

Classification: Science by Keith Kelly

AGE: Teenagers
LEVEL: Intermediate
TIME NEEDED: Approx. 90 minutes
OBJECTIVES: to learn about ways of classifying plants and trees according to their leaves; watch a presentation and do a note-taking activity; complete an image–text matching activity; take part in a class information-sharing activity; research a leaf profile according to given criteria; complete exercises on words linked to classification.
KEY SKILLS: listening and note taking; reading; speaking; writing
MATERIALS: one copy of the worksheet per student; one copy of the cut-out *Match the leaves* picture and text cards per group of three or four; one copy of the *Question loop: Classifying leaves* per class; one copy of *Preparing a leaf profile* per student; the presentation *Classifying plants by their leaves* (in PowerPoint format)

Content focus Classifying leaves

Warm-up: 10 minutes
Activity 1: 10 minutes
Activity 2: 10 minutes
Activity 3: 10 minutes
Activity 4: 20 minutes

WARM-UP

Take a bag or bucket of different types of fallen or pruned leaves into class. Divide the students into groups of three or four and give each group a handful of leaves. Get students to put the leaves into groups. Then as a class, ask students to describe how they grouped the leaves. If leaves aren't available, prepare a handout with images of different leaves.

ACTIVITY 1

Write up on the board or screen four different ways of classifying leaves:

- number of sections
- shape
- vein pattern
- edge.

Using one of the leaves you brought in or a picture, show students how to apply the classification categories. Tell the class you are going to talk about different leaves and the students should make notes. Tell students that

they should refer to the four ways of classifying leaves to help them follow the presentation and make their notes. Explain that they shouldn't note down any names at this point, as they just need to retain an idea of the different ways of classifying leaves.

Use the presentation *Classifying plants by their leaves* (in PowerPoint format) to describe the different ways of classifying leaves. Explain the different images of leaves as they appear. Check that students understand *apex*, *base*, *notch*, *vein*.

When you have finished the presentation, ask students simple questions about the different criteria for classifying leaves, for example, *How many different shapes did you see?*

ACTIVITY 2

Divide the students into groups of three or four and get them to play the *Match the leaves* game. Hand out one set of cut-out picture cards and one set of cut-out text cards to each group (make sure you shuffle the cards first). Students should arrange the cards face up and, as a team, match the picture cards to the correct text cards. The first team to finish, calls *stop*. Each team should then read out their matches and get one point for every correct answer; they are penalised one point for every incorrect answer. If they get the answer wrong, any other team can try to win the point. The first team to put their hand up, can guess a correct match for that picture. If they answer correctly, they get a point. If they answer incorrectly, they lose a point. The team with the most points wins.

Some of the cards could be paired with texts intended for other pictures. Go through any pictures students are unsure about.

Key

simple: leaves that have a single leaflet growing from the stalk

compound: leaves that have three or more leaflets connected to a shared stalk

linear: leaves that are much longer leaves than they are wide and are rounded at the apex rather than pointed
lanceolate: leaves that have the shape of a spearhead; wide at the base and sharp at the apex
elliptical: leaves that are in the shape of an ellipsis, starting narrow and ending narrow, and are longer than they are wide

cordate: leaves that are wide at the base with a cut-out notch at the stem in the shape of a heart

reniform: leaves that are in the shape of a kidney with a wider notch and a more rounded apex than cordate leaves

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sagittate: leaves that are in the shape of an arrowhead with a sharp apex and sharp notch at the stem

parallel veined: leaves that have veins which grow at the same distance from each other

pinnate: leaves where all the veins run off from along a main vein known as the midrib

palmate: leaves where the veins grow out from a single point at the base of the leaf near the stem

entire: leaves which have a smooth edge or 'margin'

dentate: leaves which have little teeth on the outer edge

serrate: leaves which have teeth like dentate leaves, but they are bent slightly back like those of a saw

wavy: leaves which have small waves or curves along the edge or margin

lobed: leaves which have rounded indentations which cut into the leaf towards the centre

ACTIVITY 3

Hand out one cut-out question and answer from the *Question loop: Classifying leaves* sheet to each student in the class. If there are fewer strips than students, hand out one between two. Get one student to read their question, and ask who has the answer. Students look at the answers on their sheets but if nobody volunteers the answer, help and prompt. Continue until all of the questions have been read.

