

Reasoning and Problem Solving

Position and Direction – Year 1

About This Resource

This resource is aimed at Year 1 Expected and has been designed to give children the opportunity to consolidate the skills they have learned in Summer Block 3 – Position and Direction.

The questions are based on a selection of the same ‘small steps’ that are addressed in the block, but are presented in a different way so children can work through the pack independently and demonstrate their understanding and skills.

Small Steps

Describe turns

Describe position (1)

Describe position (2)

National Curriculum Objectives

Mathematics Year 1: (1P2) [Describe position, direction and movement, including whole, half, quarter and three-quarter turns](#)

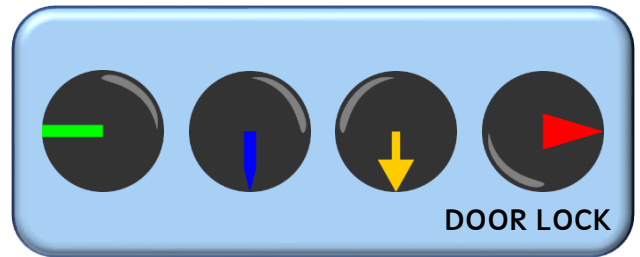
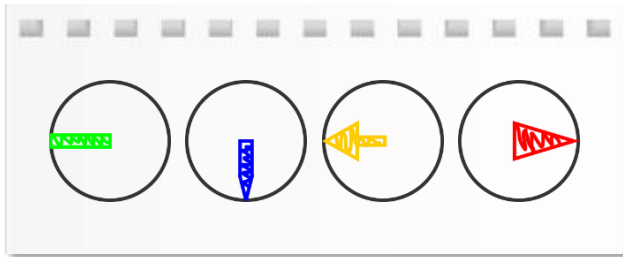
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Anna works in a lab building robots. Every day she tests her robots. Every night she lines them up and locks them in the lab.

This morning, Anna arrives at the lab early. She has lots of work to do. She must unlock the lab door to get in. She can never remember the code! She has drawn it on a piece of paper.

To unlock the door, Anna must turn the dials. She must put them all in the right position. She thinks she has done it right but the door still will not open!



1. What mistake has Anna made? Explain what she must do to make the code correct.

Beep! Buzz! Boop! The lab door opens! Anna walks in. She is ready to start her work.

Something is not right. Something is different. What is it? The robots! They have moved! How did this happen? Anna is sure that she left them lined up. They were all facing the same way. Now they are facing in lots of directions!



Robo-Dex



Robo-San



Robo-Cos



Robo-Bop



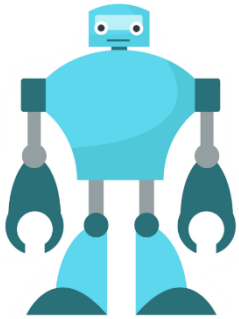
Robo-Kin

2. Look at the robots' eyes to see if they are facing the wrong way. Describe a turn each robot might have made in the night.

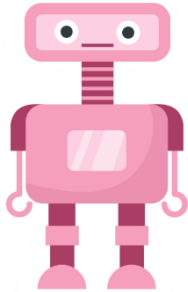
“How very strange!” Anna thinks. “Who might have moved the robots?”

Anna does not have time to worry about it. The robots need to be tested. Today, Anna is going to look at their lasers!

Anna takes the robots to the testing room and lines them up.



Robo-Cos



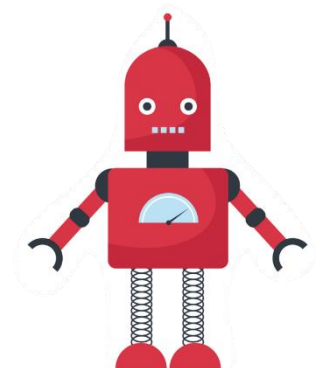
Robo-Kin



Robo-Bop



Robo-Dex



Robo-San

Anna takes out her notepad and writes down facts about the robots and their lasers.



Robo-Kin has the biggest laser.

The robot with the smallest laser is at the right end of the line.

Robo-Dex has a bigger laser than the robot at the left end of the line.

The robot to the right of Robo-Kin has a bigger laser than Robo-Dex.

3. Put the robots in order of laser size. Put the robot with the biggest laser first and the robot with the smallest laser last.

Anna wants to see if the robots can cut out shapes with their lasers. She sets up metal sheets for the robots to cut and puts instructions for them into her computer.

BZZZZZZZZT! The robots start to fire their lasers!

Here are the instructions on Anna’s computer:

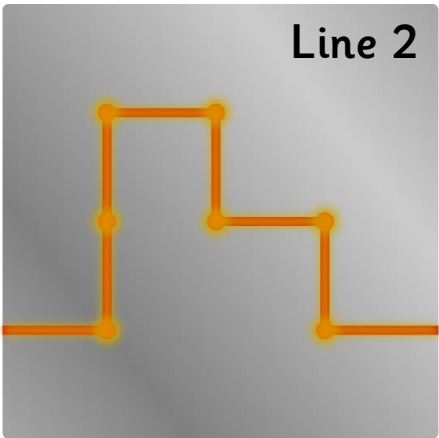
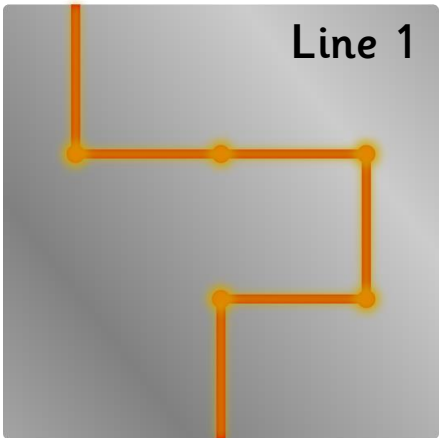
For Line 1:
Start at the bottom.

