

CLASSIFICATION

classification 分类
taxonomy 分类学
taxonomist 分类学家

© 2026 Exam Papers

For more help, please visit



Characteristics of living things

Movement: an action by an organism causing a change of position or place.

The action by an organism or part of an organism causing a change of position.

respiration: the chemical reactions in cells that break down nutrient molecules and release energy

The chemical reactions in cells that break down nutrient molecules and release energy for metabolism.

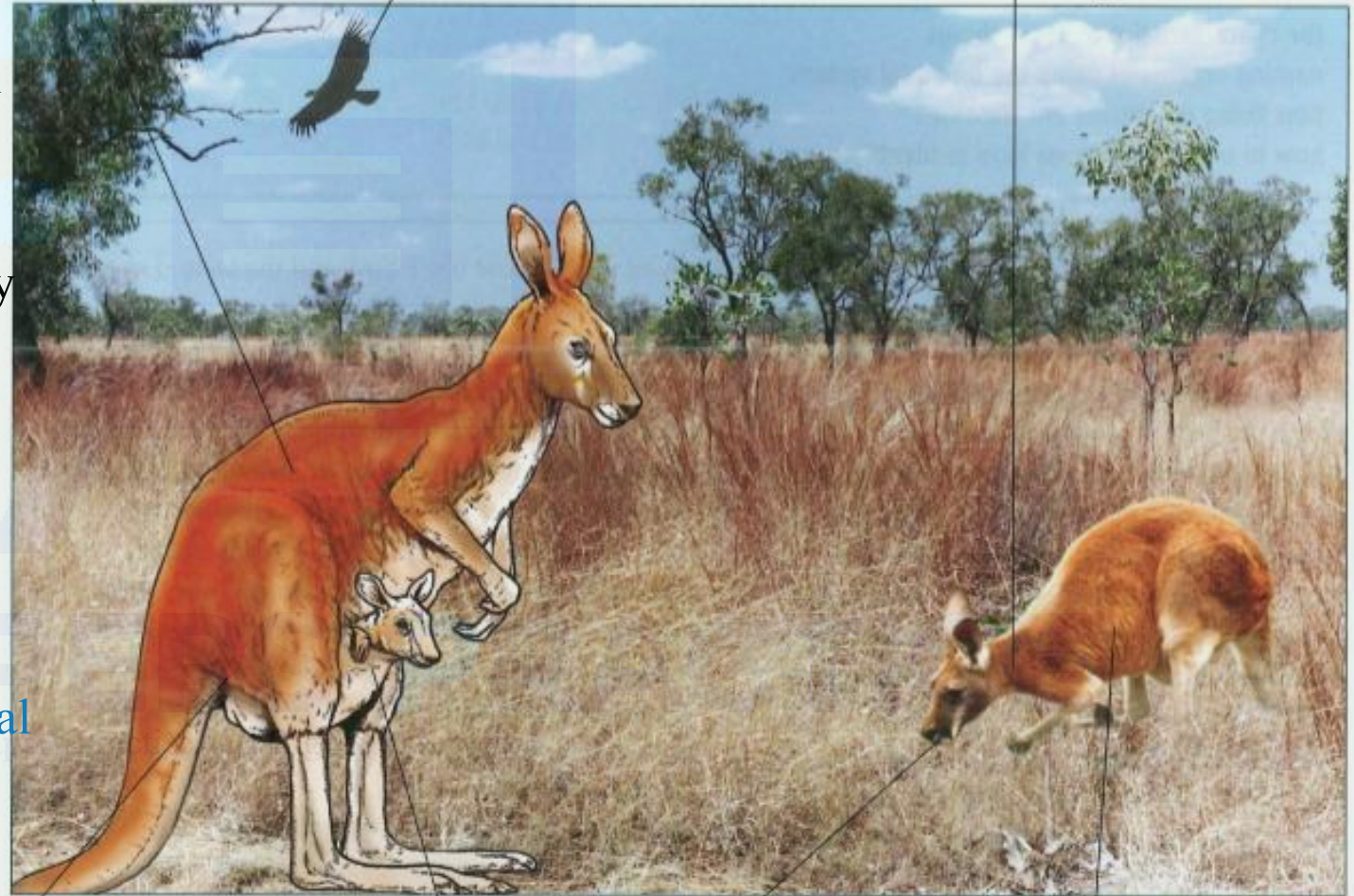
sensitivity: the ability to detect and respond to changes in the environment.

The ability to detect or sense stimuli in the internal or external environment and to make appropriate responses.

Growth All organisms begin small and get larger, by the growth of their cells and by adding new cells to their bodies.

Movement All organisms are able to move to some extent. Most animals can move their whole body from place to place, and plants can slowly move parts of themselves.

Sensitivity All organisms pick up information about changes in their environment, and react to the changes.



Excretion All organisms produce unwanted or toxic waste products as a result of their metabolic reactions, and these must be removed from the body.

Reproduction Organisms are able to make new organisms of the same species as themselves.

Nutrition Organisms take substances from their environment and use them to provide energy or materials to make new cells.

Respiration All organisms break down glucose and other substances inside their cells, to release energy that they can use.

Characteristics of living things

growth: a permanent increase in size.

A permanent increase in size and dry mass by an increase in cell number or cell size or both.

reproduction: the processes that make more of the same kind of organism.

excretion: removal from organisms of toxic materials and substances in excess of requirement.

Removal from organisms of the waste products of metabolism, toxic materials and substances in excess of requirements.

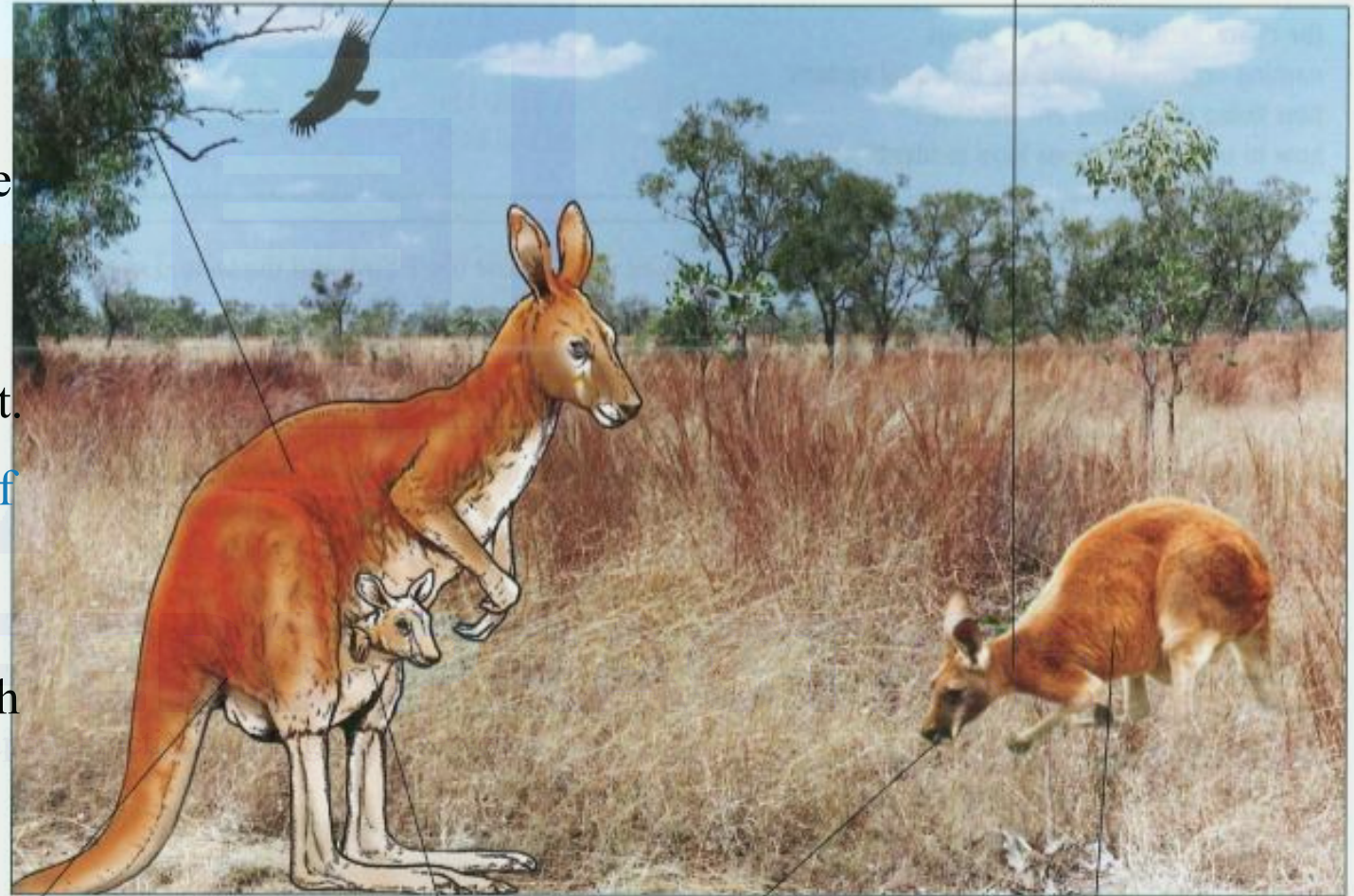
nutrition: taking in of materials for energy, growth and development.

Taking in of materials for energy, growth and development; plants require light, carbon dioxide, water and ions; animals need organic compounds and ions and usually need water.

Growth All organisms begin small and get larger, by the growth of their cells and by adding new cells to their bodies.

Movement All organisms are able to move to some extent. Most animals can move their whole body from place to place, and plants can slowly move parts of themselves.

Sensitivity All organisms pick up information about changes in their environment, and react to the changes.



Excretion All organisms produce unwanted or toxic waste products as a result of their metabolic reactions, and these must be removed from the body.

Reproduction Organisms are able to make new organisms of the same species as themselves.

Nutrition Organisms take substances from their environment and use them to provide energy or materials to make new cells.

Respiration All organisms break down glucose and other substances inside their cells, to release energy that they can use.

