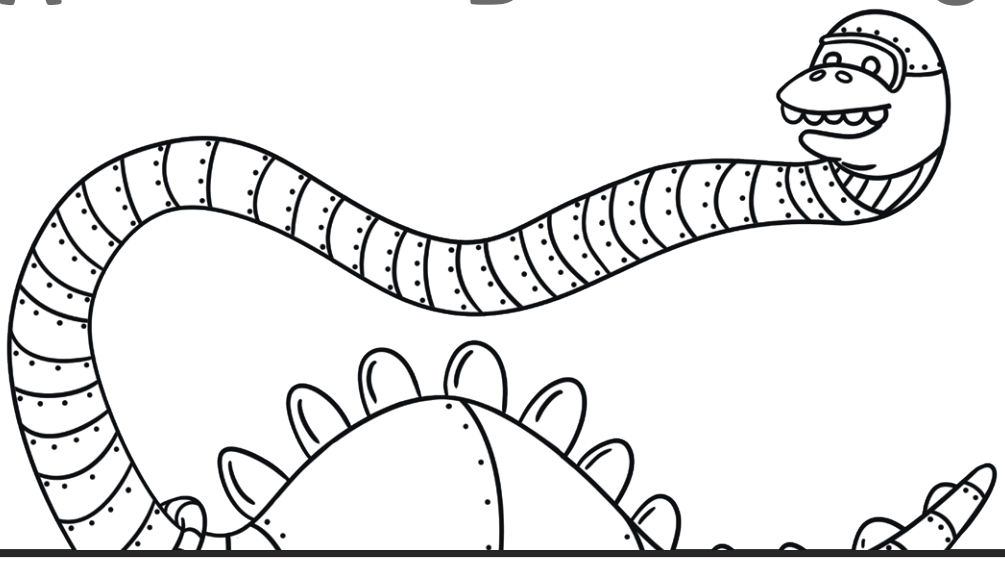
Limitations

1. There may not be more than 3 arrows on a grid.
2. Each grid must have 2 animals and they may not be next to each other.
3. There may not be 2 flowers in the same row or column.

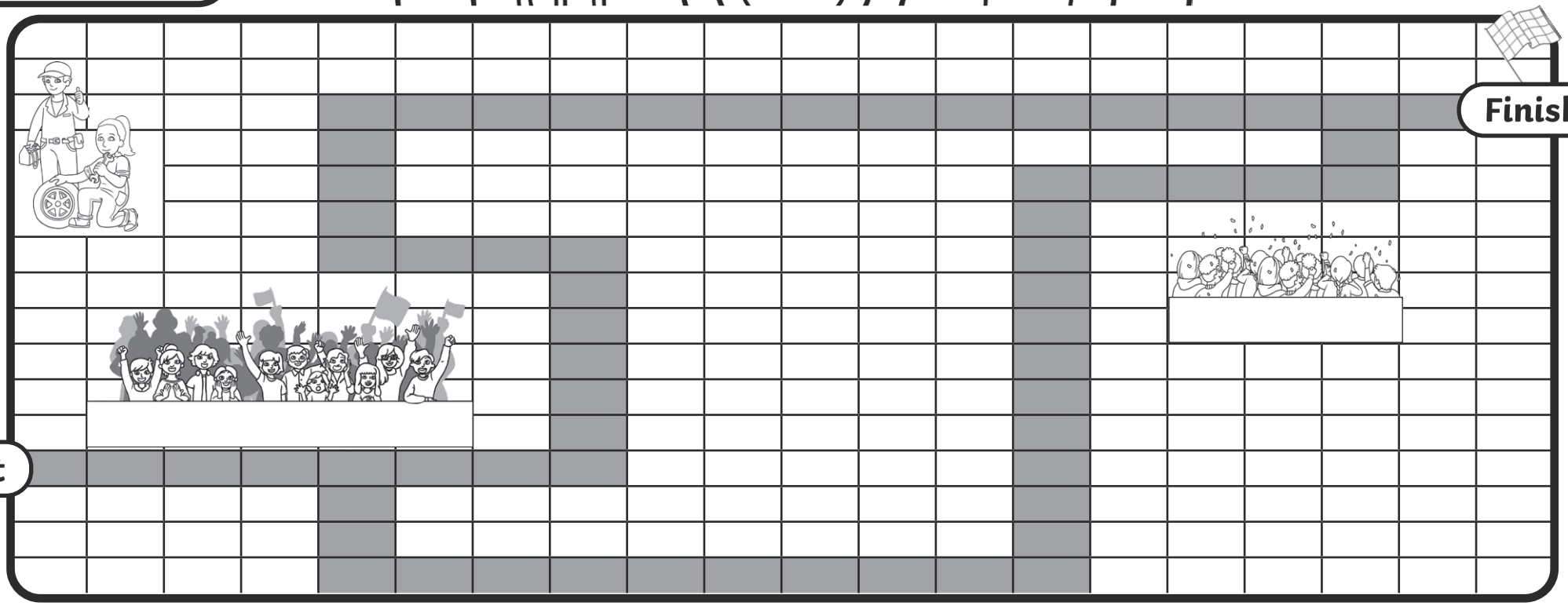
Read the limitations and then fill the grids using the following objects

Learners own Design

A **B** **C**



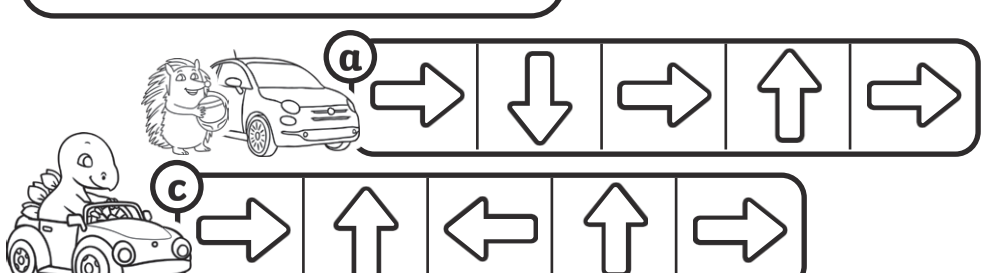
At the Races

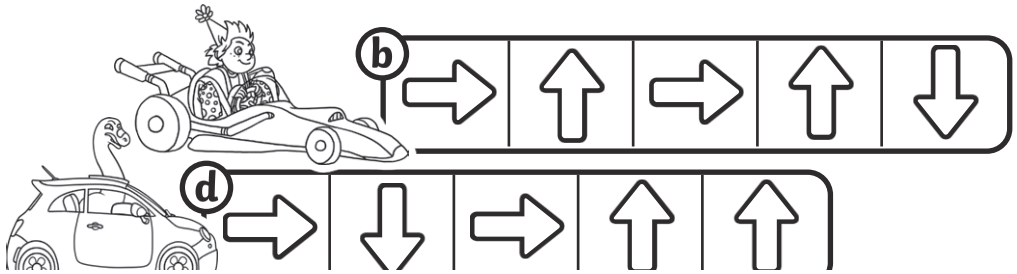


Instructions:

Look at the codes below.

Which car will win the race? C





Questions

1. Why does a robot need a body?

   A robot needs a body to hold all the components.

2. What component allows the robot to "think"?

   The processor

3. Why do you think a battery would be better than a cable on a robot with wheels?

   Yes

4. What enables robots to "see" and "hear"? **Sensors**

5. What component do you think controls the robot's legs?

   Motor

6. Would a robot designed to weld car parts together need legs? Why?

   No. It stays in one place.

7. If you were designing a robot to cut the grass what special attachment would you give it?

   Blades

8. How does the control system know how to control the robot?

It is programmed

9. Do robots have brains and can they think for themselves?

No

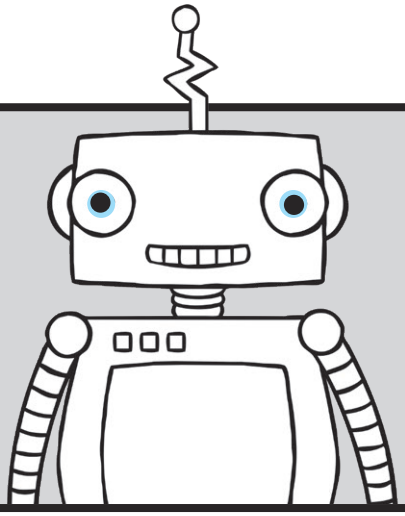
10. Design a robot that can help someone learn how to play tennis and describe what special components it will need.