1. Go up	2. Go right
3. Go up	4. Go right
5. Go right	6. Go up

For Line 2:
Start on the left.

1. Go right	2. Go up
3. Go up	4. Go right
5. Go down	6. Go right
7. Go up	8. Go right

Here are the lines cut by the lasers:



4. Does each line match the directions Anna gave? Explain any mistakes.

“Stop firing!” says Anna. “Stop firing! I need to check what’s gone wrong!”

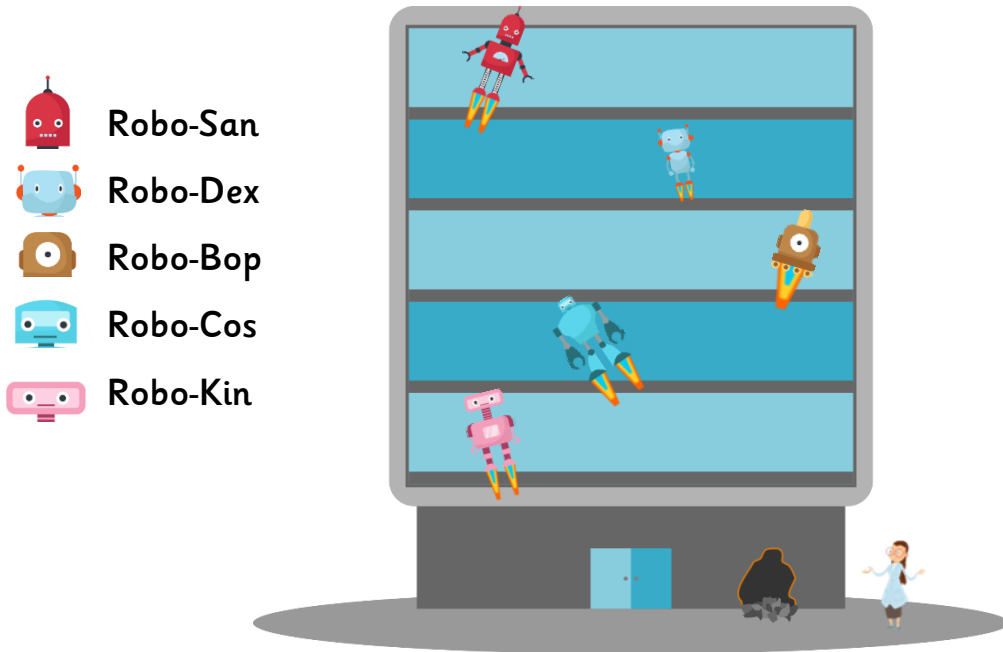
The robots are not listening! Robo-Kin turns to Anna.

“We have to go,” says Robo-Kin. “Nothing has gone wrong. We are just ready to leave.”

Anna is amazed! The robots are alive! They must have moved themselves in the night! They are choosing where to shoot their lasers!

BZZZZZZZZT! Robo-Kin is cutting a hole in the lab wall! The robots are escaping!

Anna runs through the hole and hears the robots’ rocket feet! Oh no! The robots are flying away.



Anna must call somebody for help. She calls her boss on the phone.



“The robots are flying away! Robo-Bop is in the middle. Robo-Cos is above Robo-Bop. Robo-San is at the top. Robo-Dex is at the bottom and Robo-Kin is below Robo-Cos!”

5. Look at the picture of the robots flying away and look at what Anna has told her boss. Explain any mistakes Anna has made.

Six months later, Anna has lots of prizes! The robots escaped because they wanted to help people. They have been saving lives, they have been catching robbers, they have been all over the world! Lots of people have said ‘thank you’ to Anna and given her many awards.

Anna has made a new robot called ‘Robo-Pal’. It wants to help too. Today it is going to help Anna show off all her prizes by putting them on some shelves.

6. Help Robo-Pal to follow Anna’s plan. Write where each prize should go on the grid. Robo-Pal has already done some for you!

Award 5		
		Award 6
	Award 7	



Award 1	Award 2	Award 3	Award 4	Award 5	Award 6	Award 7	Award 8	Award 9
Above Award 6	In the Middle of Award 1 and 5	Below Award 5	Left of Award 7	On the top row	Below Award 1	In the middle of the bottom row	Right of Award 3	On the bottom row

Maybe Robo-Pal will save the world one day. We will have to wait and see!

- 1. Anna has either: turned the arrow dial too far by a quarter turn to the right.
turned the arrow dial three quarter turns to the left too far.
Anna must either: turn the yellow arrow dial a quarter turn to the left.
turn the yellow arrow dial three quarter turns to the right.
- 2. Robo-Dex: a quarter turn to the left OR a three quarter turn to the right.
Robo-San: a quarter turn to the right OR a three quarter turn to the left.
Robo-Cos: a half turn in either direction.
Robo-Bop: a full turn in either direction OR no turns.
Robo-Kin: a half turn in either direction.
- 3. Robo-Kin; Robo-Bop; Robo-Dex; Robo-Cos; Robo-San.
- 4. No. Line 1: instructions 4 and 5 say 'Go right' but the laser cuts go left.
Line 2: Instruction 7 says 'Go down' but the laser cut goes up.
- 5. Robo-San: in the correct place.
Robo-Dex: not at the bottom – Robo-Dex is at second from the top.
Robo-Bop: in the correct place.
Robo-Cos: below Robo-Bop, not above.
Robo-Kin: in the correct place.

6. The shelves should look like this:

Award 5	Award 2	Award 1
Award 3	Award 8	Award 6
Award 4	Award 7	Award 9