Characteristics of living things

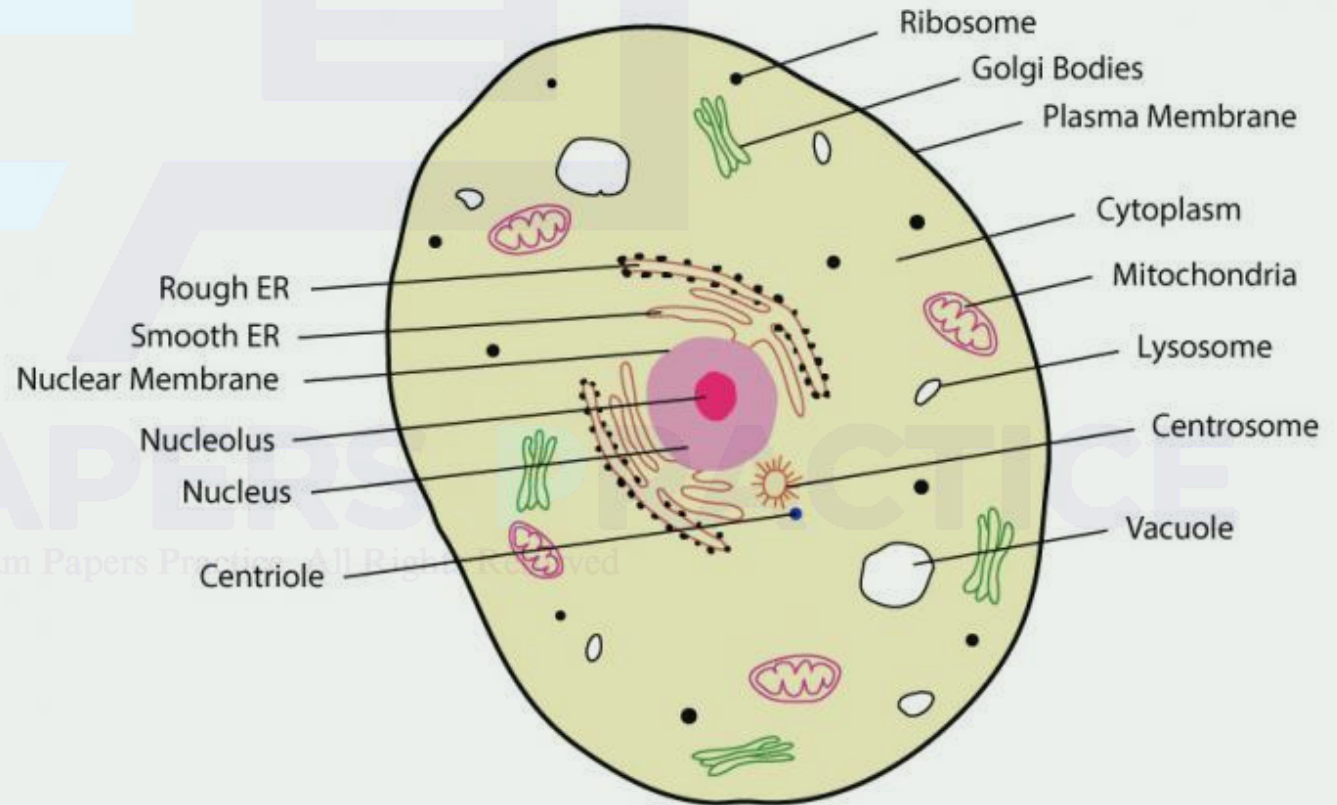
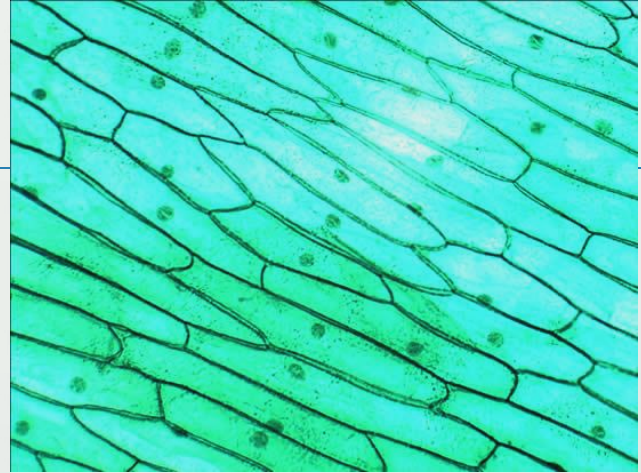
Cell

Cytoplasm/ cell membrane

DNA : genetic material

ribosomes : make proteins

enzyme : help cell to carry out anaerobic respiration.



Classification

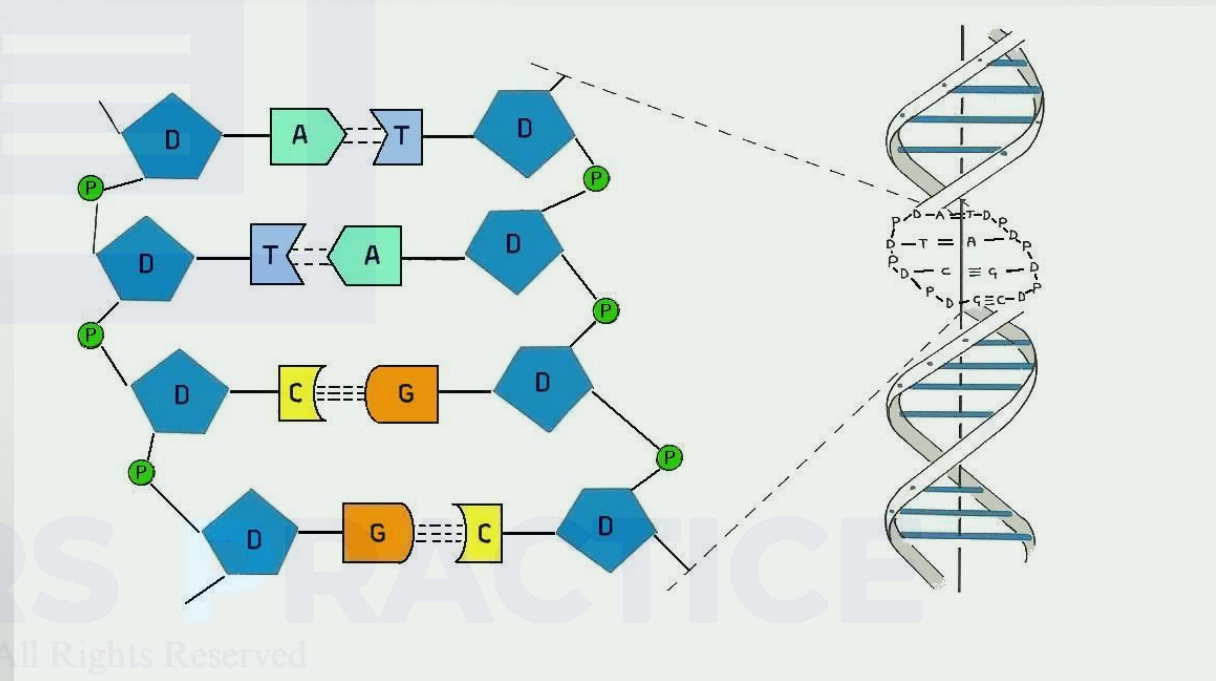
Classification means putting things into groups.
There are many possible ways in which we could group living organisms.

Morphology (the overall form and shape of their bodies)

Anatomy (the detailed body structure, which could be determined by dissection)

DNA (genetic material; four bases AGCT ;)

- compare the sequences of bases
- compare the similarities in sequences of amino acids in proteins



Classification

The classification system

Species

A group of organisms that can reproduce and produce fertile offspring

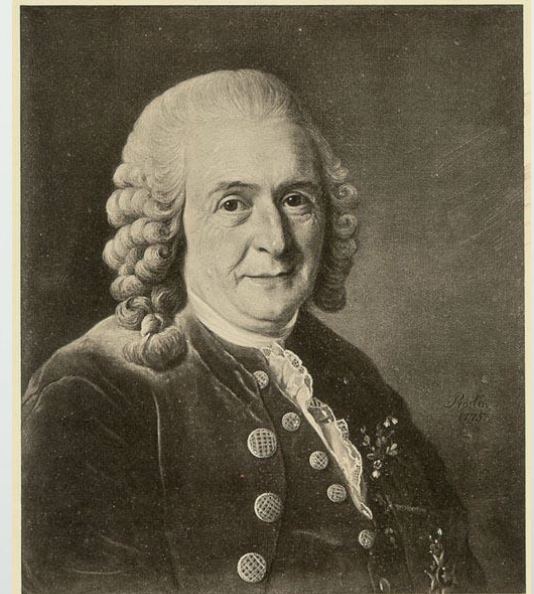
Species → Genus → family → order → class → phylum → kingdom

Binomial name system

Generic name (genus) + specific name (species) — italics

Canis lupus

C. lupus



Carl von Linné
Painting by A. Roslin, 1775

Linnaeus



The kingdoms of living organisms

The classification system

animals

- ◆ Multicellular
- ◆ nucleus, no cell walls and chloroplasts
- ◆ feed on organic substances



© 2026 Exam Papers Practice. All Rights Reserved

The kingdoms of living organisms



The classification system

plants

- ◆ multicellular
- ◆ have a nucleus, cell wall made of cellulose and often contain chloroplasts
- ◆ feed by photosynthesis
- ◆ may have roots, stems and leaves

