

POLAR REGIONS

CN: (1) On the large upper map, color only the portions of the continents (A-C) that are within the Arctic Circle. On the global views, color the continents completely. (2) On the large lower map, use a very light color for Antarctica (D). (3) On the diagram below, use yellow to color the Sun (J) and the sunlight and daylight portions of the globes (J').

The polar regions are the lands bordered by the Arctic Circle in the Northern Hemisphere and the Antarctic Circle in the Southern. These circles mark the point at which the Sun stays above the horizon for at least one 24-hour period during the year. Many geographers and scientists prefer to define the Arctic as the region north of the "tree line" (the northernmost point at which trees will grow) or the "temperature line" (the line above which the average July temperature stays below 50° F / 10° C). Both lines roughly correspond to the astronomically determined Arctic Circle.

Because of limited precipitation, the polar regions can be classified as deserts. Antarctica is the driest, with an average annual snowfall equal to 2 in. (10 cm) of rain. Because of the cold, even small amounts of precipitation do not melt, and are added to the ice cap. The Arctic receives somewhat more moisture (6-10 in. or 15-25 cm) and because of poor drainage and slow evaporation, the Arctic landscape remains marshy during the summer thaw.

Although the Arctic and Antarctic are comparable in size, have similar light and dark seasons, and receive very little precipitation, the two regions are in fact very different. The Arctic is basically an ocean surrounded by the northern regions of North America, Europe, and Asia. The Arctic Ocean, the world's smallest, covers an area of 5,500,000 sq. mi. (14,374,500 km²). The Antarctic region is just the opposite: it is a land mass that constitutes the continent of Antarctica (larger than Europe and Australia) surrounded by three oceans (the South Atlantic, South Pacific, and Indian).

Airliners taking the shorter "great circle routes" routinely fly over the Arctic, and nuclear submarines navigate under the ice at the North Pole. Yet it wasn't until 1909 that explorers reached the "the top of the world." Admiral Robert E. Peary was the first man to set foot on the North Pole. Two years later the Danish explorer Roald Amundsen was the victor by 34 days in the race to the South Pole against an Englishman, Robert F. Scott, who, with members of his team, perished on the trek back.

Because of warming ocean currents, the Arctic is not quite as cold as the interior of Siberia. But much of the Arctic Ocean stays covered by 10-15 ft. (3-4.5 m) of ice. The relative warmth of summer causes part of the ice to break into moving packs, and the tundra (treeless, permanently frozen land) thaws out enough to support colorful plant growth. The thaw involves the uppermost 6 in. (15 cm) of the 1,000 ft. (305 m) or more of permafrost (permanently frozen ground).

The Antarctic has no such dramatic change of season; it's on average 35° F (20° C) colder than the Arctic. Gale-force winds combine with the frigid cold to produce the Earth's fiercest weather. Winds in excess of 200 mph (320 kph) have been clocked, and the lowest temperature reading on record, -128° F (-89° C), was made during an Antarctic winter. Floating ice shelves attached to various parts of the Antarctic coastline considerably expand the size of the continent. In some places, the ice covering Antarctica is close to 2 mi. (4.8 km) thick. This ice cover contains 90% of the world's supply of fresh water. Most of Greenland (in the Arctic) is very similar to Antarctica because both lie under ice sheets of similar thickness. Icebergs break off from glaciers on both land masses to create hazards for shipping.

Over one million people live within the Arctic Circle. Most are of Mongoloid ancestry

including the Inuit (Eskimos) of North America, the Lapps of Scandinavia, and the Chukchi and Samoyeds of Russia. The introduction of modern communication transportation, and scientific and mining operations into these regions has changed the lifestyles of the natives. Snowmobiles are replacing dogsleds. The Arctic is sparsely populated but it seems crowded when compared to Antarctica, which hasn't a single permanent resident. About 4,000 scientists from many nations limit their periods of residence to the summer months.

The world's most vacant continent, Antarctica, is also the highest. The average elevation is 6,000 ft. (1,830 m). Some of its mountain ranges are as tall as 15,000 ft. (4,570 m); the continent would be even higher if not for the weight of the thousands of feet of ice cover which compresses land and mountains alike. The Antarctic Peninsula is an extension of the Andes Mountains of South America.

