

Same or Different Species?

The Species Continuum

Abstract

Students sort examples of organisms along a species continuum. The exercise highlights that the concept of 'species' is a human construct. It has an ideal definition, but real-life examples do not always fit it.

Learning Objectives

- One way to define species is a group that includes individuals capable of reproducing with one another.
- Speciation is a process.
- Speciation can result from natural selection acting on multiple heritable traits over time.

Estimated time

- 20 minutes

Materials

- Copies

Instructions

1. Print and cut out Organism cards to create sets. Make enough copies to give one set to each group or pair of students.
2. Distribute sets of cards.
3. Instruct students to group their cards across a continuum, indicating whether the organisms are the same or different species. At one end is "definitely different species," and at the other is "definitely the same species."
4. Have students share what they did, either through a whole-group discussion or by having each group put their cards on display.
5. Ask students to draw a line on their continuum to show where the boundary is between same and different species. Discuss: sometimes the line is hard to draw; it ends up being kind of arbitrary. There are many points to consider:
 - How different do traits and habitats have to be?

- How much interbreeding is too much?
 - How different does their DNA have to be?
6. The species definitions that scientists use tend to describe ideal cases. For example: A species is a group that includes individuals capable of reproducing with one another.

How would your students modify idealized definitions to reflect reality a little bit better? (Encourage students to include words that account for the “muddiness.”)

- Species *usually* have detectable differences in their traits.
- Species mate *mostly* with their own type.

Note: We would like to try to get students to understand the following reasoning.

Because we can observe a range of examples that fit more or less well into the same vs. different species categories, we can reason that speciation is a process where species become more defined over time. Differences accumulate over time (often very long periods of time), yet some similarities remain. What we see today is a snapshot of this process unfolding.

Notes

Students may come to different conclusions about some of the in-between examples, and that’s ok. We have intentionally chosen examples that are muddy and challenging. What’s more important is that the examples on the extremes (fish, bears, and rock pocket mice) are arranged correctly, and that students can have productive discussions and can justify their choices.



This material is based upon work supported by the National Science Foundation under Grant No. DRL-1418136. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.