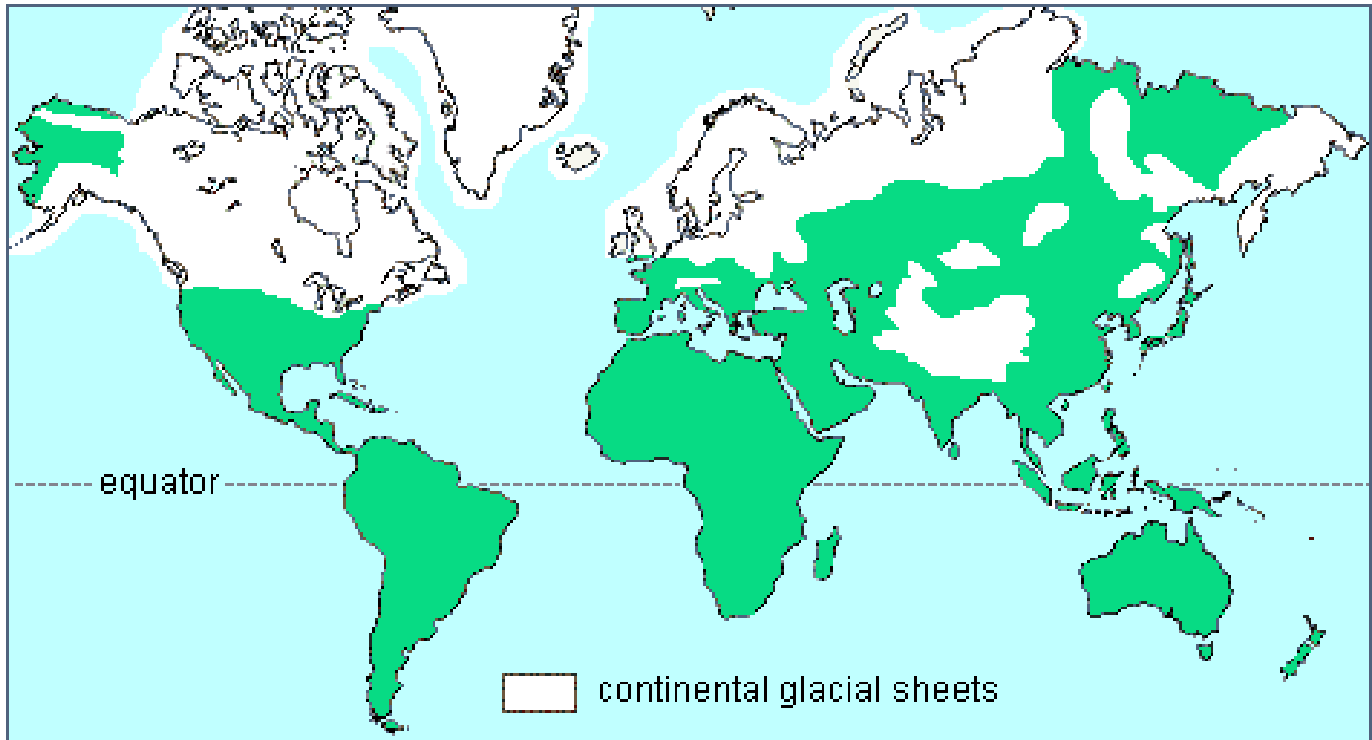


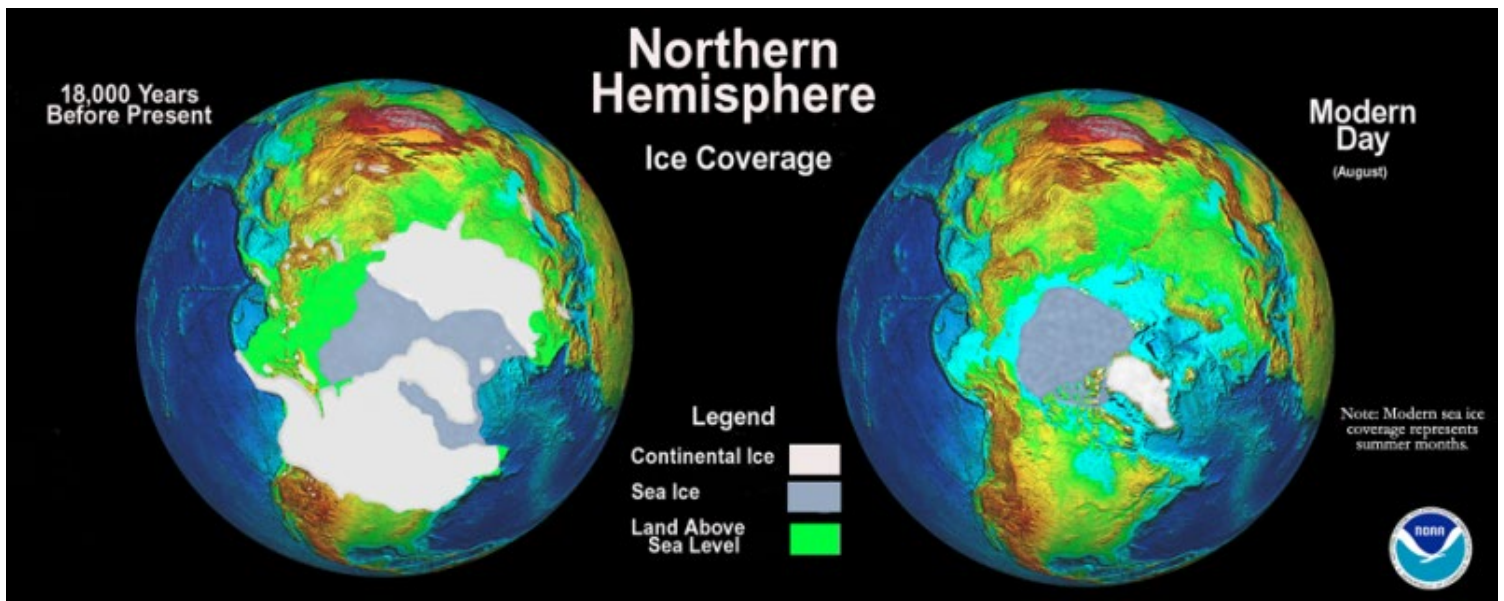
## ICE AGE THEORY (P 1-5)

The people who may have been living in central North America 15,000 to 20,000 years ago saw ice and snow year around. These people were living in the grip of the most recent ice age. During this period all of Canada, much of the United States, and most of northwestern Europe lay buried beneath sheets of glacial ice. These sheets of ice were hundreds or even thousands of feet thick. See the diagram below to get some perspective on how large the area was that was covered by ice and snow.



Today, most geologists would agree that the last Ice Age is coming to an end. A huge amount of water still remains locked in ice over Antarctica and Greenland. If this should melt, it would raise the oceans about 230 feet, completely flooding every coastal city. Florida would be completely under the ocean. Climate change (sometimes referred to as global warming) has launched the melting process.

The latest Ice Age, with its four phases, is by no means the only one Earth has ever had. There have been three ice ages in the past 600 million years. Geologists believe that two Ice Ages occurred, (one in eastern Canada, and another in China, South Africa, Norway and North America) during Proterozoic times. During the Paleozoic era, the Coal Age with its luxurious swamp growth seems to have been closed by the most severe ice age the world has ever known. Even tropical lands in India and Africa show evidence of ice sheets. South America may have been ice capped from the Brazilian jungles southward.



These ice ages arrive when the climate over a region becomes cooler. Summer heat fails to melt away winter ice and snow, so ice builds up and grows from the North pole southward and from the south pole northward.

Archaeologists suggest that people arrived in several groups beginning at least 15,000 years ago, perhaps earlier. The first Americans came from Asia and followed the herds of grazing animals across a land bridge formed during the Ice Age. Because so much water had frozen in the glaciers, the ocean levels were lowered several hundred feet below their present level all around the world. Scientists estimate that there were 12 million square miles of ice sheets—sheets that were 2 to 3 miles thick! The newly formed land bridge allowed humans and animals to move from Asia into North America.



A strip of water called the Bering Strait now separates Siberia from Alaska. In the Ice Age, when the sea level dropped, the strait became a land bridge for migrating animals and the hunters who pursued them. The dotted line shows where land appeared after the ocean level fell.

The people living during this time did not live in bitter cold. Between 15,000 and 20,000 years ago the average temperature of the world was only 6 – 9 degrees Celsius lower than it is now. Moreover, this cooler average and the very Ice Age itself were caused by cool summers rather than bitter winters. There was not enough heat in the warm months to melt away the previous winter's snow and ice. The snow and ice piled up year after year, until it covered the northern country.

