**ANSWER KEY.**

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# Symbiosis

Biology | ANSWER KEY

Answer in complete sentences where asked. Show your work for calculations and use the data as evidence.

**1.** Classify each relationship as mutualism, commensalism, or parasitism.

| Relationship | Type of symbiosis |
|---|---|
| (a) Fleas feed on a dog's blood | |
| (b) A fungus helps tree roots take up nutrients and receives sugars | |
| (c) An orchid grows on a tree branch and the tree is not clearly affected | |

(a) **Parasitism** (b) **Mutualism** (c) **Commensalism**

**2.** Write the effect on each partner as + (benefits), 0 (not clearly affected), or − (harmed). Then name the type.

(a) Partner 1: + Partner 2: +

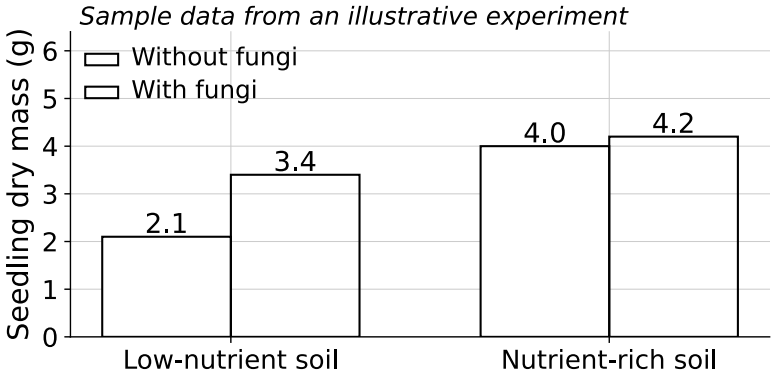
(b) Partner 1: + Partner 2: −

(c) Partner 1: + Partner 2: 0

(a) **Mutualism** (b) **Parasitism** (c) **Commensalism**


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**3.** Seedlings were grown with and without a mycorrhizal fungus in two soils (sample data).




(a) Calculate the percent increase in seedling mass with fungi in low-nutrient soil. Show your setup and round to the nearest tenth.

(b) Write a claim, evidence, and reasoning to answer: does the benefit of the fungi depend on the soil?

(a) $(3.4 - 2.1) \div 2.1 \times 100 = 1.3 \div 2.1 \times 100 =$ **61.9%**

(b) **Model answer: Yes, the benefit depends on the soil. In low-nutrient soil, seedling mass rose from 2.1 g to 3.4 g with fungi, an increase of 1.3 g, but in nutrient-rich soil it rose from 4.0 g to only 4.2 g, an increase of 0.2 g. The fungi help roots take up nutrients, so they matter more when nutrients are scarce.**

*A correct answer must include:* a claim that the benefit depends on soil nutrients; values from both soils with units; a reason linking the fungi's role in nutrient uptake to nutrient supply.

**4.** A farmer adds a large amount of fertilizer to a field.

(a) Predict how this might change how much crop plants benefit from mycorrhizal fungi. Use the data from problem 3.

(b) A parasite that kills its host very quickly can be at a disadvantage. Explain why.

(a) **The benefit is likely to get smaller. In the data, fungi helped far less in nutrient-rich soil, because the plants already had enough nutrients.**

(b) **A parasite depends on its host for food, so if it kills the host quickly it loses its food supply, which can limit its own survival and spread.**


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