Sea ice is simply frozen seawater. It forms when the sea freezes and expands unlike icebergs and glaciers, which are made up of freshwater, and which float in the sea after starting on the land. For most of the year you can’t see the sea ice as it is usually covered in snow. The amount of sea ice changes throughout the year, declining in summer and increasing again in winter. These changes are important to the ecology of these regions and to the health of ocean ecosystems.

Sea ice covers about 7% of the Earth’s surface (which is about 12% of the world’s oceans) and can be found at both the North and South Poles. Most of the sea ice is found in ice packs, formed when large areas of sea ice pack together to make a large floating mass of ice.

Sea ice in the Arctic is quite a different story to ice in the Antarctic as there is no landmass in the Arctic and the area is made up solely of sea ice and snow. This means that the Arctic plays a role in the global climate by reflecting sunlight and helping to keep the planet cool. Climate scientists are very interested in observing any changes in Arctic sea ice because of what it may mean for climate across the rest of the globe (less sunlight being reflected means that more warmth is trapped in the atmosphere and the planet becomes warmer).

The Antarctic ice pack is found at various places in the Southern Ocean around the continent of Antarctica. Sea ice in the Antarctic is highly seasonal with very little ice in the summer and then growing to an area roughly the same size of Antarctica in winter.
Climate change and declining sea ice

Antarctica and the Arctic appear to be responding differently to climate change.

Antarctic sea ice appears to be growing while the Arctic ice is shrinking. This is in part due to geographical differences. Where Antarctica is a continent surrounded by water, the Arctic is an ocean surrounded by land. Wind and ocean currents around Antarctica keep it isolated from global weather patterns and help to keep it cold. The Arctic Ocean is tied to the climate systems around it, making it more sensitive to changes in climate.

Sea ice helps to keep the Arctic cool, simply because there is enough ice in large enough amounts to maintain a cold environment. However as global temperatures rise, there is less Arctic sea ice to keep the area cool. This in turn means that more ice melts and the polar region gets slowly warmer meaning that more ice melts and the polar region gets slowly warmer meaning that more ice melts and so on.

At the same time the bright, shiny surface of the ice also helps to keep the Arctic cool by reflecting most of the sunlight that hits it. As the sea ice melts it can't reflect as much sunlight back into space and the area warms up and more ice melts which means it can't reflect as much sunlight back into space and the area warms up and more ice melts and so son.

On top of that, sea ice affects the movement of ocean waters. When the seawater freezes to become sea ice, a lot of the salt is squeezed out of the ice and becomes trapped beneath the sea ice. This creates a higher concentration of salt under the ice, which increases the density of this water. This cold, denser water sinks to the bottom of the ocean and moves along the ocean floor towards the equator, while warmer water on the ocean surface moves in the direction of the poles. Less sea ice means less cold water moving to the equator and less warm water moving towards the poles. This could affect ocean ecosystems and global climate.
Sea ice plays an important part of the planet's ecology. When seawater freezes, the ice becomes filled with channels of brine, which are home to small organisms such as bacteria, algae, copepods and annelids. These animals then provide food for bigger animals such as krill and fish, which are then eaten by larger animals such as Emperor penguins and Minke whales.

Declining sea ice also poses a threat to Arctic animals such as ringed seals and polar bears. These animals are dependant on the sea ice freezing to a certain extent so that they can travel to feeding and breeding grounds and avoid predators.

Antarctica has no indigenous population and no permanent residents. However in the Arctic is home to a small number of indigenous people who depend upon sea ice for transportation and hunting. Springtime is an important hunting season for indigenous groups as spring is when prey animals emerge from hibernation. But because of rising temperatures the spring ice has been melting earlier than normal meaning that there is less access to traditional hunting grounds and foods. Traditionally indigenous hunters have used events like clouds, wind and currents to predict weather and plan hunts but because of changes to climate these are no longer useful indicators.

Sea ice quick facts

- Sea ice covers about 7% of the Earth's surface, or about 12% of the world's oceans.
- Most Antarctic sea ice is up to 1 metre (3.28 ft) thick.
- Arctic sea ice can be up to 3–4 metres thick over large areas, with ridges up to 20 metres thick.
- The area of sea ice around the poles in winter is about 15,600,000 km² either for the Antarctic or Arctic.
- 80% of the sunlight that strikes it is reflected back into space.
- Scientists in the Arctic have observed a decline in sea ice of about 3% per decade since 1972.
- In Antarctica sea ice has increased by about 0.8% per decade.

References

National Snow and Ice Data Center: http://nsidc.org/cryosphere/quickfacts/index.html