Year 12 Science: Adaptation: how New Zealand plants and animals fit their way of life

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Classify each as structural, physiological or behavioural: (a) tuatara basking near their burrows, (b) woolly alpine leaves, (c) antifreeze sugars in alpine plant cells.

2. Which life process do mangrove pneumatophores help, and how?

3. Explain how nostrils at the tip of the bill help a kiwi's nutrition.

4. Give one limitation of pneumatophores.

5. Why does gas exchange through tracheae limit how big an insect like a wētā can grow?

6. Most of New Zealand's alpine plants have white flowers. Which life process does this help, and why?

Fix the mistake

7. Correct this statement: "Kiwi grew nostrils at the end of their bills because they needed to smell worms."

8. Correct this statement: "The mangrove has pneumatophores. (and nothing more)"

9. Correct this statement: "Feeding at night is a physiological adaptation of kiwi."

10. Correct this statement: "For Option 1 I compared a mangrove, a kiwi and a tuatara."

Answer key (for parents and tutors)

1. Classify each as structural, physiological or behavioural: (a) tuatara basking near their burrows, (b) woolly alpine leaves, (c) antifreeze sugars in alpine plant cells.
   (a) behavioural, (b) structural, (c) physiological.

2. Which life process do mangrove pneumatophores help, and how?
   Gas exchange: at low tide air enters through lenticels and oxygen diffuses down through air spaces to roots buried in oxygen-poor mud, so they can respire.

3. Explain how nostrils at the tip of the bill help a kiwi's nutrition.
   The kiwi can smell worms and other prey while its bill is pushed into the soil, so it finds food it cannot see, even at night.

4. Give one limitation of pneumatophores.
   They only work when the tide is out, so mangroves need the mud uncovered for at least half of each tide and cannot grow lower on the shore.

5. Why does gas exchange through tracheae limit how big an insect like a wētā can grow?
   Oxygen moves along the tracheae mainly by diffusion, which is fast only over short distances, so cells deep inside a large body would not get enough oxygen.

6. Most of New Zealand's alpine plants have white flowers. Which life process does this help, and why?
   Reproduction: white flowers attract the flies and short-tongued bees that pollinate most alpine plants, without spending resources on coloured pigment.

7. Correct this statement: "Kiwi grew nostrils at the end of their bills because they needed to smell worms."
   Kiwi with nostrils nearer the tip found more food and bred more, so over many generations natural selection made the feature common.

8. Correct this statement: "The mangrove has pneumatophores. (and nothing more)"
   Name the life process and explain how the feature helps it, for example getting oxygen to roots in waterlogged mud.

9. Correct this statement: "Feeding at night is a physiological adaptation of kiwi."
   It is behavioural, something the kiwi does; physiological means an internal or chemical process, such as the wētā's freeze tolerance.

10. Correct this statement: "For Option 1 I compared a mangrove, a kiwi and a tuatara."
    Keep to all plants or all animals; compare one life process across three groups within that one kingdom.