**ACTIVITY: White butterfly life cycle**

**Activity idea**

In this activity, students use white butterfly eggs, larvae and pupae to compare the white butterfly life cycle to that of a monarch butterfly.

By the end of the activity, students should be able to:

* observe and discuss the life cycle of the white butterfly
* compare and contrast the white butterfly’s life cycle with that of a monarch
* record and graph caterpillar growth.

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**Introduction/background**

The monarch butterfly is one of New Zealand’s most studied life cycles. As classroom teachers, we are both captivated by the metamorphosis process and often in a panic to find enough milkweed leaves to keep the voraciously hungry caterpillars alive.

In this activity, students observe the life cycle of a white butterfly (*Pieris rapae rapae)*. Fortunately, we can purchase cabbage and other brassica plants at the supermarket so the white butterfly’s food source is always secure.

White butterflies lay their eggs on the underside of brassica leaves. Eggs are almost white when laid, but the colour changes to yellow before hatching.

The larval period lasts approximately 23 days. The caterpillars change in colour as they develop – from yellow to a well-camouflaged velvety green.

Caterpillars pupate when they are about 30mm long. They move to select a pupation site so it’s advisable to keep the mature caterpillars in an aquarium or other appropriate container if you wish to observe the chrysalis.

The pupa does not form a ‘J’ and hang like a monarch. It spins a silk pad to anchor itself and then spins a silk strand around its middle for additional support.

Metamorphosis takes place in 10–15 days during spring and summer. You can see wing development and the black markings as the pupa develops, but the colour change is not as extreme as with the monarch.

For more information on the white butterfly’s life cycle, refer to article [White butterflies](http://link.sciencelearn.org.nz/resources/696-white-butterflies).

**What you need**

* White butterfly caterpillar(s) or eggs
* Brassica plant(s) such as broccoli, cabbage
* Container(s) of water
* Aquarium or other large clear container to house the caterpillars
* Netting to cover the aquarium
* Copies of [White butterfly caterpillar growth chart](#chart)
* Ruler

**What to do**

1. Place cabbage or broccoli seedlings outside to attract female white butterflies. Alternatively, purchase seedlings that already have eggs on them.
2. Choose a brassica leaf that has both eggs and larvae on it to observe the changes that take place as caterpillars grow. The caterpillars’ greenish colour blends perfectly into the colour of their food plant so caterpillars can be hard to spot. Pinch off the leaf holding the eggs and/or caterpillars and place the leaf stem in a container of water.
3. Observe the caterpillars as they grow. Note the camouflage and colouration of the caterpillars. Compare this with the bright colouration of monarch caterpillars (see the [Monarch butterfly life cycle](https://www.sciencelearn.org.nz/image_maps/48-monarch-butterfly-life-cycle) interactive).
4. Choose an individual caterpillar and use a ruler to measure its growth. Measure and record the data daily until pupation. If you have more than one caterpillar, students will need to devise a way to identify the same caterpillar from day to day. For example, one caterpillar per leaf per labelled jar.
5. Replace the food source as needed. Cabbage leaves from the supermarket work well if you run out of garden plants. You may need to physically move the caterpillar to the fresh leaf. Gently remove the caterpillar by hand. Like monarchs, white butterfly caterpillars sequester plant toxins, in this case, mustard oils from the brassica plants. This gives them a mustard taste that can be a deterrent to birds. Wash your hands after handling the caterpillars.
6. After pupation, compare the white butterfly chrysalis with that of a monarch butterfly. Note its colouration and how it attaches itself to the pupation site.
7. Observe the chrysalis as it matures. Like the monarch, the white butterfly’s features begin to show through the chrysalis wall.
8. Release the butterfly after it emerges.

**Discussion questions**

* In what ways are the white butterfly and the monarch butterfly’s life cycles similar? In what ways are they different?
* At each stage of its life, the monarch butterfly is quite colourful and obvious. How does this compare to the white butterfly? Why do you think the colouration of a monarch is different to a white butterfly?
* Why do you think the caterpillars move away from the larval food plant when they are ready to pupate?

**White butterfly caterpillar growth chart**

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| **Date** | **Length** | **Notes about appearance/changes** |
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