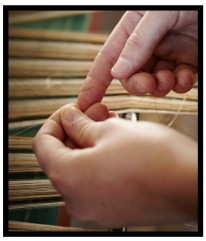
ORIGINS OF SILK

According to legend, silk was discovered by Xi Lingshi, a Chinese Empress, about 4,500 years ago. A silk-moth cocoon fell from a mulberry tree into her tea. The tea made the cocoon unravel, revealing a silk thread.

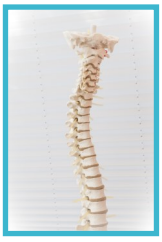
The Chinese guarded the secret of silk for nearly 3,000 years. They exported the cloth throughout Asia and to Europe, along the trading route known as the 'Silk Road'. Silk-making in Europe finally began around 550 CE and the industry flourished until the 1800s. Today, however, China dominates production once again, producing almost two thirds of the world's silk.

Discussion point… Silk is a surprisingly strong material – a silk thread can lift more weight than a steel wire of the same width. This is called its tensile strength (measured as MPa - megapascal). Compare the tensile strength of silk with these other materials.


Silk thread: 500 MPa


Human skin: 15 MPa

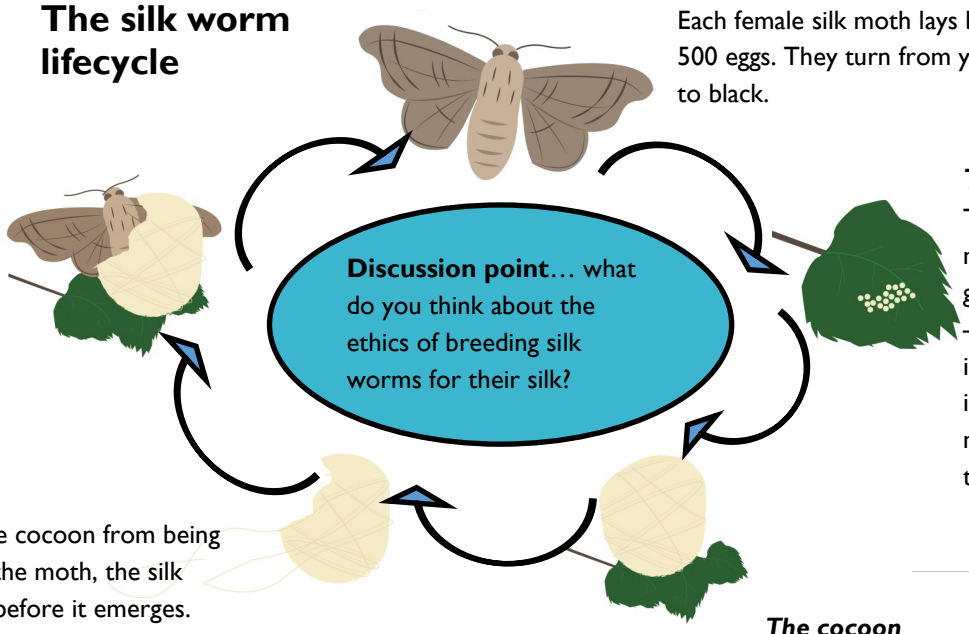

Copper: 70 MPa


Bone: 104–121 MPa


Mild steel: 247 MPa


Diamond: 1600 MPa

The silk worm lifecycle



The egg
Each female silk moth lays between 200 and 500 eggs. They turn from yellow to white to black.

The silkworm
The silkworm only eats mulberry leaves. It grows incredibly quickly – its bodyweight increases 10,000 times in one month and it must shed its skin four times.

The cocoon
The silkworm takes about three days to spin its cocoon. It produces a liquid silk, made of two proteins. The gum-like sericin, coats the fibroin forming a single filament and solidifying when in contact with the air. Inside the cocoon, the silkworm sheds its skin to form a brown-shelled pupa.

The silk
To prevent the cocoon from being destroyed by the moth, the silk farmer kills it before it emerges. by soaking the cocoon in boiling water. This also softens the threads.

The silk moth
Some moths are allowed to develop and break out of their cocoons so they can mate and start the life cycle all over again. They cannot fly and will not eat or drink in their short lifetime.

Discussion point… what do you think about the ethics of breeding silk worms for their silk?

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