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Detritivores: Earthworms, Millipedes, and Woodlice at Work

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Detritivores: Earthworms, Millipedes, and Woodlice at Work

Detritivores swallow dead matter and break it down. This lesson shows who they are, how they differ from decomposers, and why jellyfish and seahorses do not count.

At a glance

Four key facts on this topic

01 **Diet** Dead matter, not habitat, defines a detritivore.

02 **Earthworm** Three kinds: epigeic, endogeic, anecic.

03 **Woodlouse** A crustacean that needs damp places.

04 **UPSC 2021** Earthworms, millipedes and woodlice.

The basics

1 What a detritivore is

1.1 What is a detritivore?

A detritivore is an animal that swallows bits of dead matter and digests them inside its body. That is how it breaks the matter down. Most are small invertebrates, animals without a backbone. Examples are earthworms, millipedes, woodlice, dung beetles, sea cucumbers and sea stars.

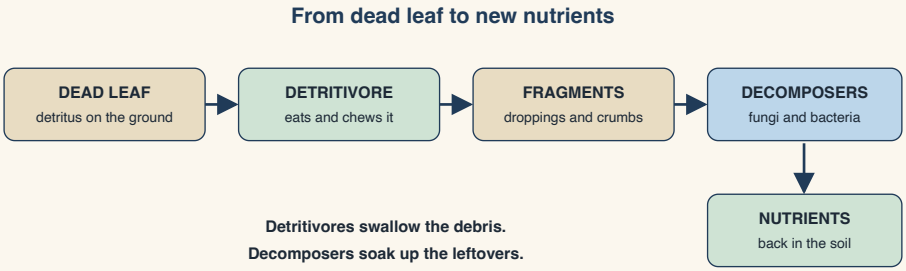
1.2 What is detritus?

Detritus is the loose debris of dead things. It is dead particles of plants and animals, plus the waste that living things leave behind. Fallen leaves are detritus. So are droppings and bits of dead wood.

In the sea, some detritivores feed on floating detritus called marine snow.

1.3 Why does the detritivore matter?

It matters because detritus holds energy and nutrients locked up in things that have already died. Eating it is a major route for recycling both. Without this step, the dead matter would stay locked up.



Original diagram. Source: ScienceABC, Detritivore.

Original diagram: how detritivores and decomposers share the work.

> **Quick check 1.** True or false: A detritivore physically swallows particles of dead matter and digests them inside its body. *(True or False?)* See answer ↓

Sources: scienceabc.com

2 Detritivore, decomposer or scavenger?

2.1 How is a detritivore different from a decomposer?

A detritivore swallows its food, but a decomposer does not. Decomposers are bacteria, protists and fungi. They release enzymes onto dead matter and absorb the breakdown products from outside. They never swallow a chunk.

2.2 How is a detritivore different from a scavenger?

A scavenger feeds on whole carcasses, while a detritivore eats small particles. Scavengers eat the bodies of larger dead animals, called carrion. Vultures, hyenas and crows are scavengers, not detritivores.

Three kinds of recycler

Group	How it feeds	Examples named by the source
Detritivore	Swallows bits of dead matter and digests them inside.	Earthworms, woodlice
Decomposer	Releases enzymes on dead matter and absorbs the result.	Mushrooms, most bacteria
Scavenger	Eats the carcasses of larger dead animals.	Vultures, hyenas, crows

Source: ScienceABC, Detritivore.

> 9. **Think it through:** A vulture eats a dead animal. Why is it not a detritivore? See answer ↓

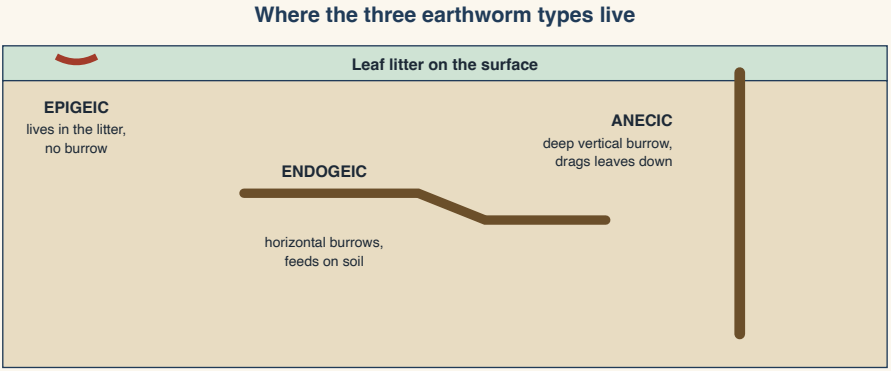
Quick check 2. True or false: Vultures are detritivores because they eat dead matter. *(True or False?)* See answer ↓

Earthworms

3 Earthworms: three lifestyles

3.1 Are all earthworms the same?

No. Earthworms differ because they live and feed at different depths. Scientists sort them into three groups. The groups are epigeic, endogeic and anecic.



