

### All about submarines

People have been thinking about submarines for centuries. As far back as the 12th century, Alexander the Great may have sent people out in a diving bell for recon missions. Making a useful sub isn't simple: it involves complex issues, including water displacement, horizontal and vertical propulsion, and supplying air to the inhabitants. Here's a look at some early efforts — none of which got the job done — and one whose name lives on anyway.

#### The Bourne Submersible

The first workable sub prototype was designed in 1578 by an Englishman named William Bourne. Unfortunately, he was all about the theory, not building the actual boat, so his ideas weren't put into practice until much later.

#### Dutch Treat

In 1620, Cornelius Drebbel, the Dutch "court inventor" for King James I of England, built the first functional sub. It was basically a rowboat with a wood roof and air tubes for the 12 oarsmen. It took short trips down the Thames River about 15 feet under the surface.

#### Deep and Still

In 1654, a Dutch group built the "Rotterdam Boat," 72 feet long and mostly submerged. It was meant to sneak across the English Channel and sink enemy ships by punching holes in their hulls, but it was so underpowered that it just wouldn't move.

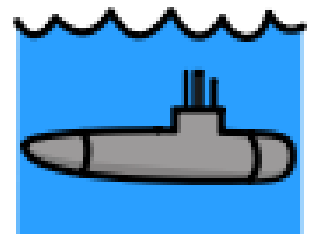
#### First U.S. Sub

In 1776, David Bushnell built "the Turtle," the first sub ever to attack another boat. The craft was towed to its target, a British gunship in New York Harbor. The operator approached the boat and tried to deposit an explosive, but his drill couldn't penetrate its hull, so the attack failed.

#### Enter the Nautilus

In 1797, Robert Fulton, an American artist living in Paris, started designing a sub to be used against the British Navy. He funded it himself, expecting to be paid a bounty for every ship it sank. In 1800, it was ready: He'd stayed under up to six hours (breathing via air tube) and gone as deep as 25 feet on several practice dives. But the ship's sail made it easy to spot, and enemy boats just moved away when they saw it coming.

The Nautilus was a flop as a warship, but Jules Verne used its name for the submarine in his 1870 sci-fi classic *Twenty Thousand Leagues Under the Sea*. The U.S. Navy also dubbed many boats the Nautilus, including the first-ever nuclear sub, the 1954 USS Nautilus.



Use this information to create a spider diagram with all of the most important pieces of information on it. Can you find any other information online about the creation of the submarine?

**Remember: If you find information from the internet, before you write it down, make sure you understand what it says- DO NOT JUST COPY IT!**