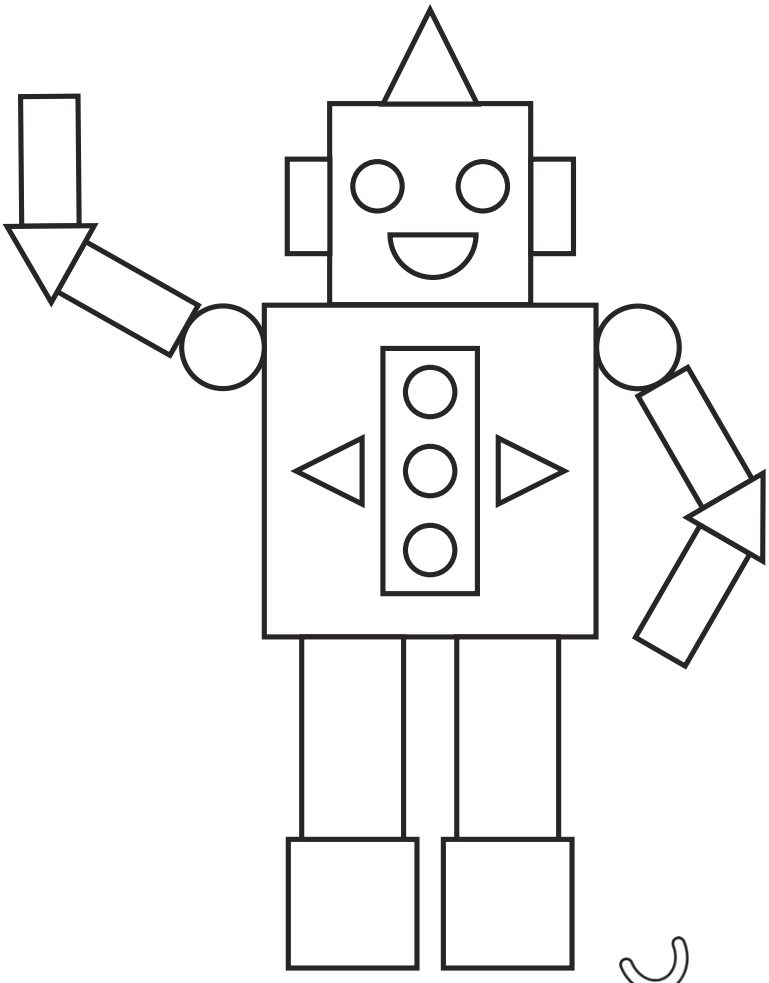
Learners own answer

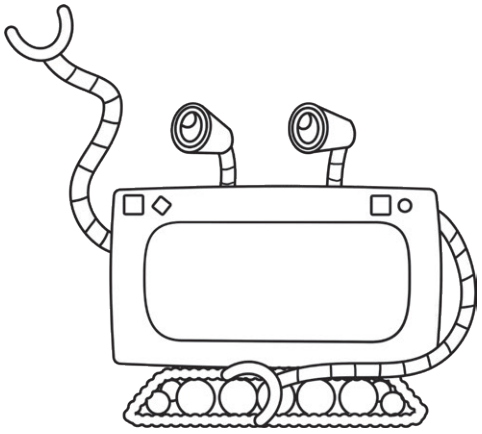
Decomposition

Instructions:

- Colour the triangles yellow
- Colour the circles blue
- Colour the squares green
- Colour the rectangles red

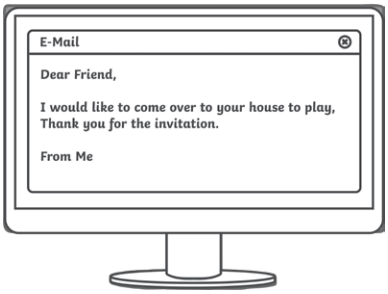
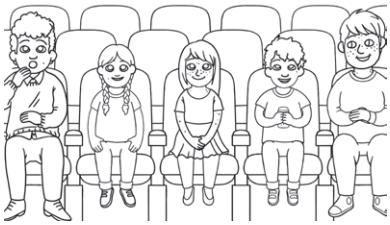






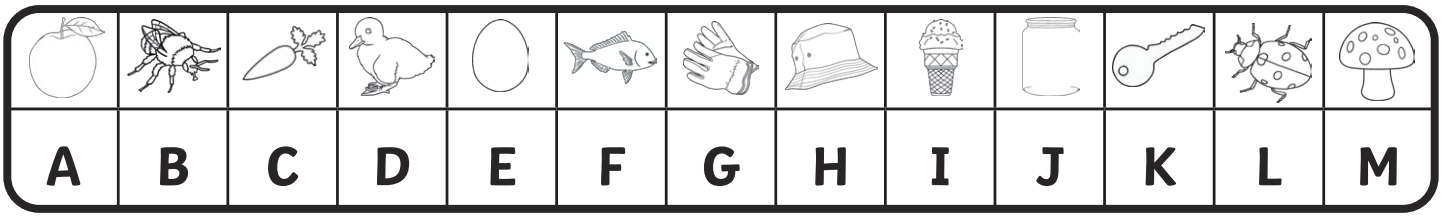
- How many triangles are there? 5
- How many rectangles are there? 9
- How many squares are there? 4
- How many circles are there? 7

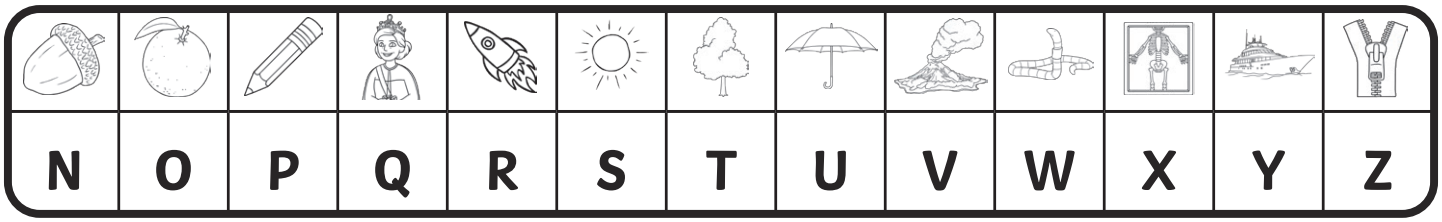
What are these people using the internet for?

		
Playing a Game	**Sending an Email**	**Phoning a Friend**
		
Shopping online	**Searching for Info**	**Listening to Music**
		
Watching a movie	**In a Chat Room**	**Doing Homework**

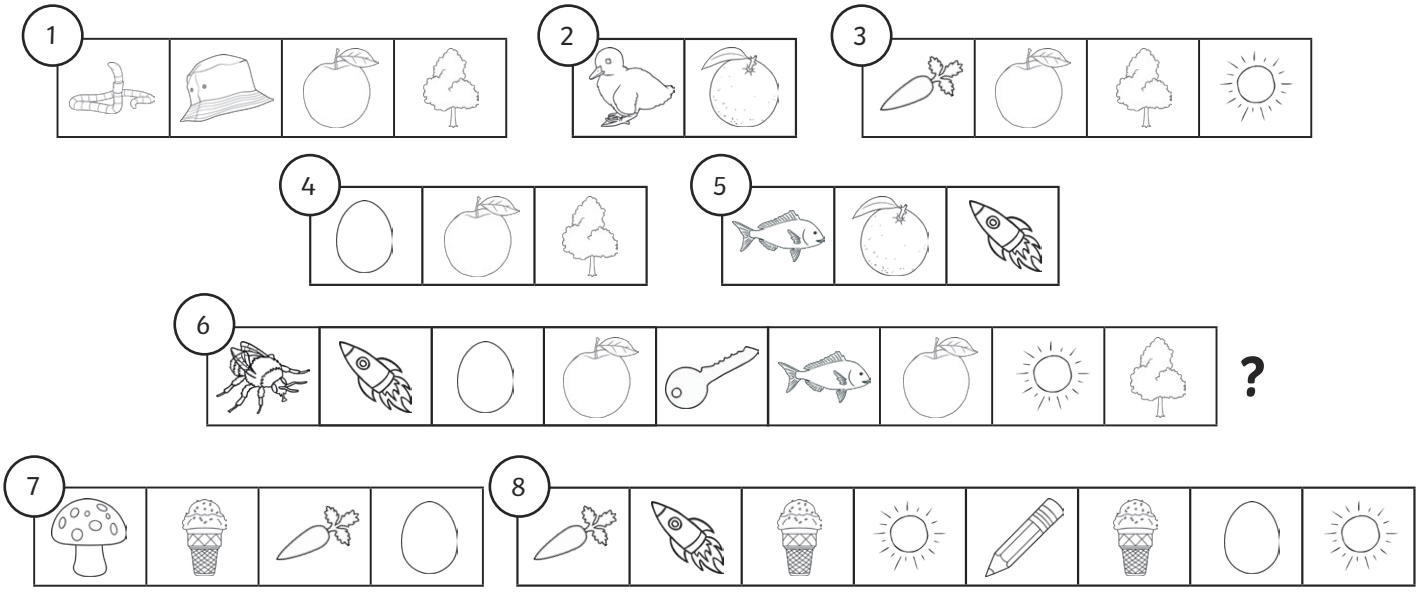
Write the correct answer beneath each picture.

playing a game; sending an email; phoning a friend; shopping online; searching for info; listening to music; watching a movie; in a chat room; and doing homework.