Key

See the *Question loop: Classifying leaves* handout.

ACTIVITY 4

Get students to go out and collect a leaf or use one of the leaves you brought in for the Warm-up. Ask students to write up a profile using the *Preparing a leaf profile* handout and submit it as a piece of written homework.

Language focus Classification

Activity 1: 10 minutes

Activity 2: 15 minutes

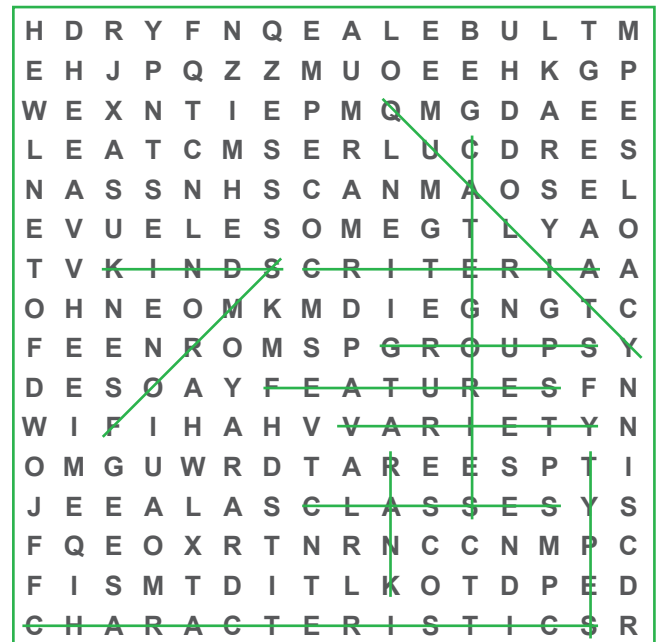
Activity 3: 7 minutes

ACTIVITY 1

Ask students to complete the wordsearch to find nouns related to classification.

Key

quality; kinds; criteria; groups; features; variety; classes; characteristics; forms; rank; categories; types



ACTIVITY 2

Ask the students to choose the correct linking phrase to complete the sentences. Alternative answers are given in brackets.

Key

1. according to (in terms of); 2. according to (in terms of); 3. according to (in terms of); 4. in terms of (according to); 5. in terms of; 6. in terms of; 7. in terms of (according to)

ACTIVITY 3

Ask the students to complete the crossword. All the answers are classification verbs.

Key

- Across: 1. separated; 3. sorted; 4. classified; 6. belong; 7. divided
Down: 2. associated; 5. grouped

Classification: Science
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Classifying leaves**ACTIVITY 1**

There are many ways of classifying plants. One way is to classify them according to the leaves. Listen and watch the presentation on leaves by your teacher and make notes on the different ways of classifying leaves:

- number of sections
- shape
- vein pattern
- edge

ACTIVITY 2

In groups, play the *Match the leaves* game. Place the cards in rows and columns and match the picture cards to the correct text cards. When you finish, call *Stop!* Read out your matching cards to the class. For every correct answer, you win one point. If you have an incorrect answer, another team can try to win the point. But be careful! If you try to win a point and make a mistake, you will lose a point. The winner is the team with the most points.

ACTIVITY 3

Your teacher will give you a question and an answer. The answer does not match the question. As your classmates read out their questions, listen and when you think the question for your answer is read out, read out your answer. Then it's your turn to read your question.

ACTIVITY 4

Take a leaf and follow the instructions to prepare a leaf profile. Use the language given to help you. Hand in your work to your teacher.

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Language focus
Classification

ACTIVITY 1

Complete the wordsearch to find nouns related to classification.