EXAM PAPERS PRACTICE

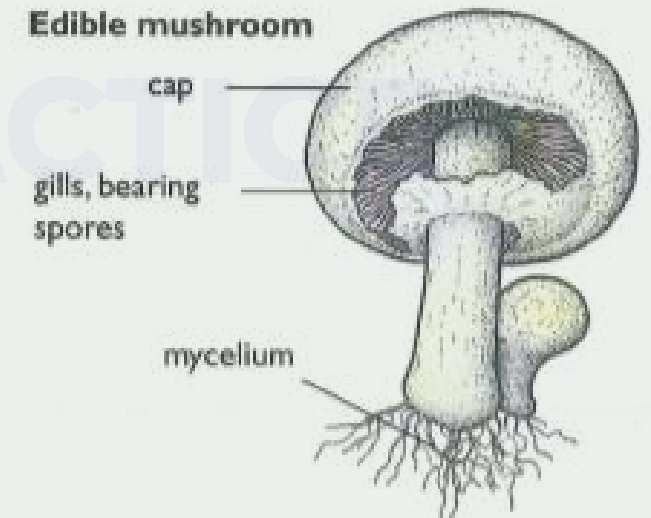
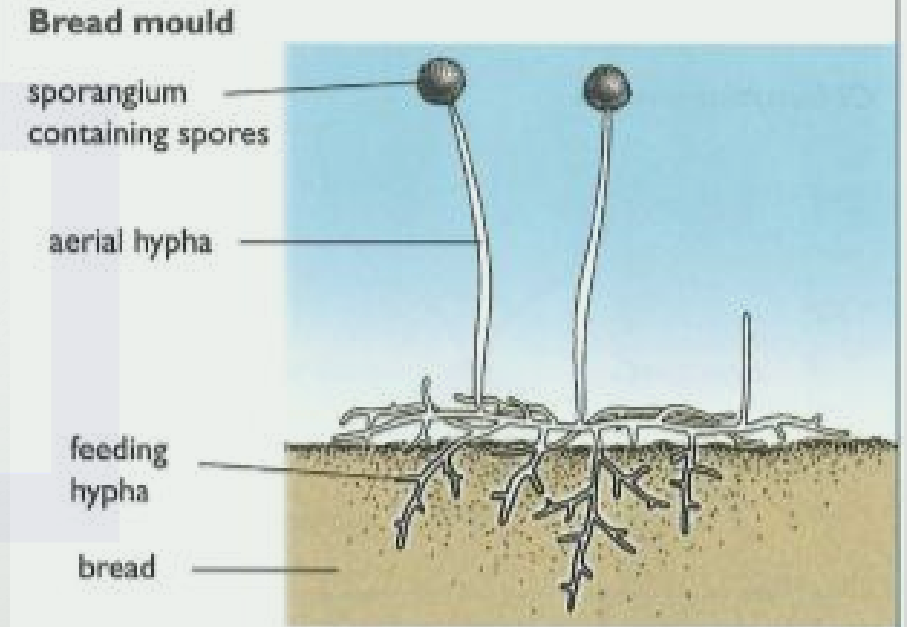
© 2026 Exam Papers Practice. All Rights Reserved

The kingdoms of living organisms

The classification system

fungi

- ◆ usually multicellular
- ◆ nuclei
- ◆ cell walls, not made of cellulose
- ◆ do not have chlorophyll
- ◆ feed by saprophytic or parasitic nutrition

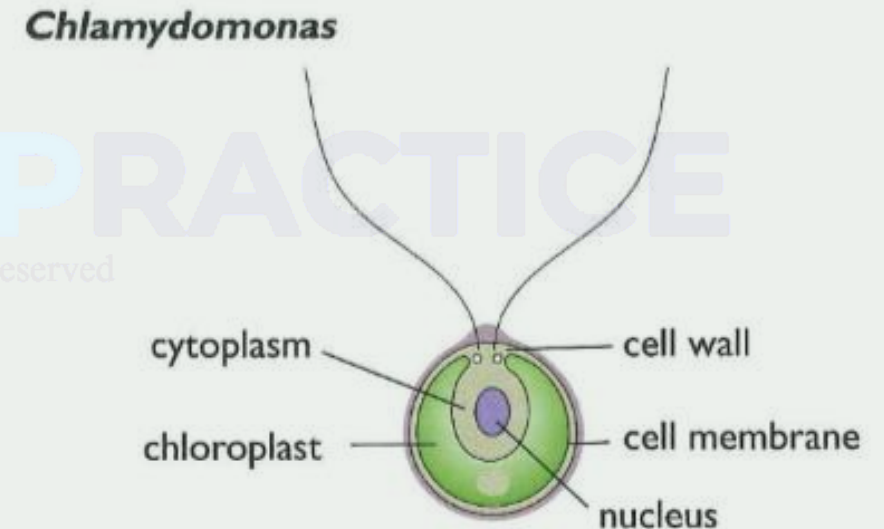
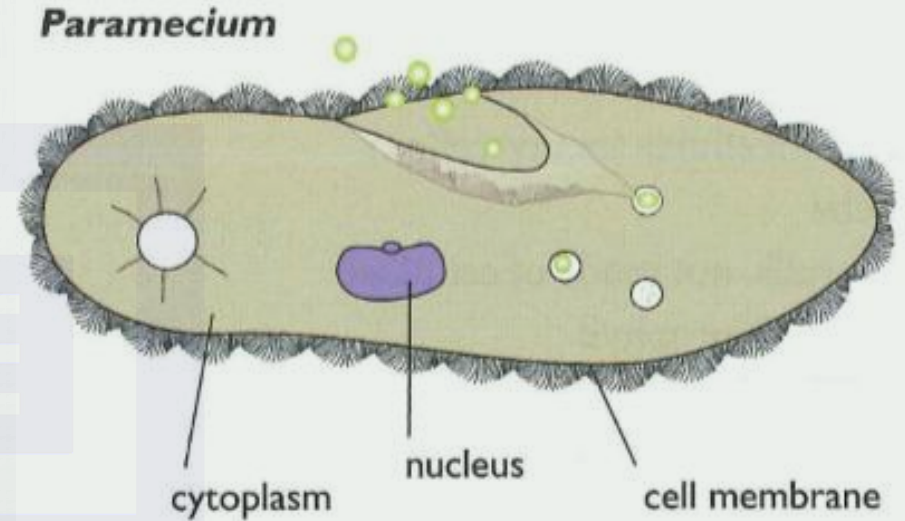


The kingdoms of living organisms

The classification system

protocista

- ◆ multicellular or unicellular
- ◆ have nucleus
- ◆ may or may not have a cell wall and chloroplasts
- ◆ some feed by photosynthesis and others feed on organic substances

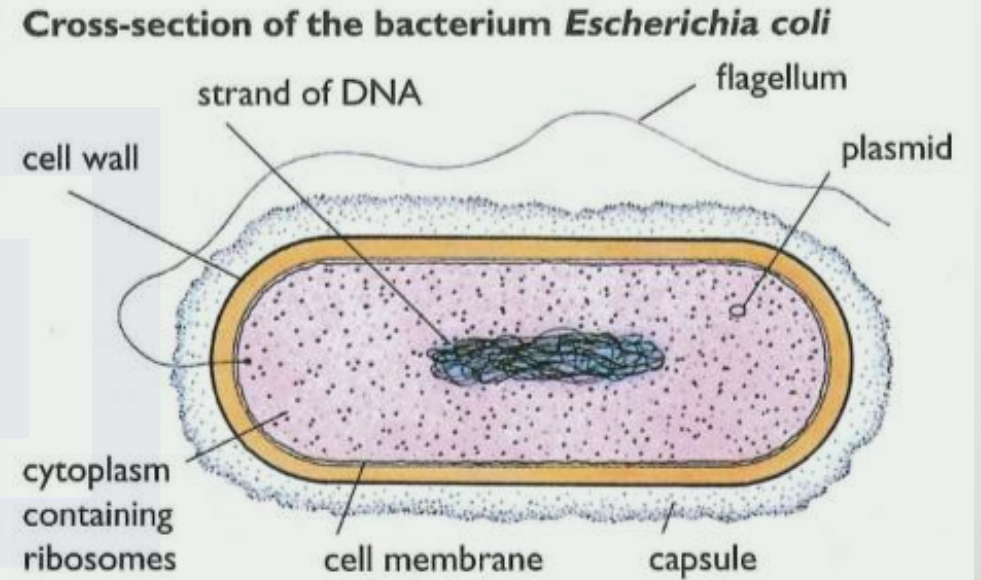


The kingdoms of living organisms

The classification system

prokaryotes

- ♦ often unicellular (single- celled)
- ♦ no nucleus
- ♦ have cell walls, not made of cellulose
- ♦ have no mitochondria and chloroplast



External view of cholera bacteria *Vibrio cholerae*

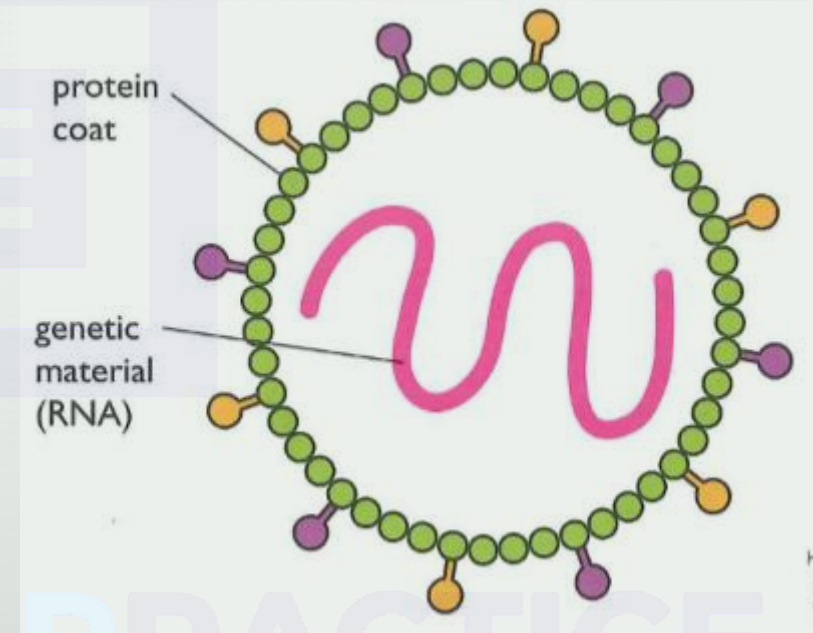


The kingdoms of living organisms

The classification system

viruses

- ◆ no cellular structure ,protein coat + genetic material(DNA or RNA)
- ◆ parasitic (in living cell)



