

Ecology

with Joanna Greenwood

Talking points

Knowledge

1. What two questions did Joanna base her study on?
2. What tool did Joanna use to collect insect samples for laboratory identification?

Comprehension

3. What is the difference between a deciduous and coniferous forest?
4. How does the amount of pollination impact the number of seeds in an apple, and therefore its quality?

Application

5. Imagine you own an apple orchard. How would you determine the average number of pollinator visits per minute for trees on your orchard?
6. How do you think an apple grower could improve the size and symmetry of their apples?

Analysis

7. Joanna suggests that the use of pesticides on orchards might have impacted her results. What other variables do you think could have affected her results, and why?
8. Compare Joanna's initial hypothesis with her results. What is the difference between the two, and why do you think the results did not confirm the hypothesis?

Synthesis

9. Imagine that you own an orchard in the northeastern US. Based on Joanna's article, how would you design a plan to improve the yield and quality of your apples?

Evaluation

10. Joanna mentioned that repeating the study at more orchards might help her better understand the data. How do you think a larger sample size would affect the reliability and validity of her results, and why?
11. Even though her results did not support her hypothesis, Joanna will publish her findings and speaks openly about what she doesn't understand. To what extent do you think it is important for scientists to share 'unexpected' or 'negative' results with the agricultural community as well as 'positive' results?

Activity

Choose two habitats to study within your school grounds, garden or local area. Try to choose two habitats that are different from one another such as a front lawn and a flower bed, a sports field and a forest, or a hedgerow and a community garden.

Observe the pollinators in both of your chosen habitats for 20 minutes. Use a free mobile app like **iNaturalist** to help you identify what you see. Every time you see an insect visiting a flower, take a clear, close-up picture of it on your app and write down a quick description of it and where you saw it in a field notebook.

Identify your pollinators using the photos you took in the app. If you can't identify them to species level, record their genus or family. Write down the scientific and common names of the insects that you find and make a list of everything that you saw.

Calculate the total number of different species (species richness) and the total number of individual insects (abundance) that you found in each habitat. Use this data to make a bar graph comparing the species richness and abundance between your two habitats.

Write a three-paragraph report explaining your results. In the first paragraph, use your data to describe which habitat supported a healthier, more diverse community of pollinators. In your second paragraph, use information from Joanna's article and your own research to explain why you think there was a difference between your two habitats. And in the third paragraph, propose two management practices for each habitat that could support its pollinator community.

Reflect on your study by answering the following questions: What limitations or potential errors might have affected your data collection and results? How could you improve the reliability and validity of your results? What have you learnt from taking part in this ecology field study?

More resources

- Watch this video to learn more about iNaturalist: [youtube.com/watch?v=Xigf85KgsmQ&t=55s](https://www.youtube.com/watch?v=Xigf85KgsmQ&t=55s)
- Learn more about bees and agriculture: [museumoftheearth.org/bees/agriculture](https://www.museumoftheearth.org/bees/agriculture)
- Discover how to become an ecologist: [cieem.net/i-want-to-be/how-to-become-an-eem](https://www.cieem.net/i-want-to-be/how-to-become-an-eem)