

## Teacher Notes

### Introduction

Pupils can work on this problem individually or with others.

- They can discuss how they will find the area of each leaf to see which is the biggest and will therefore absorb more sunlight.
- They can consider the materials provided and decide on which to use.
- They can compare their approach with others and adapt their own strategy if needed.

This problem deals with a pupil's ability to read through information, use cm square paper to estimate areas, and combine whole and fractional areas to make approximations and draw conclusions about surface area. Please provide pupils with a box of resources from which they can choose the appropriate materials if they need them. The resources should include tracing paper, cm square paper, blank paper and pencils.

**Please note: When printing Leaf A and B from the problem, please select 'Actual size' from the size options in the print dialogue box. (If you select 'Fit', the leaves will not print in the expected size.)**

### What I know (think)

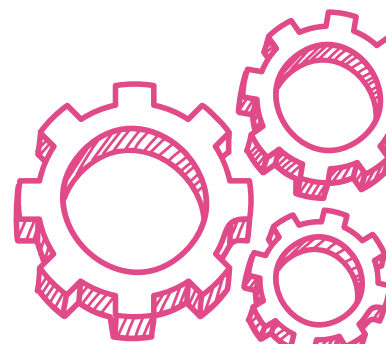
The pupils should know from the given problem:

- Leaves with larger surface areas absorb more sunlight.
- This is to help them to make food to help them grow.
- There are two leaves (Leaf A and Leaf B).
- There are available resources:
  - The teacher should state that each square on the square paper has an area of  $1 \text{ cm}^2$ .
- They need to decide which of the two leaves will absorb the most sunlight.

### What I need to know (identify)

Pupils need to identify:

- which of the resources are needed to find the area of a leaf;
- how to use the resources to estimate the area of each leaf;
- an estimation for the surface area for each leaf; and
- which of the two leaves has the greater area.



# Catching Sunlight (Continued)

## What I need to do (employ)

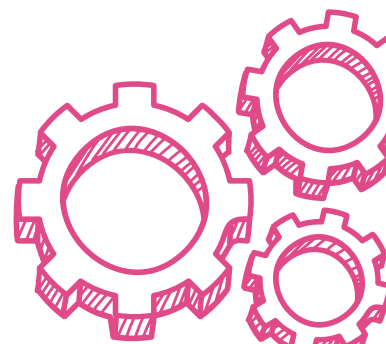
Pupils should use the information they have been given and come up with appropriate steps to help them solve the problem, for example:

- They choose the cm square paper from the selection of resources.
- Pupils also choose how they will trace the leaves onto the cm square paper:
  - they can do this by placing the cm square paper on top of the leaf and tracing around the outline of the image below; or
  - they can use tracing paper to draw around the outline of the leaf and superimpose onto the cm square paper.
- Pupils choose their given strategy for estimating the area for one leaf and then repeat for the other leaf.
- They identify and count all the full squares for each leaf.
- They consider the remainder and decide on an appropriate strategy, for example:
  - They take half a square or more to be an additional  $\text{cm}^2$  and ignore less than half a square.
  - They choose to estimate whole squares by adding two halves, or two-thirds and one third, and so forth where appropriate.
  - They consider whether either leaf has a line of symmetry and if so may estimate the area of half the leaf using either of the above, then doubling their answer.
- They compare their areas and comment on which is the greater of the two, and therefore will absorb more sunlight.

## What I did (review)

Pupils will use self-assessment, peer assessment or teacher feedback to decide whether they have approached the problem as intended.

- Did they use the available resources appropriately and effectively?
- How did they draw an outline of each leaf?
- Did they choose an appropriate method to find the area?
- Did they deal appropriately with squares that were not whole squares?
- Did they count the squares accurately?
- Did they use their findings to make a correct conclusion on which leaf had the greater area and therefore absorbed more sunlight?



# Catching Sunlight (Continued)

## Curriculum Objectives

This problem should enable pupils to demonstrate their knowledge, understanding and skills through:

Developing pupils as individuals

Demonstrate an ability and willingness to develop logical arguments:

- Pupils will show how they have used available resources to estimate the area of two leaves and decide which will absorb more sunlight.

## Thinking Skills and Personal Capabilities

This problem can provide an opportunity for pupils to demonstrate a variety of the following Thinking Skills and Personal Capabilities:

Managing Information

- Plan and set goals and break a task into sub-tasks

Thinking, Problem-Solving and Decision Making

- Make connections between learning in different contexts
- Generate possible solutions, try out alternative approaches and evaluate outcomes

Being Creative

- Experiment with ideas and questions
- Learn from and value other people's ideas

Working with Others

- Listen actively and share opinions
- Suggest ways of improving their approach to working collaboratively

Self-Management

- Seek advice when necessary
- Organise and plan how to go about a task

## Cross-Curricular Skills

This problem should enable pupils to demonstrate a variety of the following Cross-Curriculum Skills:



Using Mathematics

