Grade 5 Science and Technology

Terms 1, 2 and 3 - notes for 8 topics

IN EVERY TOPIC

- What you will learn and the key words.
- Short, clear notes with worked examples.
- Questions to try and a topic test, with the answers at the back.

TOPICS IN THESE NOTES

Topic	Name	Term
1.1	Classification of plants	1
1.2	Invertebrates	1
1.3	The Human Breathing system	1
2.1	Mixtures	2
2.2	Water Pollution	2
3.1	Floating and Sinking	3
3.2	Sound Energy	3
3.3	Heat transfer	3

A TASTE OF THE FIRST TOPIC

Plants around us

Plants are living things found almost everywhere - trees, grasses, shrubs, ferns, and mosses are all plants, even though they look very different from each other.

Because there are so many different kinds of plants, scientists classify (group) them by shared features, which makes them easier to study and understand.

CONTENTS

Topic	Name	Term	Page
1.1	Classification of plants	1	3
1.2	Invertebrates	1	7
1.3	The Human Breathing system	1	12
2.1	Mixtures	2	17
2.2	Water Pollution	2	22
3.1	Floating and Sinking	3	27
3.2	Sound Energy	3	32
3.3	Heat transfer	3	36
	Answers		40

Elimu254
Learn • Grow • Build Tomorrow

Strand 1.0 Living Things and their Environment | Term 1

1.1 Classification of plants

WHAT YOU WILL LEARN

By the end of this topic you should be able to:

- classify plants into flowering and non-flowering
- describe functions of parts of a flower
- outline the importance of flowers in nature

KEY WORDS

flowering plant, non-flowering plant, petal, sepal, stamen, pistil, pollination.

1. What a plant is

Plants around us

Plants are living things found almost everywhere - trees, grasses, shrubs, ferns, and mosses are all plants, even though they look very different from each other.

Because there are so many different kinds of plants, scientists classify (group) them by shared features, which makes them easier to study and understand.

2. What flowering plants are

Flowering plants

A flowering plant is a plant that produces flowers at some point in its life, which later develop into fruits containing seeds. Examples include beans, hibiscus, mango trees, maize, and roses.

Flowering plants are the largest group of plants on Earth, and most food crops - like maize, beans, and fruit trees - are flowering plants.

3. What non-flowering plants are

Non-flowering plants

A non-flowering plant is a plant that never produces flowers, and instead reproduces in other ways, such as by spores. Examples include ferns, mosses, and algae.

Non-flowering plants are often found in damp, shady places, such as under trees, near rivers, or on wet rocks.

4. Practical: classifying real plants

Practical: sorting plants

Materials: real plant samples or pictures; pairs.

In pairs, sort a set of plant samples or pictures into two groups - flowering and non-flowering - explaining the reason for each choice.

A flowering plant without a visible flower right now (like a mango tree between flowering seasons) is still classified as flowering, because it produces flowers at some point in its life cycle.

5. Comparing flowering and non-flowering plants

Comparing the two groups

Flowering plants produce flowers and later fruits/seeds, and are the largest plant group, including most food crops.

Non-flowering plants never produce flowers, reproduce by spores instead, and are often found in damp, shady places.

Both groups are still real, important plants - "non-flowering" does not mean "less important", just a different way of reproducing.

6. Where flowering and non-flowering plants are found

Habitats of the two groups

Flowering plants are found almost everywhere - gardens, farms, forests, and even dry areas, since many have adapted to different conditions. Non-flowering plants like ferns and mosses usually prefer damp, shady places, such as forest floors, riverbanks, and wet rock surfaces.

This is why you are more likely to find moss on the shaded, damp side of a wall or tree than on a dry, sunny one.

7. Consolidating plant classification

Practical: quiz and consolidation

Materials: plant pictures or samples; whole class or pairs.

In a quick round, learners are shown a plant (picture or real sample) and must quickly classify it as flowering or non-flowering, explaining their reasoning aloud.

