

Unit 6

Four daily lessons

Title: shape and space including reasoning about shapes

Year 2

Spring term

Unit Objectives

Year

- Make and describe shapes using pin-boards, elastic boards, squared paper and programmable toy.
- Begin to recognise symmetry.
- Use mathematical vocabulary to describe position and direction.
- Recognise whole, half and quarter turns, left, right, clockwise and anti-clockwise.
- Solve shape puzzles, explaining reasoning orally.
- Recall multiplication facts of 10x table, deduce division facts.

Link Objectives

Year 1

- Use everyday language to describe features of familiar 2-D and 3-D shapes.
- Make and describe models, patterns, and pictures using everyday materials.
- Use everyday language to describe position and direction.
- Talk about things that turn.
- Use one or more shapes to make patterns, describe repeating patterns.
- Predict from simple patterns, and suggest extensions.
- Count on or back in 10s from zero.

Year 3

- Make and describe shapes and patterns.
- Relate solid shapes to pictures of them.
- Read and begin to write the vocabulary of direction.
- Make and use right-angled turns and use the four compass points.
- Solve shape problems or puzzles.
- Recall multiplication facts for 2x, 5x, 10x, table and derive division facts.

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

Interlocking cubes,
ITP 'area'
Carpet tiles or squares of paper
Pirate hat (not essential!)
Activity sheet 6.1
Resource sheet 6.2
Floor robot.
ITP 'number grid' or 100 square,
Small mirrors
Pegboards
Squared paper
Selection of 2-d shapes: circle, square, rectangle, pentagon, hexagon, octagon,
Resource sheet 6.1.
Pinboards and elastic bands
Programmable robot.



Planning sheet		Day one	Unit 6: shape and space including reasoning about shapes	Term: <i>spring</i>	Year Group: 2
Oral and mental			Main teaching		Plenary
Objectives and Vocabulary		Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions
<ul style="list-style-type: none"> Count up and back in tens from any number <p>VOCABULARY: multiples of 10, 10 more/less, 20 more/less, count up and back.</p> <p>RESOURCES: ITP 'number grid' or 100 square.</p>		<ul style="list-style-type: none"> Use ITP number grid or a 100 square. <p>Q Can I have a volunteer to choose a number</p> <ul style="list-style-type: none"> Highlight all the multiples of 10 from that number up to 100, counting at the same time. Count back down to number. Repeat with other numbers. <p>Q If I highlight a number, which number is:</p> <p>10 more 10 less 20 more/less 40 more/less</p>	<ul style="list-style-type: none"> Make and describe shapes using pin-boards, elastic bands, squared paper. Solve shape puzzles, explaining reasoning orally. <p>VOCABULARY: circle, triangle, square, rectangle, star, pentagon, hexagon, octagon, side, corner, straight, curved.</p> <p>RESOURCES: selection of 2-d shapes: circle, square, rectangle, pentagon, hexagon, octagon, resource sheet 6.1. pinboards and elastic bands, interlocking cubes.</p>	<ul style="list-style-type: none"> Hand out a selection of 2-d shapes to volunteers. <p>Q Who can describe their shape using mathematical words like side, corner, straight, curved?</p> <p>Q Who can tell me the names of all these shapes?</p> <ul style="list-style-type: none"> Write the names of the shapes on the board, recapping on difficult spellings. Show ITP polygon, or use a pinboard and elastic bands. <p>Q this shape has 5 sides and 5 corners. What is it called?</p> <p>Q If I stretch it so it looks different but still has 5 sides and 5 corners, is it still a pentagon? If I stretch it again, is it still a pentagon?</p> <ul style="list-style-type: none"> Repeat with other shapes. Model using a pinboard and elastic bands to make shapes if you haven't already. <p>Q who can show us how to make a pentagon using these interlocking cubes?</p> <p>Activity:</p> <div style="border: 1px solid black; padding: 5px;"> <p>Use cards on resource sheet 6.1. Take a card with a shape name on it. Use pinboards and elastic bands/ interlocking cubes to make different forms of that shape.</p> </div> <p>Q Are there any types of shape we can't make? Why not?</p> <p>Activity:</p> <div style="border: 1px solid black; padding: 5px;"> <p>Give each group the name of a shape to make using interlocking cubes. Draw and colour your shape on squared paper. (Could be used to make a class shape book.)</p> </div>	<p>Q How many different ways can I divide (the shapes we have worked on today) in half?</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Homework: Make a list of shapes of things you find at home, especially: circle, triangle, square, rectangle, star, pentagon, hexagon, octagon.</p> </div> <p>By the end of the lesson children should be able to:</p> <p>Make and describe shapes using pin-boards, elastic bands, and squared paper</p>

