

Feeding Frenzy

How can we move students beyond memorising food chains and into thinking like ecologists? Feeding Frenzy is an active, role-playing game of tag designed for secondary students that uses movement and repetition to model energy transfer through food webs and explore the impact of humans and introduced species on the ecosystem.

Student outcomes

By the end of the lesson, students will be able to:

- Describe how energy moves through a food web.
- Explain how changes to one species can affect an entire ecosystem.
- Predict the impacts of introduced species or environmental changes on ecosystem balance.

Curriculum Links:

- Year 7 - WA7SSUB2: Food chains and food webs can be used to represent energy flow in ecosystems and predict possible impacts of human activity
- Year 9 - WA9SSUB1: Plants and animals have structural, behavioural and physiological adaptations that enable their survival in their environment
- Year 11 ATAR Biology Unit 1 – Ecosystems and biodiversity

Resources and preparation

After printing and laminating role cards, you only need 10 minutes to set up & 5 minutes to pack down each time you run the game. Scale printing accordingly if you're planning on running this for more than one class at a time, for example an entire year level.

Resources required for one class:

- Oval, basketball court, or other large open space to safely run
- Whistle
- Wrist bands or pegs x200 (multiple colours)
- Laminated A5 cards
 - Plant total x15
 - Fungi x5 (optional)
 - Herbivore x15
 - Omnivore x10
 - Carnivore x10
 - Rabbit x5
 - Feral cat x5
 - Cane toad x5
 - Human x5
 - Scientist x5

Safety considerations

- Choose a playing surface that will be safe to run on – check for hazards before playing.
- Students must remain within boundaries – they immediately ‘die’ if they run over the edge. You can couch this as a road boundary with lots of traffic.
- No pushing, grabbing, blocking or tackling. Only gentle shoulder tagging is permitted.
- Stop immediately on long whistle blow.

There are several ways to play the game, starting with the simple version and moving to more difficult levels with feral animals across the hour, with breaks for discussion.

Introduction (10-15 minutes)

- Check in with students for their understanding of what a food web is (interconnected food chains, where energy flows through an ecosystem).
- Introduce game by showing the plant, fungi, herbivore, omnivore, and carnivore cards, and introduce each of the animals on the cards as being a representative of each group. Mention there are more cards for later in the game.
- Introduce the concept of energy travelling through a food chain, and explain that in this game it’s represented by wrist bands being handed from one player to another.
- Allocating roles for a healthy ecosystem:
 - Ask for the fastest runner in the class – allocate them to be the Carnivore.
 - Ask for 5 people who do not want to move around much – allocate them to be the Plants.
 - If there are any particularly disappointed students that didn’t get to be Plants, allocate 2 to be Fungi.
 - Nominate 10 remaining people to be Herbivores, and 4 to be Omnivores. Any left over can also be Plants or Fungi.
- Go through the rules on the back of the cards with everyone, starting with Plants and working your way up the food chain.
 - Reiterate on each card (except Fungi) that you ‘die’ if you run out of wrist bands and stop playing until the teacher puts you back in again.
 - Reiterate that all animals drop a wrist band when you blow the whistle.
- Define your playing area & ‘dead’ player area.
- In role groups, ask students to come up and get the correct amount of wrist bands, then head to the side of playing area.
- Check understanding of rules on the back of their cards again before beginning – when they’re collecting wrist bands, they may approach you individually to ask their question.

Game play (30 minutes)

- Throw a handful of wrist bands on playing area and release the Plants & Fungi to start picking them up.
- Release the Herbivores, followed by Omnivores, then the Carnivore. Wait about 15 seconds in between each release stage and blow a whistle after almost every one to reiterate the whistle-drop-band rule. Wait for the Carnivore to earn another wrist band before blowing the whistle after them so they don't 'die' immediately.
- Then every 30-90 seconds after the game starts blow a short blast on the whistle to get everyone to drop a wrist band. Shorter duration between blasts usually means a faster game as students 'die' of starvation.
- After 5 minutes, pause the game for a discussion with a long whistle blast. Point out how many Herbivores have 'died' and what roles are still left in the game and ask them why that might have happened, and to make any predictions on what might happen in the rest of the game.

At this stage, you can keep playing this base version of the game or introduce feral pests. If you choose to not add feral pests this time, you can change the ecosystem in other ways below.

