The Body of a Dragonfly

[Year/Subject] 3rd Year, Science
[Course Name] Body and Life Cycle of Insects

Optimum Season

If the worksheet "The Body of a Dragonfly Larva" is taken into account, dragonflies should be caught and observed between May and October, when hawkers, common dragonflies and damselflies are present in large numbers, after observing dragonfly larva between April and May. Alternatively, dragonflies can be observed first, followed by observations of well-developed dragonfly larva between November and March.

Items to Prepare

■Butterfly net: to catch dragonflies ■ Digital camera: to photograph dragonfly larva and dragonflies
■Magnifying glass: to observe the dragonfly's compound eyes

Dragonflies are living animals with exoskeletons that children can handle easily and form valuable teaching aids. Observing the body structure of dragonflies can be considered a supplementary exercise for third-year pupils who study "The Body of an Insect" in their first semester.

Dragonflies are common insects that live in the same ecosystem as humans. They can be caught between spring and the start of winter around areas such as ponds, fields and rice paddies. Provide pupils with the opportunity to catch a dragonfly as part of their study into experiences with the natural environment.

When catching and observing animals in the wild, make sure to take note of the following data.

How to catch dragonflies

Dragonflies can be difficult to catch as they can fly around very tactfully and have well-developed vision. They do, however, have blind spots towards the rear where the head joins the body, and underneath near their mouth. They can be caught with relative ease by swinging a butterfly net upwards and at an angle from the rear.

How to take dragonflies home

Rather than placing dragonflies that have been caught into a breeding case, they should be placed in a "triangular paper" folded out of tracing paper or printing paper, with care taken to avoid direct sunlight.

Triangular paper

Objectives

■Increase the pupil's awareness of "The Body of an Insect" by capturing and observing dragonflies in the wild.
■Comparisons can be made between the "Relationship between the position of the left and right eyes" and the "Shape of the forewing and aft wing", an important factor for classifying insects, which can enable pupils to think about different families of insects.
■Increase the pupil's awareness of local environmental conservation by experiencing nature around familiar water environments.

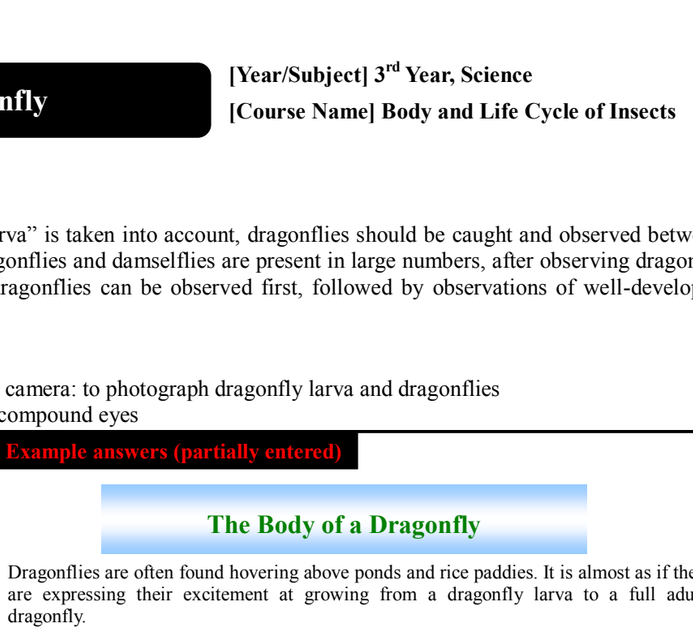
Classifying different types of dragonflies can be extremely difficult. In this exercise, ecological and morphological comparisons will be observed to enable pupils to think about different families of dragonflies.