Original diagram. Source: Earthworm Society of Britain, Earthworm ecology.

Original diagram: three earthworm lifestyles.



A common earthworm, *Lumbricus terrestris*. Photo by Rob Hille, Wikimedia Commons, licensed CC BY-SA 3.0.

3.2 What does each group do?

- **Epigeic** (surface) worms live in leaf litter, deadwood, dung and compost. They tend not to make burrows.
- **Endogeic** (soil) worms live in and feed on the soil. They make horizontal burrows.
- **Anecic** (deep) worms make permanent vertical burrows. They feed on leaves dragged down from the surface.

A simple memory hook: epigeic stays on top, endogeic stays inside the soil, and anecic links the two.

Quick check 3. True or false: Anecic earthworms make permanent vertical burrows and pull surface leaves into them. *(True or False?)*

See answer ↓

Sources: earthwormsoc.org.uk

4 Worms that make compost

4.1 What is vermicomposting?

Vermicomposting turns food and garden waste into compost by using earthworms. It works because the waste is both food and bedding for the worms. No soil is needed. For that reason, only surface-dwelling (epigeic) worms can be used.

4.2 Which worm is used?

The red wiggler, *Eisenia fetida*, is the best-known choice. It is epigeic, so it lives in litter instead of deep soil. IntechOpen lists it among the species tested for vermicomposting.

4.3 Does the government support organic farming?

Yes. India's Paramparagat Krishi Vikas Yojana (PKVY) pays farmers to adopt organic methods. Support is Rs 31,500 per hectare over three years. Of that, Rs 15,000 is for organic inputs, paid by direct benefit transfer (DBT).

PKVY is open to farmers and institutions with up to two hectares. Farmers join in groups of 20 hectares each.

Quick check 4. True or false: Vermicomposting uses deep-burrowing anecic worms because it needs soil. *(True or False?)*

See answer ↓

Sources: intechopen.com; soil.evs.buffalo.edu; static.pib.gov.in

5 Jumping worms as pests

5.1 Are all earthworms good for soil?

No. Most help soil, but jumping worms harm forests because they eat leaf litter far too fast. Usually, earthworms improve drainage, add air, raise nutrient supply and build soil structure. Jumping worms (genus *Amynthas*) are the exception.

5.2 Where do jumping worms come from?

They come from eastern Asia and were introduced to North America. They are invasive, meaning they spread where they do not belong. They live and feed near the soil surface instead of deep down.

5.3 Why do they damage forests?

They damage forests because they strip the leaf litter that other life depends on. Oregon State University says they eat two to three times more litter than burrowing worms. Bare soil is left behind.

That bare soil encourages invasive plants and animals. It disrupts native ecosystems.

10. **Think it through:** Earthworms improve soil. Why are jumping worms a problem? See answer ↓

Quick check 5. True or false: Jumping worms burrow deep and are harmless to forest leaf litter. *(True or False?)* See answer ↓

Sources: extension.unh.edu; extension.oregonstate.edu

Other detritivores

6 Woodlice and millipedes

6.1 Is a woodlouse an insect?

No. A woodlouse is a crustacean, because it belongs to the same group as crabs and lobsters. It is a land animal, but it is more closely related to crabs and shrimps than to land insects. There are around 3,500 species worldwide.

6.2 Why do woodlice stay in damp places?

They stay damp because they breathe through gills. Woodlice need water to respire. They survive with just enough dampness to cover their external gills.

In woodland, they eat dying and decaying plants. They rarely destroy living plants. Rotting leaf litter helps return nutrients to the soil.

