

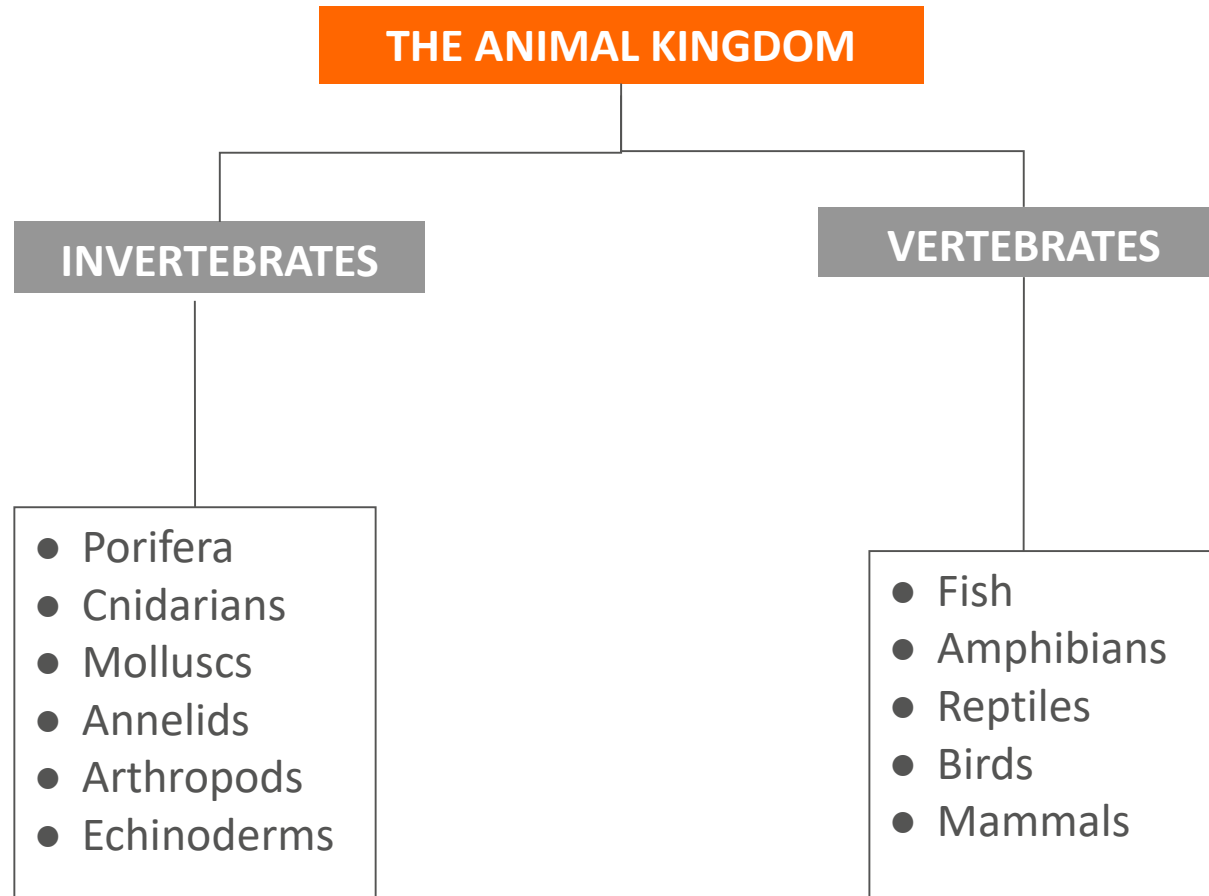
The Animal Kingdom

Invertebrates y Vertebrates

1º ESO

THE ANIMAL KINGDOM

Clasification



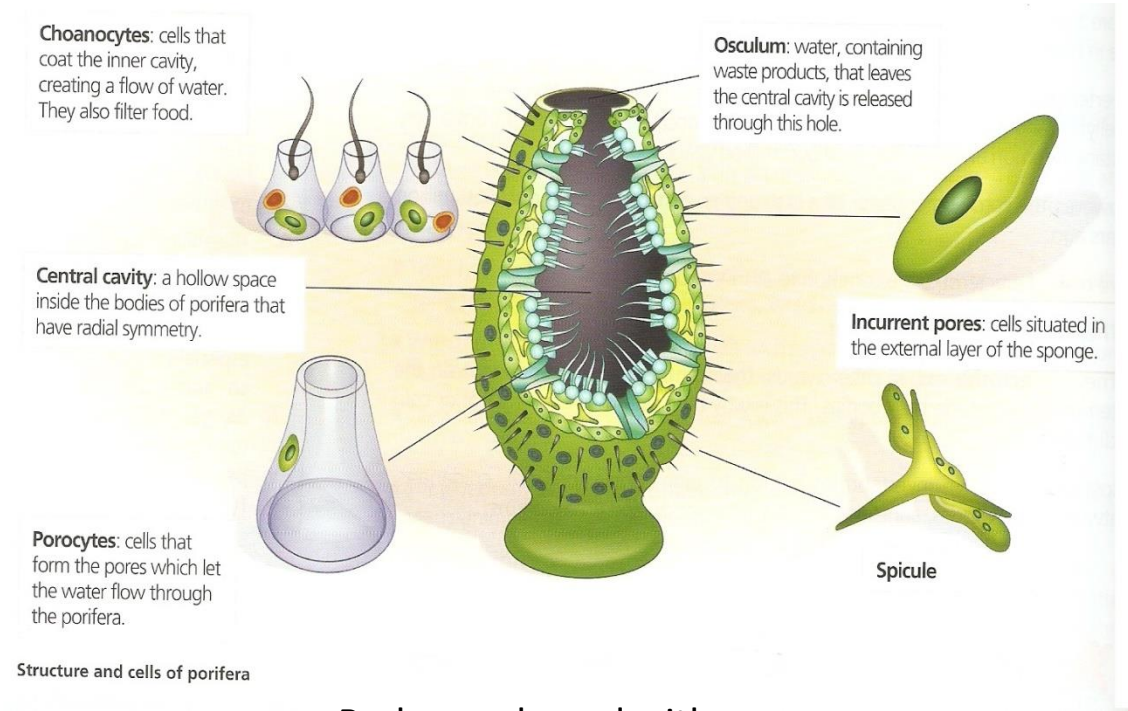
THE ANIMAL KINGDOM
 Invertebrates.
 Porifera

