**DO NOW:**

How did new technological advances enable the Age of Exploration?

The image to the left is a depiction of what it might have looked like when the Spanish forces attacked the Aztec city of Tenochtitlan. The Spanish defeated the Aztecs despite being greatly outnumbered. To get to Tenochtitlan, the Spanish had to sail over 5,000 miles on uncharted ocean.

<table>
<thead>
<tr>
<th>What technology and knowledge did the Spanish need to get to Tenochtitlan?</th>
<th>Based on the image to the left, what technology and knowledge did the Spanish need to defeat the Aztecs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship Building</td>
<td>Cannons</td>
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<tr>
<td>Compass</td>
<td>Spears</td>
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<tr>
<td>Astrolabe</td>
<td>Horse</td>
</tr>
<tr>
<td>Metal</td>
<td></td>
</tr>
</tbody>
</table>

The knowledge and technology that came to Western Europe through contact with other societies and through innovations as a result of the Renaissance and Scientific Revolution, made it possible for the Age of Exploration to begin and contributed to their ability to conquer the inhabitants of the lands they traveled to.

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**How did new technological advances impact European exploration and transoceanic trade routes?**

### The Caravel

**Video About Caravels -**

https://www.youtube.com/watch?v=1G78VT75UNs

The caravel was a small, fast, and highly maneuverable ship developed in the 15th century by the Portuguese that uses triangular lateen sails. The caravel used lateen sails which were probably invented by the Greeks around 300 CE, but may have been invented in the Western Indian Ocean and popularized by Arab traders in the Indian Ocean.

The Spanish used the caravel to create maps of Africa and establish trade routes.
### The Compass

The compass is a device that uses magnetic forces to help the user determine which direction is North. The compass helped travelers more accurately determine which direction they were heading, which was especially difficult at sea and on cloudy nights when one could not use the stars to navigate. It was invented in China during the Han Dynasty and its use spread to Western Europe through trade routes in the Indian Ocean and Silk Roads, to the Middle East and through the Mediterranean Sea.

**Notes**

*How did new technological advances impact European exploration and transoceanic trade routes?*

- The compass was used to determine directions and navigate trade routes.

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### The Astrolabe

An astrolabe is a device that allows one to determine their latitude and the time of day by "sighting" a star through the astrolabe and using the markings on the device. The astrolabe enables a person to determine their latitude and the time of day which was useful for navigation and determining distance traveled. It is not certain if they invented it, but Arab traders and mathematicians were most well known for using the astrolabe during the 600s CE and spreading the technology to other societies.

**Notes**

*How did new technological advances impact European exploration and transoceanic trade routes?*

- The astrolabe was used to tell time and location on the open waters.

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### Gunpowder and Firearms

Watch this [video on the weapons technology used by Spanish conquistadors](https://www.youtube.com/watch?v=mL0nT2cz7fg).

Gunpowder was invented in China in the Tang Dynasty (9th century), but it was not until the 1200s that the Chinese started using gunpowder to launch projectiles in warfare. Gunpowder and its use as a weapon spread west. The Ottoman Empire used cannons and long-barrelled muskets (pictured below) to expand their empire and conquer Constantinople. That technology spread to Western Europe where, by the 15th century, cannons and muskets were a regular part of warfare.

**Notes**

*How did new technological advances impact European exploration and transoceanic trade routes?*

- Gunpowder enabled the use of cannons/guns.

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### Portolani

Portolani were detailed charts (maps) that provided navigators with valuable information like the shape of coastlines, distance between ports, and compass bearings. Due to the mathematical and scientific advances in the Renaissance and Scientific Revolution, sailors and much more accurate maps.

**Notes**

*How did new technological advances impact European exploration and transoceanic trade routes?*

- Maps aided in navigation.