Role of Isolation in Speciation

Pattern of lava flow of Kilauea Volcano, Hawaii Island

Path of lava flow

Pacific Ocean

Creation of a Kipuka—an isolated area

Inversions in gene sequences

Species 1

| a | b | c | d | e | f | g | h | i | j |

Species 2

| a | b | g | f | e | d | c | h | i | j |

Species 3

| a | b | g | f | e | i | h | c | d | j |

Picture-winged Drosophila

Size: Similar to common housefly
Ken Kaneshiro hypothesizes that the rapid increase in genetic variation in picture-wing *Drosophila* in kipukas on Hawaii may result from greater acceptance of changes in the steps in courtship. One of the steps is shown here.

1. Define *speciation* and discuss how it is at work in the kipukas.

2. Define *geographic isolation* and discuss how it is at work in the kipukas.

3. Define *reproductive isolation* and discuss how it is at work in the kipukas.

4. On the transparency, you can see a series of genes for three species of organisms. Explain what has happened to the genes. How could this change lead to a separate species?

5. Kaneshiro studies *Drosophila*, which have very short life cycles. Birds also live within the kipukas. Form a hypotheses to explain why Kaneshiro would decide not to study birds.