

Symbiotic Relationships Assignment

PURPOSE: Students will analyze ecological relationships between organisms of two different species in order to determine the type of symbiotic relationship the organisms share.

Symbiosis is a close, permanent ecological relationship between organisms of two different species. Ecologists use a different term for each type of symbiotic relationship:

- **Mutualism – both species benefit**
- **Commensalism – one species benefits, the other is unaffected (neither helped nor harmed)**
- **Parasitism – one species benefits, the other is harmed but not typically killed**
- **Predation – one species benefits, the other is killed and consumed**
- **Competition – when organisms compete for a limited resource such as food, habitat or a mate**

Part 1

Determine the type of relationship that is being described below and explain in detail why you chose that relationship.

1. Aphids are considered pests to farmers because they damage and consume crops. To control Aphid infestations on crops without using harmful pesticides, farmers can order shipments of Ladybugs. The Ladybugs are then distributed among the crops where they consume the Aphids that area causing all the damage.

Relationship:

Explanation:

2. *Paramecium auralia* and *Paramecium caudatum* are both ciliated protists that multiply quickly when grown separately in the laboratory. Both *P. aurelia* and *P. caudatum* use the same food source. When these two organisms are grown together with a limited food source, *P. aurelia* multiplies quickly, while *P. caudatum* gradually goes extinct.

Relationship:

Explanation:

3. Several species of the flower *Rafflesia* grow in jungles of Southeast Asia. *Rafflesia arnoldii* is the largest, its blossom attains a diameter of 1 meter and can weigh up to 11 kg. It produces no leaves, stems or roots but lives on the *Tetrastigma* vine. Only the flower or bud can be seen; the rest of the plant exists only as filaments within the host vine. The *Rafflesia* obtains nourishment and gains physical support from the host vine.

Relationship:

Explanation:

4. During the day the bobtailed squid, *Euprymna scolopes*, remains buried in the sand of shallow reef flats. As the sun sets, the nocturnal animal emerges from its safe hiding place and searches for food. In the moonlit night, the squid would appear as a dark silhouette when it swims through the water and would be easily detected by predatory fish from below. The squid camouflages itself by projecting light downward from its light organ. Inside the light organ are luminescent bacteria, *Vibrio fischeri*, that produce light. The squid provides an environment for the bacteria to live that is very rich in amino acids.

Relationship:

Explanation:

5. Legumes, a type of plant, can survive independently of a symbiotic relationship if they live in soil that is rich in nitrates. Rhizobia, a type of bacteria, can live freely in soil. However, Rhizobia do not fix nitrogen if they live alone. If the soil is nitrate poor, then the legume will form a relationship with Rhizobia. The bacteria live within the tissue of the legume and receives nutrition. The bacteria will then fix nitrogen so the legumes will receive nitrogen in order to make proteins and DNA.

Relationship:

Explanation:

6. Barnacle are sedentary, highly modified crustaceans resembling conical pyramids. Barnacles live by using long, feathering appendages to sweep the surrounding water for small, free-floating organisms. The critical resource for barnacles is a place to stay. Barnacles attach to rocks, ships, shells, whales, and just about anywhere else they can gain a foothold.

Relationship:

Explanation:

7. Pseudoscorpions are small, predaceous arthropods, mostly less than 1 centimeter in length. These scorpion-like animals have pinchers (chelicerae) like scorpions, but lack a sting. A few species of pseudoscorpions conceal themselves under the wing covers of large beetles and travel undetected. The pseudoscorpions gain the advantage of being dispersed over wide areas while simultaneously being protected from predators as they travel.

Relationship:

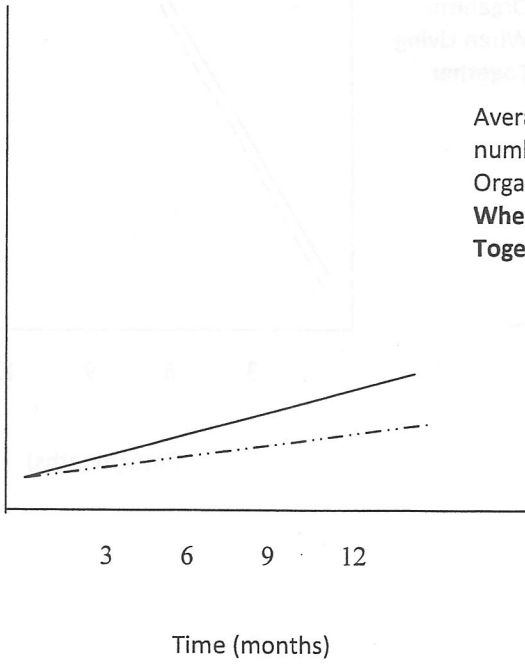
Explanation:

