OUT AND ABOUT OUTDOOR ACTIVITIES FOR KEY STAGE 2 MATHEMATICS

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Garden Designs

Learning focus

- Create a plan which uses a simple scale
- Calculate the perimeter of squares and rectangles
- Calculate the area of squares and rectangles
- Use the 4 operations to solve problems
- Enter information in a spreadsheet
- Adjust the spreadsheet to solve problems

Key vocabulary

- Plan
- Scale drawing
- Scale
- True length
- Edge
- Area
- Perimeter
- Spreadsheet

Resources

- Chalk (or string or sticks)
- Metre sticks
- 30 cm rulers
- Pencils, paper and clipboards



Activity

Introduce the activity by explaining that the school governors/management have decided that they would like to create a garden within the school grounds and they would like the children to be involved in the design. Explain that it is their job to produce a plan of the garden. Discuss with the children how they will go about this task.

> What steps will you go through to produce your plan? What information will you need? What decisions will you need to make?

Ask the children to identify a suitable location for the garden and what they think the garden should include. Encourage them to give reasons for their responses. Pose questions such as:

> Where do you think the garden should be located? Why? Will it get enough sunlight? How can you tell? What do you think the garden should include? Where will you store the garden tools and equipment?

Explain that the governors have agreed that the garden will be 10 m by 8 m and they would like the garden to include the following items: a vegetable patch, 2 flower beds, a paved area for seating and a garden shed. You could have a pre-prepared information sheet with a list of items and the corresponding measurements:

1 large vegetable patch: 3 m by 1.5 m 2 flower beds: 2 m by 1 m Paved seating area: 2.5 m by 2.5 m Garden shed: 1.5 m by 1 m Grass: remaining area

(Whole number measurements could be used instead of decimal numbers.)

Alternatively, children could be encouraged to make their own decisions about what to include and they could source the corresponding measurements for each item.

Assign children to groups and allocate each group a space outdoors to draft their ideas. For example, they could sketch out their ideas using sticks or string on a grass area or using chalk on the playground. Each group will also need a measuring stick.

Once the children have marked out their garden designs, ask them to draw a plan of their garden on squared paper. They will need 30 cm rulers. Choose a sensible scale such as 1:100.

Teaching point

A scale of 1:100 means that 1 cm on the scale drawing represents 100 cm on the actual garden. Establish that this means that the true length of the garden is 100 times the length on the scale drawing.

Each group should then present their garden plans to the whole class, justifying their decisions.

Next, explain that the governors wish to erect a fence around the garden. Ask the children how they will work out the length of fencing required.

What name do we give to the length of the boundary around the garden? How will you find the perimeter of the garden? Can you think of another way? What units will you use to record your findings?

Teaching point

Perimeter is the length of the boundary around the edge of a two-dimensional shape. Since perimeter is a length, it is measured in units of length. The perimeter of a rectangle is found by adding the lengths of all four sides. Since opposite sides of a rectangle are equal in length, the perimeter of a rectangle can also be found by adding adjacent sides and multiplying by two.

Children could be encouraged to formulate the rule that the perimeter of a rectangle with adjacent sides of length a units and b units can be expressed as follows:

P = a + b + a + bP = 2a + 2bP = 2 (a + b)

The governors would also like to purchase paving stones for the seating area as well as an area on which to place the garden shed. Ask the children how they will work out the amount of paving required for each item.

How will you find the area? What units will you use to record your findings?

Teaching point

Area is a measure of the amount of two-dimensional space covered by a two-dimensional shape. In other words, it is a measure of the amount of two-dimensional space inside a boundary. The units for measuring area are always square units. Small areas are measured in square centimetres. A square centimetre is the amount of space occupied by a square of side 1 cm. Larger areas are measured in square metres. A square metre is the amount of space occupied by a square of space occupied by a square of side 1 m.

The area of a rectangle is found by multiplying the lengths of two adjacent sides. Children could be encouraged to formulate the rule that the area of a rectangle with adjacent sides of length a units and b units can be expressed as follows:

$$A = a \times b$$

The area of a square is found by multiplying the length of one side by itself. Children could be encouraged to formulate the rule that the area of a square with a side length of a units can be expressed as follows:

$$A = a \times a$$

 $A = a^2$

Taking ideas further

Explain that the governors are allocating a budget of 800 euros or pounds (as appropriate) for garden features and equipment. The children must compile a list of items to purchase. Invite the children to make suggestions.

What might you need for your vegetable patch? What might you plant in your flower beds? What garden tools might you need? What garden furniture might you add? Can you think of anything else you might need?

The children should then work in their groups to decide how the money should be spent. This task will require children to do some research. They could use the internet to investigate various options and the associated costs. They could record their findings in a simple spreadsheet.

	A	В	С	D	E
1	Item	Price	Quantity	Cost	
2	Spade	£25.00	1	£25.00	
3	Shovel	£15.00	1	£15.00	
4	Hoe	£22.00	1	£22.00	
5	Rake	£20.00	1	£20.00	
6	Hand trowel	£5.00	1	£5.00	
7	Watering can	£8.25	1	£8.25	
8	Gardening gloves	£3.50	1	£3.50	
9	Carrot seeds	£1.85	5	£9.25	
10	Lettuce seeds	£2.40	3	£7.20	
11	Tomato seeds	£2.15	3	£6.45	
12					
13					

Each group should then present their ideas to the whole class. They should be able to explain and justify their decisions.

To challenge children further, pose problems which will require them to adjust their spreadsheet. For example, explain that the Parent Teacher Association (PTA) have decided to donate an additional 200 euros or pounds towards the garden project. The children could then adjust their spreadsheet to indicate how they will spend the extra money. Alternatively, explain that prices of each item have increased by 20%. They could adjust their spreadsheet to calculate the new total cost.

Assessment opportunities

Are the children able to:

- Create a plan of their garden using a simple scale
- Make sense of scale in the context of their plan
- Calculate the area and perimeter of squares and rectangles
- Record measurements using appropriate units
- Record information in a table
- Use the 4 operations to solve problems
- Explain and justify their decisions
- Enter information in a simple spreadsheet and use it to solve problems