

PHILOSOPHY OF SCIENCE WITH PROFESSOR CHARLES PENCE

TALKING POINTS

KNOWLEDGE

1. List some of the factors driving biodiversity loss.
2. Where would you find Darwin's finches?

COMPREHENSION

3. Explain why biodiversity is a tricky concept to define.
4. Why is it important to have a clear definition of what a species is?

APPLICATION

5. What questions would you ask if you were studying the philosophy of physics? What about the philosophy of chemistry or astronomy?

6. Once Charles and his team have concluded their research, what steps could they take to communicate their findings to the wider community?

ANALYSIS

7. What is the problem with the current definition of biodiversity?

SYNTHESIS

8. Imagine you are surveying a section of forest to establish its level of biodiversity and that you and your partner disagree on the exact definition of a species. How would this affect the results of your survey?

EVALUATION

9. To what extent do you believe that studying philosophy of science is important?

10. What practical implications do you think will arise from solving the disagreements around the definition of biodiversity?

CREATIVITY

11. How would you design a workshop to help people understand the disagreements surrounding the definition of biodiversity?

MORE RESOURCES

- Explore Charles' research in more detail here: pencelab.be
- Explore the resources and activities available on biodiversity on the school's website: www.biodiversityinschools.com
- Explore some of the international agencies working to preserve biodiversity: www.unep.org, ipbes.net

ACTIVITIES

BIODIVERSITY WORKSHOP

Charles says that one of his next steps is to organise a workshop that is designed to encourage a conversation about the definition of biodiversity among different organisations and members of society. Imagine you are presenting a talk at this workshop to explain Charles' research about the definitions of biodiversity and taxonomy. Create a poster or a presentation to help you communicate with your audience. Think about who might be attending the workshop and why it is important that they hear about Charles' research.

BIODIVERSITY SURVEY

Biodiversity is an important part of any ecosystem, including your local parks, school playground or even your garden. Use the following methodology to conduct your biodiversity survey in your local area. Depending on the size of the area you want to survey, it may be best to do this in groups, or even as a class.

Step 1: Create a habitat map of the area you want to survey. First, draw the main features and boundaries of the habitat i.e., ponds, fences, buildings or paths. Then, add in details about the types of habitats found in each area and include any smaller features such as trees and bushes. Once you have completed your map, draw a grid over the top of it to divide it into sections, which you can label as A1, A2, B1, B2...

Step 2: For each grid section of the map, record the number of different species that you find there, as well as the total number of organisms. This will be easiest if you start with the plants and then move on to animals. To survey the animals in a section, it is recommended that you first conduct stationary observations by sitting quietly in one spot and observing any insects, birds or other animals that you see. It is important to stay still and quiet, so that you don't scare any animals off, and to remain in your spot for at least 10 minutes to make sure you get a fair sample. Once you have done the stationary observations, you

can take a closer look at your section to see if you can find any other animals. You can also count signs of animals such as dropping or footprints.

Step 3: To calculate what's known as the 'diversity index' for each section, divide the number of different species found by the total number of organisms. For example, if you find five different species in section C3 and 25 individual organisms, the diversity index would be $5/25 = 0.2$. To determine the diversity index for the whole area, simply divide the total number of different species found by the total number of individual organisms found. The closer your diversity index is to 1, the more diverse your area is.

Step 4: Reflect on what you have learned and think about steps you could take to improve the biodiversity in your area.