Use the table above to help you decode the following message.



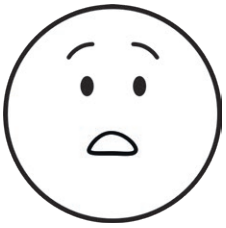
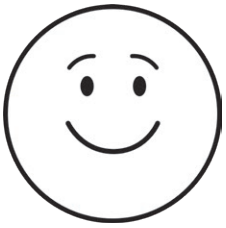
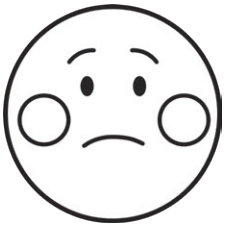
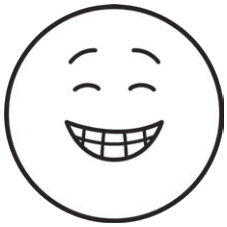
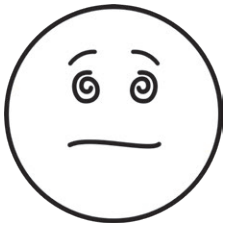
1 w h a t 2 d o 3 c a t s

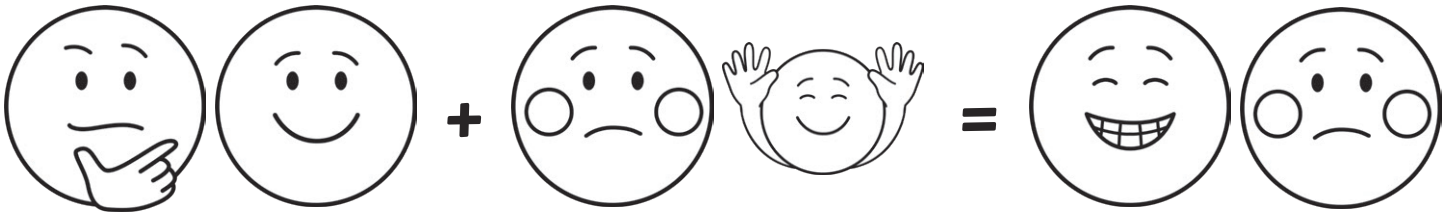
4 e a t 5 f o r

6 b r e a k f a s t ?

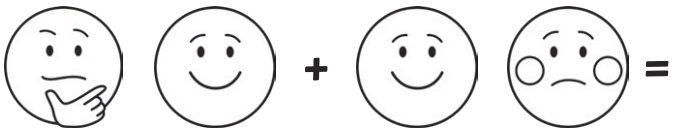
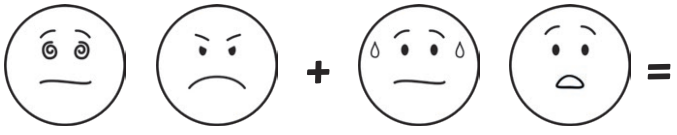
7 m i c e 8 c r i s p i e s

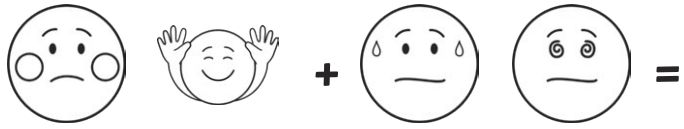
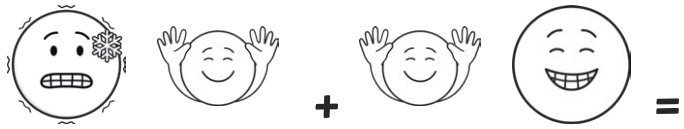
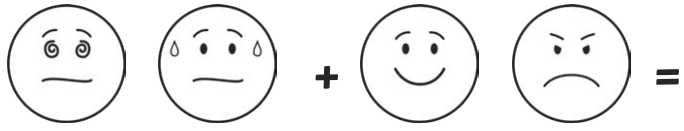
Code Breaking Mathematics

				
5	2	7	3	4
				
9	6	8	0	1



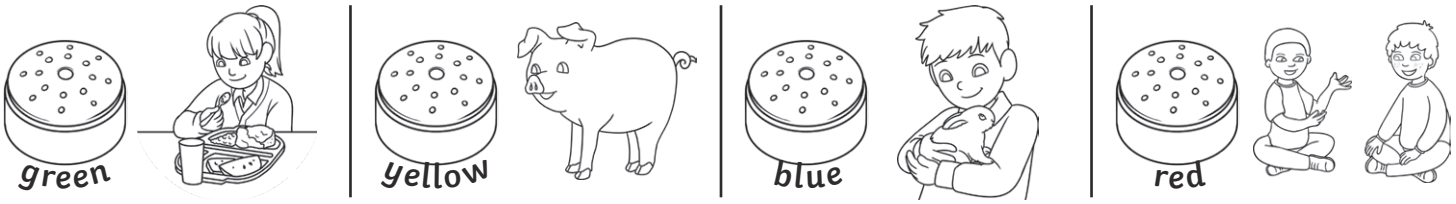
5 3 + 4 1 = 9 4

	53+34=87
	60+27=87

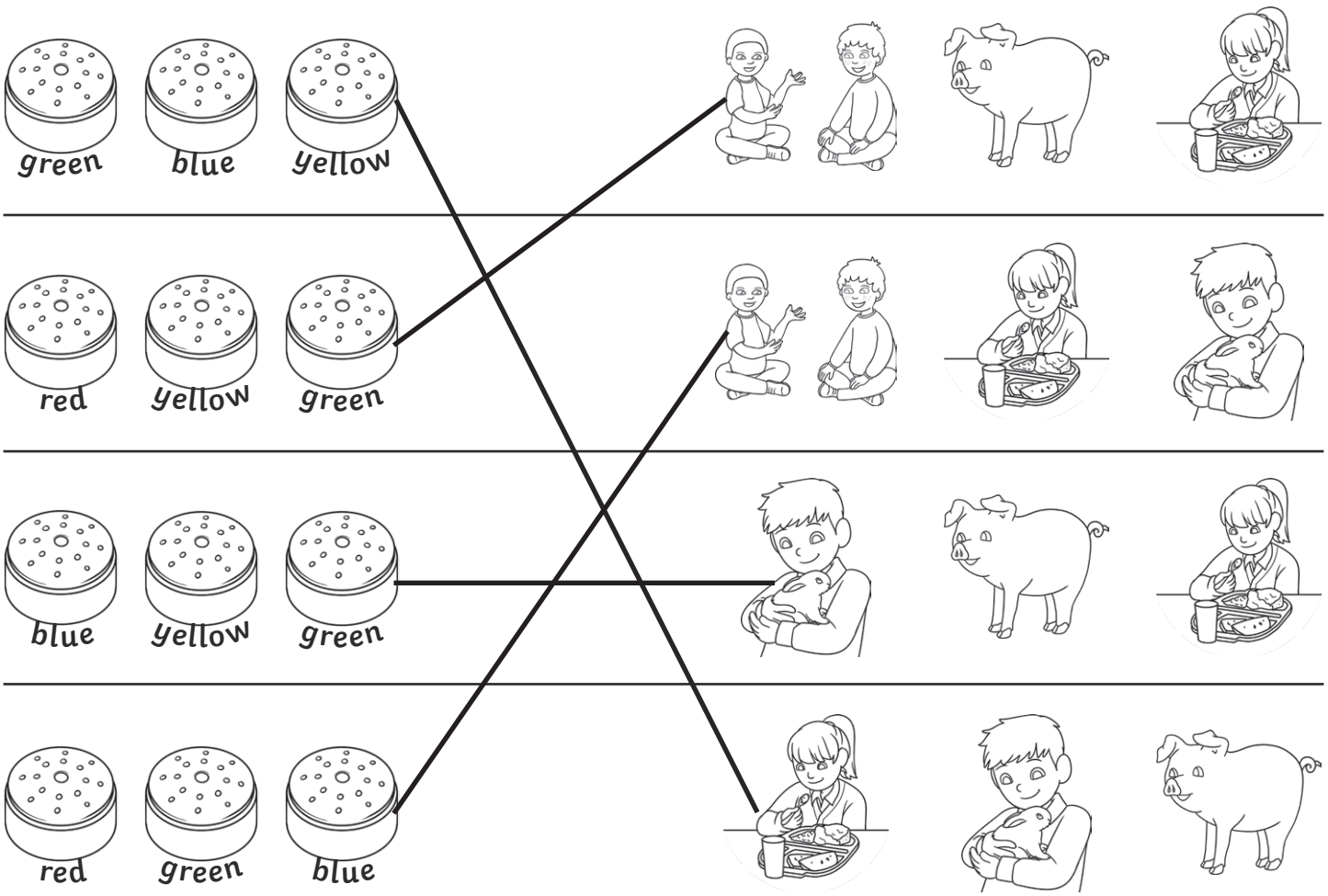
	41+26=87
	81+19= 100
	77-10=67
	66+22-88
	13+74= 87
	87-56= 31
	95-12-83
	62+30=32

Coding Magic Pictures

You have a magic picture frame that changes the photo in the frame depending on the code you enter. Each button on the remote control represents a different photo.