H	D	R	Y	F	N	Q	E	A	L	E	B	U	L	T	M
E	H	J	P	Q	Z	Z	M	U	O	E	E	H	K	G	P
W	E	X	N	T	I	E	P	M	Q	M	G	D	A	E	E
L	E	A	T	C	M	S	E	R	L	U	C	D	R	E	S
N	A	S	S	N	H	S	C	A	N	M	A	O	S	E	L
E	V	U	E	L	E	S	O	M	E	G	T	L	Y	A	O
T	V	K	I	N	D	S	C	R	I	T	E	R	I	A	A
O	H	N	E	O	M	K	M	D	I	E	G	N	G	T	C
F	E	E	N	R	O	M	S	P	G	R	O	U	P	S	Y
D	E	S	O	A	Y	F	E	A	T	U	R	E	S	F	N
W	I	F	I	H	A	H	V	V	A	R	I	E	T	Y	N
O	M	G	U	W	R	D	T	A	R	E	E	S	P	T	I
J	E	E	A	L	A	S	C	L	A	S	S	E	S	Y	S
F	Q	E	O	X	R	T	N	R	N	C	C	N	M	P	C
F	I	S	M	T	D	I	T	L	K	O	T	D	P	E	D
C	H	A	R	A	C	T	E	R	I	S	T	I	C	S	R

- quality
- kinds
- criteria
- groups
- features
- variety
- classes
- characteristics
- forms
- rank
- categories
- types

ACTIVITY 2

Choose one of the linking phrases to complete the classifying sentences.

according to

in terms of

as regards

1	During a sedimentation, test the particles of soil settle out	particle size, where the larger and heavier particles settle out first.
2	Consumers (animals) are grouped	their position in a food chain.
3	As the solvent moves up the chromatography paper, the different pigments will separate	their solubility and density in the solvent.
4	Although the image is laterally inverted, we automatically interpret the image	which side of the vehicle something is happening.
5	Remember that useful energy is the same as useful work done, so we can express efficiency	work done.
6	The nervous system can be seen	receptors and effectors.
7	Animals can be classified	what they eat: plants, other animals or both.

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ACTIVITY 3

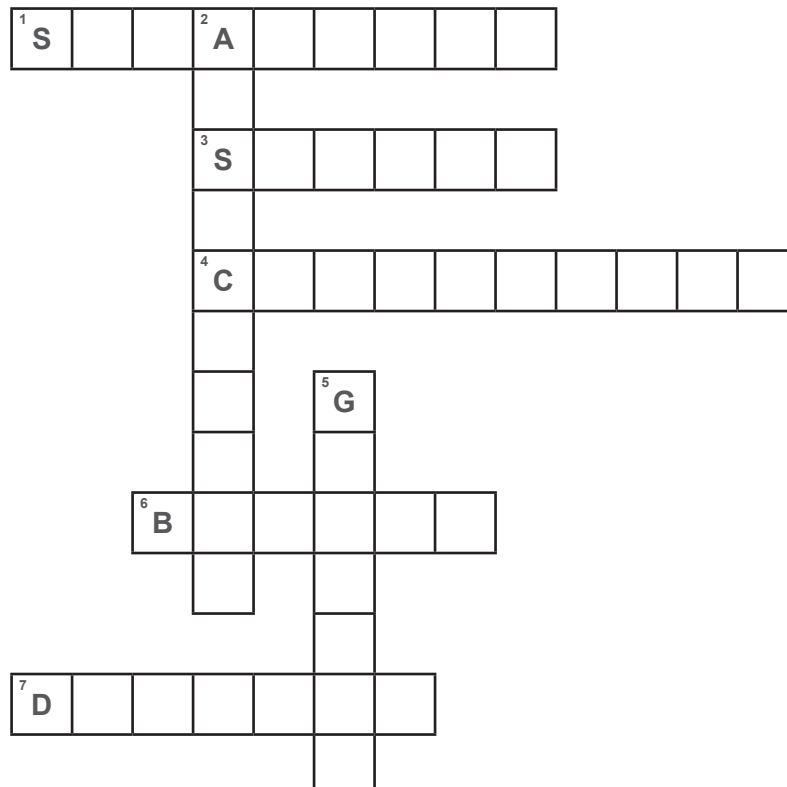
Complete the crossword. All the answers are classification verbs.