Example answers (partially entered)

The Body of a Dragonfly

Dragonflies are often found hovering above ponds and rice paddies. It is almost as if they are expressing their excitement at growing from a dragonfly larva to a full adult dragonfly.
Dragonflies have a sleek, gorgeous form.
Let's have a closer look at dragonflies.
● **Observation date & time:** ● **Weather:**
● **Observation area:** ● **Temperature:**

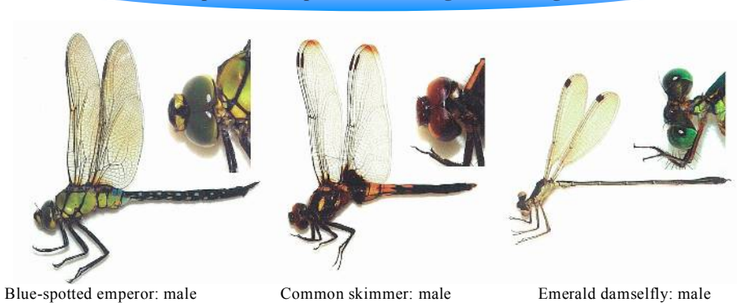
Write the name of each body part of a dragonfly in the corresponding squares.



Let's have a closer look at the dragonfly's wings when it is stationary.

Species with wings that are spread out horizontally	Species with wings that are closed or slightly closed
Aeshnidae, orthetrum, sympetrum etc	Coenagrionidae

Let's have a closer look at the position of the left and right eyes. Compare the shape of the forewing and aft wing.



Blue-spotted emperor: male | Common skimmer: male | Emerald damselfly: male

	Relationship between the position of the left and right eyes.	Shape of the forewing and aft wing.
Blue-spotted emperor	Connected	Different, aft wings larger than forewings
Common skimmer	Connected	Different, aft wings larger than forewings
Emerald damselfly	Separated	Almost the same

What conclusions can be made after making these observations?

The relationship between the wings, position of the left and right eyes, and shape of the forewing and aft wings of the aeshnidae and orthetrum (and sympetrum) were similar, however the coenagrionidae was different. From this, we can conclude that aeshnidae and orthetrum (and sympetrum) are closely related, while coenagrionidae is only distantly related.

Observation technique

Dragonflies that have been brought back to the classroom should be placed into a clear Ziploc-type plastic bag and observed from the side with their wings in a closed position. Doing so prevents damage to the dragonfly's wings or body, enabling them to be released without harm after observations are complete.

Thorax, legs and wings

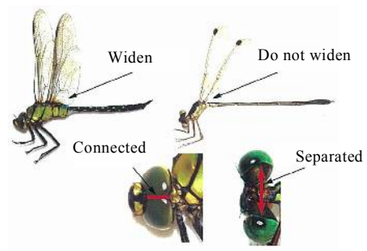
The thorax area of insects is divided into the "prothorax", "mesothorax" and "metathorax". The "front legs" are connected to the "prothorax", the "middle legs" to the "mesothorax" and the "rear legs" to the "metathorax". Observing dragonflies from the side is an extremely effective method for understanding "the body of an insect".

Observing dragonfly wings when they are stationary

Dragonflies that live around ponds and have fully closed wings when they are stationary belong to the coenagrionidae family, while those that have partially closed wings belong to the lestidae family; both are part of the zygoptera suborder. Members of the odanata order, including aeshnidae, orthetrum and sympetrum, have their wings almost fully open in a horizontal position.

Observing dragonfly wings

Observe the base shape of the aft wings. The base shape of the aft wings in families other than the coenagrionidae are wider and have a different shape to those of the forewings.



Observing dragonfly compound eyes

Observe whether the left and right compound eyes are "separated or connected". Of these three different families, only those in the coenagrionidae are separated.

Further discussion

While the size and shape of dragonflies in these three families differ, those in the aeshnidae, orthetrum and sympetrum suborders are closely related, and share common behavioral and characteristic traits. Observation shows that dragonflies in the coenagrionidae family are only distantly related. This distance relationship is expressed by the "order" rather than on "suborder" scale. Try and allow pupils to observe as many different types as possible to provide them with an understanding of this type of classification.