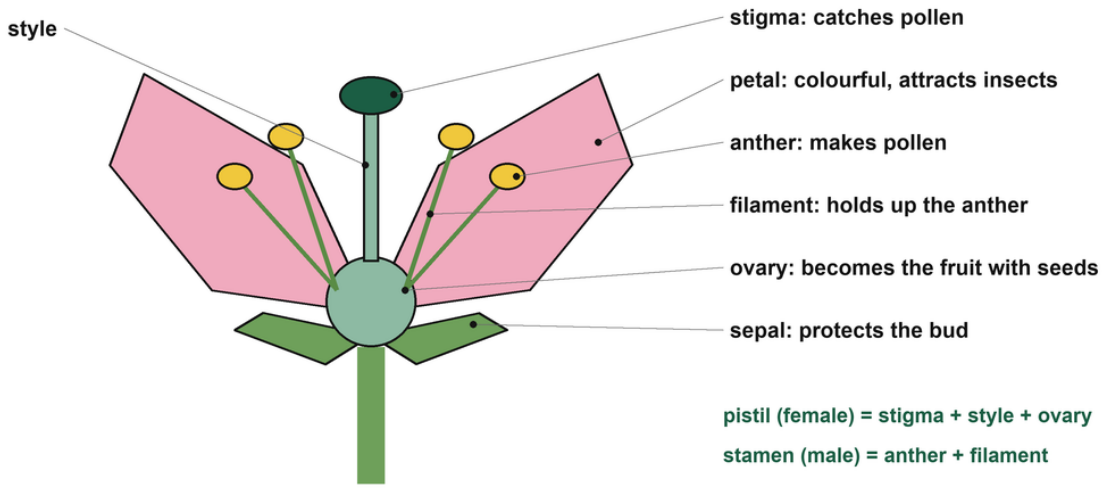
This consolidates the whole first half of the sub-strand before moving on to look closely at the parts of a flower.

8. Parts of a flower

Parts of a flower

A typical flower has four main parts: petals (the often colourful outer parts), sepals (small, usually green parts that protect the bud before it opens), the stamen (the male part, made of a stalk called the filament topped by the anther), and the pistil (the female part, made of the stigma, style, and ovary).

Not every flower has all these parts equally developed, but most common flowers, like a hibiscus, show them clearly.



The parts of a flower

9. Function of petals and sepals

Petals and sepals

Petals are often brightly coloured and sometimes scented, which helps attract insects like bees and butterflies for pollination. Sepals are usually small and green, and their main job is to protect the delicate flower bud before it opens.

Once the flower has opened and is fully grown, the sepals are often folded back beneath the petals.

10. Function of the stamen and pistil

Stamen and pistil

The stamen is the male part of the flower - its anther produces pollen, a fine powder needed for reproduction. The pistil is the female part - its sticky stigma receives pollen, which travels down the style to the ovary, where seeds can then form.

This transfer of pollen from the stamen to the pistil, often carried by insects or wind, is called pollination.

11. Practical: observing a real flower

Practical: dissecting a flower

Materials: a real flower, such as a hibiscus; pairs.

Gently pull apart a real flower, layer by layer, starting with the outer sepals, then the petals, then the stamens, and finally the pistil at the centre, laying each part out and identifying it.

Handle the flower gently, since the parts (especially the pistil and stamens) can be delicate.

12. Flowers and reproduction in nature

Flowers and reproduction

Flowers are essential for a plant's reproduction: after pollination, the ovary develops into a fruit, and the seeds inside can grow into new plants. Without flowers, most plants could not produce the seeds needed to grow the next generation.

Flowers also support entire ecosystems, providing food (nectar and pollen) for bees, butterflies, birds, and other creatures.