1) Porifera

SPONGES



WATER CIRCULATION



Body sac shaped with many pores
 Spicules and spongin
 Filtration process

Porifera

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Porifera	Sponges	Aquatic (marine and fixed to the bottom in shallow waters).	<ul style="list-style-type: none"> - Sack-like shape. - Perforated walls (porocytes). - Internal cavity (atrium) - Osculum (large hole) - Choanocytes (cells with flagella). - Spongin (pinacocytes) - Spicules 			<p>The choanocytes generate a current that causes water to enter with nutrients and O₂ and exit with waste and CO₂ through the osculum.</p> <p>Sexual reproduction (male and female cells → larvae).</p> <p>Asexual reproduction (fragmentation). sponges</p>	Sponges

Porifera

1. **Spicules:** rigid spines that form the skeleton of certain porifera.
2. **Choanocytes:** cells with flagella that cover the inner cavity and create a stream of water for breathing and feeding.
3. **Atrium:** hollow central cavity lined with choanocytes.
4. **Porocytes:** cells that form the pores which let water flow into the sponge.
5. **Pinacocytes:** cells on the sponge's external layer (spongin).
6. **Osculum:** large hole used to release water and waste substances.

THE ANIMAL KINGDOM

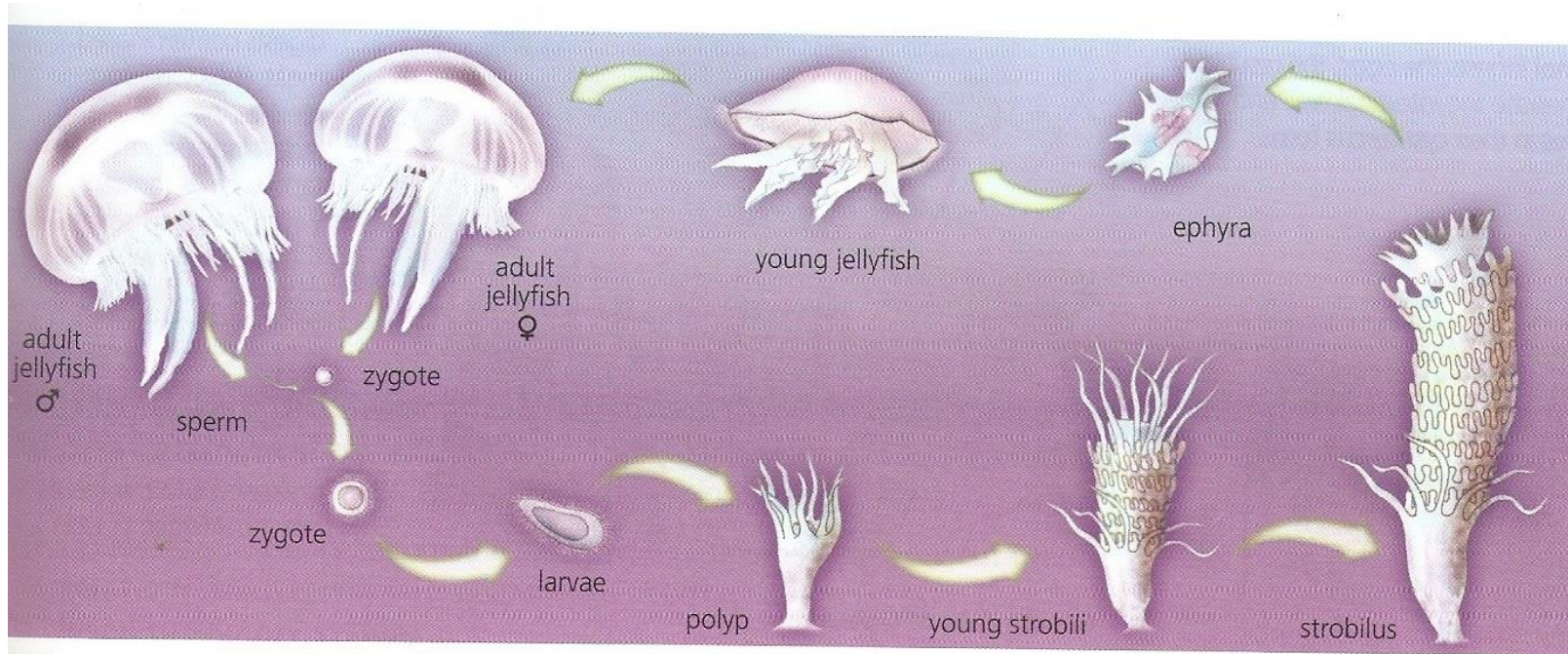
Invertebrates.

Cnidarians

Cnidoblasts

2) Cnidarians

- Polyps: internal or external skeleton “sessile”
- Jellyfish: hydrostatic skeleton



Cnidarian alternate reproduction

- Tentacles with cnidoblasts
- Digestive cavity
- Mouth-anus

Cnidarians

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Cnidarians	-Polyps -Medusae	Aquatic (freshwater and saltwater).	Sack-like shape (polyp) or umbrella-like gelatinous shape (medusae).	They lack a respiratory or excretory system → directly exchange gases with water.	-Tentacles. - <u>Cnidoblasts</u> (stinging cells). -Venom that paralyzes prey. -Digestive cavity. -Mouth-anus opening.	<u>Alternate reproduction.</u>	Freshwater hydra, Jellyfish, Coral Sea anemone.

Cnidarians

- 7. **Cnidoblasts:** Specialized cells with flagella that produce a venom to catch preys in cnidarians.
- 8. **Gastrovascular cavity:** A central digestive chamber found in certain animals like cnidarians.
- 9. **Tentacles:** Elongated, flexible structures often equipped with stinging cells, found in some animals like jellyfish.
- 10. **Polyp:** A cylindrical body form in cnidarians, such as sea anemones.
- 11. **Sessile:** Refers to organisms that are attached or fixed in one place and do not move.

THE ANIMAL KINGDOM
Invertebrates.
Molluscs

3) Molluscs

CEPHALOPODS



Squid
Octopus

BIVALVES



Mussel
Clam

GASTROPODS



Snail
Slug

THE ANIMAL KINGDOM

Invertebrates.