The biggest difference between the country near the edge of the ice sheet and the same country today was the vegetation and animal life. The cold prevented the growth of trees, grasses, and most flowering plants. The ground was covered with mosses and lichens. Only during the warmest weeks would one find a few fast-blooming plants such as we find in the Arctic Regions today. The principal animals were wild reindeer, or caribou, musk oxen, and mammoths. These animals are adapted to paw through the snow to get food. There were also meat eaters, such as bears and wolves.



The humans living along the edges of great walls of ice hunted for food. In summer they fished in the cold streams that flowed from the melting ice.

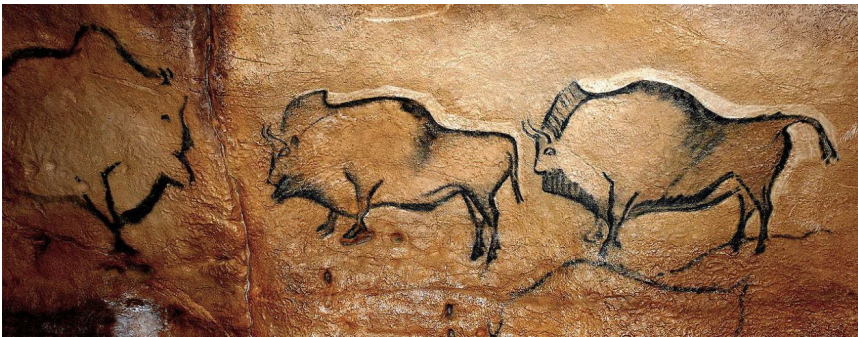
Archaeologists are scientists who have discovered remnants of these ancient peoples. They are known to have originated in Asia. They followed the herds of grazing animals across the land bridge formed during the last ice age. The peoples trekked slowly southward into North America through a harsh landscape.

Early native North Americans made knives from stone and bone. These tools were sharp enough to slice up large animals. They used them as scrapers to remove the fur and flesh from skins. They were excellent hunters and speared huge animals such as woolly



mammoths and long-horned bison. These animals provided skins for cloth, sinews for thread, and bones for needles and hooks. The enormous beasts later died out, and the people were forced to hunt smaller game and collect wild plants for food. The bison and caribou, though much smaller than the woolly mammoth, provided food Ice Age people for hundreds of years.

Ice-Age art and artifacts (also known as Paleolithic art), is some of the earliest known human art. It was produced roughly between 40,000 and 10,000 B.C. These well-preserved artifacts included highly detailed, colored figures of the animals that lived at that time. Cave paintings reflect the lives of the people. This cave art provides archeological evidence of how the people lived. Several dating techniques have been used to pin point when the art was created. Some techniques involve carbon dating of the artifacts found in caves. A newer technique allows scientists to date the cave paintings themselves. This method involves an instrument called an accelerator mass spectrometer. The device can separate and count individual carbon isotopes in tiny amounts of charcoal-based paints. Analysis of the artwork has indicated that the artwork was painted 14,000 years ago. A couple of pictures taken in caves are shown below. What do you think these art forms tell about the Ice Age people?



## What Causes Ice Ages?

Four times within a 2,000,000 year span of time glaciers have advanced over large areas of the continents and then melted away. What conditions caused the ice ages to happen? What might cause another glacial episode even as the last one comes to an end? So far, many theories have been proposed to explain the causes of ice ages.

Currently we would say none of them has all the answers, but here are 5 theories.

1] Certainly, a significant drop in the Earth's average temperature (about 6°C) would cause another "deep freeze". Such a drop in temperature might result from a change in the Sun's energy output.

2] We know that the seasons are caused by the tilt of the earth on its axis (23.5 degrees) as it orbits the Sun. If the axis of rotation was changed, this could affect the length of the seasons.

3] Changes in the arrangement of the continental plates could affect the heating patterns of the Earth.

4] Volcanic dust thrown up into the atmosphere, (cutting off heat from the Sun), could drastically affect the climate.

5] Another possible theory includes the possibility of the explosion of a nearby star that emitted radiation which interfered with the flow of the sun's energy causing colder temperatures.

There is some evidence to support each of the views expressed above, but to date we have no comprehensive theory to explain the Ice Ages. If the greenhouse effect continues to warm the Earth, we may someday have no glaciers on this planet. Some other change in the future may reverse that, bringing on another ice age. No one can say for certain what the future will bring. We can only wait and see. The big idea here is that the Earth is constantly changing. Those changes bring changes in how we as humans interact with our environment. The past is very different from the present, and the present will be very different from the future. We live on a very dynamic, changing planet. The question is how much are *humans* influencing future patterns of change?