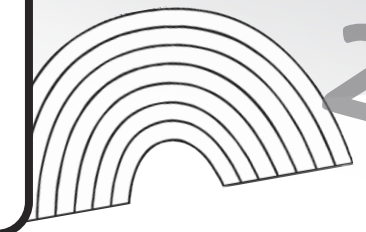


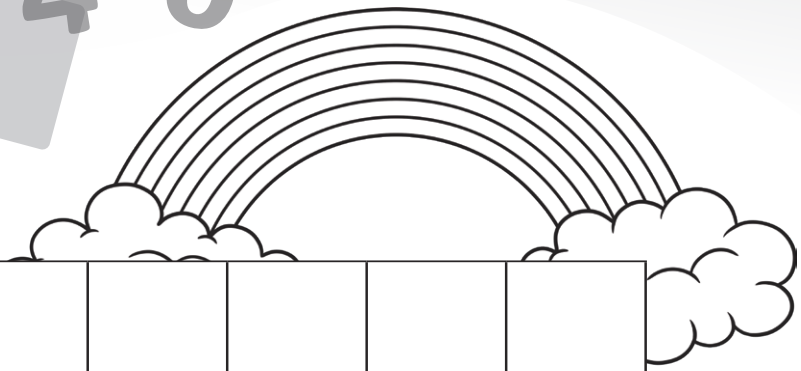
Instructions: Can you work out which series of buttons will show which set of pictures are on your frame? Draw a line to match each set of buttons to the corresponding pictures.



Term 4

Create a Pattern



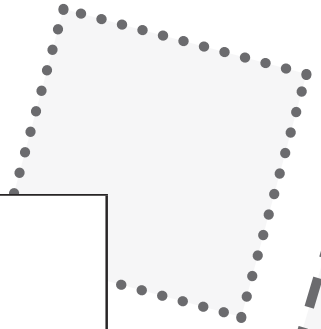


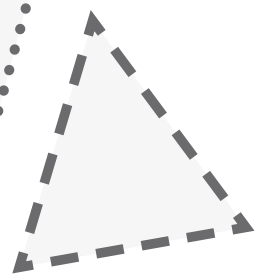
Create a pattern using the colours of the rainbow

Individual answers.													

Create a pattern using even numbers. You must use at least 5 different numbers.

Individual answers.														

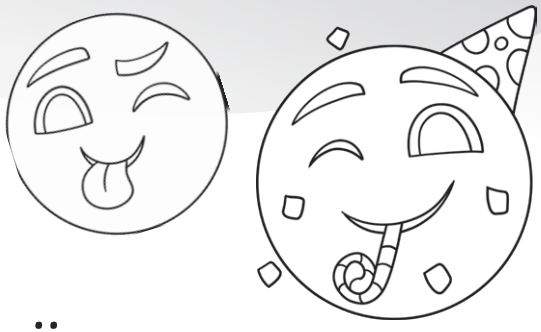




Create a pattern using 4 different shapes.

Individual answers.											

Create a Pattern



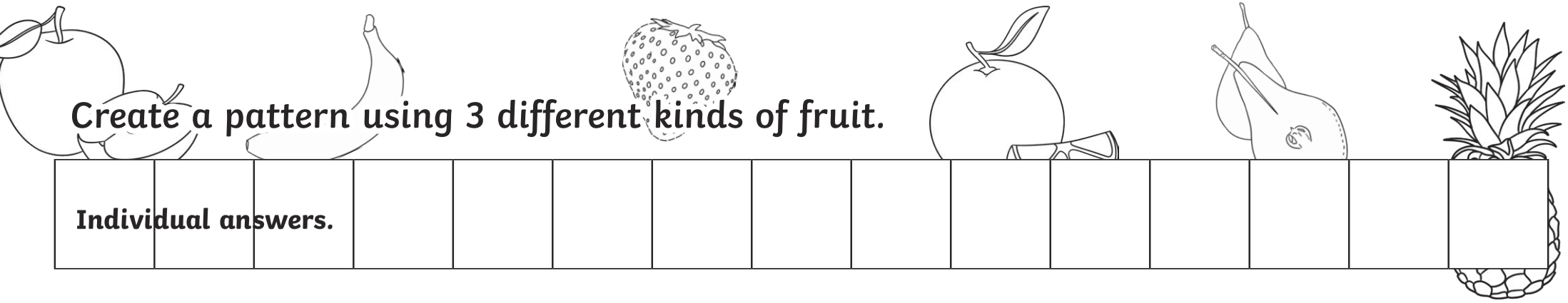
Create a pattern using 4 different emojis.

Individual answers.											

Create a pattern using 5 different leaves.

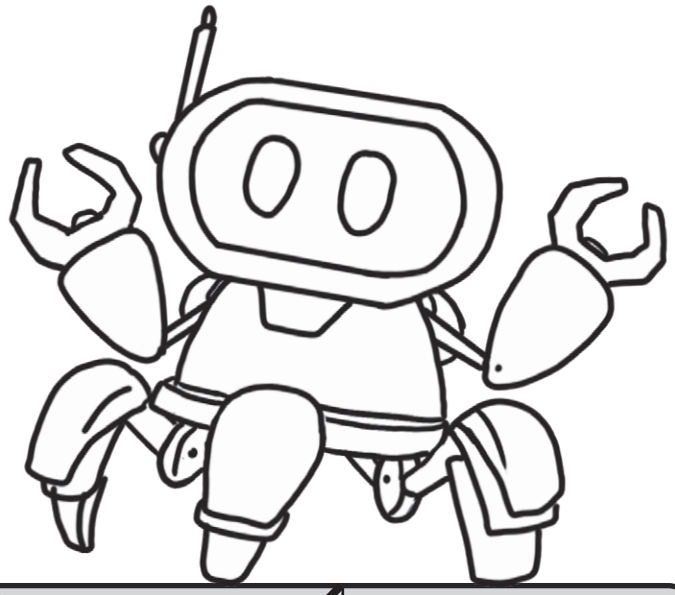
Individual answers.														

Create a pattern using 3 different kinds of fruit.

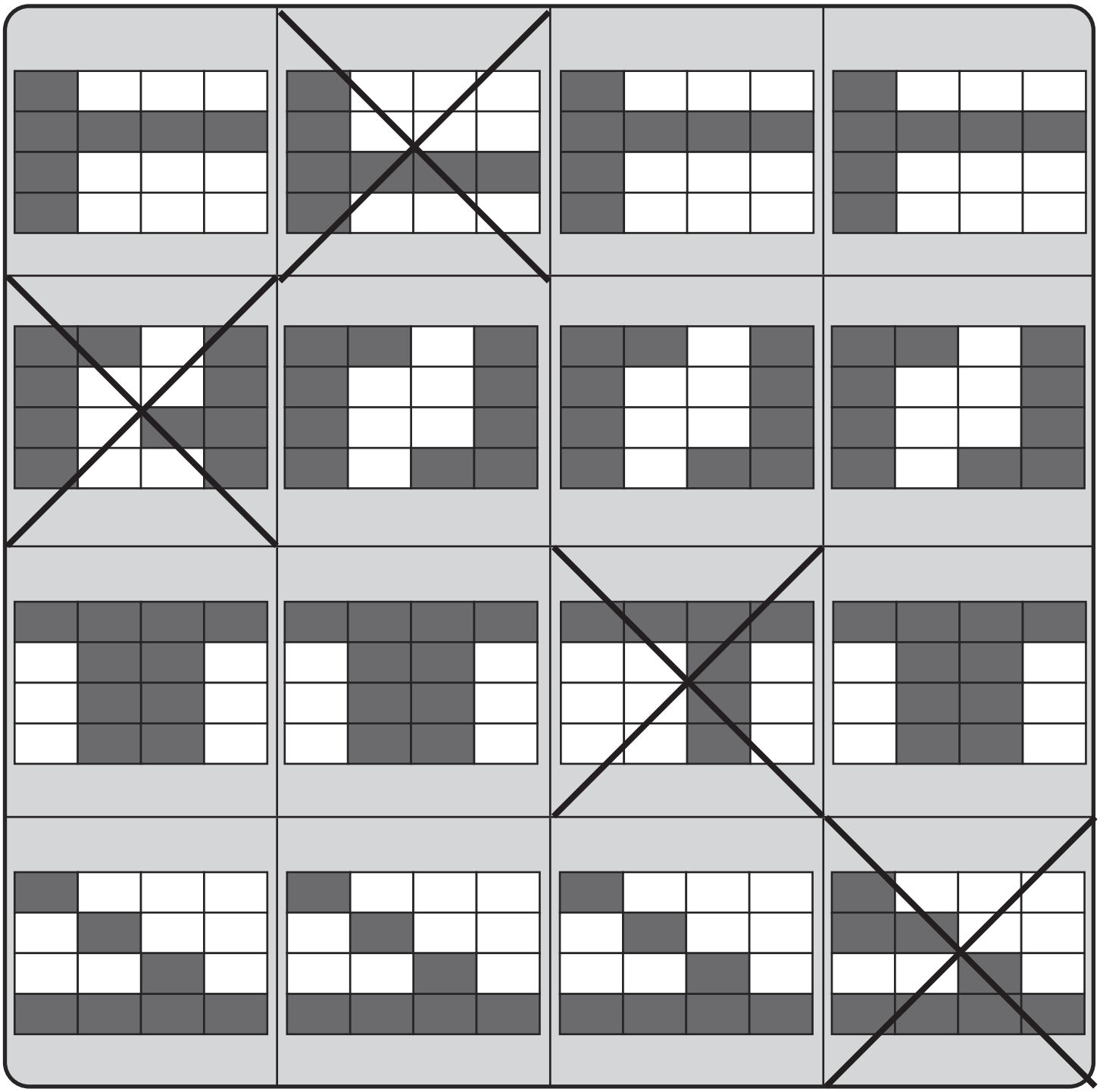


Individual answers.														