13. Importance of flowers to people

Flowers and people

Flowers are important to people in many ways: decoration (for homes, events, weddings), some flowers are eaten as food (such as pumpkin flowers), some are used to make perfumes and medicines, and flowering plants support beekeeping, since bees collect nectar to make honey.

Kenya also grows and exports large quantities of cut flowers, which is an important part of the country's economy.

14. Appreciating flowers in nature

Why flowers matter

Flowers are essential for plant reproduction, support countless other creatures through food and habitat, and provide real benefits to people through food, medicine, decoration, and industries like flower export and beekeeping.

Appreciating flowers means recognising them as far more than decoration - they are a vital part of how nature, and much of human life, actually works.

TRY THESE

1. Name one plant you can see around your school.
2. Are trees, grasses and ferns all plants?
3. What is a flowering plant?
4. Name one example of a flowering plant.
5. What is a non-flowering plant?
6. Name one example of a non-flowering plant.
7. Into which two groups did you sort the plants?
8. Give one reason you classified a plant as flowering.
9. Give one difference between flowering and non-flowering plants.

10. Which group includes most food crops?
11. Where are flowering plants commonly found?
12. Where are non-flowering plants like ferns and mosses commonly found?
13. In your own words, how are plants classified in this sub-strand?
14. What is the test for whether a plant is "flowering"?
15. Name the four main parts of a flower.
16. What is the stamen made of?
17. What is the function of petals?
18. What is the function of sepals?
19. What does the stamen's anther produce?
20. What part of the pistil receives pollen?
21. Which part of the flower is removed first when dissecting from the outside in?
22. Which part is usually found at the very centre of the flower?
23. What does the ovary develop into after pollination?
24. What is inside the fruit that can grow into a new plant?
25. Give one way people use flowers.
26. Name one flower that can be eaten as food.
27. Give one reason flowers are essential in nature.
28. What would likely happen to many animals if flowering plants disappeared?

TOPIC TEST

T1. List five different plants you can find in your own compound at home.
T2. Name three food crops grown in Kenya that are flowering plants.
T3. Why might non-flowering plants often grow in damp, shady places rather than dry, sunny ones?
T4. Find one real plant in your compound and classify it, explaining your reasoning.
T5. Why might ferns and mosses be important even though people do not eat them as food?
T6. Describe a real damp, shady spot you know, and any moss or fern you have seen growing there.
T7. Explain the difference between flowering and non-flowering plants to a family member, and note how it went.
T8. Draw and label a simple flower diagram from memory, then check it against the lesson's diagram.
T9. Why might a flower pollinated mainly by insects with a poor sense of smell rely more on bright colour than scent?
T10. Why might insects, without meaning to, help a flower reproduce as they search for nectar?
T11. Draw and label the real flower parts you found in your dissection.
T12. Name one animal, apart from bees, that you know feeds on flowers or their nectar.
T13. Have you or your family ever used a flower for food, medicine, or decoration? Describe it.
T14. Write one sentence about why you will look at flowers differently after studying this sub-strand.

Elimu254 Learn • Grow • Build Tomorrow

Strand 1.0 Living Things and their Environment | Term 1

1.2 Invertebrates

WHAT YOU WILL LEARN

By the end of this topic you should be able to:

- identify invertebrates found in the local environment
- classify invertebrates into major groups based on observable characteristics
- describe the economic importance of invertebrates

KEY WORDS

invertebrate, exoskeleton, insect, arachnid, myriapod, antennae.

1. What invertebrates are

Invertebrates

An invertebrate is an animal without a backbone (spine). This is different from a vertebrate, like a human, bird, or fish, which does have a backbone. Invertebrates make up the vast majority of all animal species on Earth.
Examples of invertebrates include insects, spiders, snails, earthworms, and crabs - all animals you can find around a typical Kenyan home or school.