The Arctic region has a rich sampling of land animals: polar bears, reindeer (in Europe and Asia), caribou (the reindeer's cousins in North America), wolves, foxes, and numerous smaller creatures. Except for polar bears, seals, walrus, and some foxes, most of the animals migrate south during the winter. Antarctica, on the other hand, is even more devoid of land animals than it is of humans. The only land animal present is a tiny, wingless mosquito about a tenth of an inch (2.5 mm) long. Bird and sea life are abundant in both regions. Antarctica is best known for its penguin population. The Emperor penguin, the largest of the species, stands 4 ft. (1.2 m) tall and is capable of surviving the brutal Antarctic winter.

Personnel in scientific stations and field laboratories are actively engaged in research throughout the polar lands. Meteorologists from both hemispheres gather data to assist in global weather forecasting. A variety of mineral deposits have been discovered, but mining operations, such as oil drilling on the north slopes of Alaska, are in progress only in the more accessible Arctic region. Scientists are concerned about the status of the ozone layer of the Earth's atmosphere. This barrier against ultraviolet radiation has been thinning rapidly because of certain contaminants released into the atmosphere by the industrialized nations. A hole has been discovered in the ozone layer above the South Pole, and there has been a decrease in the region's phytoplankton, the plant source that feeds the shrimp-like krill that are at the heart of the Antarctic's marine food chain.

Although there are no immediate prospects for the exploitation of Antarctica, 16 nations have established permanent bases, and 7 have staked out claims to ownership of the land. The United States and the rest of the world do not recognize these claims. The Antarctic Treaty, signed in 1959, grants to nations the right to pursue scientific investigations for peaceful purposes, but they must share all discoveries. Military activity, nuclear testing, and the dumping of toxic waste are prohibited. An unfortunate amount of dumping, burning of waste, and numerous fuel spills have already occurred, but efforts are being made to eliminate those practices. Nations are debating the merits of a new treaty (the Wellington Convention, that would allow mining (under the strictest supervision) in the Antarctic. Skeptical environmentalists fear the unbridled despoliation of the only remaining, truly wild continent. Along with a minority of nations, they favor a proposal that would make Antarctica a "World Park."

SEASONS AT THE POLES



The Earth revolves around the Sun once every 365 1/4 days. The Earth also revolves on its own axis (an imaginary line connecting the two poles) once every 24 hours, creating a night-and-day effect for most points on the planet. The Earth's axis is tilted at an angle of 23.5° to the plane of its orbit around the Sun. We have seasonal changes on Earth because of this tilt. Without the tilt the same amount of sunlight would fall on a particular point on the planet every day, and climates would not vary throughout the year. At the summer solstice, around June 22, the Northern Hemisphere is tilted toward the sun and experiences its longest days and shortest nights. The diagram shows that on this day the entire region within the Arctic Circle receives 24 hours of sunshine. Simultaneously, the Antarctic region is in 24 hours of darkness, and winter begins in the Southern Hemisphere.

At the winter solstice, on December 22, the Northern Hemisphere is tilted furthest from the Sun, and the entire Arctic Circle is in darkness for the first 24 hours of winter. The spring and autumn equinoxes occur around March 21 and September 22. The equinoxes fall midway between the solstices. On the days of the equinoxes, the Earth's axis is perpendicular to the Sun's rays—the axis is neither toward nor away from the Sun (it might help to visualize the tilt as being "sideways" to the Sun). The sun is directly above the Equator, and days and nights are of equal length at all latitudes, in both hemispheres. Between the spring and autumn equinoxes, within the Arctic Circle there will be at least one day of 24-hour sunlight ("Midnight Sun") up to a maximum of 6 months at the North Pole. During that period, an equivalent amount of darkness will prevail within the Antarctic Circle.

NAME: _____

Directions for shading the handout:

- All item that has a * next to it use gray.
- All item that has a † next to it Do Not use any color
- All items marked with an A use Blue.
- All items marked with a B use Dark Green.
- All items marked with a C use Red
- All items marked with a D use Purple.
- All items marked with an E DO Not use any color.
- All item marked with a F use Light Green.
- All item marked with a G use Brown.
- All Item marked with a H use Dark Blue
- All items marked with an I use Orange.
- All items marked with a J use Yellow.