Spot the difference

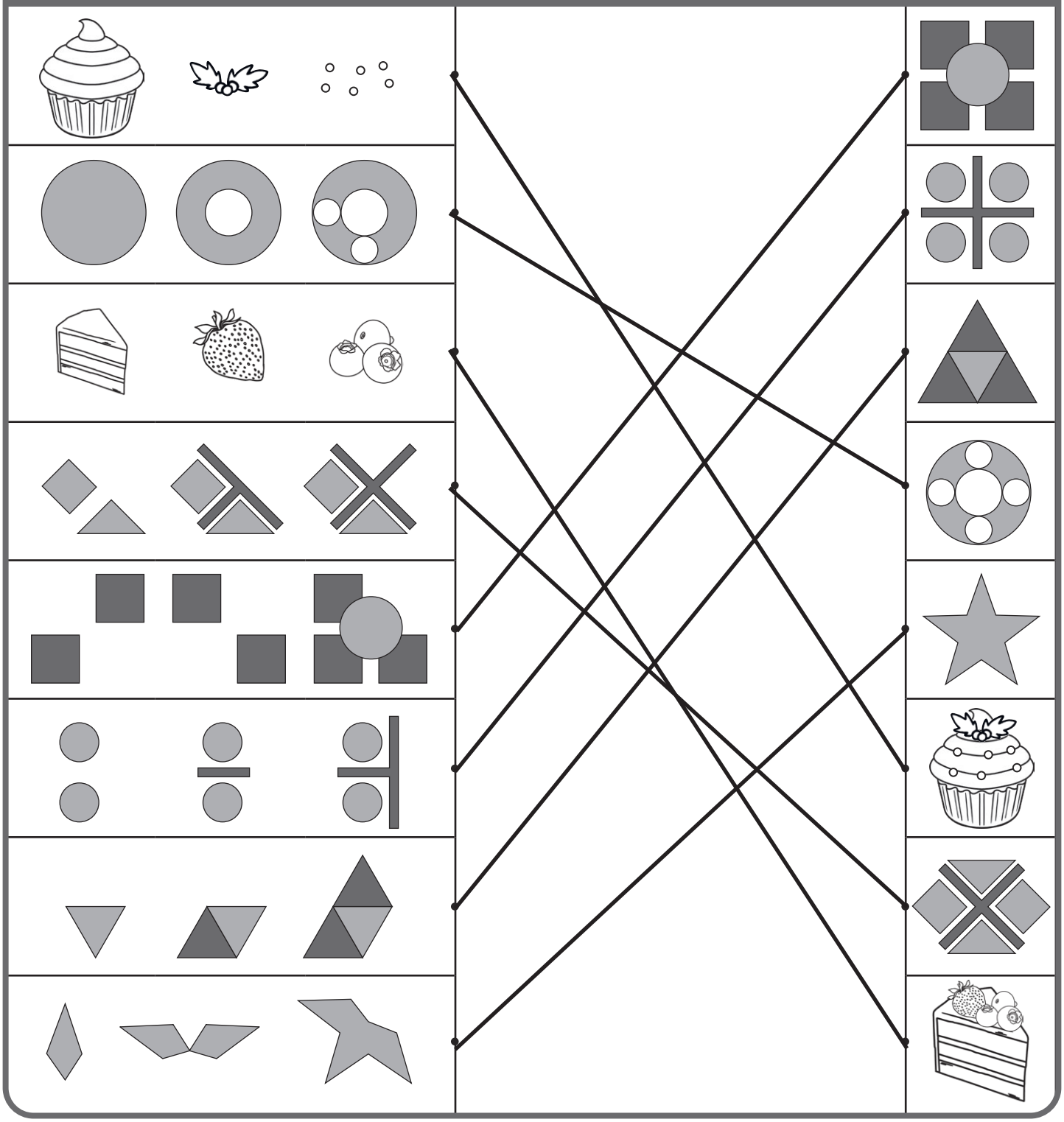


Circle the one that is different.

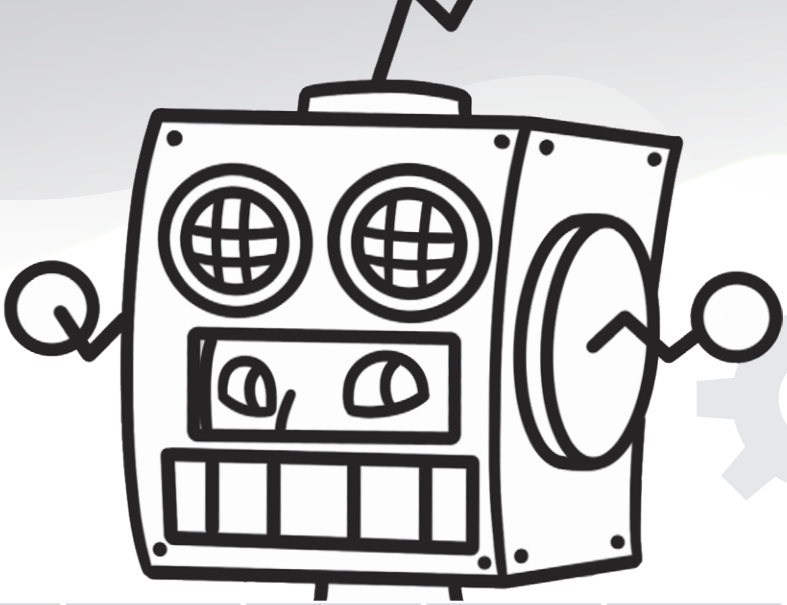


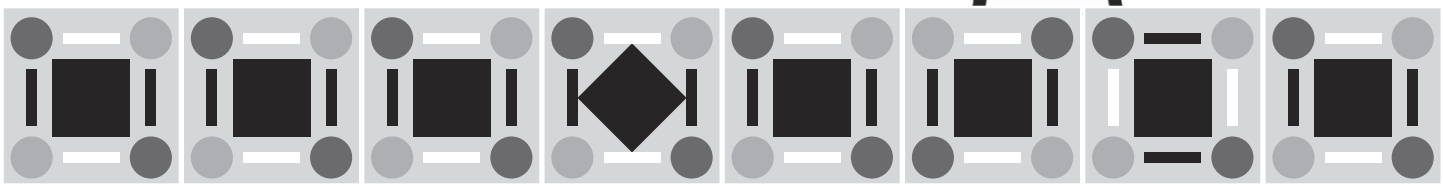
Pattern Recognition: Pattern Matching

Draw a line to match the pattern to what will come next.
Use a different colour for each one.



Debugging a Complex Pattern





Look closely at this pattern and **analyse** the elements and repetitions.

How many different shapes are there?
6

How many different colours are there?
5

How many repetitions are there?
8

How many elements are there altogether?
48

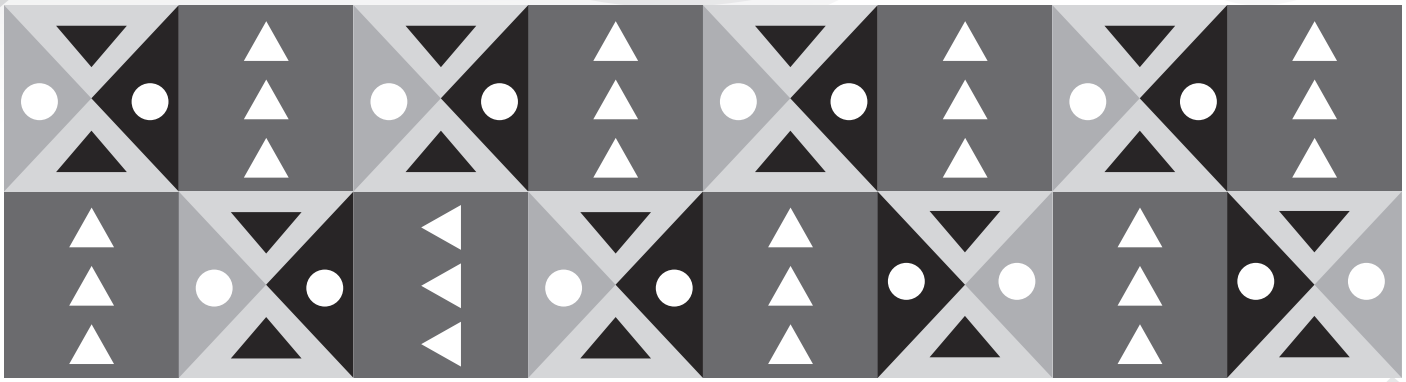
Write a description of this pattern. Begin like this -

This pattern consists of:
The pattern consists of 6 elements each with two characteristics repeated 8 times.

