

Surface Area of a Leaf Teacher Sheet



INTRODUCTION

Now students should work in their groups to find the surface area of the leaves you have provided them. They should find the surface area of the leaves by using square centimeters and recording their solutions and methods on this sheet.

For each leaf, students should measure and record the plant species, leaf surface area their group calculated, and the method used to determine the surface area of each leaf.

Leaf

Plant species: _____

Area: _____

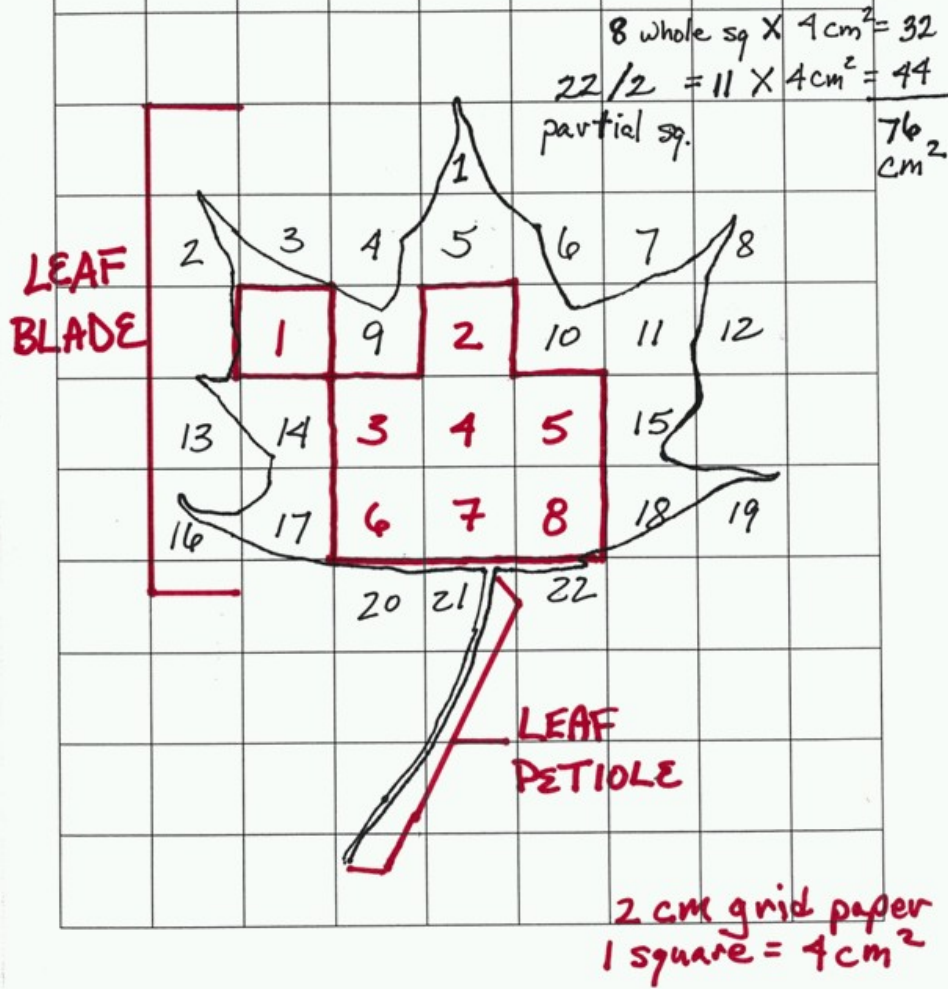
Description of how the area was determined.

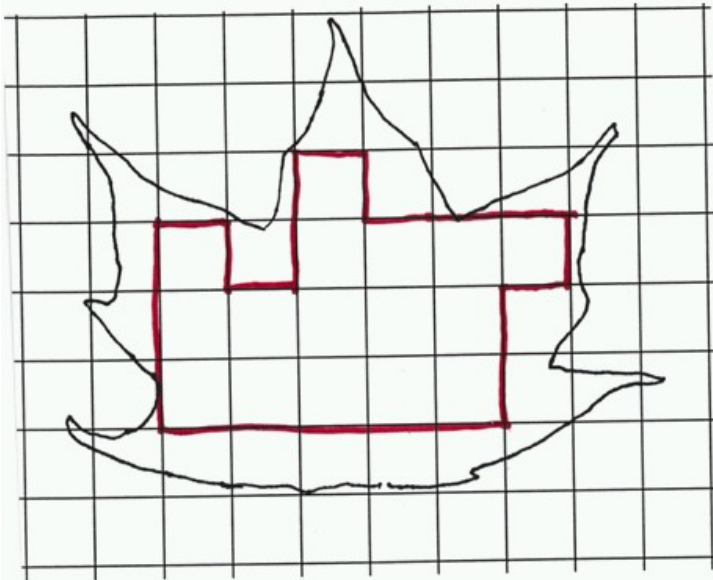
This will vary drastically depending on what types of leaves are used. Bring in a nice variety of leaves for different species which have variable leaf shapes, sizes, and thicknesses. Discuss with students ahead of time if you want them to measure one or both leaf surfaces (upper and lower). Show them stomates if possible.

