STEM Project

Chapter 6: Interactions between organisms

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What's the problem?

Humans have had an enormous impact on the Earth. We have modified some natural environments to such an extent that there is no trace of what the environment looked like before we started.

Melbourne from the south side of the Yarra River before European settlement.

Thousands of ecosystems have been modified as a result of human activity through deforestation, hunting, the introduction of invasive species, the production of waste and the creation of greenhouse gases.

Today, scientists and engineers are working hard around the world to assess and remedy some of the negative impacts that humans have had on the environment.

Defining a problem

The first step in tackling the environmental problems caused by humans is to measure or assess what has occurred, so that we know the size (quantity) and nature (quality) of the issues.

Consider the problem of plastic waste production. Humans create a lot of plastic, and much of it ends up in water ecosystems. Animals in these ecosystems can become entangled in or eat the plastic, which can either kill them or damage their health and reduce their ability to breed. This interference to the survival rates of a species plays havoc with the food webs that keep an ecosystem in balance.

Consider the following scenario: Turtles have been returning to Pristine Island for centuries to lay their eggs. Recently, the residents of the island have reported large quantities of plastic rubbish washing up on beaches. They have also noticed fewer turtles returning to lay their eggs.

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Before we can address a problem like this, we have to find out more about it. We do this by collecting data.

Quantity data

Data that tells us about the size of a problem is quantity data. Some data that could be collected to tell us about the size of the problem on Pristine Island includes:

- amount of plastic on the beach
- amount of plastic in the water
- amount of plastic found inside dead turtles
- number of turtles returning each year
- number of baby turtles hatching each year
- changes to overall turtle population.

Can you think of three more? Note them down.

Quality data

Data that tells us about the nature of a problem is quality data. Some data that could be collected to tell us about the nature of the problem on Pristine Island includes:

- the type of plastic found (fishing line, bags, etc.)
- the location of the plastic found
- the source of the plastic (households, boats, etc.)
- the health of laying turtles
- the health of baby turtles
- the chemical composition of plastic found.

Can you think of three more? Note them down.

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A local problem

You are now going to investigate the problem of general litter in an environment you inhabit. Choose an environment that you believe has a problem with litter, such as an area in your school or a local park or creek.

With a partner, brainstorm some ways to collect data on this problem that will tell you about the size and nature of the problem. Write down your ideas below.

Quantity data	Quality data

Plan and collect your data

Discuss with your partner which of your data collection ideas is possible to carry out, then plan an excursion to collect this information.

Use the following questions to guide your planning:

- What quantity and quality data will you collect?
- How will you collect this data?
- What locations will you visit to collect your data?
- What equipment will you need?
- What safety issues could be involved?

Data and results

Record the data you collect below. If you need more space to make a tally or write descriptions, use a separate sheet.

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Quantity data collection

Data type	Details

Quality data collection

Data type	Details

Discussion and reflection

Describe the difference between quantity data and quality data.

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Given the data you have collected, what effect could the litter in your environment have on ecosystems that exist there? How big is this effect?

Can you make any conclusions about the cause of the litter problem you investigated?

Brainstorm some ideas to reduce the litter problem you investigated.

Which of your ideas to address the problem of litter is most feasible (most realistic to implement)? Who would need to be involved to make this happen?

Extension activity

Take your best idea to address the problem of litter in your environment and make it happen!

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