Grade 6 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

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A TASTE OF THE FIRST TOPIC

Fungi

Fungi (one is a fungus) are living things that are neither plants nor animals.

They have no green colour (chlorophyll), so they cannot make their own food from sunlight.

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Strand 1.0 Living things and their Environment | Term 1

1.1 Fungi

WHAT YOU WILL LEARN

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

- identify common fungi in the environment
- describe the importance of fungi in nature

KEY WORDS

fungi (fungus), mushroom, toadstool, mould, yeast, spore, cap, gills, stalk, decomposer.

1. What fungi are

Fungi

Fungi (one is a fungus) are living things that are neither plants nor animals.
They have no green colour (chlorophyll), so they cannot make their own food from sunlight.
They feed on dead or living things, often by growing on them and breaking them down.
Most reproduce by tiny spores carried by wind or water.
They grow best where it is warm, damp and dark.

2. Common fungi in the environment

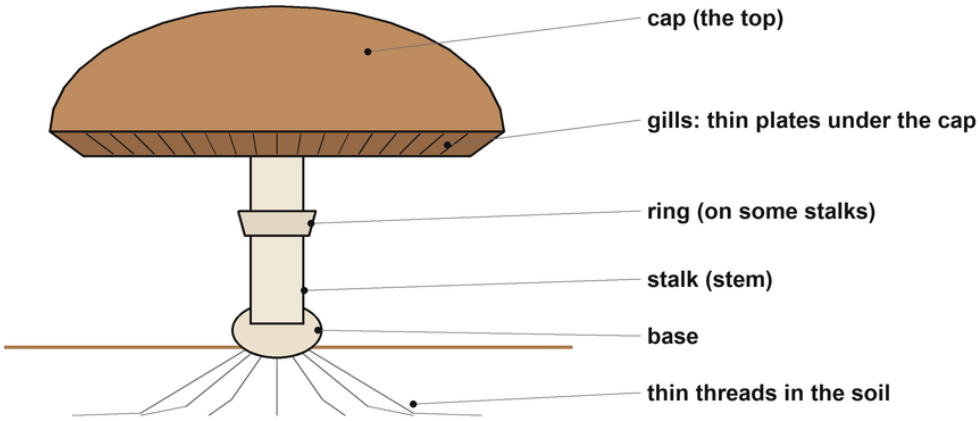
Common fungi

Mushrooms and toadstools: umbrella-shaped, in grass and on rotting wood after rain.
Moulds: fluffy growth on bread, fruit, maize and damp walls (black, green, white or blue).
Yeast: tiny one-celled fungi used in baking.
Bracket fungi: shelf-like growths on tree trunks.
Puffballs: round fungi that release clouds of spores.
Safety: many wild mushrooms are poisonous and look like edible ones; never pick or eat wild mushrooms.

3. Practical: parts of a mushroom

Practical: observing

Materials: shop-bought mushrooms, hand lenses, gloves.
Wear gloves; use only mushrooms bought from a shop.
Observe and draw: cap (top), gills (thin plates under the cap), stalk (stem), ring on some stalks, and the base.
Press a cap gills-down on white paper overnight (covered with a bowl): a brown "spore print" forms.
Wash hands afterwards.



The parts of a mushroom

4. Practical: growing bread mould

Practical: mould on bread

Materials: bread, water, clear plastic bags.
Bag A: bread sprinkled with water, sealed, kept in a warm dark cupboard.
Bag B: dry bread, sealed, kept in the same place.
Bag C: bread sprinkled with water, sealed, kept in a cool place (or a fridge if available).
Observe through the bag daily for a week; draw and record colour and amount of mould.
Never open the bags (spores can cause allergies); throw them away sealed.

5. Conditions for the growth of fungi

Results and conclusions

Typical result: Bag A (damp, warm) had the most mould; Bag B (dry) had little or none; Bag C (damp, cool) had less than A.
Fungi need moisture, warmth, food and usually darkness.
This explains why food is kept dry and cool, and why houses should be well ventilated.

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6. Practical: yeast at work

Practical: yeast and sugar

Materials: dry yeast, sugar, warm water, bottle, balloon.
The teacher prepares warm (not hot) water.
Put one teaspoon of yeast and two of sugar in a bottle with warm water; stretch a balloon over the mouth.
Leave for 20-30 minutes: the mixture froths and the balloon inflates.
Yeast feeds on sugar and gives off a gas (carbon dioxide). In dough, this gas makes bread and mandazi rise.

