

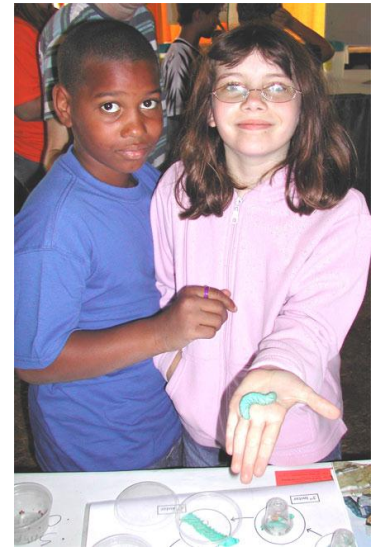
Manduca Tobacco Hornworm

Manduca Script for a presenter

The Manduca Tobacco Hornworm is the Most Powerful Biological Magnet known to humanity.

Well, maybe that's an overstatement. But the big green fifth instar caterpillar can powerfully attract some people, and just as powerfully repel others.

The Manduca Tobacco Hornworm Exploration Station includes a complete lifecycle of the Manduca Tobacco Hornworm as organisms: eggs, five instars of caterpillars, pupa, and moths (male and female). All but the moths are living.



Explore the Manduca

The heart of the Manduca is a long dark tube that runs down the middle of the back of the caterpillar. The heart is divided up into a series of chambers that correspond with the segmentation of the Manduca. Each chamber has a pair of flaps that serve a similar purpose as the valves do in a human heart. The blood is pumped one segment at a time from tail towards the head at the base of the brain. After the blood has been pumped up to the brain it percolates back through the body until it is collected at the tail end, and ready to be pumped forward again.

Experiment: Take a long balloon and squeeze one end. What happens to the balloon? As you move forward hand over hand towards the opposite end of the balloon what occurs? This is a rough model of the blood flow in Manduca.

Why the Manduca? The Manduca is an example of a model organism useful, in this case, in studying gene expression in development.

Questions you should ask: What Makes a Good Model Organism? Why would researchers study Manduca as a model organism?

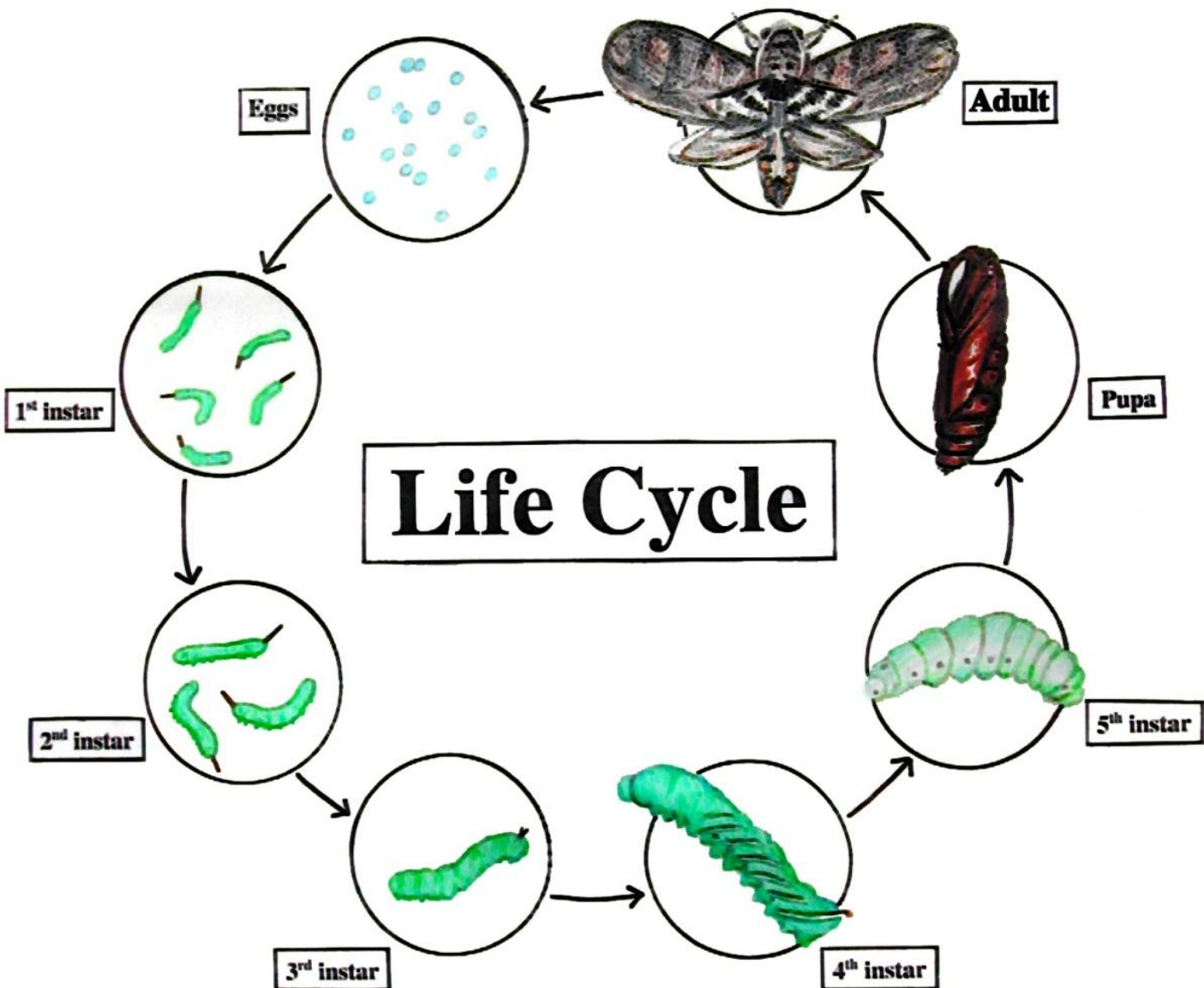
- What Makes a Good Model Organism?
- Do you want something that's small or large?
- Fast or slow in life cycle (from egg to adult)?
- Simple or complex?
- Cheap or expensive?

