Biomagnification in Food Chains

This activity shows how pollutants can move up a food chain, affecting both species lower down, and higher up the chain.

# You will need:

* A collection of small tokens to represent food (e.g. buttons, beads, squares of coloured paper) in two different colours ratio 3:1 (colour 1 to colour 2). Colour 2 is contaminated food.
* An open space.

# Overview:

Students are split into differently sized groups representing different levels of a food chain. They play rounds of rock, paper scissors to mimic predators eating prey. Coloured tokens represent food, some of which is contaminated. The contaminated food is passed up the food chain and biomagnified in the top predator.

# How to play:

1. Split the class into groups: 50% will play the role of insects, 30% will be bats, and the remaining 20% peregrine falcons.
2. Place small piles of the food tokens around the room. Make sure the colours are all mixed together, so that there isn’t just one or two piles of ‘polluted’ food.
3. Let the insects loose! They have 20 seconds to move around the room collecting (‘eating’) the food before the bats are released.
4. Then release the bats. They want to eat as many insects as possible, represented by playing a game of rock, paper, scissors with any insect they encounter. If the insect loses, they must give up one of their food tokens to the bat. If the insect wins, the bat player moves on without a token.
5. After a short delay release the peregrine falcons to prey on the bats in the same way.
6. When time is up, students count their tokens, separating them by colour. Tell them that the colour 2 tokens represent a pollutant (e.g. DDT).
7. Any insects or bats holding coloured tokens are dead.
8. Peregrine falcons, being larger, can survive higher levels of pollutants. However, the pollutants make their eggshells so thin that they break, meaning they will not hatch any chicks.

## Discussion points:

* Ask the students to predict what will happen to the Peregrine Falcon population.
* How will this then affect the rest of the food chain?
* Ask students to list all the sources of pollutants that animals may come across. For example, pollutants may be in the soil, water, air, plants, their prey, on the ground (litter).
* What challenges do we face in trying to remove pollutants from the food chain?

## Going Further

* Pick a pollutant and research:
  + The uses of that pollutant (where does it come from?)
  + How it gets into the environment
  + Which habitats are particularly affected?
  + Which species of plants and/or animals is it especially affecting?
  + What steps (if any) are being taken to reduce the amount of the pollutant in the environment?
  + If levels of the pollutant do not decrease, what are the long-term consequences of this?