Polar Regions and Seasons at the Poles

1. How are the Polar Regions defined? _____
2. What does the Arctic (and Antarctic) Circle mark? _____

3. What is the "Tree Line?" _____
4. What is the "Temperate Line?" _____
5. Why can the Polar Regions be classified as deserts? _____
6. Which polar region gets the least amount of precipitation? _____
7. Which Polar region gets the most precipitations? _____
8. How is the Northern Polar region different than the Southern Polar region?

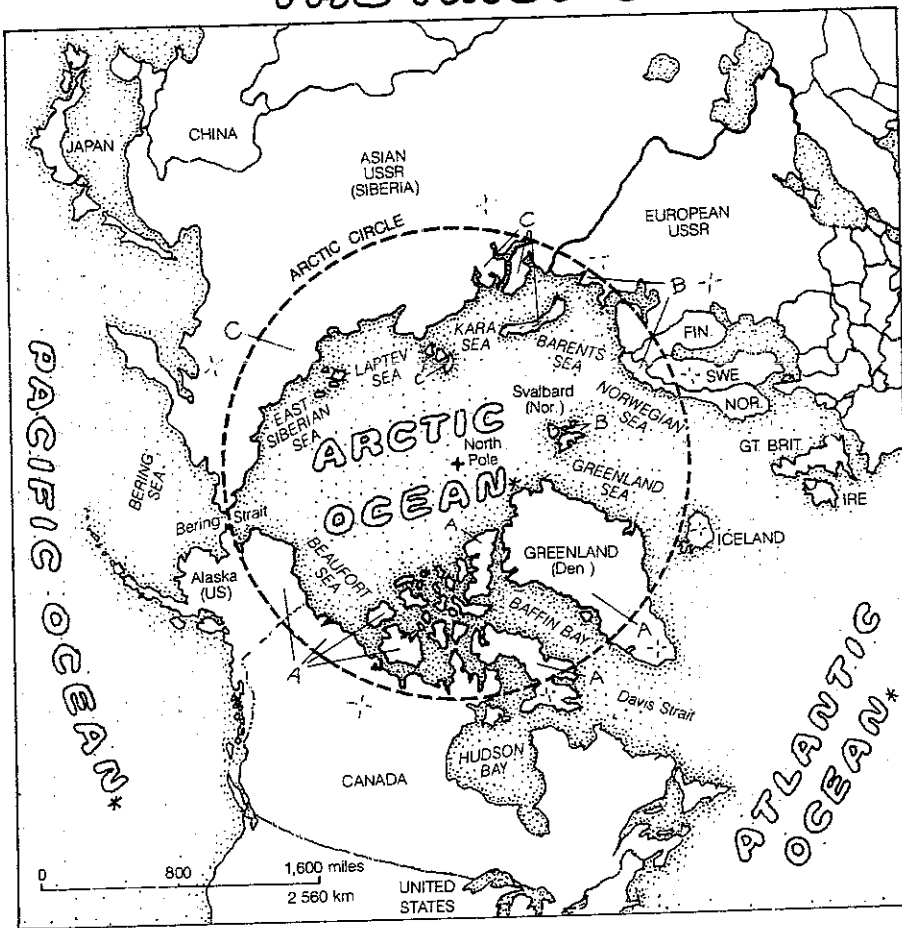
9. What year did explorers reach the North Pole? _____
10. Name the explorer who arrived first. _____
11. What year did explorers reach the South? _____
12. Name the explorer who arrived first. _____
13. What is the average thickness of (north) Polar Ice? _____
14. During warm months, how much of the permafrost thaws? _____
15. About to what depth can permafrost be found? _____

Seasons at the Poles

34. How long does it take the earth to revolve around the sun? _____
35. At what rate does the earth spin on its axis? _____
36. What is the earth's tilt on its axis? _____
37. What causes seasonal changes? _____
38. Approximately when does the summer solstice occur? _____
39. Approximately when does the winter solstice occur? _____
40. When does the spring equinox occur? _____
41. When does the fall equinox occur? _____
42. When is the earth's axis perpendicular to the sun? _____