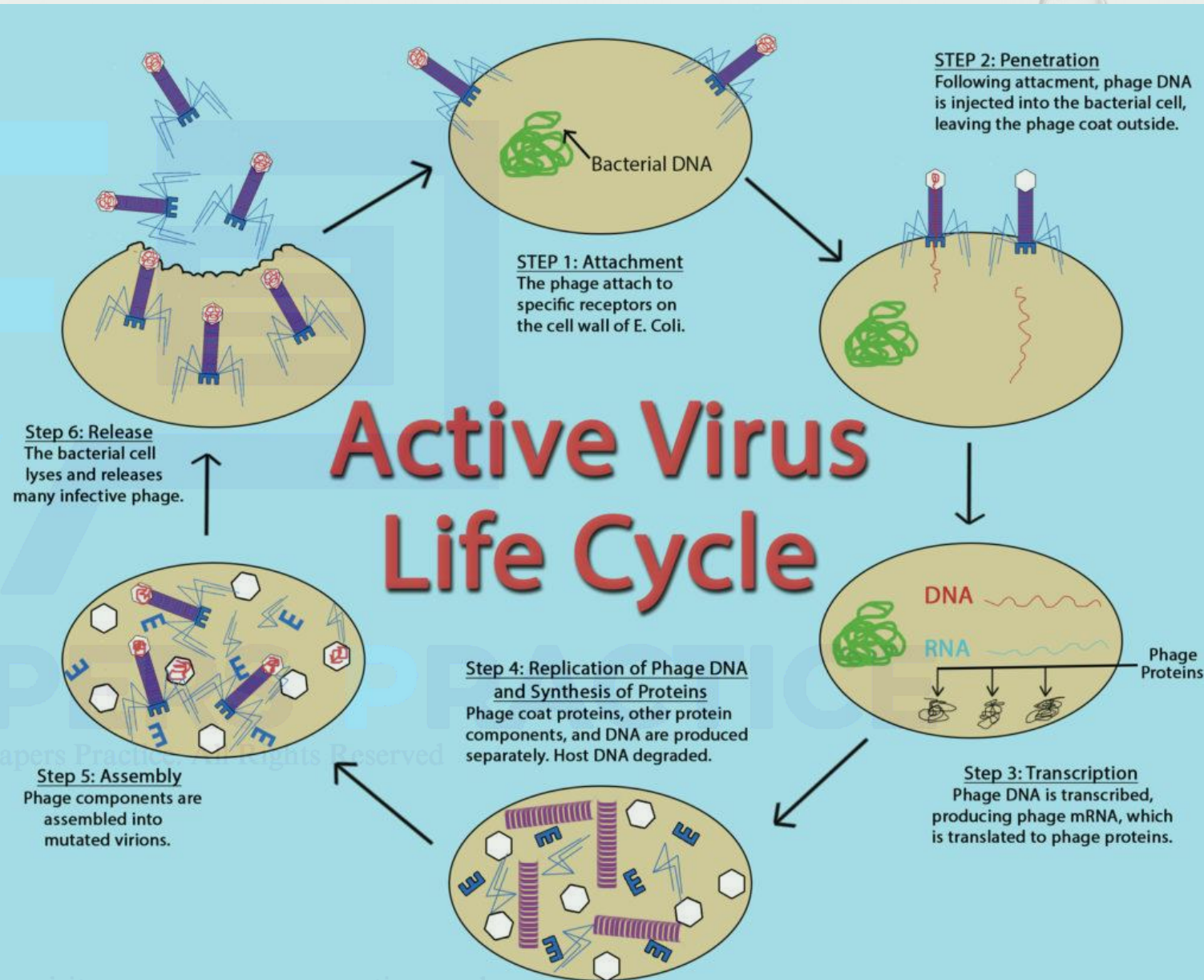
© 2026 Exam Papers Practice. All Rights Reserved

The kingdoms of living organisms

viruses

- ◆ no cellular structure ,protein coat + genetic material(DNA or RNA)
- ◆ parasitic (in living cell)

The classification system



The kingdoms of living organisms



The classification system

Why are viruses not generally considered to be living things?

State one similarity and one difference between the cells of a fungus and the cells of a plant.

How do the cells of bacteria differ from the cells of plants and animals?

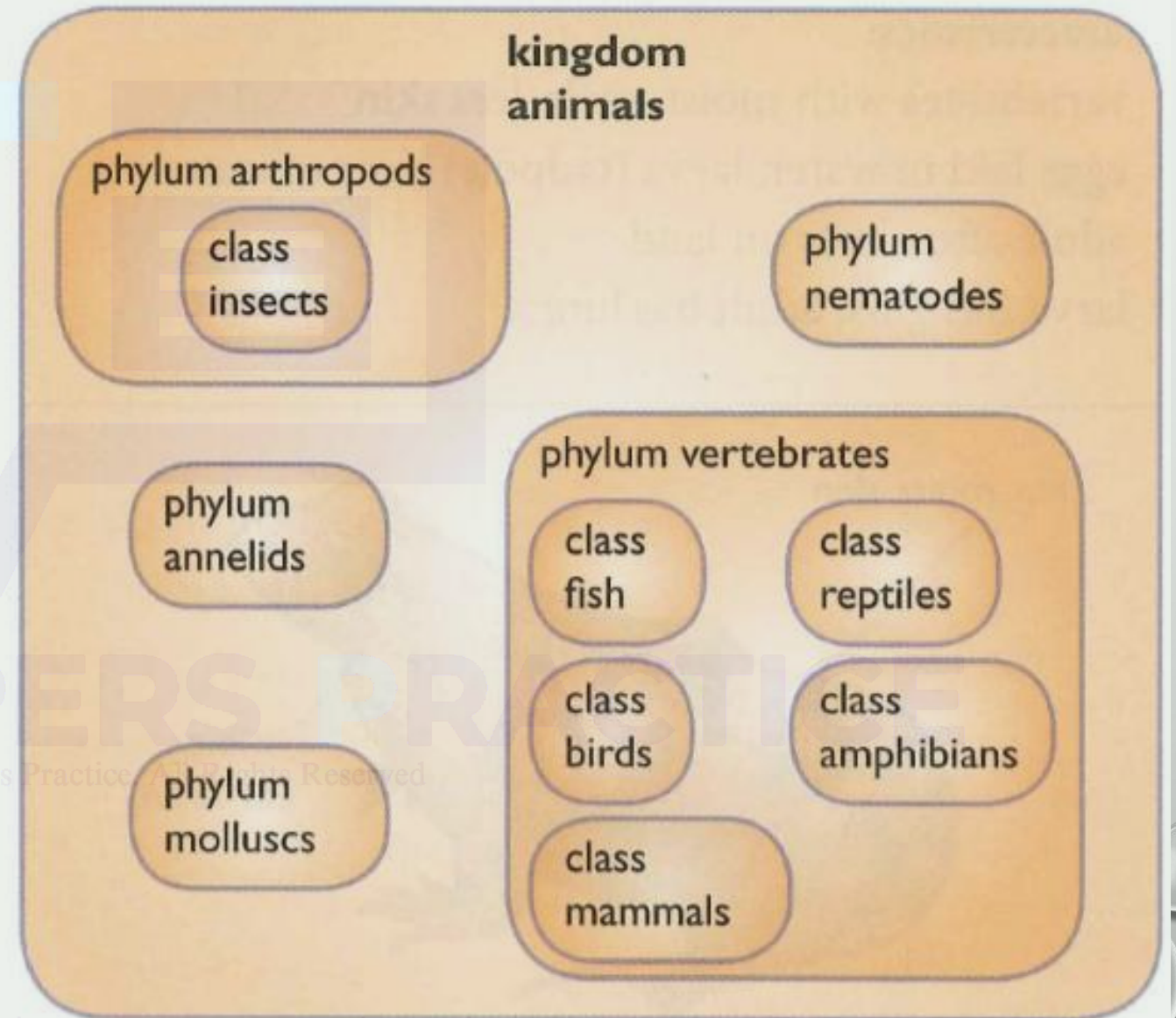
EXAM PAPERS PRACTICE

© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals

vertebrate 脊椎动物
invertebrate 无脊椎动物
arthropod 节肢动物
reptile 爬行动物
amphibian 两栖动物

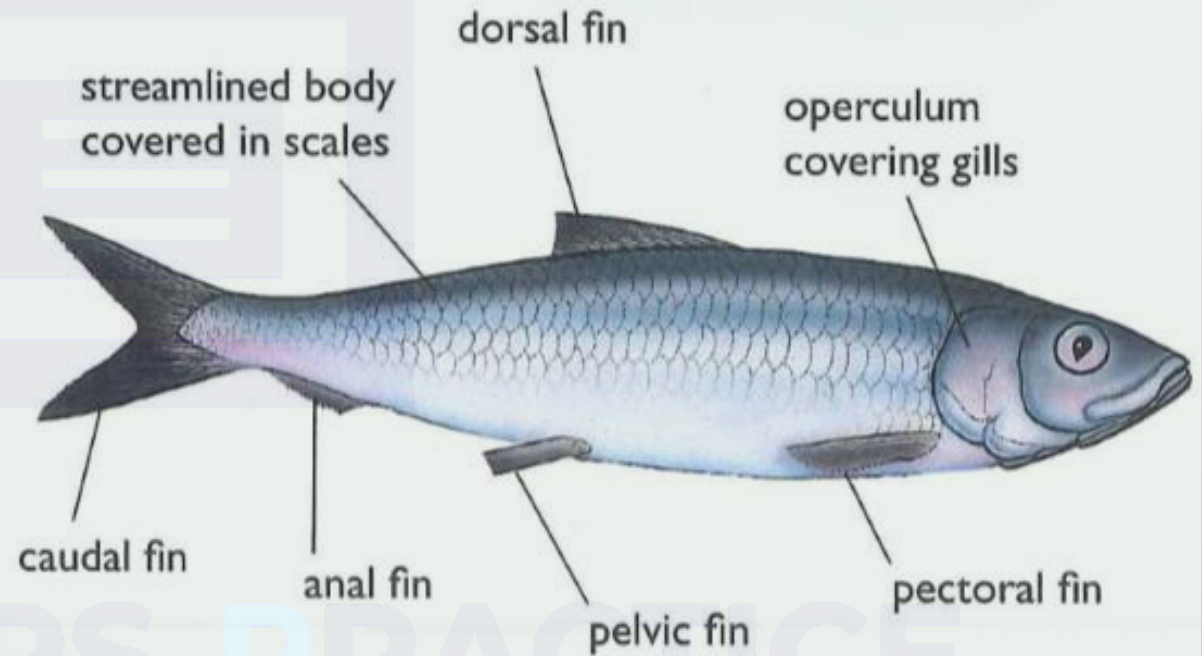


classification

classifying animals——phylum vertebrate

fish

- ◆ vertebrate with scaly skin
- ◆ gills
- ◆ fins



© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals——phylum vertebrate

amphibians

- ◆ moist, scale-less skin
- ◆ eggs laid in water, larva (tadpole) lives in water
- ◆ adult often lives on land
- ◆ larva has gills, adult has lungs



© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals——phylum vertebrates

Reptiles

- ◆ scaly skin
- ◆ lay eggs with rubbery shells



EXAM PAPER

© 2026 Exam Papers Practice

For more help, please visit www.

classification

classifying animals——phylum vertebrate

Birds

- ◆ vertebrates with feathers
- ◆ forelimbs have become wings
- ◆ lay eggs with hard shells
- ◆ endothermic
- ◆ have a beak
- ◆ heart has four chambers



REAL LIFE ANGRY BIRDS
(compiled by <http://rooturaj.com>)

classification

classifying animals——phylum vertebrate

mammals

- ◆ hair
- ◆ placenta
- ◆ feed on milk
- ◆ endothermic
- ◆ diaphragm
- ◆ heart has four chambers
- ◆ different types of teeth (incisors, canines, premolars and molars)



List three ways in which all mammals differ from all birds

Explain why bats are classified as mammals, even though they have wings

EXAM PAPERS PRACTICE

© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals——phylum
arthropods

arthropods

- ◆ several pairs of jointed legs
- ◆ exoskeleton

Arthropods

 bee	 ladybug	 butterfly
 dragonfly	 beetle	 crab
 spider	 caterpillar	 katydid
 moth	Arthropods are the most numerous animals on earth. They have an exoskeleton, a segmented body, and jointed legs. They do not have a backbone and are cold-blooded.	
Can you discover other Arthropods?		

