

Lesson One: Introducing Ecosystems

Objectives

- To understand the mechanics that control food webs and ecosystems
- To appreciate the interdependency that exists between the different parts of any ecosystem
- To be able to quantify elements of Gersmehl's model and interpret the relative sizes of nutrient flows and stores

Context and Rationale

This lesson introduces the students to the concept of a food web, the key components of the web and how the different elements of the web are linked together. Students should be encouraged to think about interdependence within and between biotic and abiotic factors from the outset as this will develop their sense of connections in the ecosystem as a whole. Through simple arithmetic students can explore the idea of energy movement within the food web and stronger students can take this further to work with percentages; allowing them to recognise that within a food web energy is neither created nor destroyed.

Students who have not previously been taught a systems approach to a topic may require an initial introduction to its central concepts of inputs, processes, outputs and feedback.

*This lesson is also presented as a walk-through PowerPoint presentation. See document '**Lesson One Walkthrough**'.*

Starter

Present the students with a key question: ***What is a food web and what might it tell us about the relationships between plants and animals?*** Students should be able to recognise that a food web is a series of plants and animals that are linked together by their feeding patterns.

This can be developed through a short and simple question and answer activity, and for weaker class sets, one might like to begin this exercise as a 'Think, Pair, Share', allowing students the opportunity to note any key ideas they find on a mini white board.

Then present each student with a card from '**Introducing Ecosystems Key Word Cards**' – blue cards have a key word written on it while green cards have a definition (there is no reason why cards cannot be doubled up for large teaching sets). Students have to get up and 'find their partner' somewhere else in the room, and only sitting down with them once they are sure they have the right person. A verbal check around the room, informing the students that they will need these definitions shortly, will check that everyone has found their correct partner.

Presenting ***'Ecosystems Key Definitions Presentation'*** on the board will allow the teacher to go through the definitions again. Key parts of the definitions have been omitted to test students' understanding of the key parts of each definition. A crib sheet ***'Ecosystems Key Definitions Crib Sheet'*** can be issued to students once you are confident that they have a working knowledge of the key words that they will be using throughout the topic.

Body

Show the students the simple food web in ***'Food Web and Energy Flows Presentation'***. Students can demonstrate their ability to describe the flow of energy in the food web by drawing arrows of energy flow on ***'Energy Flows Worksheet'*** and working out the relative biomass values assigned to each organism. Offer students the chance to think how they could present the flow of nutrients and energy between organisms differently and allow them to think about other examples of data flows they may have used or seen (such as traffic flow maps).

Introduce the idea of proportional arrows and how they can be put into a diagram. Show students ***'Gersmehls Model Presentation'*** and talk through how it works, testing their ability to 'read' the relative size of the arrows as a data presentation method. This can be done either verbally or through ***'Gersmehls Model Worksheet'***.

Using the original, simple food web and on ***'Food Web and Energy Flows Presentation'*** students can draw an estimate of their own Gersmehl's model for the organisms shown.

Plenary

Show a series of Gersmehl's models that correspond to different biomes through ***'Gersmehls Model Biome Match Presentation'***. Students can be asked to match the appropriate biome to the right model diagram. Students should also attempt to verbally justify why they have selected that biome and what visual clues in the organisms and the energy values have informed their view.

Homework or Extension / Enrichment Tasks

Students can try to draw a Gersmehl Model for a temperate woodland in the UK, based on the principles they have learnt about relative sizes of stores and flows as well as proportional shape diagrams.

Differentiation Possibilities

Alternative resources are available for students with SEND, EAL, and those with less confidence in the subject matter:

'Alternative Lesson One Walkthrough'

'Alternative Introducing Ecosystems Key Word Cards'

'Alternative Ecosystems Key Definitions Presentation'

'Alternative Ecosystems Key Definitions Crib Sheet'

'Alternative Food Web and Energy Flows Presentation'

'Alternative Energy Flows Worksheet'

'Alternative Gersmehls Model Presentation'

'Alternative Gersmehls Model Worksheet'

'Alternative Gersmeh's Model Biome Match Presentation'