Biology from Hawaii Name

2014

**Hypothesizing Hyposmocoma**

*inventing new species of fancy-case caterpillars*

**Introduction**

*Hyposmocoma* **caterpillars** are wonderfully diverse animals. There are over 400 unique species, and they only exist in the Hawaiian Islands. These tiny caterpillars make their **chrysalis cases** early in life, decorate the cases with tiny pebbles or lichens or algae, then drag them around for protection. Another power they employ is **strong** **silk** (like spiders) secreted from a gland near their mouths. Caterpillars use this silk to construct their fancy cases and as a natural rope. They typically eat leaves and dead animals using **chewing mouthparts**. After living and growing for many months, the caterpillars metamorphose into tiny **moths** which only live for a few weeks.

**caterpillar** **moth**

7 months of eating average 3 weeks of eating

and growing, Hyposmocoma flower nectar and fruit

constructs a case after life cycle juice, has this time to



hatching, elongates its l mate, then dies

l case as it grows

Imagine what would happen to a species of *Hyposmocoma* caterpillar after thousands of years living in a new habitat. In which ways would the species evolve?

**Procedure**

1. **Draw** this species as it might look several hundred thousand of years from now.

2. **Label** any features that changed since the caterpillar first arrived in the habitat. Include in your labels both how the feature changed (for example, the chrysalis became thicker) and why the feature changed (for example, because caterpillars with thicker chrysalis cases can survive bird attack).

|  |  |  |
| --- | --- | --- |
| **Grading** | points worth | points earned |
| **Results**  accurate drawing of caterpillar  detailed labels explain evolution | **5** |  |
| **Total** | **5** |  |

Habitat 1: a large, flat island. Without high mountains to push up rainclouds, the island remains **dry** all year. Most **plants** have tiny silver hairs covering their leaves, protecting them from sunshine, but also making them **difficult** for caterpillars to eat. The most abundant food is **lichen** growing on bare, exposed rocks. The only predators are *kolea* (golden plovers), sharp-eyed **birds** that **hunt insects** during the day.

Habitat 2: a large, rainy island. **Swamps** and **streams** cover this island, with meadows of moss and reeds accented by occasional patches of trees. There are many other species of **insects already living here**, and competition for leaves and dead animals is very fierce. The only unused food source is **algae** growing on rocks in deep **streams**. Several species of **birds** **hunt insects** in the swamps here, but no insect predators exist underwater.

Habitat 3: a large island covered in **rainforest**. There are lots of edible leaves here, but also lots of other species of **insects already eating leaves**. Even more nutritious are the slow, thin-shelled **snails** that live on trees, and no other species eats them. However, the rainforest is infested with **parasitic flies** that land on chrysalis cases, burrow through, and lay eggs.

Habitat 4: an island with tall trees. Towering **forest** dominates this island, with a high canopy of green above a brown forest floor of fallen branches and leaves. Delicious, edible, orange and green **lichen** covers the massive trunks, while tasty **fungi** eat dead leaves and branches on the ground. Many species of **birds** **hunt insects** in the forest, eating many insects in the air, crawling on bark, burrowing in branches, and hiding under leaves.

Habitat 5: top of the mountain. It is **cold** up here, and a major challenge to any organism is surviving the freezing temperature at night. Constant high **wind** can also bring a body's temperature down further and **frozen insects** are often blown from the forests below. Although there are **no trees** this high up, a few hardy **bushes** dot the landscape and there is abundant **lichen** growing on the rocks.