Does this pattern have any bugs? Yes/no

Put a circle around the bugs.

Draw the correct pattern here.



Look closely at this pattern and **analyse** the elements and repetitions.

How many different shapes are there?

6

How many different colours are there?

4

How many repetitions are there?

5

How many elements are there altogether?

96

Write a description of this pattern. Begin like this -

This pattern consists of:

This pattern consists of 6 shapes with two characteristics each repeated 8 times.

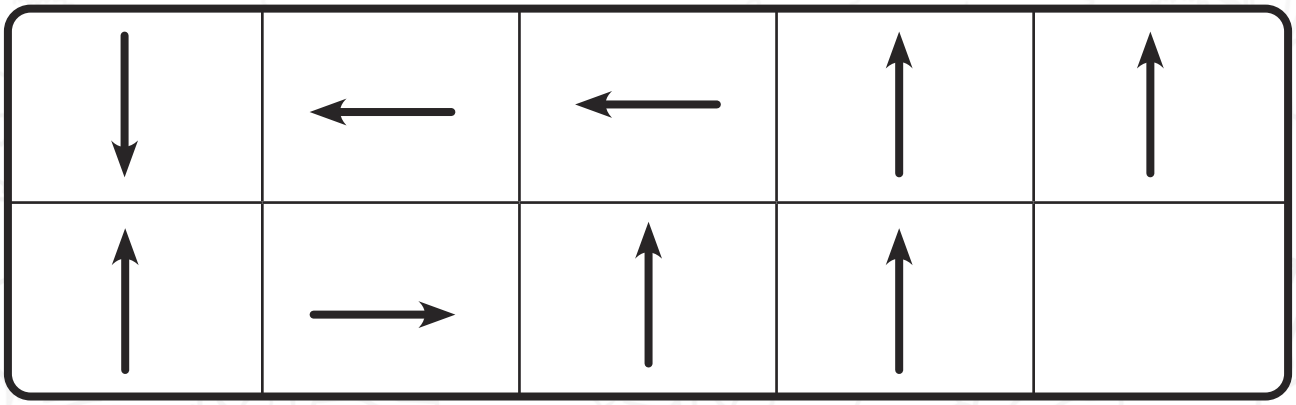
Does this pattern have any bugs? Yes/no

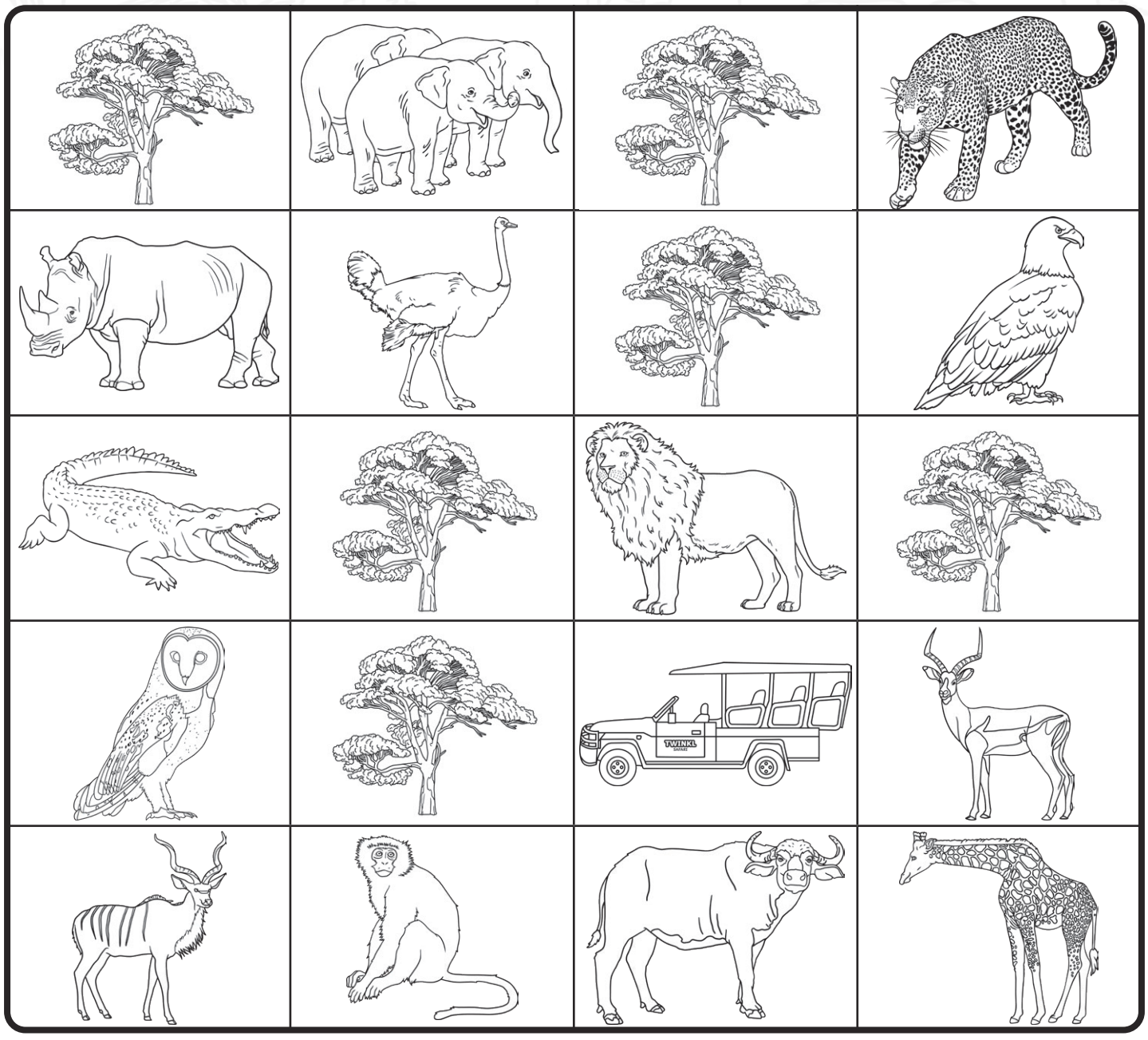
Put a circle around the bugs.

Draw the correct pattern here.

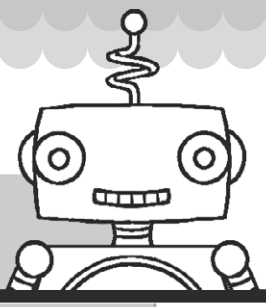
The Game Reserve

Draw arrows in the grid below to show how to get to the elephants. Colour in the animals as you go. You must go around the trees.