Molluscs

3) Molluscs

Mantle and internal organs

Shell

Muscular foot/siphon

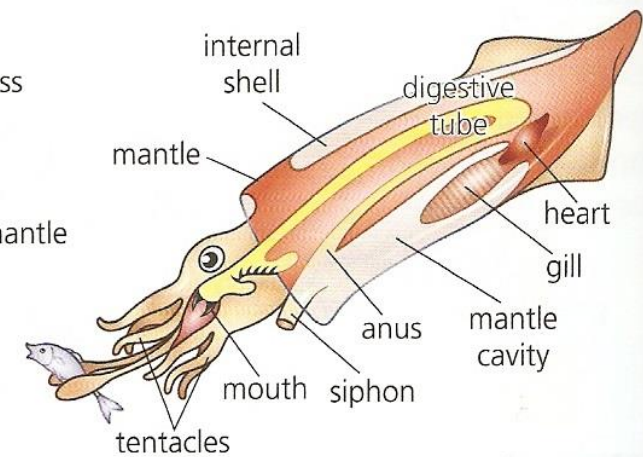
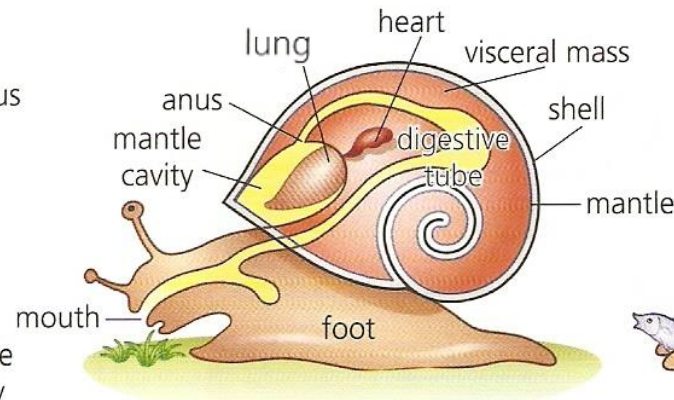
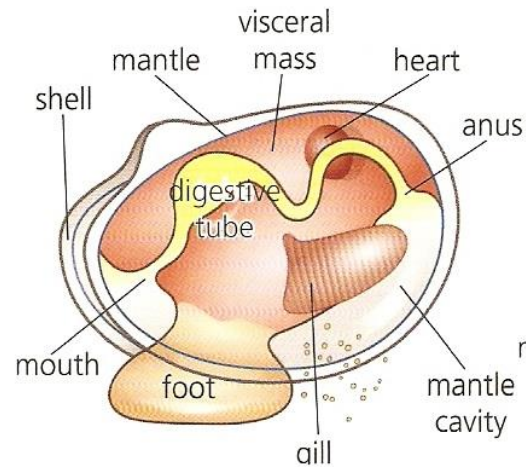
Very well developed sense organs

Lung/gills



Snail radula

Radula: to scrape and grind food



The bodies of different groups of molluscs

Molluscs

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
<i>Molluscs</i>	<ul style="list-style-type: none"> - <u>Bivalves</u> - <u>Gastropods</u> - <u>Cephalopods</u> 	Aquatic and terrestrial.	<ul style="list-style-type: none"> - <u>Soft body</u> (mantle and visceral mass). - <u>Shell.</u> - <u>Muscular foot</u> (anchorage, hunting, movement). - Developed sensory organs/heart. 	<ul style="list-style-type: none"> <u>Gills</u> (aquatic) <u>Lung</u> (terrestrial). 	<ul style="list-style-type: none"> -Have a <u>radula</u> to triturate food. -Complete digestive system -Diet diverse 	<ul style="list-style-type: none"> <u>Sexual</u> reproduction (egg or larva). Hermaphroditic. 	Clam, Snail, Squid

Molluscs

16. **Radula:** A tongue-like organ with tiny, chitinous teeth found in molluscs.
17. **Visceral mass:** The central mass containing the organs in molluscs.
18. **Mantle:** A fold of tissue that drapes over the visceral mass in molluscs.
19. **Muscular foot:** A large, muscular organ used for movement in molluscs.
20. **Siphon:** A tube-like structure through which water is expelled or taken in by certain molluscs.

THE ANIMAL KINGDOM

Invertebrates.

Annelids

4) Annelids



Clitellum

Earthworms feed on the remains of animals and plants.



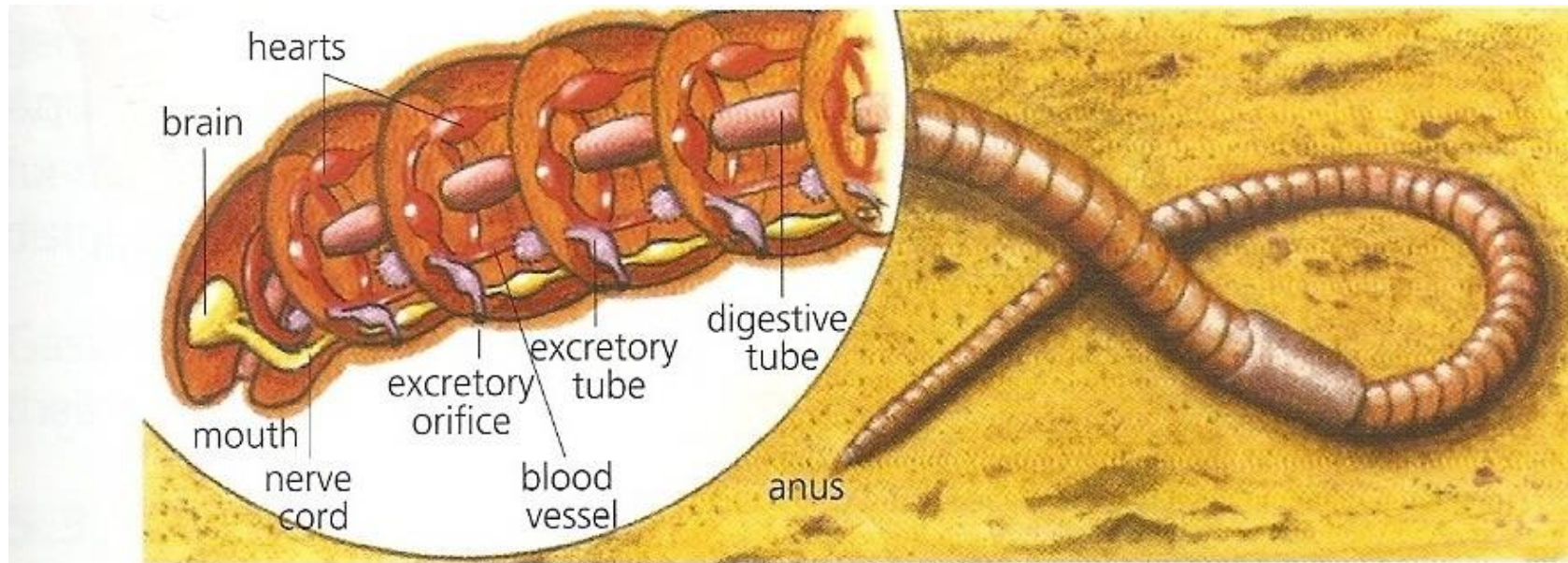
Leeches feed on the blood of vertebrates