Planning sheet		Day two	Unit 6: shape and space including reasoning about shapes	Term: <i>spring</i>	Year Group: 2
			Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities		Teaching Activities/ Focus Questions
<ul style="list-style-type: none"> Recall multiplication facts of 10x table. <p>VOCABULARY: tens, times, multiply, add, count.</p> <p>RESOURCES: interlocking cubes, ITP 'number grid' or 100 square,</p>	<p>Q today I need 10 towers of 10 made out of cubes. How quickly can we make them?</p> <p>Q How many cubes are in 1 tower of 10? 2 towers of 10? Etc</p> <ul style="list-style-type: none"> Highlight the numbers on ITP 'number grid' or 100 square as you go. <p>Q Does anyone know how to write down what we have counted?</p> <ul style="list-style-type: none"> Count each tower again, this time writing down the 10 x table as you count. 	<ul style="list-style-type: none"> Begin to recognise symmetry. <p>VOCABULARY: mirror, match, mirror image, symmetry, symmetrical.</p> <p>RESOURCES: interlocking cubes, small mirrors, pegboards, squared paper.</p>	<ul style="list-style-type: none"> Sit children in pairs, face to face. Play the mirror game, one of the pair makes a movement and the other has to match the movement like a mirror. <p>Q When your partner moved their left arm, if you wanted to be their mirror, which arm did you move? Why?</p> <ul style="list-style-type: none"> Hand out an even number of interlocking cubes to each pair. <p>Activity:</p> <div style="border: 1px solid black; padding: 5px;"> <p>One of the pair makes a shape in interlocking cubes. Use a mirror to find a mirror image of the shape and then try and make this mirror image in cubes.</p> </div> <p>Q How can we check that you have made a mirror image of your partner's shape, not just a copy? (Use mirrors/ put them together, along an imaginary line of symmetry).</p> <ul style="list-style-type: none"> You may need to repeat this activity with cubes and extend to other equipment such as pegboards. <p>Activity:</p> <div style="border: 1px solid black; padding: 5px;"> <p>Fold a piece of squared paper in half to make a line of symmetry. Choose one of the shapes you or your partner made and draw it on the squared paper along the line of symmetry. Then draw its symmetrical mirror image.</p> </div>		<p>Q If I fold a piece of squared paper and draw my shape in the middle of one half (not by the line of symmetry), where do I draw the symmetrical image of this shape?</p> <p>Begin a collection of kaleidoscopes, mirrors and shiny surfaces.</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Begin to recognise symmetry.

Planning sheet	Day three	Unit 6 shape and space including reasoning about shapes.	Term: <i>spring</i>	Year Group: 2
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions
<ul style="list-style-type: none"> Recall multiplication facts of 10x table, deduce division facts. <p>VOCABULARY: share, divide.</p> <p>RESOURCES: interlocking cubes,</p>	<ul style="list-style-type: none"> On board recall and write up 10x table, leaving spaces in between to later add division facts. <p>Q If $10 \times 5 = 50$, how many towers of 10 will I have? How many cubes will I have altogether?</p> <ul style="list-style-type: none"> Make up towers to prove it. <p>Repeat with other multiples of 10 to reinforce.</p> <p>Q If I go back to my 50 cubes in 5 towers of 10. If I wanted to share my 50 cubes between 5 friends, how many cubes would each friend get?</p> <ul style="list-style-type: none"> Use cubes to prove it. <ul style="list-style-type: none"> Show how to write it down as a division sum. <p>Q Can we work out the division sum for each of our multiplication facts? Use counting equipment to help you.</p>	<ul style="list-style-type: none"> Use mathematical vocabulary to describe position and direction. Recognise whole, half and quarter turns, left, right. <p>VOCABULARY: over, under, above, below, top, bottom, side, outside, inside, in front, behind, beside, next to, opposite, between, centre, corner, direction, journey, route, left, right, half turn, quarter turn.</p> <p>RESOURCES: ITP 'area', carpet tiles or squares of paper, pirate hat (not essential!), activity sheet 6.1, resource sheet 6.2, floor robot.</p>	<p>Q We're going to start with a physical warm up to get our brains going. Can you stand up and follow the instructions?</p> <p>Q face the front, turn to the left, tap your right knee, stamp your feet left, right etc (could use dance music).</p> <ul style="list-style-type: none"> Place carpet tiles or squares of paper on the floor to make a grid. Draw a similar grid on the whiteboard or use ITP 'area'. Choose a volunteer to be a pirate captain and stand on a square. Place some 'treasure' under one of the carpet tiles. <p>Q I'm going to mark the square that our pirate is standing on in red on my grid (or ITP). The pirate has to find the treasure marked as a green square on my grid. Can you describe the route the pirate has to take (no diagonals).</p> <ul style="list-style-type: none"> Pirate follows the instructions using correct vocabulary. Repeat with a different pirate on a different square. <p>Activity:</p> <div style="border: 1px solid black; padding: 5px;"> <p>In pairs use activity sheet 6.1. Cut out picture (or use a counter) and place pirate on a square and treasure on another. Draw some obstacles or other features of a treasure map that might help you describe the route to your partner (eg palm trees, a crocodile lake, a bridge etc). Describe to your partner how you are going to get the pirate to the treasure. Colour in the path your pirate will take. Use resource sheet 6.2 to write down your route.</p> </div> <p>Activity:</p> <div style="border: 1px solid black; padding: 5px;"> <p>Place treasure symbol on floor. Instruct floor robot 'pirate' to find the treasure.</p> </div>	<p>Q I'm going to describe a route from here to a place in school that you all know well. If you listen carefully to my instructions, can you tell me where I'm thinking of going?</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Use mathematical vocabulary to describe position and direction. Recognise whole, half and quarter turns, left, right.