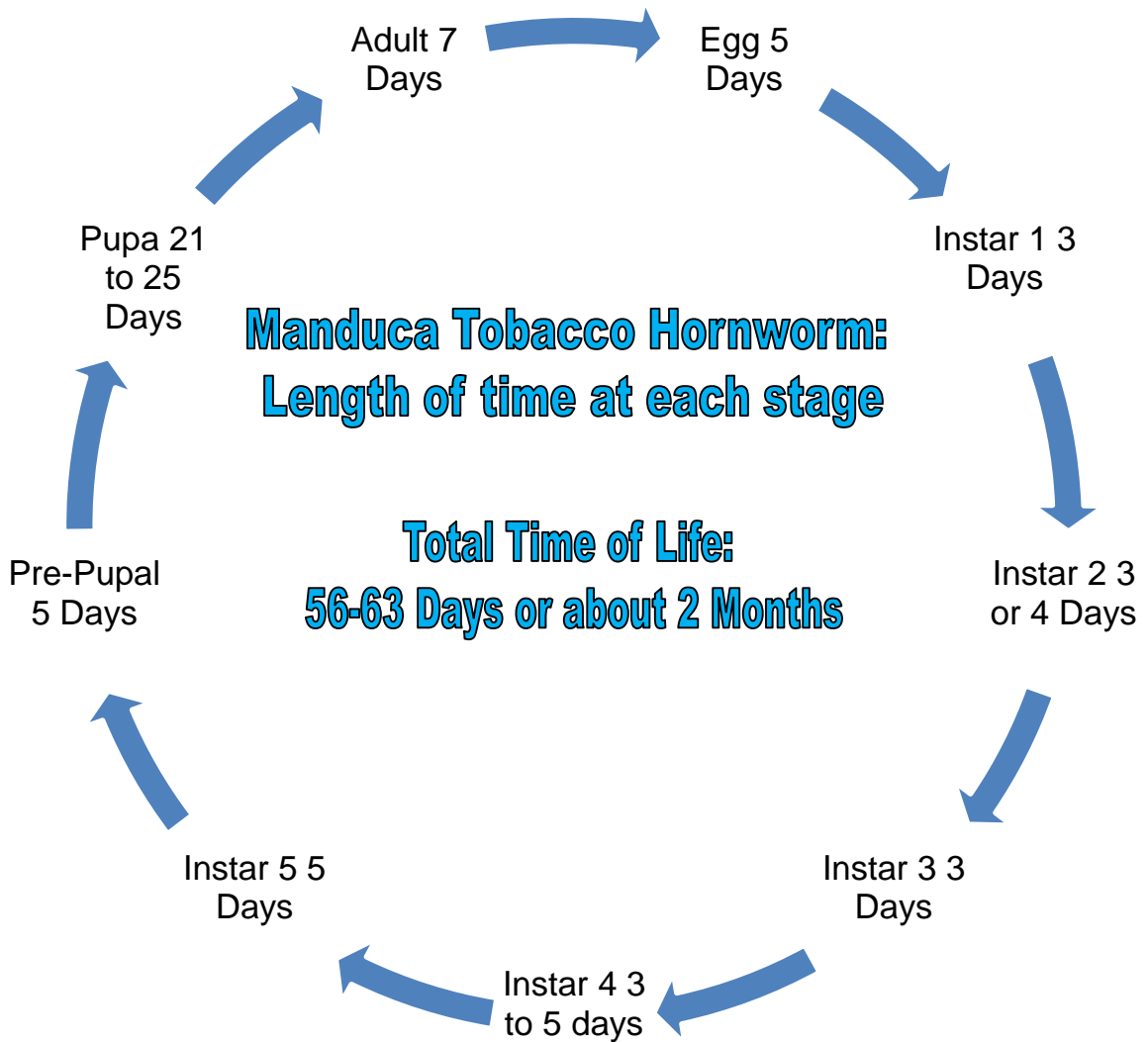


How many generations of Manduca can a geneticist study each year?

Tobacco Hornworm

(Manduca sexta)





**The exception to this is if the Manduca enters its pupa too late in the summer, in which case it will stay in the pupa through fall and winter, and emerge as an adult in spring.

Some history of Model organisms

In research during the early 20th century that led to the discovery of vitamins, University of Wisconsin researchers Stephen Babcock and Elmer McCollum first worked with cows, but then they started to also use rats. Why would scientists work with rats in addition to cows?

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There are good reasons to work with cows, but there are good reasons to also work with rats, or mice.

The use of model organisms can also have a political bent. What is the name of the award that Senator Proxmire of Wisconsin handed out to highlight what he thought were boondoggles (waste of money)?

- Golden Fleece Award

When Stephen Babcock (of Babcock Hall ice cream fame) and Elmer McCollum first approached the Dean Henry Russell of the College of Agriculture for permission to use College money to purchase experimental rats, Dean Russell refused permission, who pounded his desk and roared, "The answer is no! The rat is a barnyard pest and should be exterminated! The legislature will never stand for feeding such animals. We will proceed with cattle." Ihde, Aaron, "Chemistry, as Viewed from Bascom's Hill" page 337.