Across

- At the end of the experiment the green colour had _____ into blue and yellow.
- The metals can be _____ in their order of reactivity from the most reactive to the least reactive.
- Plastics are _____ as either thermoplastics or thermosetting plastics.
- Fats and oils _____ to the same food group, lipids, but fats are usually solid at room temperature and oils are liquids.
- Looking at the brain from above, the cerebrum is _____ into two cerebral hemispheres.

Down

- The alimentary canal is _____ with the organs of the liver, gall bladder and pancreas.
- Radio wavelengths are _____ into four bands: long waves, medium waves, short waves and VHF and UHF.



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YOUR CLIL CUT-OUTS

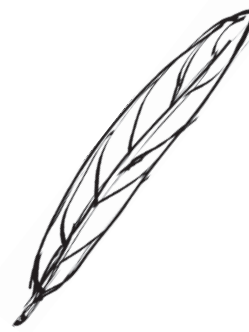
Match the leaves game



simple



compound



linear



lanceolate



elliptical



cordate



reniform



sagittate



parallel veined



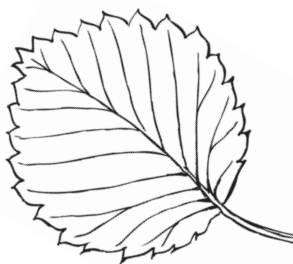
pinnate



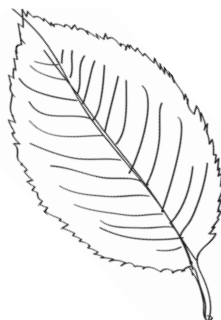
palmate



entire



dentate



serrate



wavy



lobed

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YOUR CLIL CUT-OUTS

Match the leaves game

leaves that have a single leaflet growing from the stalk	leaves that have three or more leaflets connected to a shared stalk	leaves that are much longer than they are wide and are rounded at the apex rather than pointed	leaves that have the shape of a spearhead; wide at the base and sharp at the apex
leaves that are in the shape of an ellipsis, starting narrow and ending narrow, and are longer than they are wide	leaves that are wide at the base with a cut-out notch at the stem in the shape of a heart	leaves that are in the shape of a kidney with a wider notch and a more rounded apex than cordate leaves	leaves that are in the shape of an arrowhead with a sharp apex and sharp notch at the stem
leaves that have veins which grow at the same distance from each other	leaves where all the veins run off from along a main vein known as the midrib	leaves where the veins grow out from a single point at the base of the leaf near the stem	leaves which have a smooth edge or 'margin'
leaves which have little teeth on the outer edge	leaves which have teeth like dentate leaves, but they are bent slightly back like those of a saw	leaves which have small waves or curves along the edge or margin	leaves which have rounded indentations which cut into the leaf towards the centre



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Question loop: Classifying leaves

What are simple leaves?	leaves which have rounded indentations which cut into the leaf towards the centre
What are compound leaves?	leaves that have a single leaflet growing from the stalk
What are linear leaves?	leaves that have three or more leaflets connected to a shared stalk
What are lanceolate leaves?	leaves that are much longer than they are wide and are rounded at the apex rather than pointed
What are elliptical leaves?	leaves that have the shape of a spearhead, wide at the base and sharp at the apex
What are cordate leaves?	leaves in the shape of an ellipsis, starting narrow and ending narrow, and are longer than they are wide
What are reniform leaves?	leaves which are wide at the base with a cut-out notch at the stem in the shape of a heart
What are sagittate leaves?	leaves in the shape of a kidney with a wider notch and a more rounded apex than cordate leaves
What are parallel veined leaves?	leaves in the shape of an arrowhead with a sharp apex and sharp notch at the stem
What are pinnate leaves?	leaves that have veins which grow at the same distance from each other
What are palmate leaves?	leaves where all the veins run off from along a main vein known as the midrib
What are smooth leaves?	leaves where the veins grow out from a single point at the base of the leaf near the stem
What are dentate leaves?	leaves which have a smooth edge or 'margin'
What are serrate leaves?	leaves which have little teeth on the outer edge, also known as toothed leaves
What are wavy leaves?	leaves which have teeth like dentate leaves, but they are bent slightly back like those of a saw
What are lobed leaves?	leaves which have small waves or curves along the edge or margin



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Preparing a leaf profile

Give the name of the plant or tree.