Part 2

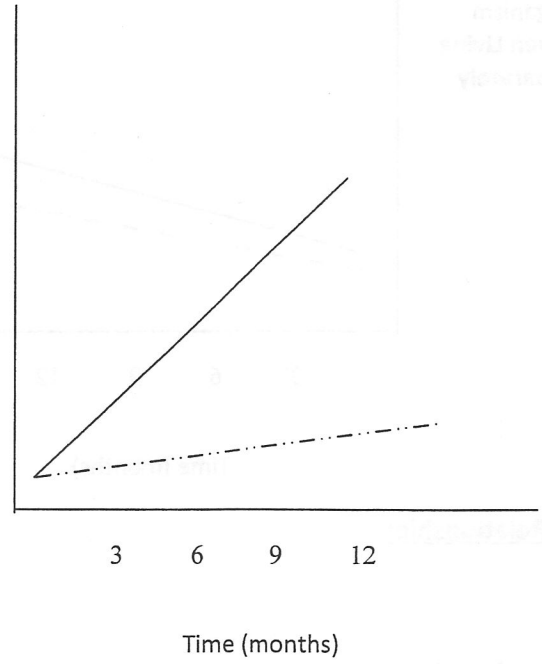
Below are two sets of graphs that represent a type symbiotic relationship. Determine the type of relationship that is represented and explain in detail why you chose that relationship.

Set A

Average number of Organism When Living Separately



Average number of Organism When Living Together

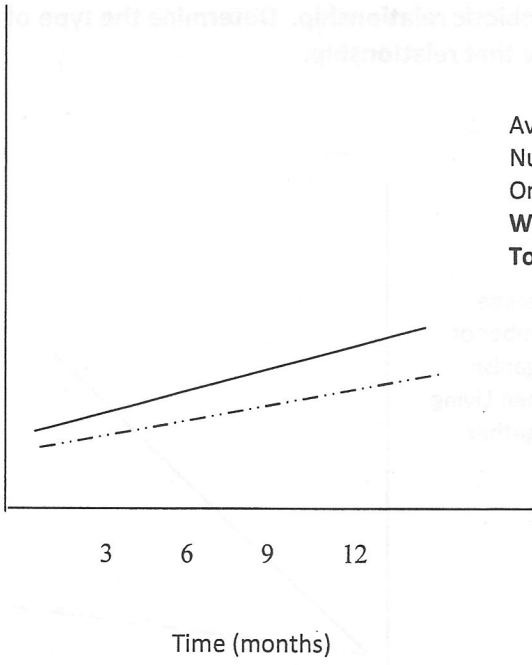


Relationship:

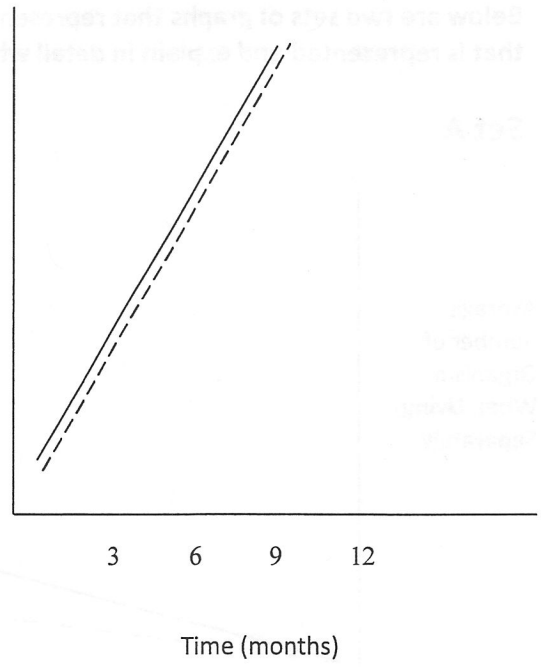
Explanation:

Set B

Average
Number of
Organism
When Living
Separately



Average
Number of
Organism
When Living
Together



Relationship:

Explanation: