Teacher notes

Growing food : Helicopter seeds

Description

Many species of plants take to the air to disperse their seed and germinate away from their parent plant. Understanding how seeds disperse helps agriculturalists propagate self-dispersal crops and manage weed populations.

Resources

Rulers / tape measures, metre rules, scissors, selection of paperclips and blu-tac to use as weights, large pieces of paper (A1 or A0 sheets taped together to create a large recording area for each group), set of digital scales, card for the template.

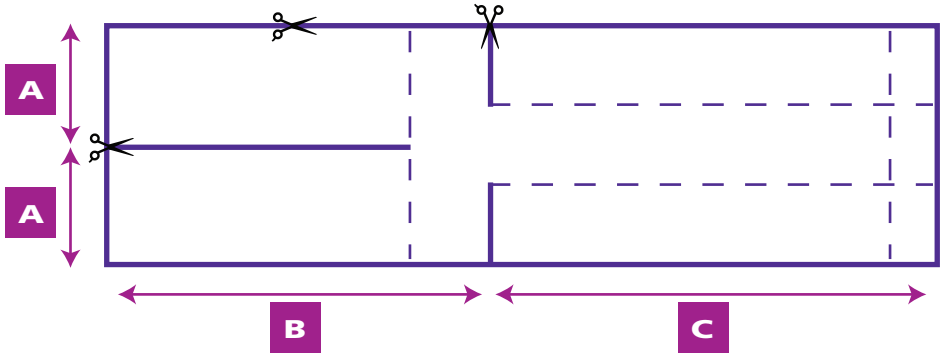
Activity 1: Flight testing

Flight testing models and investigates the 'helicopter' method of seed movement. Begin with a whole class discussion about how seeds like those of the sycamore are dispersed. In practice, wind plays a big part in spreading the seed. In these activities the wind factor is fixed and its effect is not investigated so you will need to ensure the experiments are not conducted near draughts or open windows.

Demonstrate the movement of the seeds modelled from card using the Template cards by dropping the seed from a height of one metre onto a large sheet of paper. Draw attention to the importance of a specified release point directly over a central marker. Discuss how the land point may be marked and how its distance from the central marker can be measured.

Pupils work in small groups of four or five with each pupil testing their helicopter seed model by dropping it ten times from the standard height of one metre. The groups work together to draw lines from the central marker to the land point and measure and record each distance on their Data recording sheet. Each group then calculates the mean, median, minimum value, maximum value and range from their combined data. This is the control data for the next part of the activity.

Draw the whole class together to discuss how the basic helicopter seed could be modified so that the seeds spread further. Engage your pupils in a discussion of possible parameters that could be modified: wing width (A), wing length (B), tail length (C) or mass. (Use blu-tac and paperclips to modify the mass of the helicopter.)



Growing food : Helicopter seeds

Each group investigates a parameter, repeats the experiment and compares the results with the control data, reporting the optimum value for their parameter to the class. It may be, of course, that changing the parameter has no effect.

Finally, each group designs what they consider to be the optimal helicopter based on the data available. Then the groups compete to investigate who has the best design – this will involve discussion on the criteria to be used for "best". For example, is the maximum value or the highest average value or a feature of the range the most important aspect? Each model will be tested ten times. This can be made more engaging by dropping the helicopters from a greater height than in the experiments to date – from, say, two or three metres.

An extension activity is to collect further data to explore the relationship between the height of the drop and the average distance travelled. Scatterplots can be used to explore this relationship with predictions made from these leading to questions like *"How tall does the tree need to be for the seed to travel a specified distance?*"

The mathematics

Flight testing involves the pupils in data collection and recording, measurement and the calculation of averages. It also gives good first-hand experience of the mathematical idea of range.