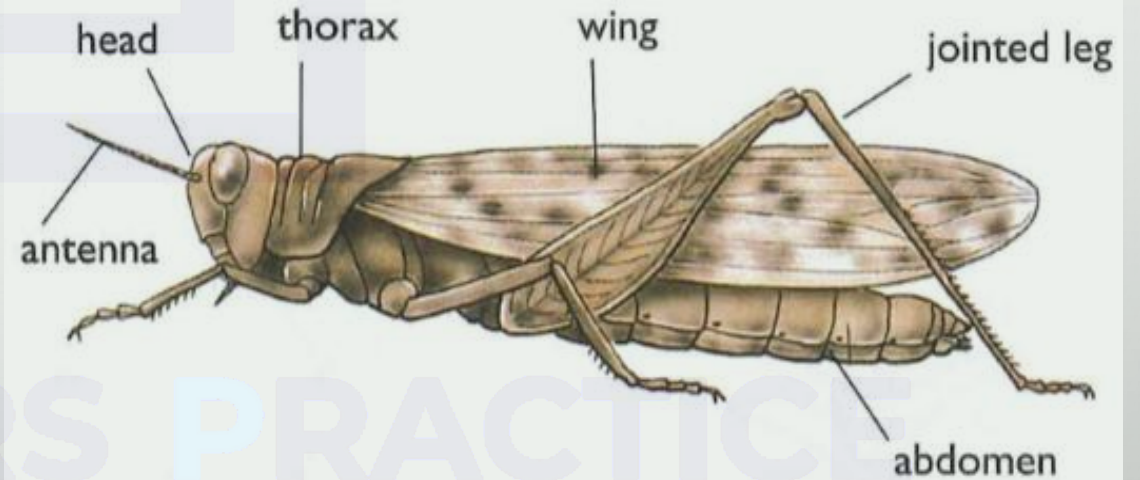
classification

classifying animals——phylum arthropods

insects

- ◆ three pairs of jointed legs
- ◆ two pairs of wings (one or both may be vestigial)
- ◆ breathe through tracheae
- ◆ body divided into head, thorax and abdomen

Locust



© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals——phylum arthropods

crustaceans

- ◆ more than four pairs of jointed legs
- ◆ not millipedes or centipedes
- ◆ breathe through gills

Edible crab

exoskeleton containing
calcium salts

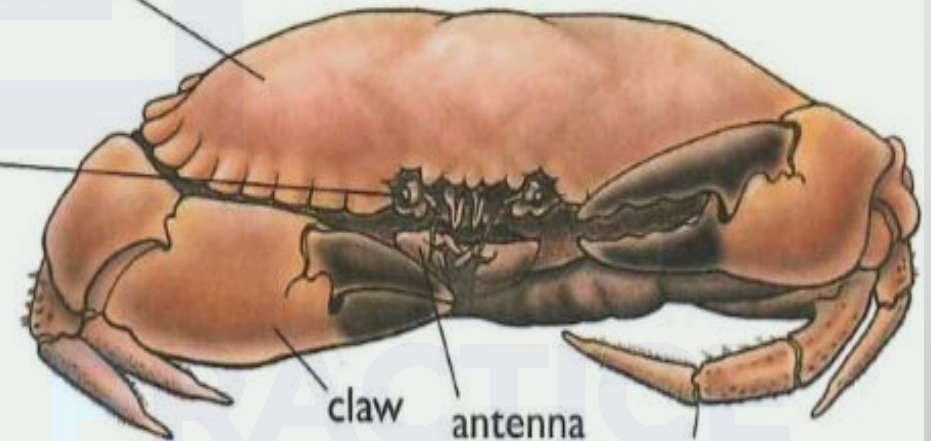
eye

2 cm

claw

antenna

jointed leg



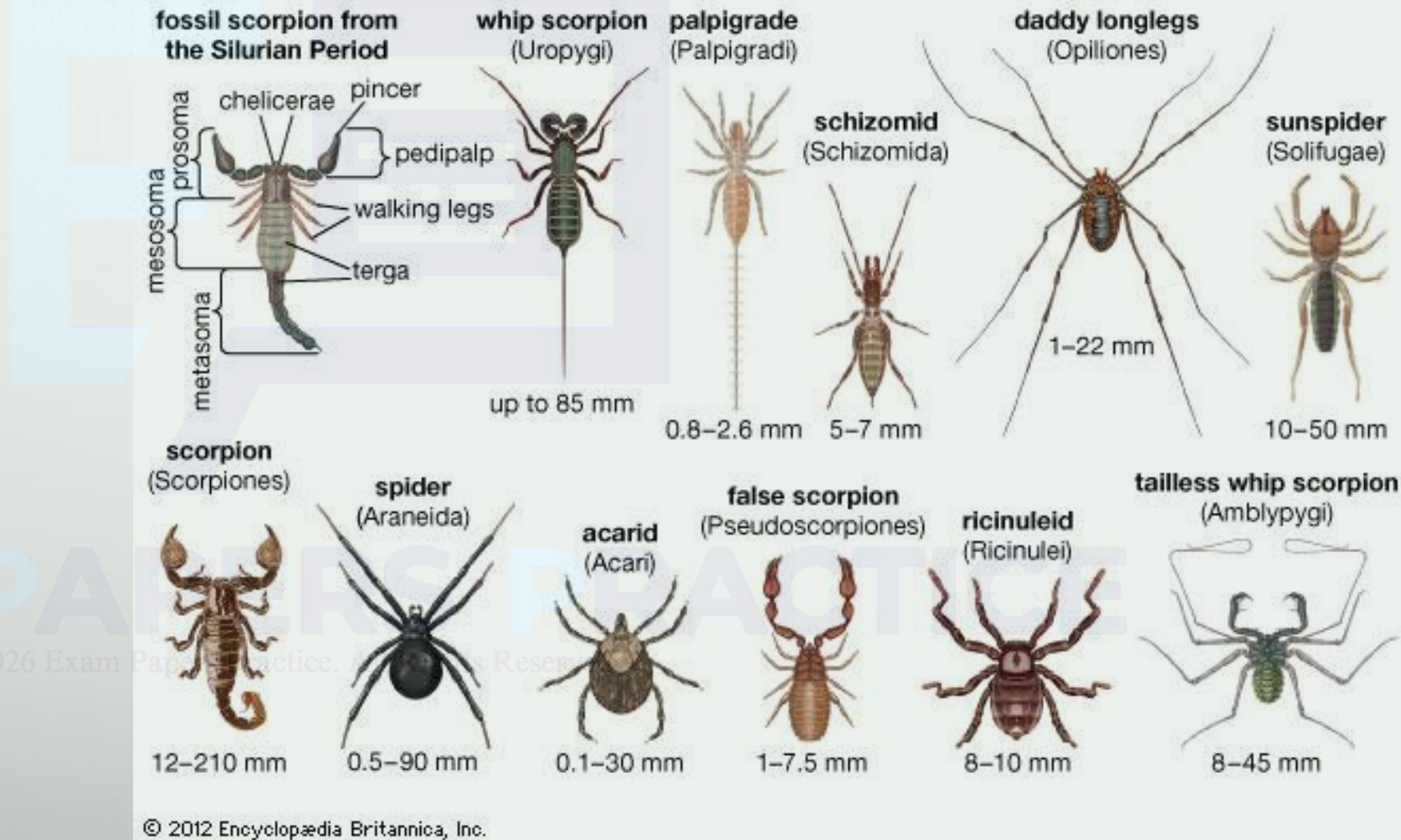
© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals—phylum arthropods

