Case 9

Adaptations in Nature

Many animals and plants show features of colour, shape or behaviour which help them to survive. These are called adaptations. In this display you are invited to think about some animal adaptations and suggest how they might help the animal to survive.

1. Q. How do the shape and colour of this butterfly help it to stay safe?

A. When the butterfly settles on a twig and closes its wings it looks like a dead leaf. Predators are then unlikely to notice it.

India Leaf Butterfly (*Kallima huttoni*)
ELGNM: 1939.4.420

The camouflage works better on a natural background!

Photo: Mike Prince

2. Q. How do the large, round spots on the underwing help the Owl Butterfly to stay safe?

A. The Owl Butterfly flies slowly, and risks being caught by a predator. When it lands and closes its wings the large spot suddenly appears and looks like the eye of an owl. This may help to frighten a predator away.

Owl Butterfly
ELGNM: 1939.4.534

3. Q. Why is the Wood Wasp coloured to look like a Wasp?

A. Most predators don't eat Wasps in case they get stung. They learn to avoid Wasps by recognising the black-and-yellow colour. The harmless Wood Wasp has the same black-and-yellow warning colour which 'fools' predators into leaving it alone.

Wood Wasp
ELGNM: 1930.10.95

Wood Wasp, showing the long ovipositor which it uses when laying eggs in wood.

Photo: Holger Gröschl

4. Q. Why are there no insects much larger than the Rhinoceros Beetle?

A. Unlike mammals, and other vertebrates, insects do not have a blood system to carry oxygen round their bodies. Instead, they have branching tubes connected to the outside air. The air, containing oxygen, diffuses down these tubes to all parts of the insect's body. If insects get too large, they might not get enough oxygen to the centre of their bodies.
In the Paleozoic Era (540-250 million years ago) there were some much larger insects. But at that time the air was about 32% oxygen – today it is only 21%.

Rhinoceros Beetle
ELGNM: 1978.1398

5. Q. Why are Guillemot eggs so variable?

A. Many birds are breeding on the same ledge so the markings mean that each bird can recognise its own egg.

Q. Why are Guillemot eggs round at one end and pointed at the other?

A. There are at least two theories. One idea is that it causes the large round end to be raised above the level of the muck which collects on the ledges. This keeps the pores in the shell open to allow oxygen to enter. Another (older) idea is that it causes the egg to roll in a circular fashion which means it is less likely to roll off the ledge.

Guillemot eggs
ELGNM: 1978.189.22, 1978.651.7, 2009.36.131, 2009.36.202

More variety in Guillemot eggs

Photo: Didier Descouens

6. Q. Why are Puffin eggs white and not marked like Guillemot eggs?

A. Puffins nest in a burrow so a white egg is easier to see in the darkness. Markings are not important because the Puffin nests singly and doesn't need to recognise its own egg among others.

Puffin egg
ELGNM: 1978.189.19

7. Q. Why are Lapwing eggs pointed?

A. The eggs are large because the Lapwing chick is well developed when it hatches. It can run about soon after hatching. The pointed shape means that the eggs can fit together neatly in the nest. It is then possible for the adult to cover them all when it sits on the eggs.

Lapwing eggs
ELGNM: 1978.366.104, 2009.36.326

8. Q. How do the markings of the Buff-tip moth help it to avoid predators during the day?

Spot the Buff-tip moths!

Photo: Gail Hampshire

A. It rests on a branch with its wings closed. The buff-coloured head and wing tips look like a broken twig, so a predator won't notice the moth.

Buff-tip
ELGNM: 1956.11.124

9. Q. Why do these birds have their eyes in different positions?

A. The Snipe has its eyes on the side of its head so it can see backwards and forwards. It can then see a predator approaching from behind. The Tawny Owl has no predators but must be able to judge distance when pouncing on a mouse. Forward facing eyes make it easier to judge distance.

Snipe and Tawny Owl
ELGNM: 1930.16, 1920.4

A monkey also has forward-facing eyes. It is important for a monkey to judge distance accurately when swinging from branch to branch.

Photo: Charles Sharp

10. Q. Why is the female Shoveler brown (like nearly all female ducks)?

A. When the Shoveler is sitting on its eggs it is in danger of being attacked by a predator, such as a Fox. The brightly coloured male would be easy to see but the brown female is well camouflaged – blending with the rushes or grass where it nests.

Shoveler
ELGNM: 1978.772

11. Q. Why does the Curlew have a curved beak?

A. When the Curlew is feeding in mud, it uses the sensitive tip of its beak to detect its food (invertebrates). When the bird moves its head from side to side, the tip of the curved beak moves below the surface. This increases the chance of the beak touching a food item. When the Curlew is feeding among stones, the curved beak makes it easier for the bird to feel for food under the stones.

Curlew
ELGNM: 1855.2

A newly hatched Curlew doesn't have a long beak. It wouldn't fit in the egg! It grows rapidly after hatching.

Photo: Tim Melling

12. Q. Why does the Merganser have a row of small teeth along each side of its beak?

A. Most ducks eat water weeds and other plant material. The Merganser eats fish. The small teeth enable it to grip the slippery fish.

Red-breasted Merganser
ELGNM: 1978.802

13. Q. Why does the Beaver have such large incisor teeth?

A. Beavers cut down small trees to build their lodge. The incisor teeth must be large and strong to gnaw the tough wood.

Beaver skull
ELGNM: 1978.493

A tree felled by a Beaver. Notice the marks left by the teeth as it gnaws the wood.

Photo: Gordon Robertson

Display curated by Martin Cook, Museum Volunteer.