7. Fungi as decomposers in nature

Decomposers

Fungi (with bacteria) break down dead leaves, wood, animal droppings and dead animals.
This releases nutrients back into the soil for plants to use (recycling).
Without decomposers, dead matter would pile up and soils would lose nutrients.
Compost heaps use decomposers to turn waste into manure.

8. Harmful fungi

Harm from fungi

Food spoilage: moulds spoil bread, fruit and stored grain; some moulds on maize and groundnuts make poisons (aflatoxins).
Diseases in people: ringworm, athlete's foot, thrush.
Crop diseases: rusts, blights and mildews reduce harvests.
Poisonous mushrooms.
Prevention: dry and store food well, discard mouldy food, keep skin and feet clean and dry, do not share towels, use resistant seeds.

9. Fungi in the economy

Economic importance

Food: edible mushrooms are grown and sold; they are rich in protein.
Baking: yeast for bread, mandazi and cakes.
Medicines: penicillin, an antibiotic, comes from a mould.
Industry: some fungi are used in making cheese, soy sauce and enzymes.
Income: mushroom farming is a growing small business in Kenya.

10. Mushroom growing

How mushrooms are farmed (simple outline)

A growing material (substrate) such as chopped, pasteurised maize stalks or straw is mixed with mushroom "seed" (spawn) and packed in bags.
Bags are kept in a clean, dark, damp, cool room; the spawn spreads through the material.
After some weeks, holes are made in the bags and mushrooms grow out; they are harvested by hand.
It needs little land and uses farm waste, so it suits small farms and youth groups. Training from agricultural officers is advised.

11. Preventing fungal damage at home and on the farm

Prevention

Food: dry grains well; store in clean, dry, airy places; keep bread in cool, dry places and eat it fresh; cover food.
Home: open windows for air; fix leaks; dry clothes in the sun.
Body: bathe daily, dry well between toes, wear clean dry socks, do not share combs or towels.
Farm: use certified seeds, rotate crops, remove infected plants.

12. Review: fungi

Summary

Fungi have no chlorophyll, feed on dead or living matter and reproduce by spores; they include mushrooms, moulds, yeast and bracket fungi.
They need moisture, warmth, food and darkness.
In nature they are decomposers that recycle nutrients.
Economically: food, baking, medicine and income; but they also spoil food and cause diseases.
Never eat wild mushrooms.

TRY THESE

1. Are fungi plants?
2. Why can fungi not make their own food?
3. Name four common fungi.
4. Where does mould often grow?
5. Name three parts of a mushroom.
6. Where are the spores made?
7. Which bag do you predict will grow most mould?
8. Why must the bags stay sealed?
9. Name four conditions fungi need.
10. Why did the dry bread grow little mould?
11. What happened to the balloon?
12. What gas did the yeast produce?
13. What is a decomposer?
14. How do fungi help plants?
15. Name two diseases fungi cause in people.
16. What poison can mould on maize produce?
17. Name a medicine made from a fungus.
18. How is yeast used in industry?
19. What is spawn?
20. Name one material mushrooms grow on.
21. Give two ways to keep food free of mould.
22. Why dry clothes in the sun?
23. Name three types of fungi.
24. What is the role of fungi in nature?

TOPIC TEST

T1. Why are fungi often found under logs?
T2. Look around the school compound (without touching) and list fungi you see.
T3. Why do spores need to be so light?
T4. Why is only one thing changed between two bags?
T5. How could a farmer store maize to prevent mould?
T6. Predict what happens with cold water.
T7. Why do bracket fungi often grow on dead trees?
T8. Why is aflatoxin a serious problem in Kenya?
T9. Find out the price of mushrooms at a local shop.
T10. Plan a small mushroom project for a school club.
T11. Design a poster: "Stop the mould!"
T12. Write a short paragraph: "Fungi: friends or enemies?"

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 common invertebrates in the environment
- practise precautions in handling invertebrates
- describe the general characteristics of invertebrates
- outline the economic importance of invertebrates

