Plan and cost a garden bed

Subject(s): **Mathematics**

Grade(s): **8**

Key Stage(s): **3**

Learning intention(s)

Students will apply their knowledge of area, perimeter, volume, and cost calculations to design a productive garden bed. They will use mathematical reasoning to optimise space and budget while considering practical gardening constraints.

Mapping to curriculum

Scope and Sequence Statement	How it is Addressed in the Activity
Measurement	
• Area and perimeter of 2D shapes	• Students calculate the area and perimeter of their chosen garden bed shape (e.g., rectangle, triangle, circle) under $6m^2$.
• Volume and capacity	• Students determine the volume of soil required based on area and depth, and convert this to bags for budgeting.
Number and financial mathematics	
• Money and financial decisions	• Students calculate the total cost of soil and optional fencing, developing budgeting and financial planning skills.
• Problem-solving and reasoning	• Students apply mathematical reasoning to optimise garden layout within space and cost constraints, solving a real-world problem.
Data and statistics	
• Representing and interpreting data	• Students estimate and compare how many plants fit within the area based on spacing data, applying proportional reasoning.
Mathematics in context	
• Sustainability and design	• Students integrate maths with sustainable gardening practices, linking mathematical concepts to real-life applications.

Lesson Instructions

You have been given a space in the school garden to design a vegetable garden bed. Your goal is to create a functional and cost-effective design while considering space, soil requirements, and budget constraints.

1. **Choosing your garden bed shape:** Select a shape for your garden bed

   o   Rectangle

   o   Square

   o   Triangle

   o   Circle

   Calculate the area and perimeter of your chosen shape. Ensure the total area does not exceed 6m^2.

2. **Determining soil volume:** Your garden bed will need **30cm (0.3m) of soil depth**.

   o   Calculate the volume of soil required.

   o   If soil is sold in **bags of 0.5m^3 for $25 each,** determine how many bags are needed and the total cost.

3. **Selecting plants:** Choose 3 different types of vegetables to grow.

   o   Research the recommended spacing for each plant (e.g. 30cm apart).

   o   Calculate how many plants of each type can fit in your garden bed.

4. **Fencing (Optional extension task):** If you want to fence your garden bed,

   o   Calculate the total length of fencing needed based on the perimeter.

   o   If fencing costs **$12 per metre**, determine the total fencing cost.

Final reflection: Write a short paragraph explaining your design choices. Consider:

   o   Why you chose a particular shape

   o   How do you optimize space and cost

   o   Any challenges or improvements for your design

Assessment Criteria

   o   Accurate calculations of area, perimeter, and volume

   o   Correct budgeting and cost analysis

   o   Logical and realistic plant spacing

   o   Clear and well-reasoned reflection