THE ANIMAL KINGDOM
Invertebrates.
Annelids

4) Annelids

CUTANEOUS RESPIRATION / GILLS

METAMERES



Anatomy of an annelid

Sexual reproduction (cross-fertilisation)
Hermaphrodite

Annelids

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Annelids	Worms: -Platyhelminthes -Nematodes -Annelids	Earthworms (terrestrial, requiring humidity) Leeches (aquatic).	- <u>Metameres</u> : segmented structure (organs like excretory tubes, digestive, nerves, and blood vessels are repeated). -Thickened ring: <u>clitellum</u> .	<u>Cutaneous</u> respiration (moist skin). (terrestrial) <u>Gills</u> (aquatic).	Through the digestive system (mouth-segment-anus).	Sexual reproduction (hermaphroditic or separate sexes).	Earthworms, Leeches.

Annelids

- 12. **Metameres:** Repeated body segments in certain animals like earthworms.
- 13. **Clitellum:** A specialized reproductive structure in earthworms and leeches.
- 14. **Cutaneous respiration:** Breathing through the skin, as seen in certain amphibians.
- 15. **Hermaphrodite:** An organism with both male and female reproductive organs.

THE ANIMAL KINGDOM

Invertebrates.

Arthropods

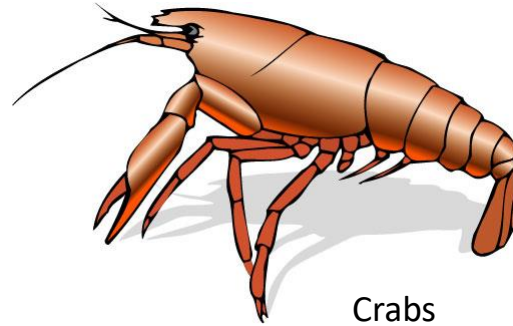
5) Arthropods

MYRIAPODS



Diplopoda
Chilopoda

CRUSTACEANS



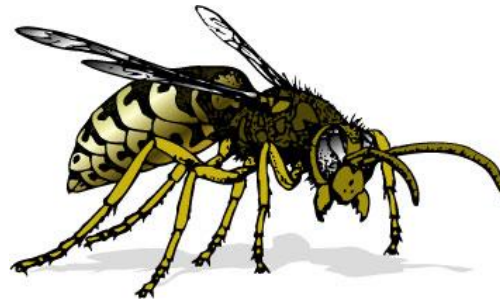
Crabs
Prawns
Lobsters

ARACHNIDS



Scorpions
Spiders
Mites

INSECTS



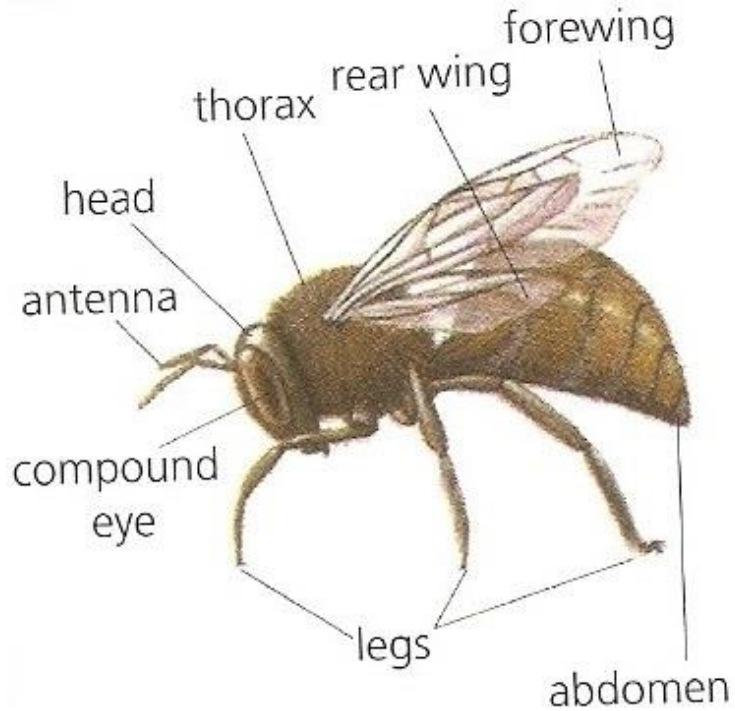
Bees
Mosquitoes
Butterfly
Ants

THE ANIMAL KINGDOM

Invertebrates.

Arthropods

5) Arthropods



Articulated parts: appendages

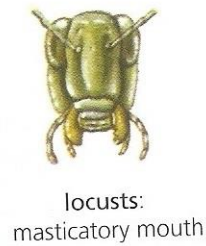
Segmented bodies:
head, thorax and abdomen

Exoeskeleton (chitin)

Tracheae (terrestrial) and gills (aquatic)

Moulting or ecdysis

Metamorphosis



locusts:
masticatory mouth



fly: licker
mouth



butterfly:
sucking mouth



mosquito:
biting mouth

Arthropods

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Arthropods	<ul style="list-style-type: none"> - <u>Myriapods</u> - <u>Arachnids</u> - <u>Crustaceans</u> - <u>Insects</u> 	All known environments.	<p>Body with:</p> <ul style="list-style-type: none"> - <u>Segments</u>: head, thorax, abdomen. - <u>Articulated parts</u>: (legs, wings, and antennae, jaws). - <u>Exoskeleton</u> or external skeleton. - <u>Moulting process or ecdysis</u> (shedding the rigid exoskeleton to facilitate growth). - Nerves, sensory organs, flight. 	<p><u>Gills</u> (aquatic)</p> <p><u>Tracheae</u> (terrestrial)</p>	Mouth with adaptations (to different types of food).	Sexual reproduction: eggs (simple or complete <u>metamorphosis</u>).	<p>Millipede</p> <p>Spider, scorpion</p> <p>Lobster, crab</p> <p>Flies, butterfly</p>

Arthropods

- 21. **Articulated appendages:** Jointed appendages, characteristic of arthropods.
- 22. **Ecdysis or moulting:** The replacement of the old exoskeleton by a new one in arthropods to grow.
- 23. **Metamorphosis:** The transformations that arthropods can undergo from the initial stage to reach the adult stage.
- 24. **Exoskeleton:** A hard, external skeleton that provides support and protection in arthropods.
- 25. **Chitin:** The substance that forms the exoskeleton in arthropods.

