IELTS ACADEMIC · READING PASSAGE 2 · QUESTIONS 1–14 · SUGGESTED TIME: 20 MINUTES

READING PASSAGE 2

Threads in the Soil

How a vivid metaphor outran the evidence beneath the forest floor

A Few ideas in recent popular science have spread as quickly as the notion that the trees of a forest are joined beneath the soil into a single, communicating whole. In books, documentaries and widely shared talks, the forest floor has been reimagined as a kind of living switchboard, across which trees are said to trade sugar, send chemical warnings, and even nurture their own seedlings. The image is irresistible, and it has a memorable name: the “wood wide web”. Yet the distance between this beguiling metaphor and what laboratory and field studies have firmly established is wider than most enthusiasts appreciate, and a number of biologists now argue that the story has run some way ahead of the science that first inspired it.

B The biological foundation of the idea is, however, beyond dispute. Almost all land plants form partnerships with fungi at their roots, a relationship known as mycorrhiza. The fungus threads its filaments through the soil, drawing up water and mineral nutrients — particularly phosphorus and nitrogen — which it passes to the plant; in return, the plant supplies the fungus with sugars manufactured by photosynthesis, which fungi cannot produce for themselves. Two broad types dominate. Ectomycorrhizal fungi sheathe the outside of root tips and are characteristic of many temperate trees, while arbuscular mycorrhizal fungi penetrate the root cells and associate with the majority of plant species worldwide. That fungi benefit their host plants, and that healthy forests depend on them, is not seriously questioned by any researcher.

C The leap from this established partnership to the idea of a forest-wide network rests largely on a single, celebrated experiment. In 1997, the Canadian forest ecologist Suzanne Simard and her colleagues published a study in the journal *Nature* in which seedlings of paper birch and Douglas fir were enclosed in chambers and given carbon dioxide carrying distinct carbon isotopes, allowing the researchers to trace the movement of carbon between them. Western red cedar, which does not share the same fungal partners, was planted alongside as a control. Carbon was found to travel in both directions between the birch and the fir, with the fir gaining slightly more than it gave. The cover of the magazine introduced a phrase that would prove unusually durable: the wood wide web.

D Over the following two decades, the concept expanded considerably. Subsequent experiments reported that when one tree was stripped of its needles, neighbouring trees of a different species appeared to receive both carbon and the chemical signals associated with stress, as though a warning had been relayed underground. The most striking extension was the proposal that large, old specimens — sometimes termed “mother trees” — could recognise their own offspring and channel resources preferentially towards them through the fungal connections. Popular accounts seized on these findings, presenting the forest as a cooperative community knitted together by maternal care and mutual aid, a portrait that resonated far beyond the scientific literature.

E In 2023, this picture was sharply challenged. A team of three biologists reviewed the published research underpinning the popular claims and reached an uncomfortable conclusion. Examining how the relevant studies had been cited over time, they found that the proportion of statements unsupported by solid evidence had roughly doubled across twenty-five years, and that authors had drifted towards citing only those findings that confirmed the network’s benefits. Of the three claims they assessed, two — that such networks are common throughout forests, and that resources moving through them improve the survival of seedlings — were judged to rest on field results too variable, too open to other explanations, or too few to support sweeping

generalisations. The third claim, that mature trees deliberately direct resources and warnings to their own young, they reported had no support in the peer-reviewed literature at all.

F None of this amounts to a claim that trees are isolated, and the critics were careful to say so. What they disputed was not the existence of fungal connections but the grander architecture built upon them: the assumption that carbon detected in a neighbouring tree must have travelled through a fungal network, rather than leaking through the soil by other routes, and that such transfers are large enough to matter for a tree's survival. Other researchers have pushed back in turn, pointing to newer techniques — including methods that trace labelled carbon into the DNA of specific fungi — as evidence that transfer through the network is real and that the case is still building. The dispute, in short, is not settled, and it turns on the difficult question of what any single measurement can and cannot prove.

G The stakes extend beyond academic disagreement. Recommendations to alter the way forests are logged and replanted have been advanced partly on the strength of the network idea, which makes the reliability of the underlying evidence a practical concern rather than a purely scholarly one. The episode has become something of a case study in how an appealing metaphor can shape public understanding faster than careful measurement can either confirm it or rein it in. The fungi beneath the forest floor are unquestionably vital; whether they constitute the conscious, nurturing web of popular imagination is a question the science, for now, has yet to answer.