arachnids

- ◆ four pairs of jointed legs
- ◆ breathe through gills called book lungs

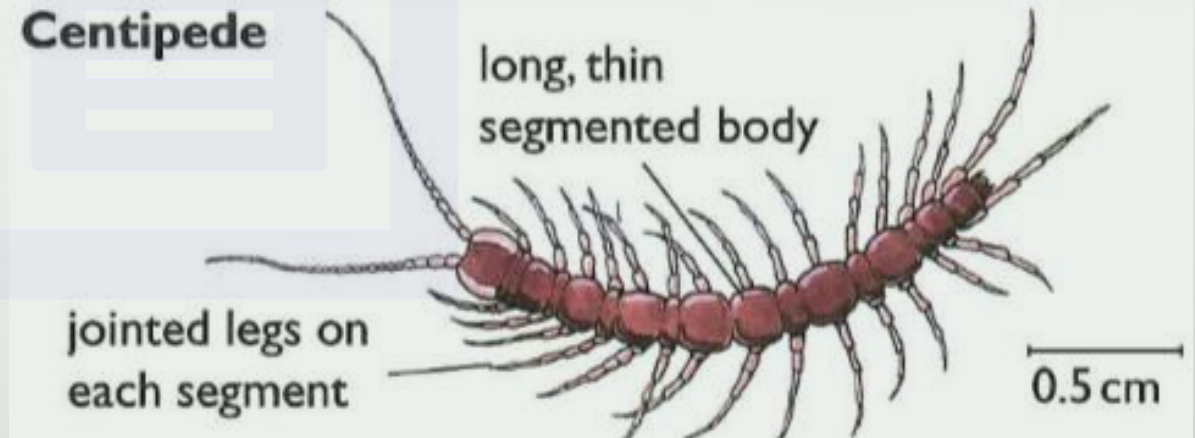


classification

classifying animals——phylum arthropods

myriapods

- ◆ many segments
- ◆ each segment has jointed legs



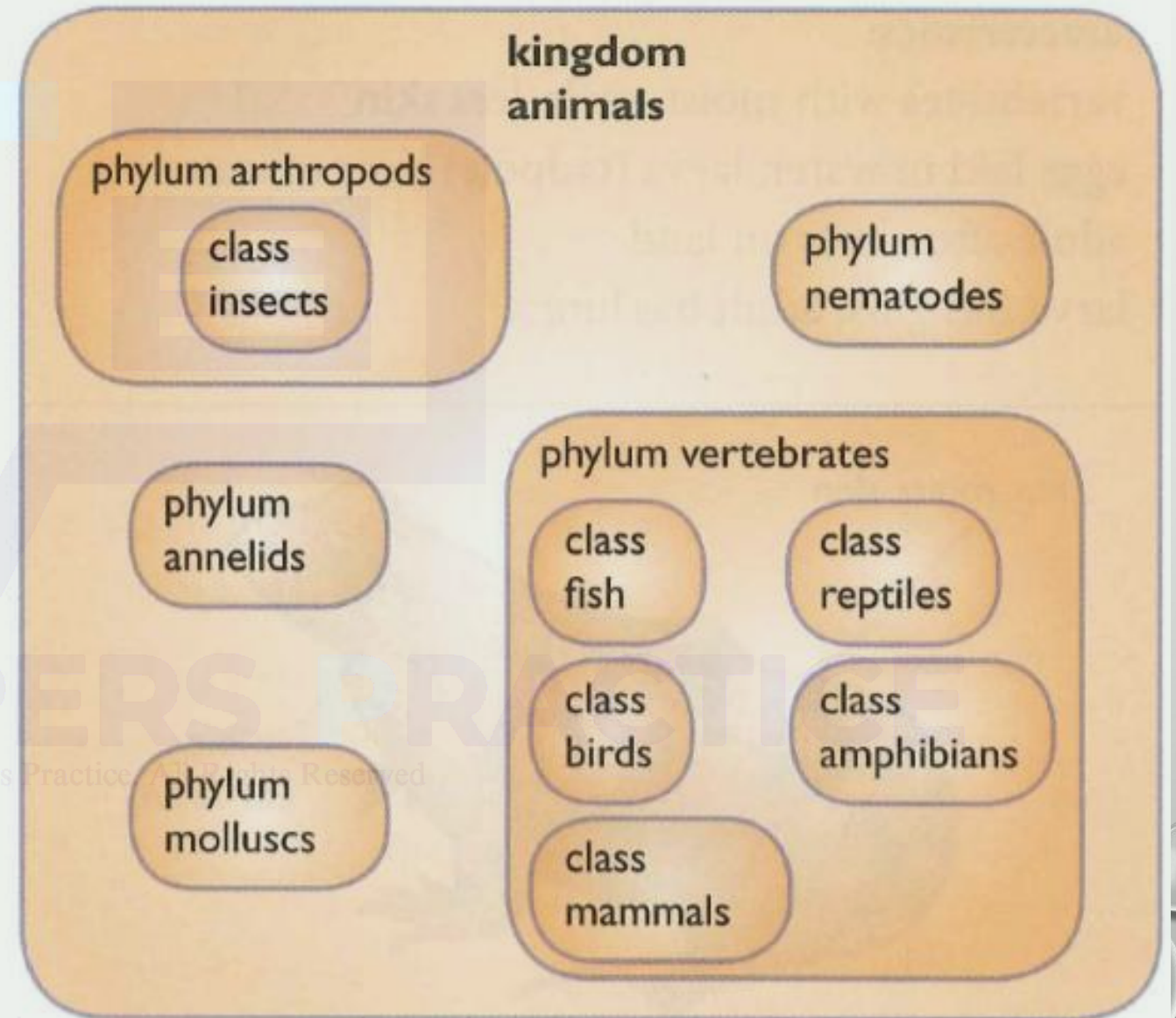
EXAM PAPERS PRACTICE

© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals

vertebrate 脊椎动物
invertebrate 无脊椎动物
arthropod 节肢动物
reptile 爬行动物
amphibian 两栖动物

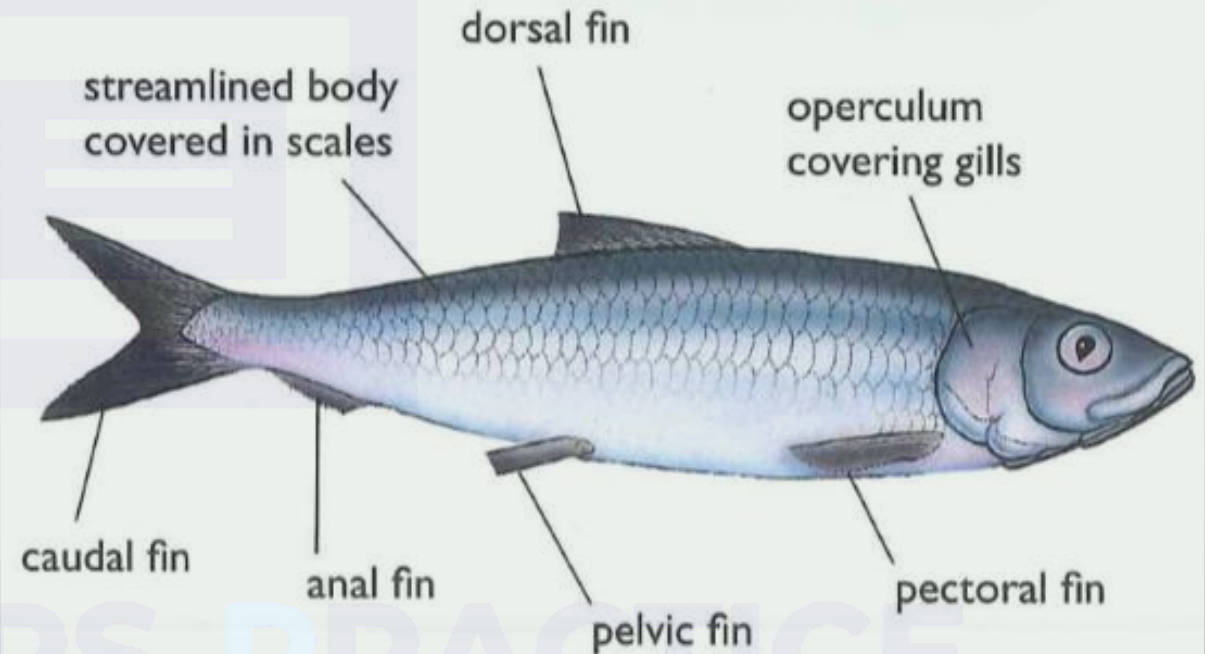


classification

classifying animals——phylum vertebrate

fish

- ◆ vertebrate with scaly skin
- ◆ gills
- ◆ fins



© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals——phylum vertebrate

amphibians

- ◆ moist, scale-less skin
- ◆ eggs laid in water, larva (tadpole) lives in water
- ◆ adult often lives on land
- ◆ larva has gills, adult has lungs



© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals——phylum vertebrates

Reptiles

- ◆ scaly skin
- ◆ lay eggs with rubbery shells



EXAM PAPER

© 2026 Exam Papers Practice

For more help, please visit www.

classification

classifying animals——phylum vertebrate

Birds

- ◆ vertebrates with feathers
- ◆ forelimbs have become wings
- ◆ lay eggs with hard shells
- ◆ endothermic
- ◆ have a beak
- ◆ heart has four chambers



REAL LIFE ANGRY BIRDS
(compiled by <http://rooturaj.com>)

classification

classifying animals——phylum vertebrate

mammals

- ◆ hair
- ◆ placenta
- ◆ feed on milk
- ◆ endothermic
- ◆ diaphragm
- ◆ heart has four chambers
- ◆ different types of teeth (incisors, canines, premolars and molars)



List three ways in which all mammals differ from all birds

Explain why bats are classified as mammals, even though they have wings

EXAM PAPERS PRACTICE

© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals——phylum
arthropods

arthropods

- ◆ several pairs of jointed legs
- ◆ exoskeleton

Arthropods

 bee	 ladybug	 butterfly
 dragonfly	 beetle	 crab
 spider	 caterpillar	 katydid
 moth	Arthropods are the most numerous animals on earth. They have an exoskeleton, a segmented body, and jointed legs. They do not have a backbone and are cold-blooded.	
		Can you discover other Arthropods?

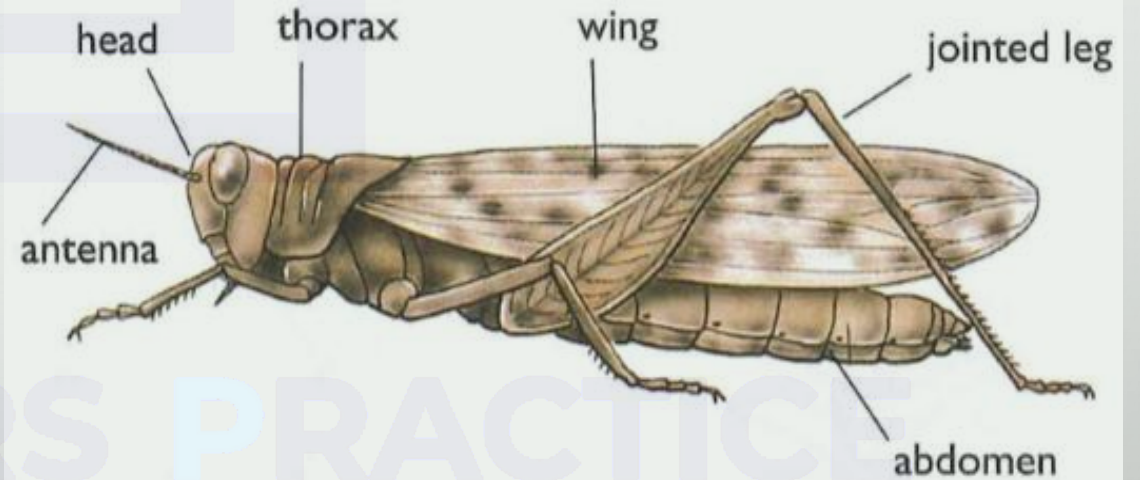
classification

classifying animals——phylum arthropods

insects

- ◆ three pairs of jointed legs
- ◆ two pairs of wings (one or both may be vestigial)
- ◆ breathe through tracheae
- ◆ body divided into head, thorax and abdomen