*Below are three examples of one Norway Maple (*Acer platanoides*) leaf, which has been used to demonstrate the use of grid paper in measuring surface. Each of the examples were hand-drawn onto the grid paper using the same dried, pressed leaf as students would do in class. The first example using 2 cm grid paper shows both basic leaf parts (blade and petiole). The leaf blade is the primary photosynthetic surface and the petiole is the leaf stalk connection to the stem.*

In calculating surface area, we traced the maple leaf onto 2 cm, 1.5 cm, 1 cm, and 0.5 cm grid paper. Since the petiole does not contribute much to photosynthesis, it was only drawn once to show the basic plant parts. The petiole was removed from the other drawings. For each calculated surface area, whole squares located within the leaf area drawing were identified first (outlined in red and numbered on the first diagram) and multiplied by the appropriate area of each grid size (e.g., the area for each square using 2 cm grid paper = 4 cm²). Squares which included part of the leaf surface (numbered in black print on the first diagram) were added up then divided by 2 since only part of the surface was included within the square. Note: As the grid size gets smaller, a better estimate of the true leaf surface area is determined. Grid size can be decreased until it becomes too difficult to see the squares. Using different grid sizes is a great lead-in to a discussion of accuracy and precision in surface area measurement.

NORWAY MAPLE LEAF STRUCTURE





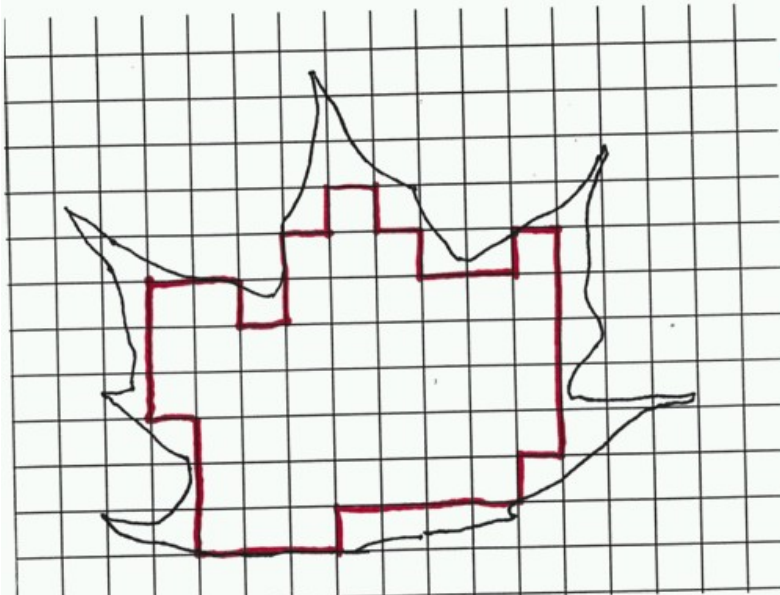
1.5 cm grid
 $1 \text{ sq} = 2.25 \text{ cm}^2$

$$14 \text{ sq} \times 2.25 = 36$$

$$3 \frac{1}{2} = 15.5$$

$$15.5 \times 2.25 = 34.9$$

$$\begin{array}{r} 36.0 \\ + 34.9 \\ \hline 70.9 \text{ cm}^2 \end{array}$$

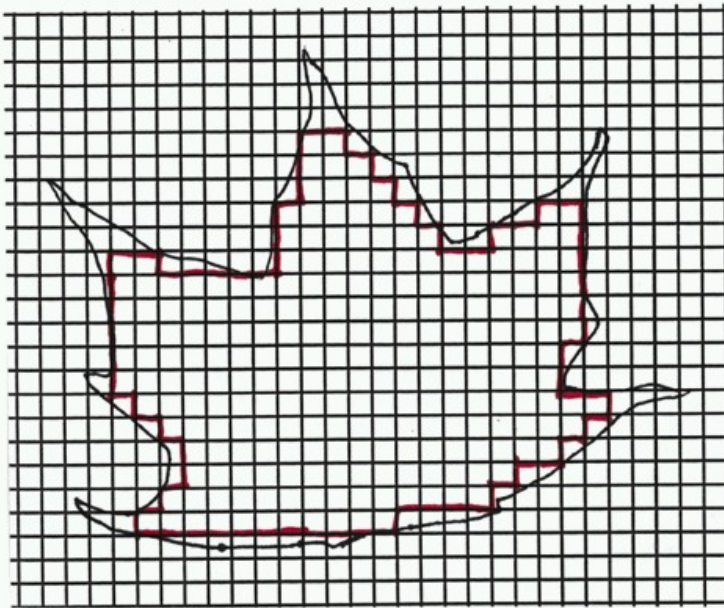


1 cm grid

$$49 \text{ sq} = 49$$

$$4 \frac{1}{2} = 20.5$$

$$\begin{array}{r} \text{partial} \\ \text{sq} \end{array} \quad \begin{array}{r} 69.5 \\ \hline \text{cm}^2 \end{array}$$



0.5 cm grid
1 sq = 0.25 cm²

$$234 \text{ sq} \times 0.25 \text{ cm}^2 = 58.5 \text{ cm}^2$$

$$36 \text{ sq} \times 0.25 \text{ cm}^2 = 9.0 \text{ cm}^2$$

$$67.5 \text{ cm}^2$$

This teacher sheet is a part of the **Finding the Surface Area of a Leaf** lesson.

© Copyright AAAS 2020. All rights reserved. [Terms of Use \(http://www.aaas.org/terms_of_use.shtml\)](http://www.aaas.org/terms_of_use.shtml) & [Privacy Policy \(http://www.aaas.org/privacy.shtml\)](http://www.aaas.org/privacy.shtml).