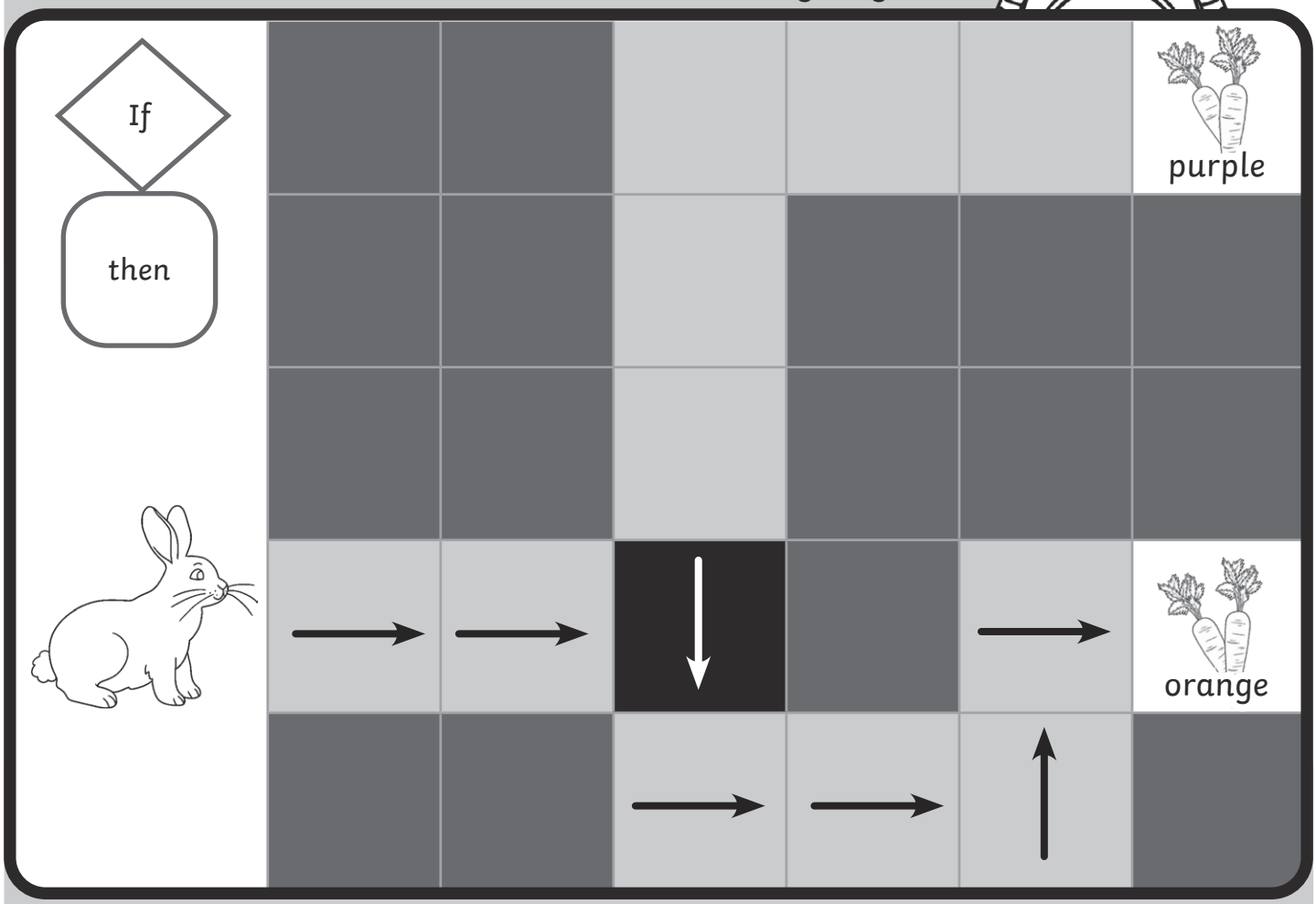




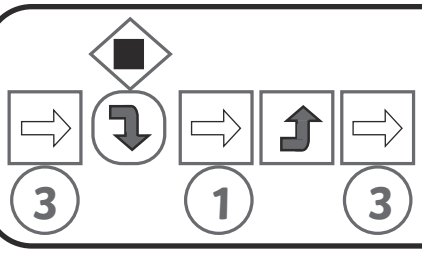
Making Decisions



The bunny does not like purple carrots, when he reaches the red decision block he has to decide which way to go.

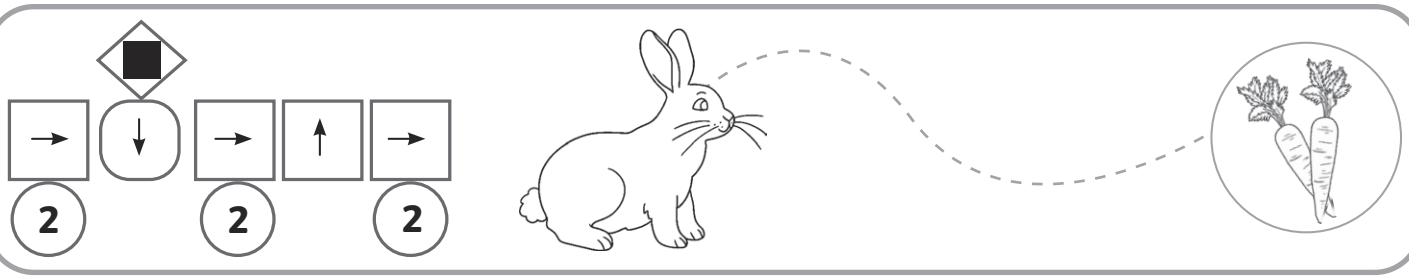


If you reach the decision block then decide which way to go. He decided to turn right



This is the code that the bunny followed. Will he reach the orange carrots?

Write the correct code here.



Examine the code for set A

a. After the code has been executed what number will the bunny end up on?

b. After the code has been executed how many purple carrots will the bunny have collected?

c. After the code has been executed how many orange carrots will the bunny have collected?

Answers for A

a. 6

b. 3

c. 1

Examine the code for set B

a. After the code has been executed what number will the bunny end up on?

b. After the code has been executed how many purple carrots will the bunny have collected?

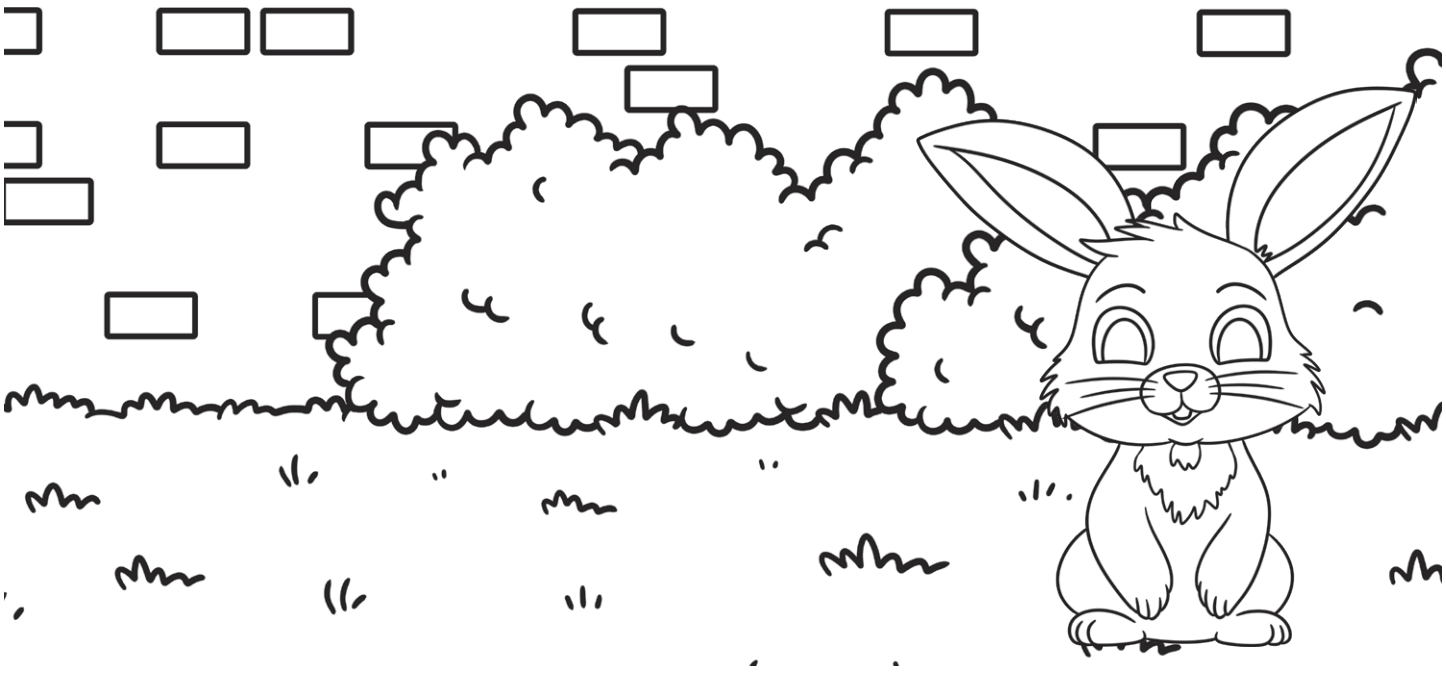
c. After the code has been executed how many orange carrots will the bunny have collected?

Answers for B

a. 9

b. 1

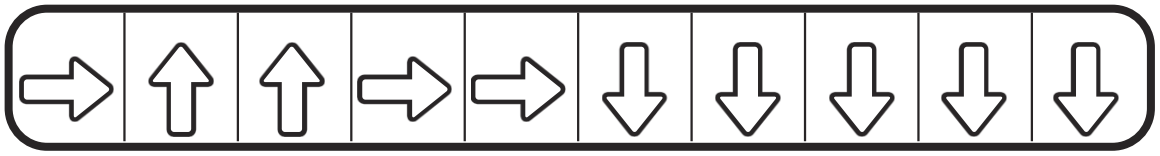
c. 2



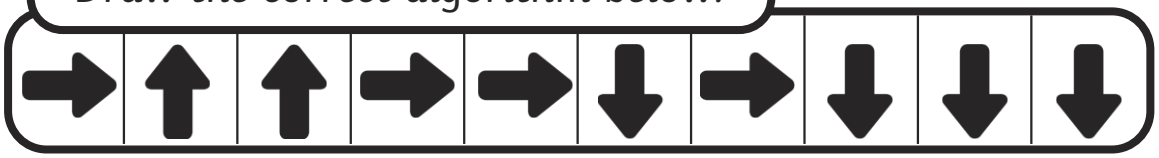
Algorithmic Thinking -

Find the Bug in the Algorithm Answers

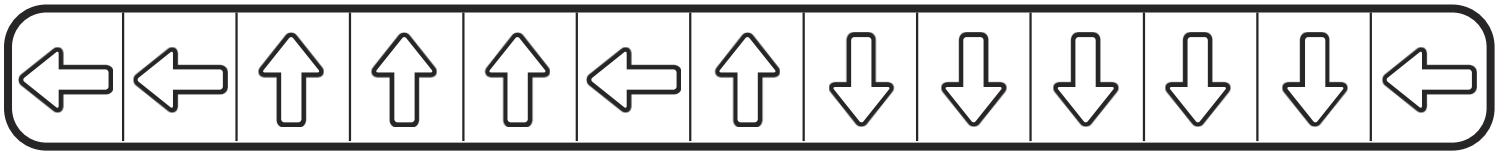
Help the plane land safely at the airport.



