



Predators usually prefer to attack prey without being seen (it increases the chance of successful capture before the prey runs away). If prey is looking directly at a predator, the predator is deterred from attacking the prey.

Some butterflies have evolved dark, round spots on their wings. Some predators see these dark spots and seem to mistake them as watching eyes, so they avoid attacking prey with eyespots.

NB Experiments involving animals must be approved by an Animal Welfare committee (depending on your state or territory's education department). Please obtain approval from your education department before carrying out these experiments.

What you need

Each group of students will need:

- PLAIN white flour.
- Lard such as copha or butter.
- Bowls and spoons to make pastry.
- Aprons, gloves, etc to protect clothing and skin from pastry and food colouring.
- 40 ml each tasteless food dye colours—green, orange/red, black, brown.
- Small paintbrushes.
- One tape measure that reaches 4 metres or more.
- Pegs that can be placed in the ground (such as tent pegs).
- One roll of string.

What to do

1. The amounts of pastry can be increased to produce more pastry butterfly prey and achieve more reliable results.
2. For each activity, mix up 400 grams of pastry from a mixture of 300 grams plain white flour and 100 grams lard (3:1). Pastry prey can also be kept in the freezer until required.
3. Also check whether the area where pastry prey will be left is protected from dogs, cats, young children, native mammals, etc.
4. Birds most likely to be present in a school yard are:
 - sparrows (*Passer domesticus*)
 - starlings (*Sturnus vulgaris*)
 - Indian mynas (*Acridotheres tristis*) and
 - magpies (*Gymnorhina tibicen*).
5. As an extension activity, students can research the birds most commonly observed attacking the pastry prey.
5. Roll the pastry out flat and cut out as many butterfly wing shapes as possible. Save any pastry off-cuts as these can be used to form the butterfly's body.
6. Paint the pastry butterflies with a thin layer of brown food dye.
7. Once these are dry, divide the butterflies into three groups. Paint one eyespot on one group of butterflies, paint two eyespots on the second group of butterflies and do not paint eyespots on the third group of butterflies.
8. To mark out a 4x4 metre square on the ground, measure 4 metres with the tape measure, place a peg in the ground at each corner and tie the string between each peg, to form a square.



9. Once the pastry prey butterflies have dried, place the butterflies in a random order, equally spaced within the square on the ground. This can be done by randomly drawing one pastry butterfly from the container and gently placing it on the ground within the square. Step away from this spot, draw another pastry butterfly from the container and gently place on the ground within the square.
10. At the end of the day (or chosen period of time), check how many pastry butterflies have been left untouched and record this in the table. Do not record pastry butterflies that have been pecked and left behind (these have been attacked by birds but not eaten).
11. This experiment can be repeated over different days with different light levels and weather conditions to see if the results change drastically.

What to notice

Students can record and pool their results in a table similar to this one.

Number of butterflies left			
Experiment	No eyespot	One eyespot	Two eyespots

Research butterflies and other insects that have eyespots on their wings or back. Do their eyespots look very realistic?

Human newborn babies also react to eyespots. Why would this be an advantage in humans?

More information

Significance of butterfly eyespots as an anti-predator device in ground-based and aerial attacks. *Oikos* (2003), 100: 373–379. Anne Lyytinen, Paul M Brakefield and Johanna Mappes.