THE ANIMAL KINGDOM
Invertebrates.
Echinoderms

6) Echinoderms

ECHINOIDS



Sea urchins

ASTEROIDEANS



Starfish

HOLOTHURIANS



Sea cucumber

THE ANIMAL KINGDOM

Invertebrates.

Echinoderms

Dermoskeleton

Ambulacral system

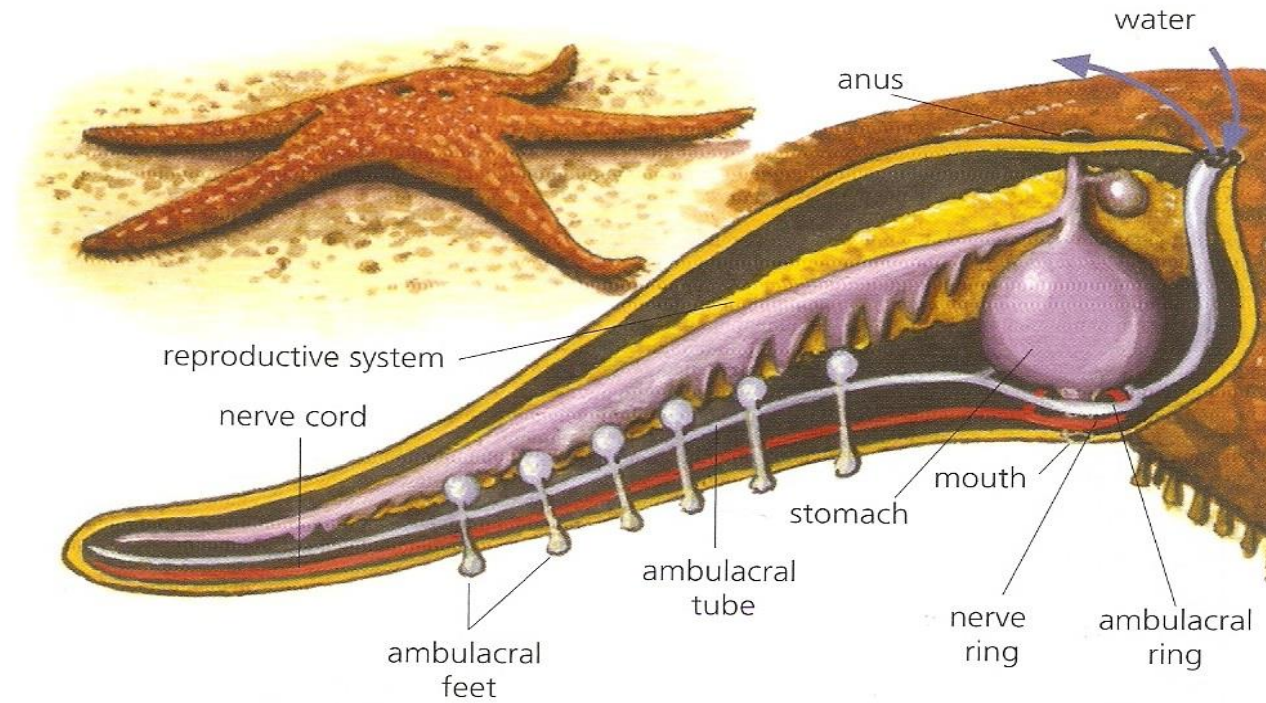
Ambulacral feet

Aristotle's lantern

6) Echinoderms

Sexual reproduction

Asexual reproduction (fragmentation)



The internal anatomy of an echinoderm

Echinoderms

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
<i>Echinoderms</i>	<p><u>-Echinoids</u></p> <p><u>-Asteroids</u></p> <p><u>-Holothuroids</u></p>	Aquatic (marine)	<p>-They have an <u>ambulacral system</u> (body divided into thin tubes ending in an ambulacral or tube foot).</p> <p>-Calcereous skeleton: <u>dermoskeleton.</u></p>	<u>Gills/ambulacral system</u>	<p>-Digestive system (mouth and anus).</p> <p><u>- Aristotle's Lantern:</u> (masticatory apparatus).</p> <p>-Starfish (carnivorous) Sea urchin (herbivores) and sea cucumber (detritivores)</p>	<p>Sexual reproduction (separate male and female individuals – form swimming larvae).</p> <p>Asexual (fragmentation)</p>	<p>Sea urchin</p> <p>Starfish</p> <p>Sea cucumber</p>

Echinoderms

- 26. **Aristotle's Lantern:** A complex masticatory structure found in sea urchins.
- 27. **Dermoskeleton:** A type of skeleton formed from the skin, seen in certain marine animals.
- 28. **Ambulacral system:** A water vascular system in echinoderms, such as starfish.