Locust



© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals——phylum arthropods

crustaceans

- ◆ more than four pairs of jointed legs
- ◆ not millipedes or centipedes
- ◆ breathe through gills

Edible crab

exoskeleton containing
calcium salts

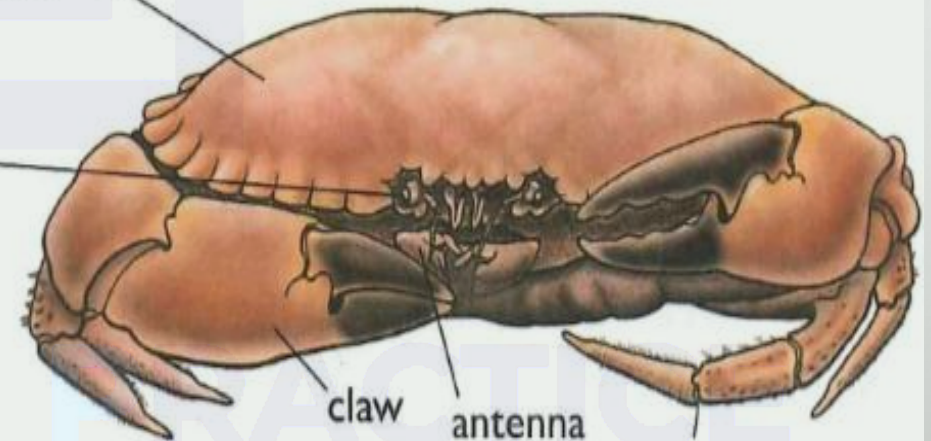
eye

2 cm

claw

antenna

jointed leg



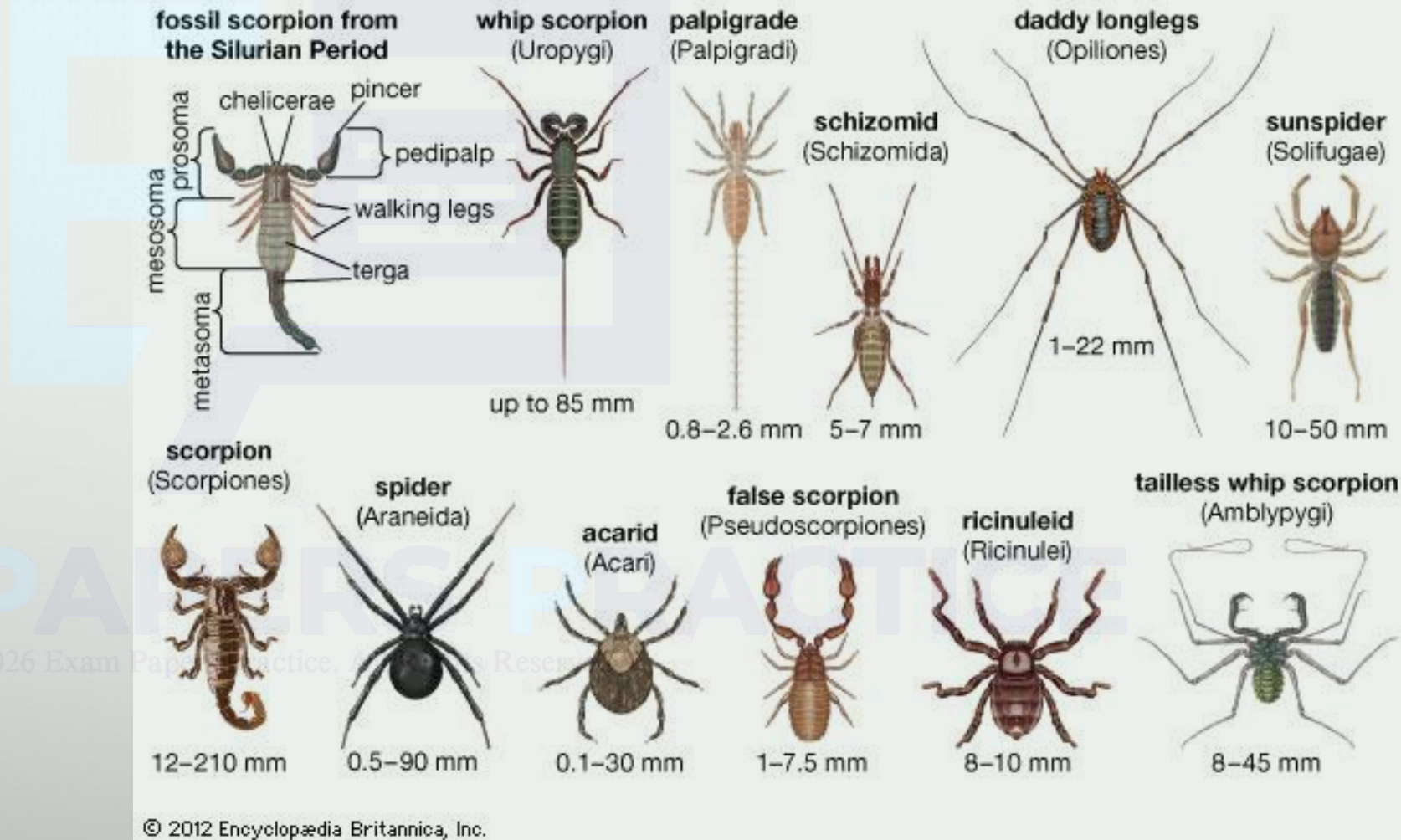
© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying animals—phylum arthropods

arachnids

- ◆ four pairs of jointed legs
- ◆ breathe through gills called book lungs

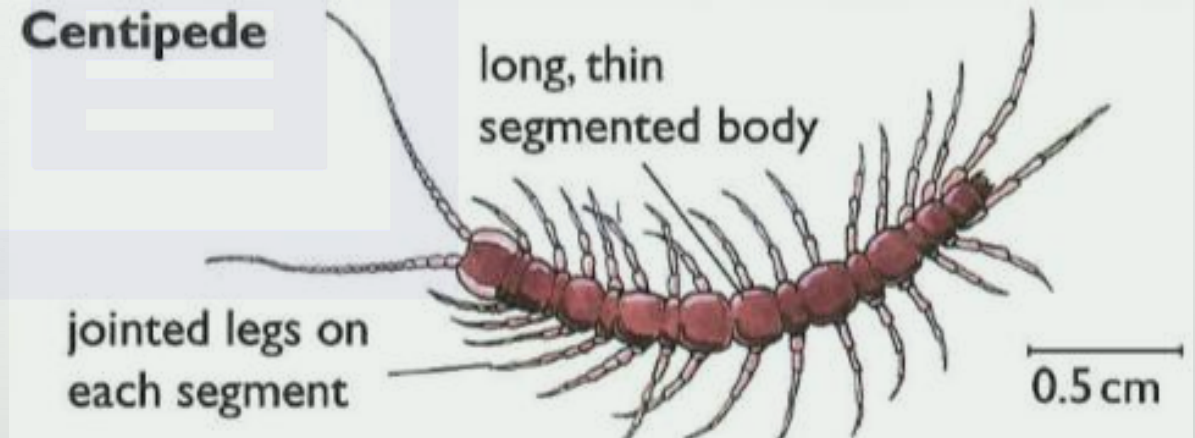


classification

classifying animals—phylum arthropods

myriapods

- ◆ many segments
- ◆ each segment has jointed legs



EXAM PAPERS PRACTICE

© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying plants

plants

- ◆ multicellular
- ◆ cell wall (cellulose)
- ◆ chloroplast, photosynthesis (not all)
- ◆



classification

classifying plants — ferns

ferns

- ◆ roots, stems and leaves
- ◆ have leaves called fronds
- ◆ do not produce flowers
- ◆ reproduce by spores