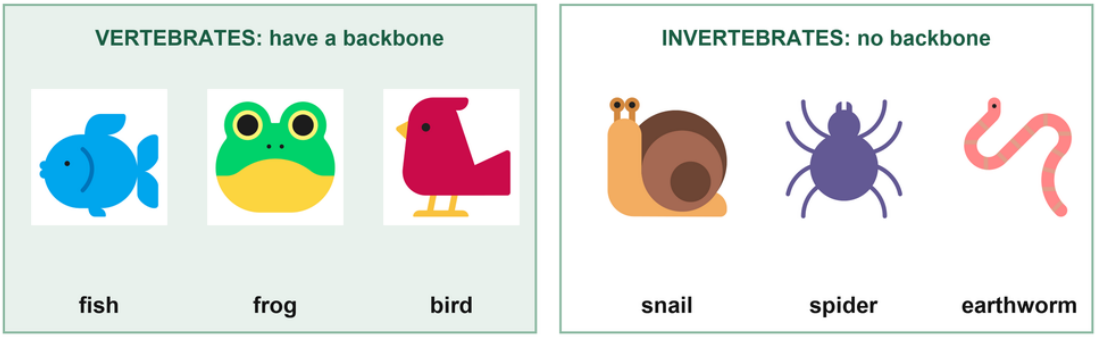
KEY WORDS

invertebrate, vertebrate, backbone, insect, arachnid, myriapod, mollusc, segment, antennae, exoskeleton, pest, vector.

1. Vertebrates and invertebrates

Two big groups of animals

Vertebrates have a backbone: fish, frogs, snakes, birds, mammals (including people).
Invertebrates have no backbone: insects, spiders, snails, earthworms, millipedes, crabs.
Most animals on Earth are invertebrates.



Animals with and without a backbone

2. Common invertebrates in our environment

Where they live

Garden and soil: earthworms, millipedes, centipedes, snails, slugs, ants, termites.
Plants and flowers: bees, butterflies, caterpillars, aphids, grasshoppers.
Homes: houseflies, mosquitoes, cockroaches, spiders.
Animals: ticks on cattle and dogs.
Water: mosquito larvae, crabs, water snails.

3. Practical: an invertebrate survey

Practical: survey

Materials: hand lenses, notebooks, gloves.
In groups, search the school garden, under stones and logs and on plants.
Look, do not touch: observe with a hand lens and record the animal, where it was found, its colour, number of legs and body parts.
Turn stones back gently so homes are not destroyed.
Stay away from bees' and wasps' nests and do not put hands into holes.

4. Precautions when handling invertebrates

Safety rules

Do not touch animals that sting or bite: bees, wasps, scorpions, centipedes, some spiders, safari ants.
Wear gloves; use a soft brush or paper to move harmless animals into a container with air holes.
Do not squeeze animals; keep them only briefly; return them where found.
Wash hands with soap afterwards.
If stung or bitten: tell the teacher at once; a bee sting is scraped out (not squeezed); cool the area; get medical help if there is swelling of the face or difficulty breathing.

5. General characteristics of invertebrates

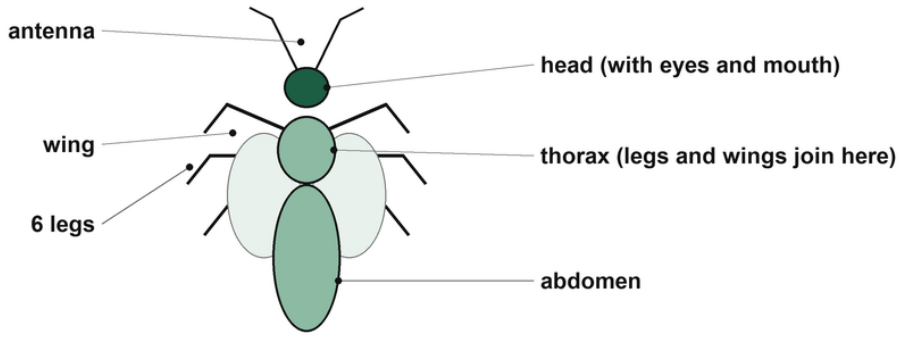
Common features

No backbone.
Many have jointed legs and a hard outer covering (exoskeleton): insects, spiders, millipedes, crabs.
Many have bodies divided into segments: earthworms, millipedes.
Some have soft bodies, often protected by a shell: snails; slugs have no shell.
Most are small, but some (like giant land snails) are quite large.

6. Insects

Insects

Body in three parts: head, thorax and abdomen.
Six legs (three pairs) on the thorax.
One pair of antennae (feelers).
Most have wings at some stage.
Examples: housefly, bee, butterfly, mosquito, grasshopper, ant, beetle.



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

The body of an insect

7. Spiders, ticks and many-legged invertebrates

Arachnids and myriapods

Arachnids: two body parts, eight legs, no antennae, no wings: spiders, ticks, scorpions, mites.
Myriapods: long, segmented bodies with many legs.
Centipede: one pair of legs on each segment; fast; can bite.
Millipede: two pairs of legs on each segment; slow; curls up; harmless but may release an irritating liquid.