

Topic	Inherited and environmental variation	Level	Key Stage 3 (or any course for students aged 11-14)
Outcomes	<ol style="list-style-type: none"> 1. To understand the term variation, both within and between species 2. To know that some differences between organisms are inherited, some differences are caused by the environment and some differences are caused by both 3. To label the main parts of a leaf 		

Instructions for the teacher:

This activity is a great opportunity to get students outside and collecting leaves. Students can be given leaves if you prefer, but this is definitely less fun!

Students collect leaves from a single plant and then consider differences and similarities in their structure. We then get students to compare leaf structure between two different species and finally introduce the concepts of environmental and inherited variation.

Progress: further biology teaching resources are available here:

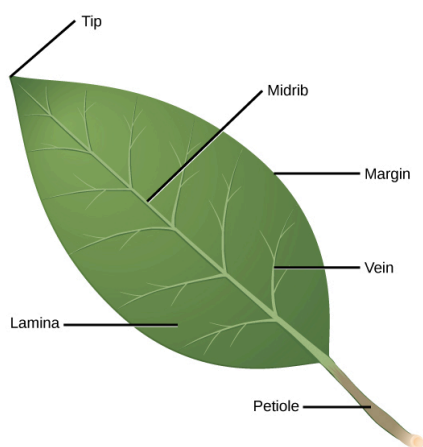
<http://thescienceteacher.co.uk/biology-teaching-resources/>

Why are living organisms not identical?

A leaf is a plant organ. The function of the leaf is to capture sunlight and use this energy to produce food from carbon dioxide and water through the process of photosynthesis.

Today we are going to collect some leaves from **one plant** and look at their similarities and differences.

1. Look closely at the leaves that you have collected and write down the main similarities and differences in the table below. Use the leaf structure diagram to help your descriptions.



Source: <http://www.freelearningchannel.com>.e.g. leaf length, colour

Similarities <i>e.g. colour, size, margin shape</i>	Differences <i>e.g. colour, size, margin shape</i>

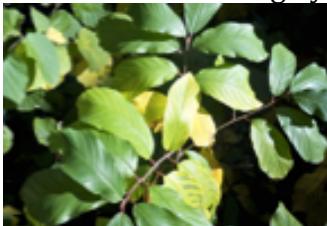


2. What do you think causes the **similarities** between the leaves i.e. why do they all look similar?

3. What do you think causes the **differences** between the leaves i.e. why don't they all look identical?

4. Now, take **one leaf** that you collected and compare it to the leaf below that was taken from an oak tree (*Quercus robur*). Why do the two leaves look so different?



5. Differences between organisms is called **variation**. Variation can either be caused by the environment or can be inherited from parents. Sometimes variation is caused by a mixture of both. Complete the table below about some different plants.

Description of feature	Is the feature caused by the environment, inherited or both? Give a reason.
<p>If plants don't get enough magnesium ions from the soil their leaves go yellow.</p> 	
<p>Instead of leaves, cacti have spines (which are modified leaves) on flattened stems. These spines do not lose water through evaporation unlike normal leaves.</p> 	
<p>If a basil plant does not get enough water the leaves begin to wilt.</p> 	
<p>In autumn, when temperatures drop, the oak tree loses its leaves.</p> 