THE ANIMAL KINGDOM
Vertebrates. Fish

1) Fish

CARTILAGINOUS FISH



Shark
Ray

BONY FISH



Hake
Carp

THE ANIMAL KINGDOM

Vertebrates. Fish

1) Fish

Ectothermic aquatic vertebrates

Fusiform body

Gills (operculum)

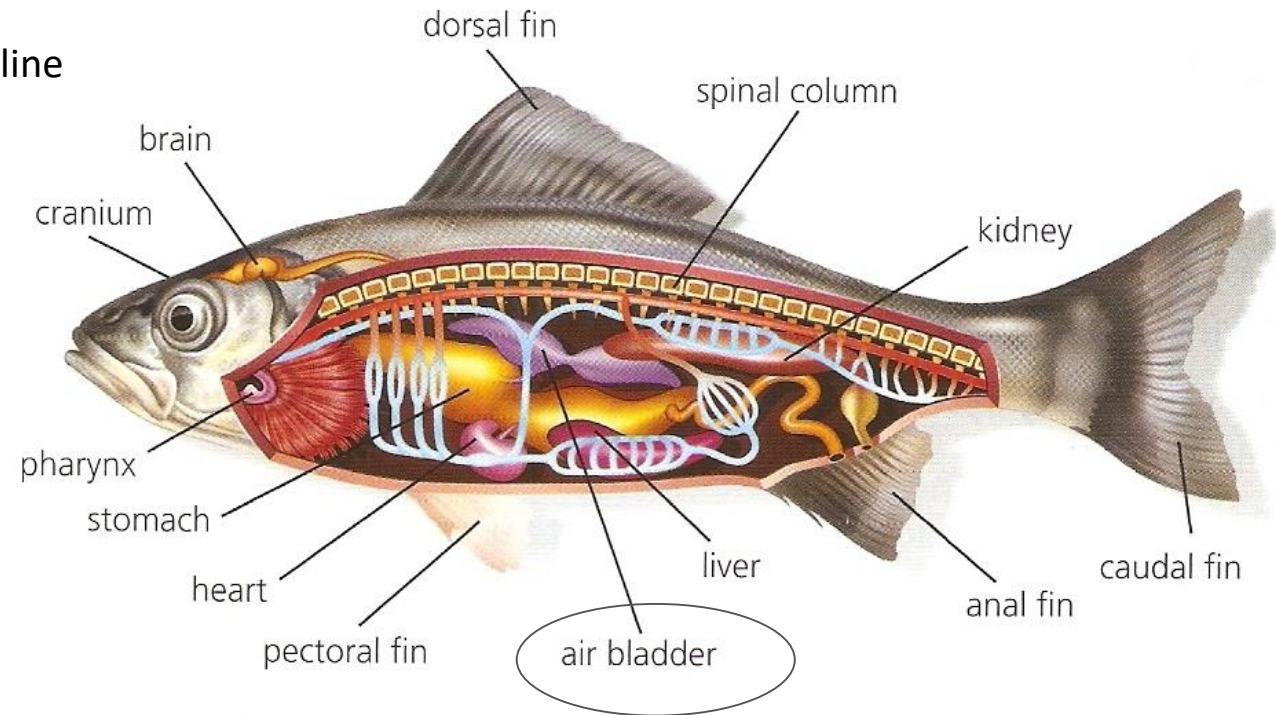
Cloaca

Fin(s)

Scales

Lateral line

Sexual (oviparous)



Fish

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Fish	<p><u>Cartilaginous</u></p> <p><u>Bony</u></p>	Aquatic environment (fresh or saltwater).	<p>-Head, trunk, and tail (fusiform).</p> <p>-<u>Fins</u> for swimming.</p> <p>-<u>Operculum</u> (protects the gills).</p> <p><u>Swim bladder</u> (buoyancy and balance).</p> <p><u>Lateral line</u> (sensory organ).</p> <p><u>Ectothermic</u> (cold-blooded).</p>	<u>Gills.</u>	<p>-Generally carnivorous (others are herbivores and omnivores, detritivores).</p> <p><u>-Cloaca.</u></p>	<p>Sexual reproduction.</p> <p>Oviparous (fry hatch from eggs).</p> <p>Oviparous, ovoviviparous and viviparous.</p>	<p>Shark</p> <p>Seahorse...</p>

Fish

29. **Ectotherm:** An organism that relies on external sources to regulate its body temperature in fish, amphibians, reptiles.
30. **Endotherm:** An organism capable of maintaining a constant internal body temperature in birds and mammals.
31. **Operculum:** It is the protective structure of the gills in bony fish.
32. **Swim bladder:** An internal gas-filled organ that helps fish control buoyancy.
33. **Lateral line:** A sensory organ in fish that detects changes in water pressure.
34. **Gills:** Respiratory organs in aquatic animals that extract oxygen from water.
35. **Fusiform:** It is the characteristic shape of fish and birds that is wider in the center than on the sides.
36. **Detritivores:** Organisms that feed on dead and decaying organic matter.

THE ANIMAL KINGDOM
Vertebrates.
Amphibians

2) Amphibians

ANURA



Toad
Frog

URODELA



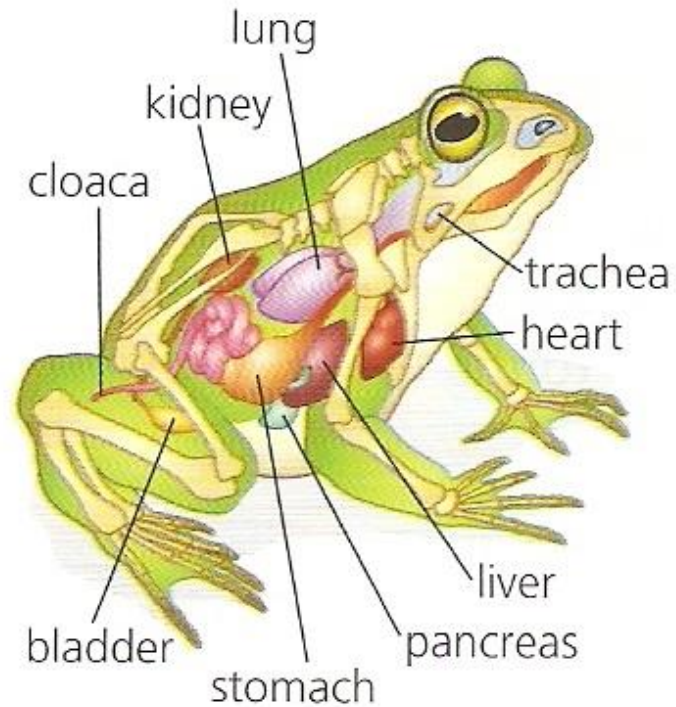
Salamander
Newt

THE ANIMAL KINGDOM

Vertebrates.