- Restart the game, slowly adding in the orange feral cards (rabbit, feral cat, cane toad, human) by swapping out cards on students as they 'die'. Pause the game at any point for a discussion on how the food web is changing/changed.
- At any point, you can change the rules and pause for discussion. For example (don't have to do all of these, as some don't work with each other):
 - Herbivores must travel in groups.
 - If you've been given a wrist band by a human, you now 'die' from disease or unhealthy feeding habits.
 - Anyone with a black wrist band 'dies' immediately (then have discussion about rodenticide/rat poison travelling through food chain and accumulating in owls).
 - Change some players to be carnivores and see how long it takes for everything to run out of food.
 - Carnivores travel only in groups.
 - Change all Omnivores and Carnivores into Herbivores to simulate plague levels and see how fast all the food runs out.
 - Shout 'forest fire' or 'new housing development' and kill off all the plants to see how long the animals survive.
 - Simulate disease by killing off any animals gathered in groups >3.
 - Simulate habitat loss by reducing the size of the playing area or splitting it in two.
- To end the game, introduce the Scientist player/s to try and fix the ecosystem & remove feral animals.

Conclusion (10 minutes)

Collect all the role cards & wrist bands and find somewhere comfortable to sit for a discussion.

Lead a discussion around what happened during the game. Was it fair that some players could eat more than others? Or immediately kill another player? How did it feel to try and fix everything and remove the feral animals? In the game, humans can be nasty or nice – what kind of things can you humans do in real life to help our environment?

You can also add other tasks for the classroom environment, like draw your own food web with arrows going the correct way to get your students to demonstrate their understanding of the concepts.

Some potential examples that students might mention, and their ecological meaning:

Observation	What happened next?	Ecological meaning
Herbivores disappeared.	Omnivore and carnivore populations declined soon after.	Energy was no longer flowing to higher levels of the food web due to reduced food availability. More predator pressure on omnivores.
Feral cat introduced.	Native herbivore, omnivore and carnivore populations declined.	Introduced predators can increase predation pressure and disrupt ecosystem balance.
Animal eats bacon and egg plant.	Feral animals died while native animals survived.	Native species often evolve adaptations to local plants and toxins that introduced species lack.
Animal eats cane toad.	Animal dies.	Cane toads are a poisonous introduced species that can kill native predators and alter food web dynamics.
Too many herbivores were present.	Plants were quickly depleted.	Population growth can exceed available resources, leading to competition and ecosystem imbalance.
Habitat size was reduced.	Animals interacted more often and resources ran out faster.	Habitat loss increases competition and can reduce biodiversity.
Scientists removed feral species.	Native populations began recovering.	Ecosystem management can help restore balance, although recovery may take time.

Teacher notes

- If you are using this lesson to introduce the concept of food webs, please also have some other printed pictures of food chains and webs to visually introduce them while speaking.
- Although we refer to *wrist bands*, we encourage you to use whatever resources are already available in your school, such as clothes pegs, tails, or other markers. We aim to avoid purchasing new plastic materials where possible. The resources used at ECU have been repurposed from retired branded materials from our own and other organisations as part of our commitment to sustainability.
- The Plant and Fungi roles are designed to be accessible for students with injuries or disabilities and still play the game (of course you know your students best and they should not be limited to *only* these roles if they want).
- All roles are represented by an actual living thing found in South West Western Australia. Plants are represented by either jarrah or bacon & egg plant (which is poisonous to ferals), Fungi are a russula (toxic to humans), Herbivore is a caterpillar, Omnivore is a quenda/bandicoot, Carnivore is a boobook owl. You can talk through these if you want or leave it for students to discover on the cards.
- I usually assign the Carnivore role first to one of the fastest students, then offer roles to students who may be less inclined to participate. This often helps build buy-in and encourages more students to volunteer. You know your class best, so adapt role allocation as needed.
- The smaller the area, the more interactive the game. I often use a half basketball court for one class and reduce size as the game goes on to represent habitat loss.
- As you play repeated games, you can start with a healthy or unhealthy ecosystem – ask the students to vote on what they'd like to start with, and how *they* would make it unhealthy (like 1 plant or 10 carnivores etc).

Acknowledgements

Feeding Frenzy was created by ECU's Science Outreach and Engagement Coordinator Cass Rowles to help students explore food webs, ecosystem balance, and the impacts of environmental change through active participation and play-based learning and has been further refined through delivery in ECU's science outreach programs.

The lesson continues to evolve (like the most recent addition of Fungi and new WA curriculum links) through feedback from teachers, students, and science communicators. Educators are welcome to adapt the activity to suit their learners and local ecosystems. If reproducing, sharing, or adapting this resource, please acknowledge **Cass Rowles** and/or **Edith Cowan University (ECU)** as the original source.