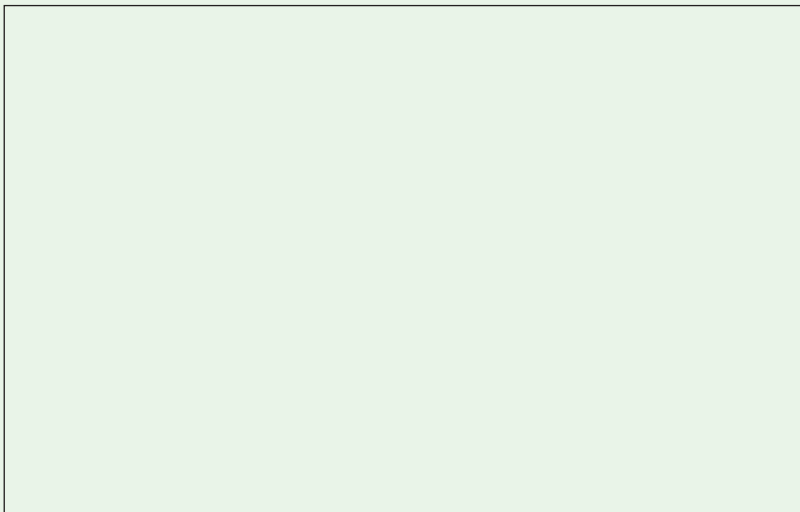
The plant / tree the leaf comes from is _____.

Give the time and location of collection.

The leaf was collected on _____ *(date) in* _____ *(place).*

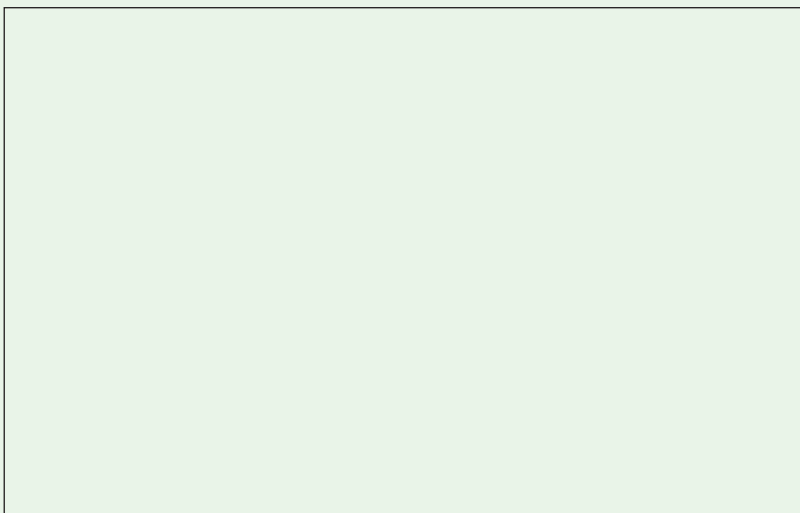
Include a photo of the plant or tree.

This is a photo of the tree from _____.



Include any rubbings you do of the leaf / bark.

Here is a rubbing of the leaf / bark.



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Describe the parts of the leaf for classification

Measure the leaf.

The leaf measures _____ cm in length and _____ cm in width.

Is the leaf structure simple or compound?

We can see that the leaf is simple / compound.

Describe the shape of the leaf.

The shape of the leaf is linear / lanceolate / elliptical / cordate / reniform / sagittate.

Describe the leaf vein pattern.

The leaf vein pattern is parallel veined / pinnate / palmate.

Describe the edge of the leaf.

The edge of the leaf is smooth / toothed / serrate / wavy / undulate / lobed.