Planning sheet	Day four	Unit 6: shape and space including reasoning about shapes.	Term: <i>spring</i>	Year Group: 2
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions
<ul style="list-style-type: none"> Recall multiplication facts of 10x table, deduce division facts. <p>VOCABULARY: multiplication, repeated addition, share, divide, repeated subtraction, take away.</p> <p>RESOURCES: counting equipment such as interlocking cubes.</p>	<ul style="list-style-type: none"> Put out 20 cubes. <p>Q How many lots of 10 have I got here? How can I write it as a multiplication sum?</p> <p>Q If I wanted to divide these cubes between 10 people, how many cubes would each person get? How did you work it out?</p> <p>Q If I had 9 times 10 cubes, how many would I have?</p> <p>Q We worked it out by counting in 10s, by adding 10 more each time. If we wanted to share or divide them among 10 people, how many would each person have?</p> <ul style="list-style-type: none"> Share out the cubes, emphasising repeated subtraction, taking away 10 each time. Repeat with other multiples of 10. 	<ul style="list-style-type: none"> Use mathematical vocabulary to describe position and direction. Recognise whole, half and quarter turns, left, right, clockwise and anti-clockwise. <p>VOCABULARY: side, in front, behind, beside, next to, opposite, between, centre, corner, direction, journey, route, left, right, half turn, quarter turn, clockwise, anticlockwise.</p> <p>RESOURCES: programmable robot.</p>	<ul style="list-style-type: none"> As yesterday, we're going to start with a physical warm up to get our brains going. Can you stand up and follow the instructions? <p>Q face the front, turn to the left, tap your right knee, stamp your feet left, right etc, using today's vocabulary list. (could use dance music).</p> <p>Q when we did our warm up today, what sorts of instructions for movement did I give you?</p> <ul style="list-style-type: none"> Write the instructions up on the board (you are aiming for a list including words in vocabulary list) <p>Q today we are going to program the robot again. Can anyone think of some robot dance steps we could teach him?</p> <ul style="list-style-type: none"> Write it up on whiteboard. Discuss any suggestions that won't work with a programmable robot (eg, jumping!) <p>Q Let's look at the first thing we want the robot to do. How are we going to program him to do it?</p> <ul style="list-style-type: none"> Continue to program the robot, then let the robot dance! <p>Activity:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Using the instructions words on the board, write down instructions for a dance you would like the robot to do.</p> </div>	<p>Play 'Simon Says' to reinforce positional vocabulary the children are still finding difficult.</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Use mathematical vocabulary to describe position and direction. Recognise whole, half and quarter turns, left, right, clockwise and anti-clockwise.

square

rectangle

triangle

pentagon

hexagon

octagon

Useful words

Left

right

turn

forwards

backwards

over

under

beside

between

next to

opposite

centre

sideways

towards

away from

half turn

quarter turn

straight line

Pirate game

sheet 6.1

Activity