TRUE / FALSE / NOT GIVEN

Questions 1–5. *Do the following statements agree with the information given in Reading Passage 2? Tick (✓) one box for each statement.*

1. The fungi in a mycorrhizal partnership are unable to produce their own sugars.

☐ TRUE ☐ FALSE ☐ NOT GIVEN

2. Arbuscular mycorrhizal fungi associate with fewer plant species than ectomycorrhizal fungi do.

☐ TRUE ☐ FALSE ☐ NOT GIVEN

3. Simard's 1997 study was the first experiment to demonstrate carbon transfer between trees.

☐ TRUE ☐ FALSE ☐ NOT GIVEN

4. The 2023 reviewers found no peer-reviewed evidence that mature trees deliberately send resources to their own young.

☐ TRUE ☐ FALSE ☐ NOT GIVEN

5. The scientists who criticised the network idea believe that forest trees grow in isolation from one another.

☐ TRUE ☐ FALSE ☐ NOT GIVEN

MULTIPLE CHOICE

Questions 6–9. *Choose the correct letter,* ***A****,* ***B****,* ***C*** *or* ***D****.*

6. According to paragraph B, what does the fungus provide to its host plant?

- **A** Sugars produced through photosynthesis
- **B** Water and mineral nutrients such as phosphorus and nitrogen
- **C** Protection of the roots from disease
- **D** Carbon drawn from neighbouring trees

7. Why was western red cedar included in Simard's experiment?

- **A** Because it grows faster than birch or fir
- **B** Because it forms partnerships with the same fungi as the other two species
- **C** Because it does not share the same fungal partners and so acted as a control
- **D** Because it was the dominant species in the forests being studied

8. What did the 2023 reviewers say about how the relevant research had been cited?

- **A** Researchers had increasingly favoured findings that supported the network's benefits
- **B** The studies had rarely been cited by other scientists
- **C** Most citations came from outside the field of forest ecology
- **D** Citations had become more accurate over the twenty-five-year period

9. What is the central point of disagreement described in paragraph F?

- **A** Whether fungal connections between trees exist at all
- **B** Whether carbon found in a tree necessarily passed through a network and is large enough to matter
- **C** Whether the newer techniques for tracing carbon are reliable
- **D** Whether trees of different species can grow close to one another

SENTENCE COMPLETION

Questions 10–11. *Complete the sentences below. Choose* ***NO MORE THAN TWO WORDS*** *from the passage for each answer.*

10. In Simard's experiment, the seedlings were given carbon dioxide carrying distinct _____, which allowed the movement of carbon to be traced.

11. Critics point out that carbon found in a neighbouring tree may have leaked through the _____ rather than passing through a fungal network.

MATCHING INFORMATION

Questions 12–14. *The reading passage has seven paragraphs,* ***A–G****. Which paragraph contains the following information? Write the correct letter,* ***A–G****.*

12. A description of the two main categories of fungi that form partnerships with plant roots. _____

13. A reference to proposals for changing the way forests are managed. _____

14. An experiment suggesting that damage to one tree can produce warning signals in others. _____

ANSWER KEY

For teacher / self-study use. Fold or detach before distributing to students.

Q	ANSWER	PARA	EXPLANATION
1	**TRUE**	**B**	The plant supplies sugars the fungus cannot make for itself.
2	**FALSE**	**B**	Arbuscular fungi associate with the majority of plant species; the statement reverses the relationship.
3	**NOT GIVEN**	**C**	The study is called “celebrated”, but the passage never states it was the first to show transfer. (A common prior-knowledge trap.)
4	**TRUE**	**E**	The third claim was reported to have no support in the peer-reviewed literature.
5	**FALSE**	**F**	The critics explicitly stated they were not claiming trees are isolated.
6	**B**	**B**	The fungus supplies water and minerals (phosphorus, nitrogen). A reverses the exchange; C is plausible but not stated.
7	**C**	**C**	Cedar does not share the same fungi, so it served as a control.
8	**A**	**E**	Authors increasingly cited only findings confirming the network’s benefits.
9	**B**	**F**	The dispute is whether carbon truly moved via the network and whether it matters for survival — not whether connections exist (A).
10	**carbon isotopes**	**C**	Accept ‘carbon isotopes’; ‘isotopes’ alone is acceptable.
11	**soil**	**F**	“leaking through the soil by other routes”.
12	**B**	**B**	Ecto- and arbuscular mycorrhizal fungi are the two types described.
13	**G**	**G**	Proposals to change logging and replanting.
14	**D**	**D**	The defoliation experiment in which a “warning” appeared to reach neighbouring trees.

APPROXIMATE IELTS BAND EQUIVALENCE (14 QUESTIONS)

SCORE	14	13	12	11	10–9	8–7	6–5	≤4
BAND	9.0	8.5	8.0	7.5	7.0–6.5	6.0–5.5	5.0	<5.0