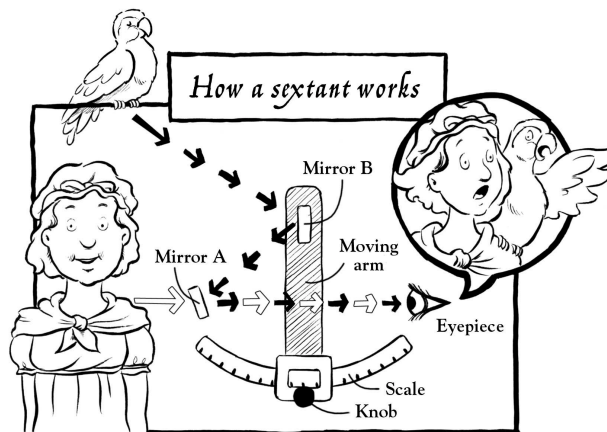




## Perch a Parrot –Sextants and Navigation

### How does a sextant work?

Sextants are used for navigating and surveying for maps. The user looks through an eyepiece, through which they can see the horizon and the reflection from the sky in the mirrors. If the second mirror on a moving arm is adjusted, the user can make a celestial body, such as a star, the Sun or the Moon appear to rest on the horizon as they look through the eyepiece. An angle in degrees can be read off the sextant and used to calculate lunar distance, longitude and where the ship is located on the Earth.



### A brief history of the sextant

The Polynesians used something similar to a sextant without mirrors – a latitude hook. This was a long needle shaped instrument, used to measure the distance between the Sun, Moon or a star (through the 'eye') and the horizon. Over the centuries, similar navigational instruments were developed to measure the angles between a celestial body and the horizon. These included the astrolabe, the quadrant, the cross-staff and the backstaff.

Around the early 1700s, the famous scientists Isaac Newton, Edmund Halley, Robert Hooke and John Hadley all had similar theories which lead to the development of the sextant. Their theories were based around using mirrors for double reflection and the measurement of angles. The London mathematician John Hadley is generally credited with being the first to produce a 'double reflecting instrument'. However, it has been proposed that he was influenced by the work of other scientists, including Thomas Godfrey who lived in the United States of America. Hadley built two models using the double reflection of two mirrors 32 years after Newton's death.

During the early 1700s, the British government was keen to explore and expand the British Empire by claiming countries as their own territory. There were problems with navigation, which resulted in the loss of ships and sailors' lives. In 1715, the British Parliament offered cash prizes of £10 000 to £20 000, for a practical and accurate method of determining longitude at sea. At that time, the two methods known for calculating longitude were the measurement of lunar distances and using portable timekeepers such as pendulum clocks. As a result of the competition, Godfrey and Hadley developed the sextant for measuring lunar distances and the chronometer was developed for measuring time. Godfrey and Hadley ended up sharing the prize for their independent work on developing the sextant, but Hadley went into production of sextants from 1731 onwards.