6.3 How do millipedes defend themselves?

Many millipedes defend themselves with chemicals made in glands along the body. In the cave millipede *Brachydesmus troglobius*, glands on both sides of the body segments release a secretion. It is a mixture of five compounds. Hydrogen cyanide was detected in it by a picric acid test.

That test was qualitative. It shows the gas is present. It does not show how much.

> **Quick check 6.** True or false: A woodlouse is a crustacean, not an insect. *(True or False?)* See answer ↓

Sources: woodlands.co.uk; heartofenglandforest.org; welshwildlife.org; digitalcommons.usf.edu

7 Dung beetles and termites

7.1 Do dung beetles cut greenhouse gases?

Not on their own, because time does most of the work. A 2020 pasture study tested two beetle species on cattle dung. Time changed gas output two to five times more than beetles did. The authors say beetles cannot cut gases unless they speed up decay faster than time alone.

The beetles still work fast. They took apart dung pats within 2 days. Their effect on gases is the open question.

7.2 How do termites digest wood?

They digest wood with the help of microbes in the gut, because they cannot do it alone. The microbes break cellulose, the main sugar in wood, into short-chain fatty acids. The termite's cells use those acids as food.

Methane is a major by-product of this breakdown. Termites are a large source of methane in the air.

> **Quick check 7.** True or false: Termites digest wood entirely on their own, with no help from other organisms. *(True or False?)*
>
> See answer ↓

Sources: pmc.ncbi.nlm.nih.gov; kenneth-noll.uconn.edu

8 Sea and mudflat detritivores

8.1 What does a sea cucumber do?

A sea cucumber cleans the seafloor because it swallows sediment and digests what little food is in it. It then passes out the undigested material. NOAA says this helps spread and aerate the sediment. That makes it healthier for other animals.

8.2 Are sea cucumbers at risk?

Yes. A 2014 Southern Cross University report cited the latest Red List of the International Union for Conservation of Nature (IUCN). It classed sixteen sea cucumber species as threatened with extinction.

8.3 What does a fiddler crab eat?

A fiddler crab eats algae, bacteria, fungus and detritus. The detritus is dead and decaying plant and animal matter. The male has one oversized claw. He waves it in a fiddling motion to attract a female.

> **Quick check 8.** True or false: Sea cucumbers swallow seafloor sediment and help to aerate it. *(True or False?)* See answer ↓

Sources: oceanexplorer.noaa.gov; scu.edu.au; nps.gov

Exam Practice

9 Exam traps

9.1 What did UPSC ask?

9.2 Why were jellyfish and seahorses wrong?

They were wrong because both catch live food. A box jellyfish stuns or kills prey such as fish and shrimp. A moon jelly eats zooplankton, tiny drifting animals. Seahorses wait for krill, copepods and fish larvae to drift by.



Original diagram. Sources: ScienceABC; National Geographic; Monterey Bay Aquarium.

Original diagram: sorting the five animals in the 2021 question.

Seahorses have no teeth and no stomach. They suck up plankton almost continually. None of this is detritus feeding.

9.3 Which mix-ups come up?

- **Habitat.** The sea does not decide it. Sea cucumbers are detritivores. Jellyfish are not.
- **Insect.** A woodlouse is a crustacean.
- **Decomposer.** Fungi and bacteria absorb food. They do not swallow it.
- **Scavenger.** Vultures eat carcasses. They are not detritivores.

Sources: nationalgeographic.com; montereybayaquarium.org

Remember this

- **Detritivore:** swallows dead matter and digests it inside.
- **Decomposer:** fungi and bacteria that absorb food from outside.
- **Scavenger:** eats the carcass of a larger animal.
- **Earthworms:** epigeic, endogeic, anecic.
- **2021 answer:** earthworms, millipedes, woodlice.
- **Jumping worms:** invasive, strip leaf litter.

Explain it back: Say why a jellyfish is not a detritivore, in two sentences.

Practice MCQs

1. Consider earthworms, jellyfish, millipedes, seahorses, and woodlice.

Which of these are detritivores?