Amphibians

2) Amphibians



Internal anatomy of a frog

Ectothermic vertebrates

Terrrestrial/aquatic

Bare skin (glands-moisture)

Tetrapods

Cloaca

Cutaneous/ gills/ lung

Head /neck/ torso/ tail

Sexual (oviparous)

Metamorphosis (tadpoles-larvae phase)

Amphibians

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Amphibians	<p>-<u>Anurans (tailless).</u></p> <p>-<u>Urodeles (with tail)</u></p>	<p>Terrestrial but always in humid areas.</p> <p>In their initial stage, they live in water.</p>	<p>-<u>Moist skin</u> without scales.</p> <p>Eyes with eyelids / emit sounds.</p> <p>-<u>Larva</u>: large tail without limbs.</p> <p>-Adult: develop limbs (tetrapod). Some lose the tail.</p> <p><u>Ectothermic.</u></p>	<p>Three systems:</p> <p><u>Gills (larva)</u></p> <p><u>Lungs and cutaneous. (adult)</u></p>	<p>-Herbivores (tadpole) and carnivorous (adult).</p> <p>Long, sticky tongue.</p> <p><u>-Cloaca.</u></p>	<p>Sexual reproduction: Oviparous (lay eggs).</p> <p><u>Metamorphosis.</u> Larva (tadpole) transforms into an adult.</p>	<p>Frogs Toads</p> <p>Salamander Newts.</p>

Amphibians

- 37. Anurans:** Frogs and toads, belonging to the order Anura (tailless).
- 38. Urodela:** Salamanders and newts, belonging to the order Urodela (with tail).
- 39. Tetrapod:** A vertebrate with four limbs, including amphibians, reptiles, birds, and mammals.

THE ANIMAL KINGDOM

Vertebrates.

Reptiles

3) Reptiles

Ectothermic

Lungs

Oviparous

CHELONIA



Turtles
Tortoises

SAURIA



Lizards
Chameleons

OPHIDIA



Snakes

CROCODILIA



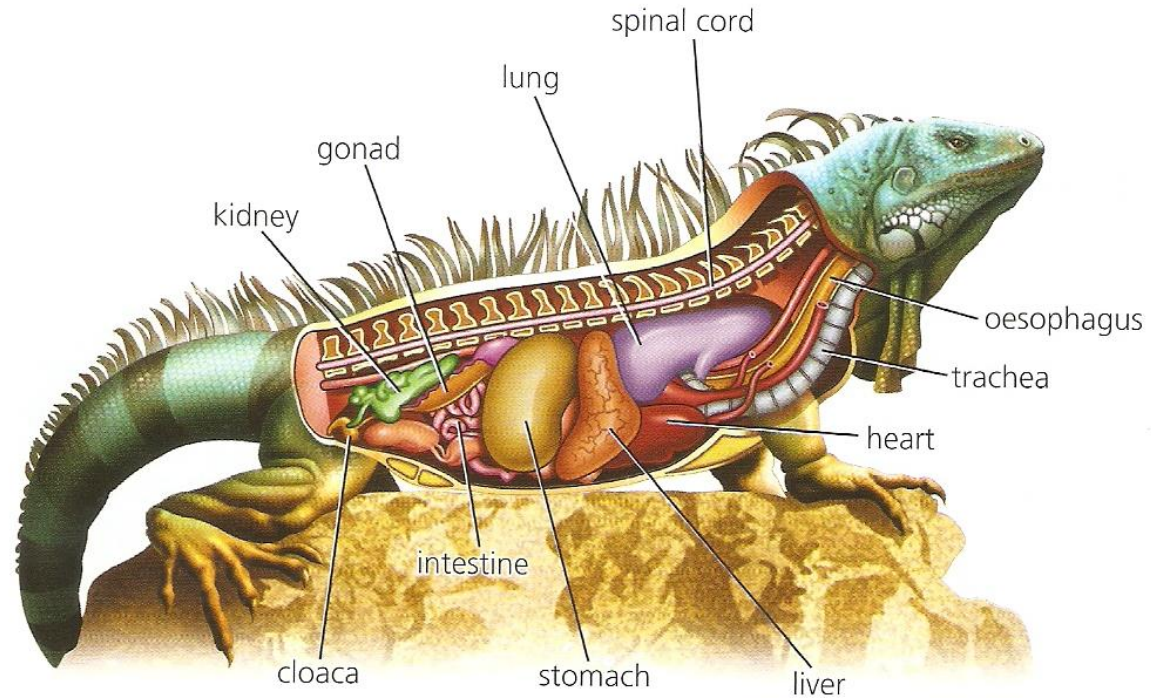
Alligators
Crocodiles

THE ANIMAL KINGDOM

Vertebrates.

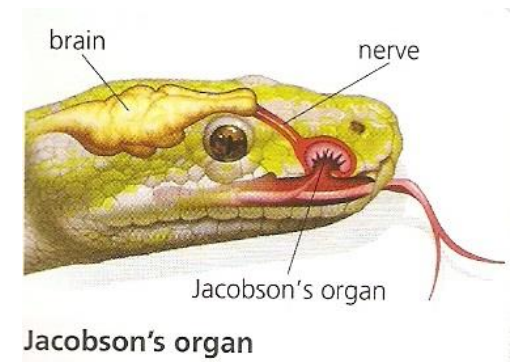
Reptiles

3) Reptiles



- Hot climates
- Horny scales
- Four short limbs
- Sense organs
- Tongue
- Lungs
- Mobile eyelid
- Cloaca