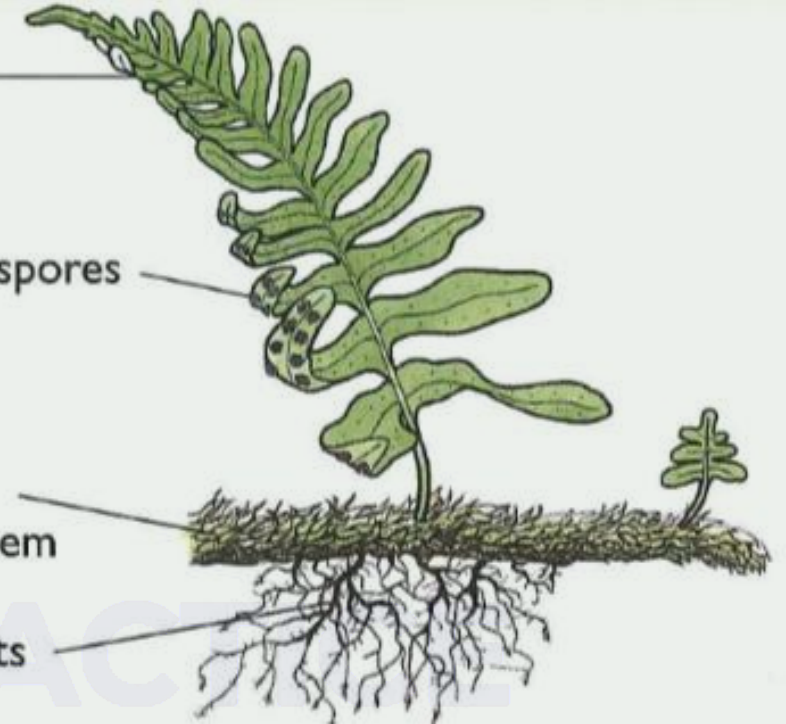
Fern

frond

sporangia with spores

rhizome – an
underground stem

roots



© 2026 Exam Papers Practice. All Rights Reserved

classification

classifying plants — flowering plants

Flowering plants

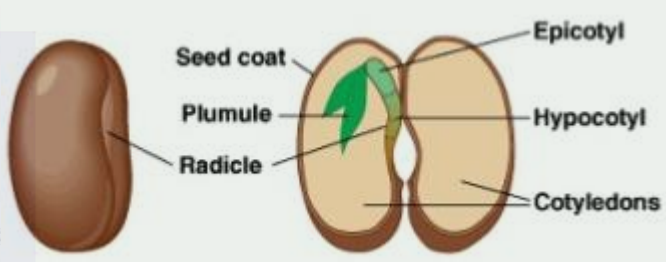
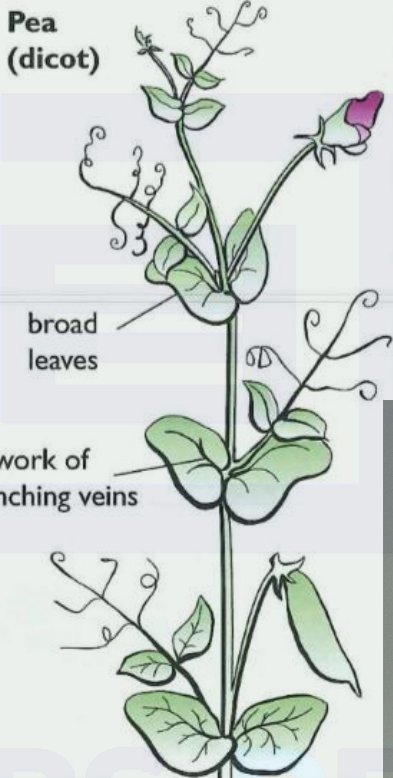
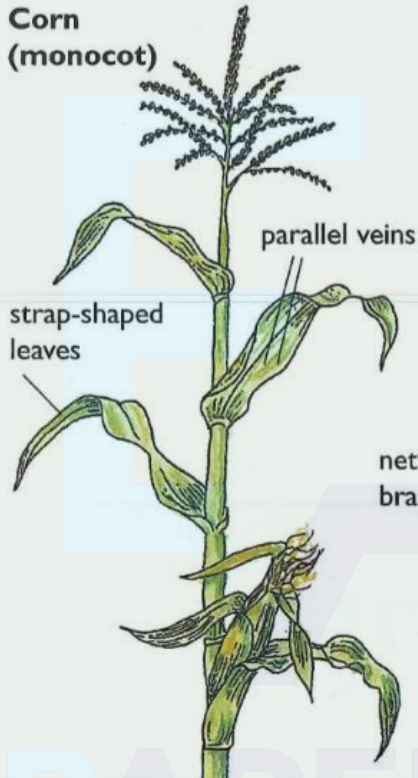
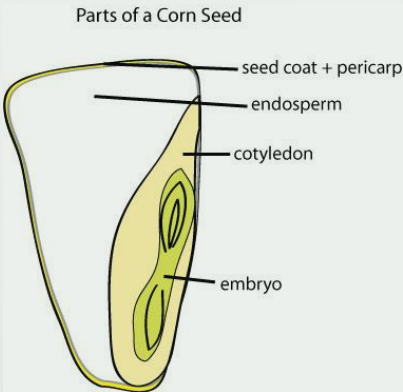
- ◆ roots, stems and leaves
- ◆ reproduce sexually by means of flowers and seeds
- ◆ seeds are produced inside the ovary, in the flower



© 2026 Exam Papers Practice. All Rights Reserved

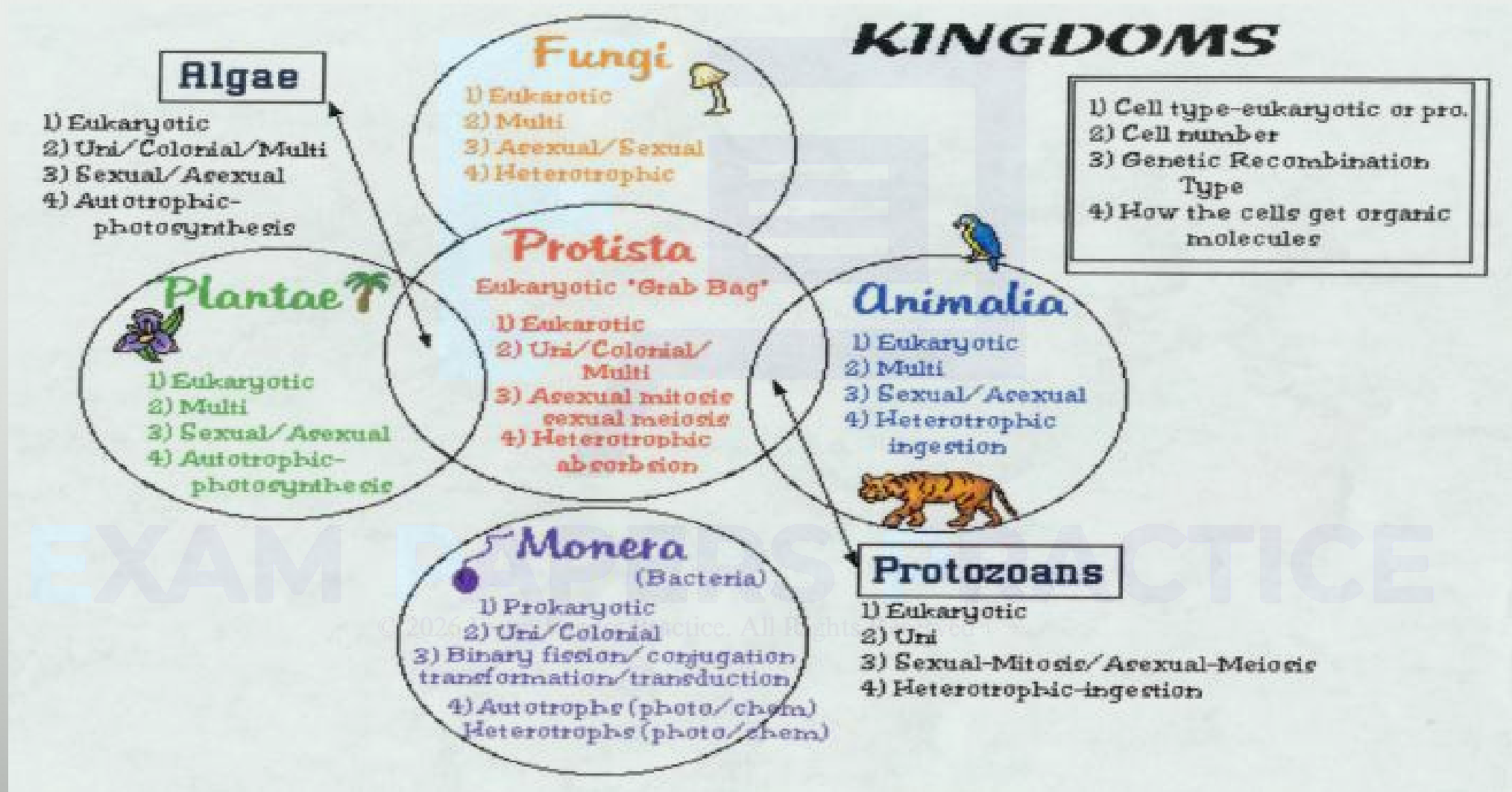
classification

classifying plants — flowering plants

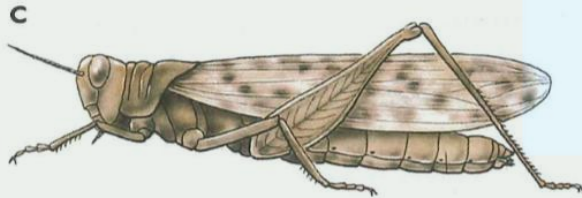
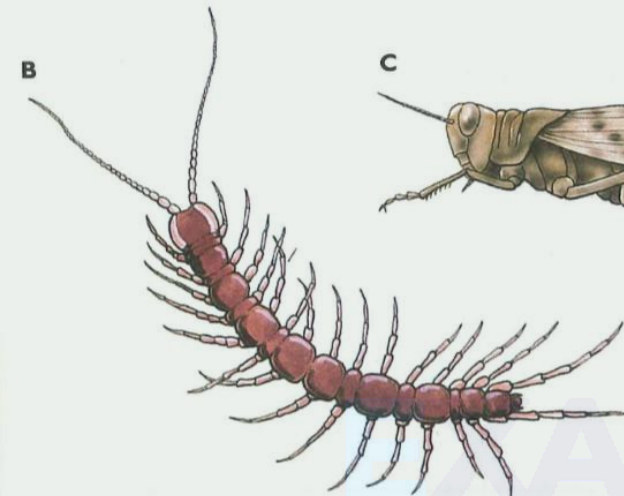
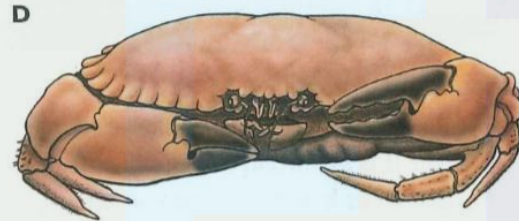
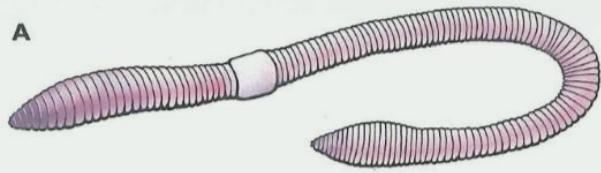


Flowering plants

Monocotyledon (monocot)	Dicotyledon (dicot)
Parallel vein (leaf)	Net vein (leaf)



classification



1	jointed limbs	2
	no jointed limbs	earthworm
2	more than 5 pairs of jointed limbs	centipede
	5 or fewer pairs of jointed limbs	3
3	first pair of limbs form large claws	crab
	no large claws	4
4	3 pairs of limbs	locust
	4 pairs of limbs	spider

© 2026 Exam Papers Practice. All Rights Reserved

A **key** is a way of leading you through to the name of your organism by giving you two descriptions at a time, and asking you to choose between them.

Dichotomous key

classification

keys—constructing keys



EXAM PAPERS PRACTICE

© 2026 Exam Papers Practice. All Rights Reserved



EXAM PAPERS PRACTICE

© 2026 Exam Papers Practice. All Rights Reserved

For more help, please visit www.exampaperspractice.co.uk