2. General characteristics of invertebrates

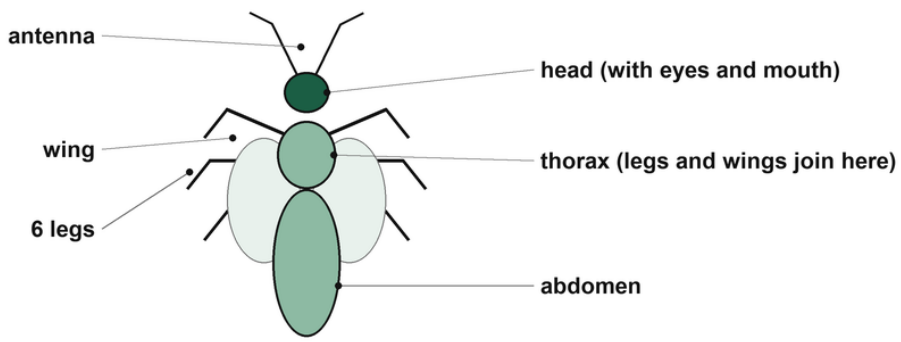
Characteristics of invertebrates

Many invertebrates, especially insects and their relatives, have an exoskeleton - a hard outer covering that protects and supports the body, instead of an internal skeleton like humans have. Invertebrates are also generally much smaller than vertebrates, though there are exceptions.
Because invertebrates are so varied, scientists group them into several major groups based on shared features, which this sub-strand explores.

3. Insects

Insects

Insects are invertebrates with six legs, a body divided into three parts (head, thorax, abdomen), and usually a pair of antennae; many also have wings. Examples include ants, bees, butterflies, grasshoppers, and houseflies.
Insects are the largest group of invertebrates, and are found almost everywhere on Earth.



An insect: 3 body parts, 6 legs, usually antennae and wings.

4. Practical: observing insects safely

Practical: observing insects

Materials: a jar or clear container; pairs, supervised.

In pairs, carefully and gently find and observe a real insect (such as an ant, grasshopper, or beetle) in the school compound, placing it briefly in a clear container to observe its legs, body parts, and antennae, then releasing it unharmed where it was found.

Handle every insect gently and briefly, and always release it back into its natural spot afterwards.

5. Arachnids

Arachnids

Arachnids are invertebrates with eight legs and a body divided into two parts, and they do not have antennae or wings. Examples include spiders, scorpions, and ticks.

Most spiders in Kenya are harmless to humans, though a few, like certain scorpions, can give a painful sting - it is best never to handle an unfamiliar spider or scorpion.

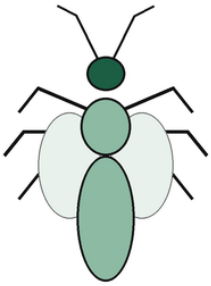
6. Comparing insects and arachnids

Practical: comparing insects and arachnids

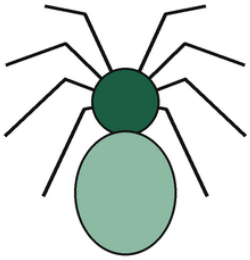
Materials: pictures of both groups; pairs.

Insects have six legs, three body parts, and usually antennae and wings. Arachnids have eight legs, two body parts, and no antennae. Sort a set of pictures into "insect" or "arachnid" using these differences.

Counting the legs is often the quickest, most reliable way to tell the two groups apart at a glance.



insect: 3 parts, 6 legs, antennae



arachnid (spider): 2 parts, 8 legs

7. Myriapods

Myriapods

Myriapods are invertebrates with many legs and a long, segmented body. The two common examples are centipedes and millipedes. Centipedes move fast, have one pair of legs per body segment, and can give a painful bite - best left alone. Millipedes move slowly, have two pairs of legs per segment, are generally harmless, and often curl into a tight spiral when disturbed.

Despite their names ("centi-" suggesting 100, "milli-" suggesting 1000), neither actually has exactly that many legs - the names are historic, not exact counts.

8. Consolidating insect, arachnid and myriapod classification