A. All five are detritivores

B. Jellyfish, millipedes, seahorses, and woodlice only

C. Earthworms, jellyfish, and seahorses only

D. Earthworms, millipedes, and woodlice only

See answer ↓

2. What does a detritivore feed on?

A. Only other detritivores

B. Sunlight through photosynthesis

C. Living prey it hunts

D. Dead organic matter

See answer ↓

3. Why are jellyfish not classified as detritivores?

A. Jellyfish are carnivorous, feeding on small planktonic animals

B. Jellyfish photosynthesize their own food

C. Jellyfish don't eat at all

D. Jellyfish only eat dead plant matter

See answer ↓

4. How do earthworms specifically benefit soil health?

A. By poisoning harmful bacteria

B. By producing pesticides

C. By improving soil aeration and structure through their activity

D. By preventing all plant growth

See answer ↓

5. What would happen to an ecosystem's nutrient cycle without detritivores?

A. Soil would become more fertile immediately

B. Dead organic matter would accumulate, because it would break down far more slowly

C. Plants would grow faster

D. Nothing would change

See answer ↓

Answer Key

1. **D.** The correct answer is **earthworms, millipedes and woodlice only**. A detritivore swallows particles of dead matter and digests them inside its body. Earthworms, millipedes and woodlice do this, as ScienceABC lists. The 'all five' option is wrong because jellyfish and seahorses catch live food. The 'jellyfish, millipedes, seahorses and woodlice' option is wrong for the same reason. The 'earthworms, jellyfish and seahorses' option is wrong because it leaves out millipedes and woodlice. Memory hook: if it swallows dead matter, it is a detritivore. ↑ Q1
2. **D.** The correct answer is **dead organic matter**. A detritivore feeds on detritus, which is dead plant and animal matter plus the waste of living things. ScienceABC says it swallows particles of detritus and digests them inside. A fiddler crab, for example, eats detritus along with algae. The 'only other detritivores' option is wrong because detritus comes from many dead things. The 'sunlight through photosynthesis' option is wrong because that is how plants feed. The 'living prey it hunts' option is wrong because that describes a predator. Memory hook: detritus means dead debris. ↑ Q2
3. **A.** The best answer is **jellyfish are carnivorous, feeding on small planktonic animals**. A moon jelly eats zooplankton, and a box jellyfish stuns or kills prey such as fish and shrimp. Both feed on live animals. The 'only dead plant matter' option is wrong because no source shows jellyfish feeding that way. The 'photosynthesize their own food' option is wrong because the sources show jellyfish catching prey. The 'don't eat at all' option is wrong because they feed on live prey. Memory hook: jellyfish hunt, they do not sweep up debris. ↑ Q3
4. **C.** The correct answer is **by improving soil aeration and structure through their activity**. UNH Extension says earthworms improve soil drainage and aeration, raise nutrient supply and build soil structure. That is why vermicomposting puts worms to work. The 'preventing all plant growth' option is wrong because worms support plants. The 'producing pesticides' option is wrong because no source says so. The 'poisoning harmful bacteria' option is wrong because no source describes this role. Memory hook: worms open up the soil. One exception is the jumping worm, which strips leaf litter. ↑ Q4

5. **B.** The best answer is that **dead organic matter would pile up and break down far more slowly**. ScienceABC says detritus feeding is a major route for recycling the energy and nutrients locked up in dead things. Wildlife Trust writers add that rotting leaf litter returns nutrients to the soil. The 'plants would grow faster' option is wrong because less recycling means less nutrient supply. The 'nothing would change' option is wrong because the cycle depends on this step. The 'soil would become more fertile immediately' option is wrong for the same reason. Memory hook: no recyclers, no fresh nutrients. ↑ Q5

Quick-check answers

1. **True.** ScienceABC says detritivores physically ingest particles of detritus and digest them internally. ↑ 1
2. **False.** ScienceABC places vultures, hyenas and crows with the scavengers, not the detritivores. ↑ 2
3. **True.** The Earthworm Society of Britain describes anecic worms this way. ↑ 3
4. **False.** Soil is not required, so only epigeic worms can be used. ↑ 4
5. **False.** They stay near the surface and eat two to three times more leaf litter. ↑ 5
6. **True.** Woodlice are more closely related to crabs, lobsters and shrimps than to land insects. ↑ 6
7. **False.** They depend on microbes in the gut to digest the sugars in wood. ↑ 7
8. **True.** NOAA describes exactly this. ↑ 8
9. **Think it through.** A vulture feeds on the carcass of a large dead animal. A detritivore swallows small particles of detritus. The size and kind of food set the label. ↑ 9
10. **Think it through.** They feed in a different way. They stay at the surface and remove the litter layer. A helper in one habitat can harm another. ↑ 10

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