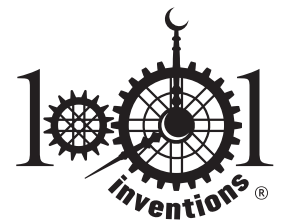


2A Compass



It's 1900. You're on a cruise ship, bound for New York. How does the crew make sure you get to the right place? They use a navigational compass, as sailors have done for centuries.

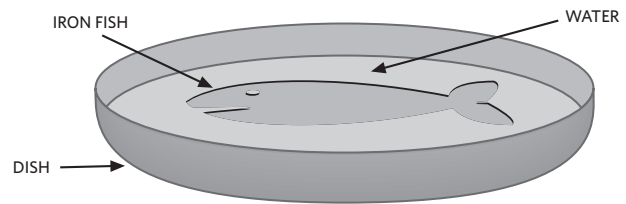
Before compasses, sailors navigated by the Sun and the stars. Some used sounding lines to measure the sea's depth, too. This was fine in the seas around the Islamic world, where skies were often clear and waters mostly shallow. But in other places sailors needed a better way of finding their way around. This might explain why the Chinese were probably the first to make and use a compass. The compass is described in a Chinese book of 1044 on military techniques

We don't know how scientists invented the compass. No-one is sure, either, how the compass got to the Islamic world. But Muslim scientists were quick to use it and improve it.



The earliest written evidence of Muslims using the magnetic compass is in Muhammad al-Awfi's *Collection of Stories*. The year was 1233. The voyage was over the Red Sea or the Persian Gulf. The compass was a fish-shaped piece of iron. It worked like this:

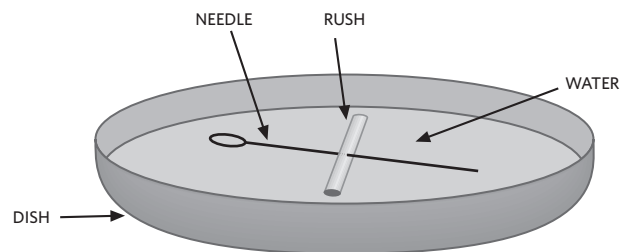
- Rub the iron fish with a magnetic stone. The iron fish becomes magnetic.
- Float the magnetic fish in a bowl of water. The fish rotates until it stops. One end of the fish now points south.



Of course the other end of the fish magnet points north. This pole is the north-seeking pole. The stone (lodestone) contains magnetic iron oxide, Fe_3O_4 .

In 1242, Baylak al-Qibjaqi sailed from Tripoli to Alexandria. He wrote about his journey in *The Treasure Book of Merchants in Travels*, and included a description of the compass they used. The description is so detailed you can use it to make a compass today.

- Make a cross from an iron needle and a rush.
- Put the cross in a bowl of water. It floats.
- Bring a magnetic stone close to the cross. Move the stone in a circle above the cross. The cross follows the moving stone.
- Suddenly, take the magnetic stone away. The needle will be in a north-south line.



Reliable compasses meant that Muslims could travel anywhere by boat, without getting lost. So they could trade goods – and exchange ideas – all over the world. Between 1400 and 1433 the Chinese Muslim Zheng He used compasses on voyages all over the Indian Ocean. He made these journeys before Christopher Columbus was born, on ships five times bigger.