- Sexual (oviparous)
- Amniotic eggs



Jacobson's organ

Reptiles

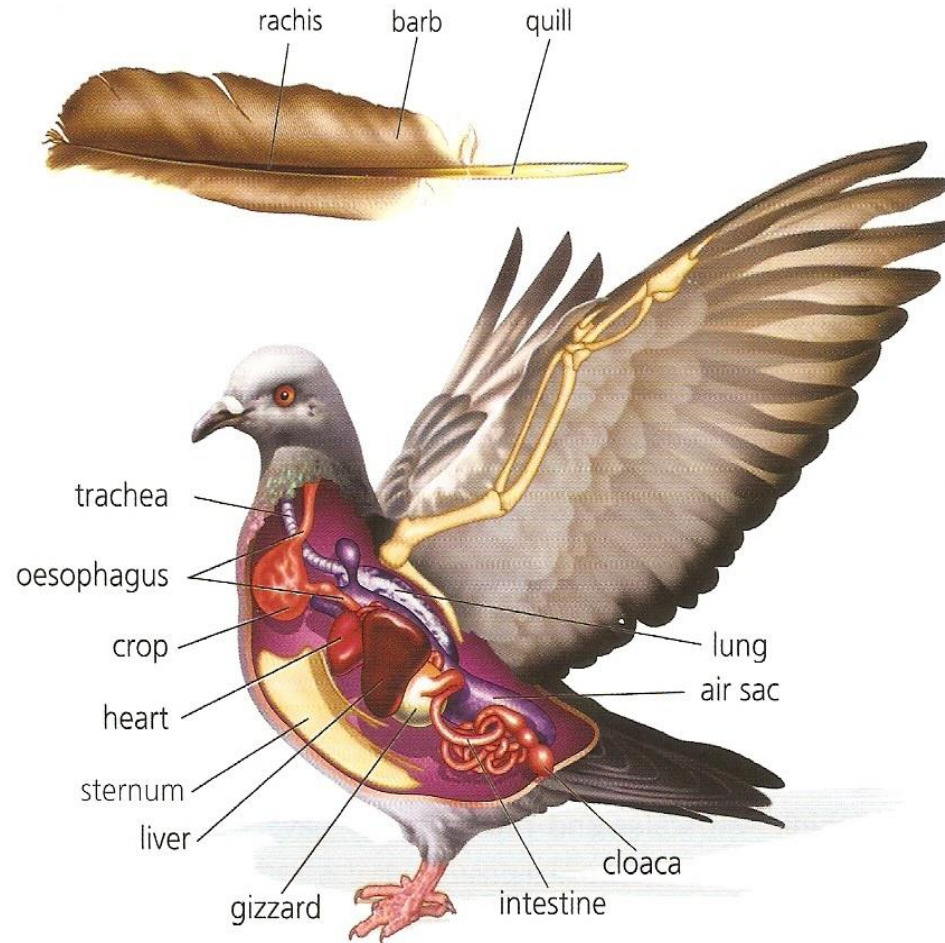
<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Reptiles	<ul style="list-style-type: none"> -<u>Chelonia</u> -<u>Sauria</u> -<u>Ophidia</u> -<u>Crocodylia</u> 	In terrestrial and aquatic environments.	<ul style="list-style-type: none"> -<u>Head, neck, trunk, tail, and four legs: with tough scales.</u> -Hearing not very developed but vision is. -Eyes with eyelids. -Sense of smell: snake's forked <u>tongue (Jacobson)</u>. -<u>Ectothermic.</u> 	<u>Lungs.</u>	<ul style="list-style-type: none"> -They have teeth. carnivores (lizards and turtles are herbivores). -<u>Cloaca.</u> 	<ul style="list-style-type: none"> -Sexual: oviparous -Sex determined by amniotic eggs incubation temperature. 	<ul style="list-style-type: none"> Turtle Lizard Snakes Crocodiles

Reptiles

40. Jacobson's organ: A scent-detecting organ in the roof of the mouth of snakes.

THE ANIMAL KINGDOM
Vertebrates. Birds

4) Birds



Internal anatomy of a bird and structure of a feather

- Endothermic vertebrates
- Fusiform aerodynamic body
- Feathers
- Air sacs
- Eyes-lateral position
- Hollow bones
- Beak
- Crop/gizzard
- Cloaca

- Sexual reproduction (oviparous)
- Amniotic eggs

Birds

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Birds	Diurnal/nocturnal Flying/apterous Beak shape depends on feeding habits.	In all known environments	-Legs with scales. - <u>Feathers</u> : enable flight. - <u>Beak</u> with varied shapes. - <u>Thin and hollow bones</u> . -Highly developed sternum. -Well-developed eyes and ears. - <u>Endothermic</u> .	<u>Lungs</u> with dilations called <u>air sacs</u> .	-Herbivores, granivores (pigeon), carnivores (eagle), scavengers (vulture). - <u>Crop/gizzard</u> - <u>Cloaca</u>	-Sexual reproduction: Oviparous (lay amniotic eggs).	Ostrich Eagle Swan Hawk

Birds

- 41. **Air sacs:** Structures in the respiratory system of birds that aid in efficient breathing.
- 42. **Feathers:** Lightweight structures covering the body of birds, providing insulation and aiding in flight.
- 43. **Apterous:** Wingless, lacking wings.
- 44. **Crop:** A pouch-like enlargement of the esophagus in some birds for storing and softening food.
- 45. **Gizzard:** A muscular part of the digestive tract in birds that grinds food.
- 46. **Cloaca:** A common chamber in birds and some other animals for the passage of urine, feces, and reproductive products.

THE ANIMAL KINGDOM

Vertebrates.

Mammals

Endothermic vertebrates

Hair

Mammary glands

Limbs

Teeth

Lungs

Sexual reproduction

5) Mammals

MONOTREMES



Platypuses
Echidna
(Oviparous)

MARSUPIALS



Koala
Possums
Kangaroo

Viviparous
(marsupium)

PLACENTALS



Viviparous

Mammals

<i>Types of Invertebrates</i>	<i>Classification</i>	<i>Distribution in ecosystems</i>	<i>Anatomical characteristics</i>	<i>Respiration</i>	<i>Feeding habits</i>	<i>Reproduction</i>	<i>Examples</i>
Mammals	<p><u>-Monotremes</u></p> <p><u>-Marsupials</u></p> <p><u>-Placentals.</u></p>	In all known environments	<p>-Body covered in fur.</p> <p>-<u>Lips</u> (milk).</p> <p>-<u>Larynx</u> (emit sounds).</p> <p>-Well-developed sensory organs.</p> <p>-<u>Limbs</u> with varied forms.</p> <p>-<u>Mammary glands</u></p> <p>-<u>Endothermic.</u></p>	<u>Lungs</u>	Varied diet.	<p>-Monotreme (oviparous):</p> <p>-Marsupials: viviparous (pouch or <u>marsupium</u>).</p> <p>-Placentals (viviparous): <u>placenta</u></p>	<p>-Platypus and echidna.</p> <p>- kangaroos, koalas, opossums.</p> <p>-Dolphins - Bats -Dogs - Humans</p>

Mammals

- 47. **Monotreme:** Egg-laying mammals, such as the platypus.
- 48. **Marsupium:** A pouch in marsupials where young offspring are carried and nursed.
- 49. **Placenta:** An organ in the uterus of mammals that provides nutrients and exchanges wastes between the mother and developing offspring during pregnancy.