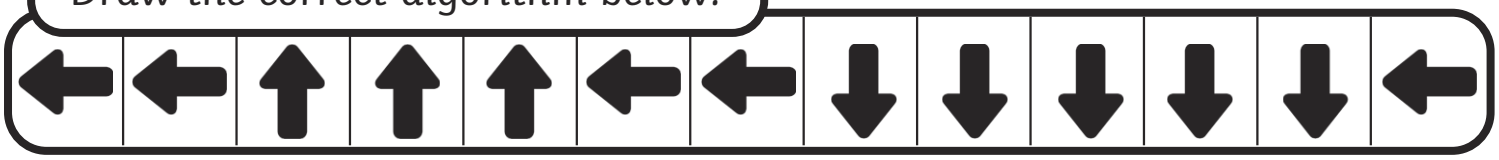
Draw the correct algorithm below.



Pass the ball from player to player to help the Bokke score.



Draw the correct algorithm below.



Questions

1. Why does a robot need a body?
   A robot needs a body to attach all the components to.

2. What component allows the robot to "think"?
   The control system.

3. Why do you think a battery would be better than a cable on a robot with wheels?
   A cable would restrict the robot"s movement.

4. What enables robots to "see" and "hear"? **Sensors**

5. What component do you think controls the robot's legs?
   The motor.

6. Would a robot designed to weld car parts together need legs? Why?
   No, it stays in one place.

7. If you were designing a robot to cut the grass what special attachment would you give it?
   A blade.

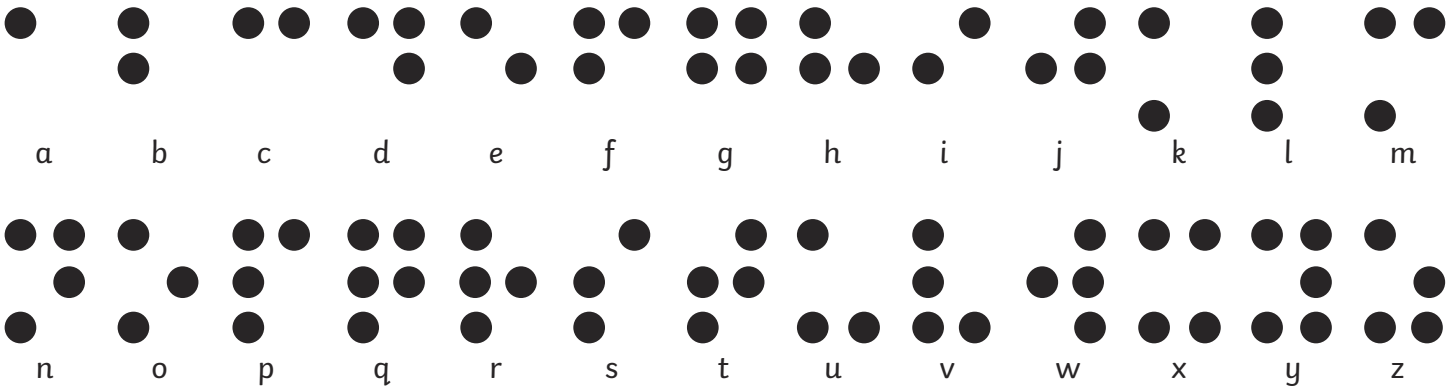
8. How does the control system know how to control the robot?
It is programmed by humans.

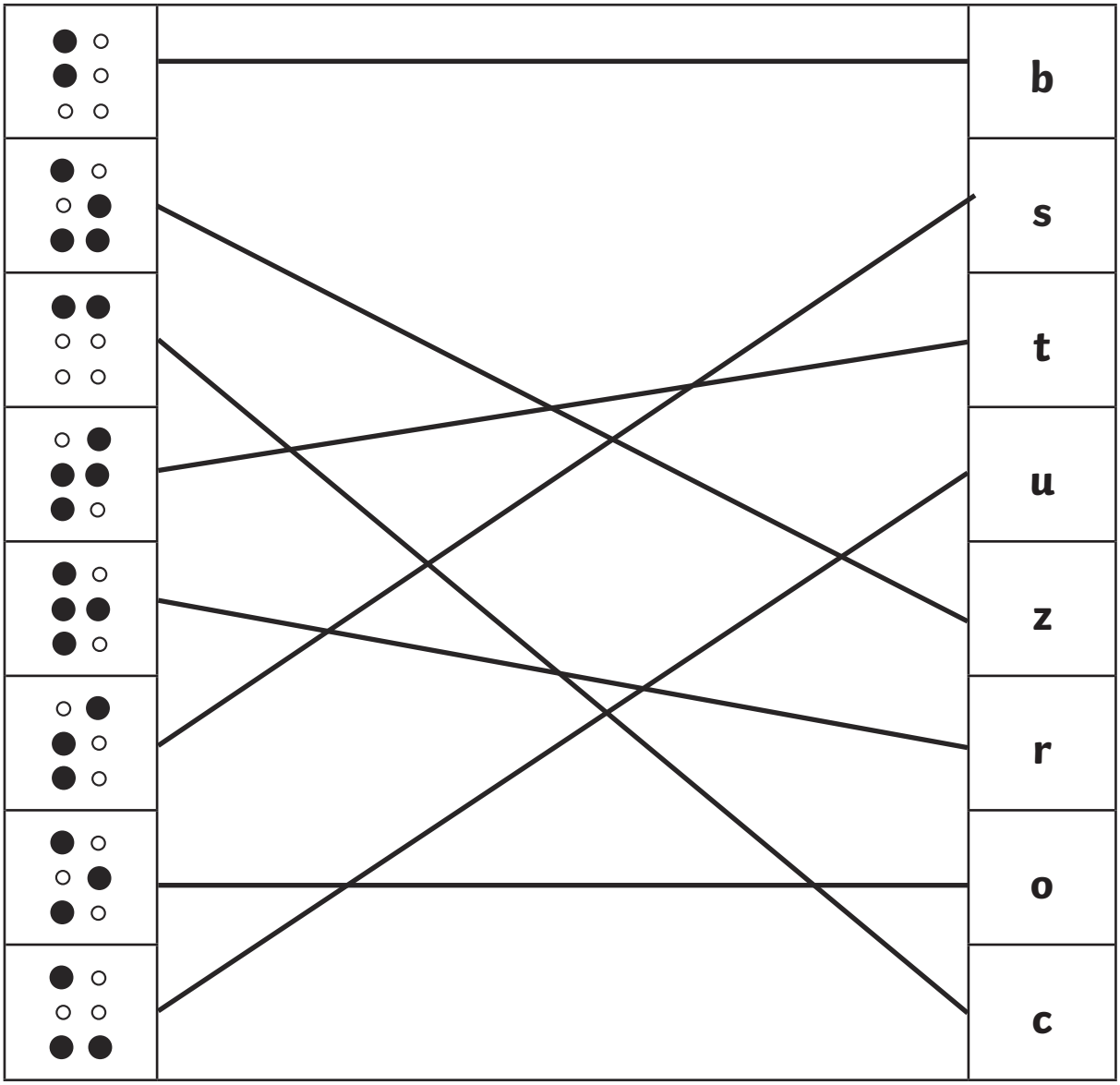
9. Do robots have brains and can they think for themselves?
No

10. Design a robot that can help someone learn how to play tennis and describe what special components it will need.
Learners own design

Braille Matching Activity

Draw lines from the letters to match the braille alphabet. The braille alphabet is written below to help you.





Christmas Joke Code Breaker **Answers**

1. What happens if you eat Christmas decorations?

   You get tinselitus

2. What do you call Santa when he stops moving?

   Santa Pause

3. What does an elf study in school?

   The elfabet

4. What is every parent's favourite Christmas carol?

   Silent Night

5. What kind of music do elves like?

   "Wrap" music

6. What do you get when you cross an iPhone with a Christmas tree?

   A pine-apple

7. How do reindeers know when it's Christmas?

   They look at a calen-deer