THE ARCTIC

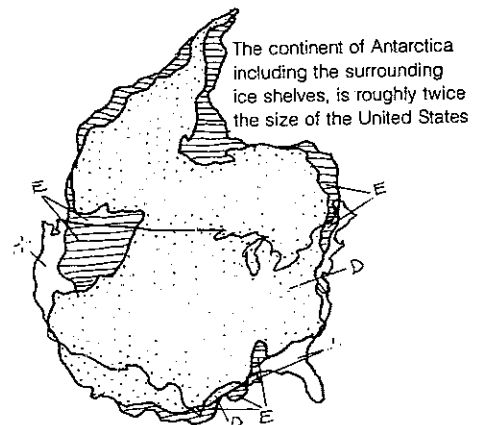
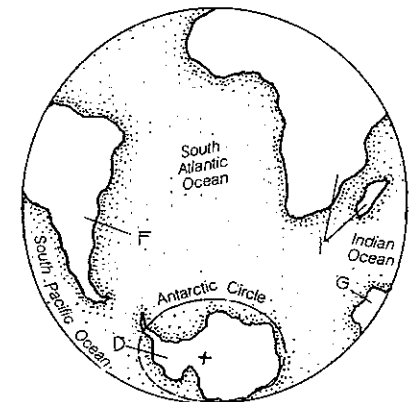
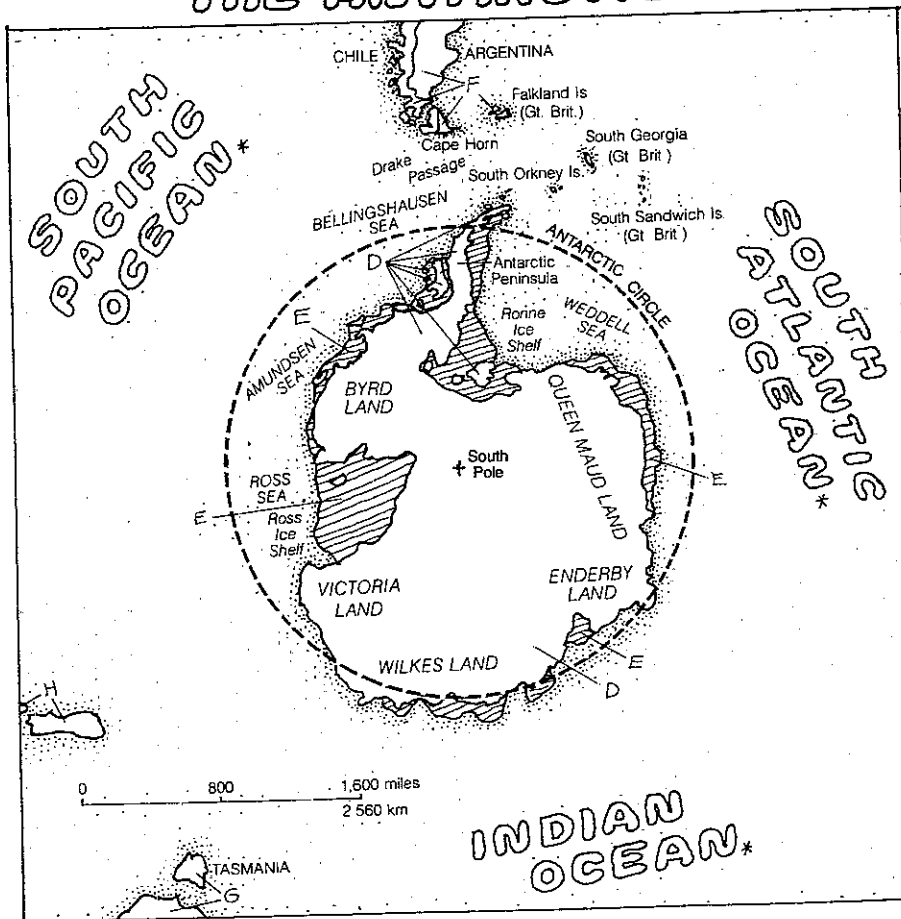


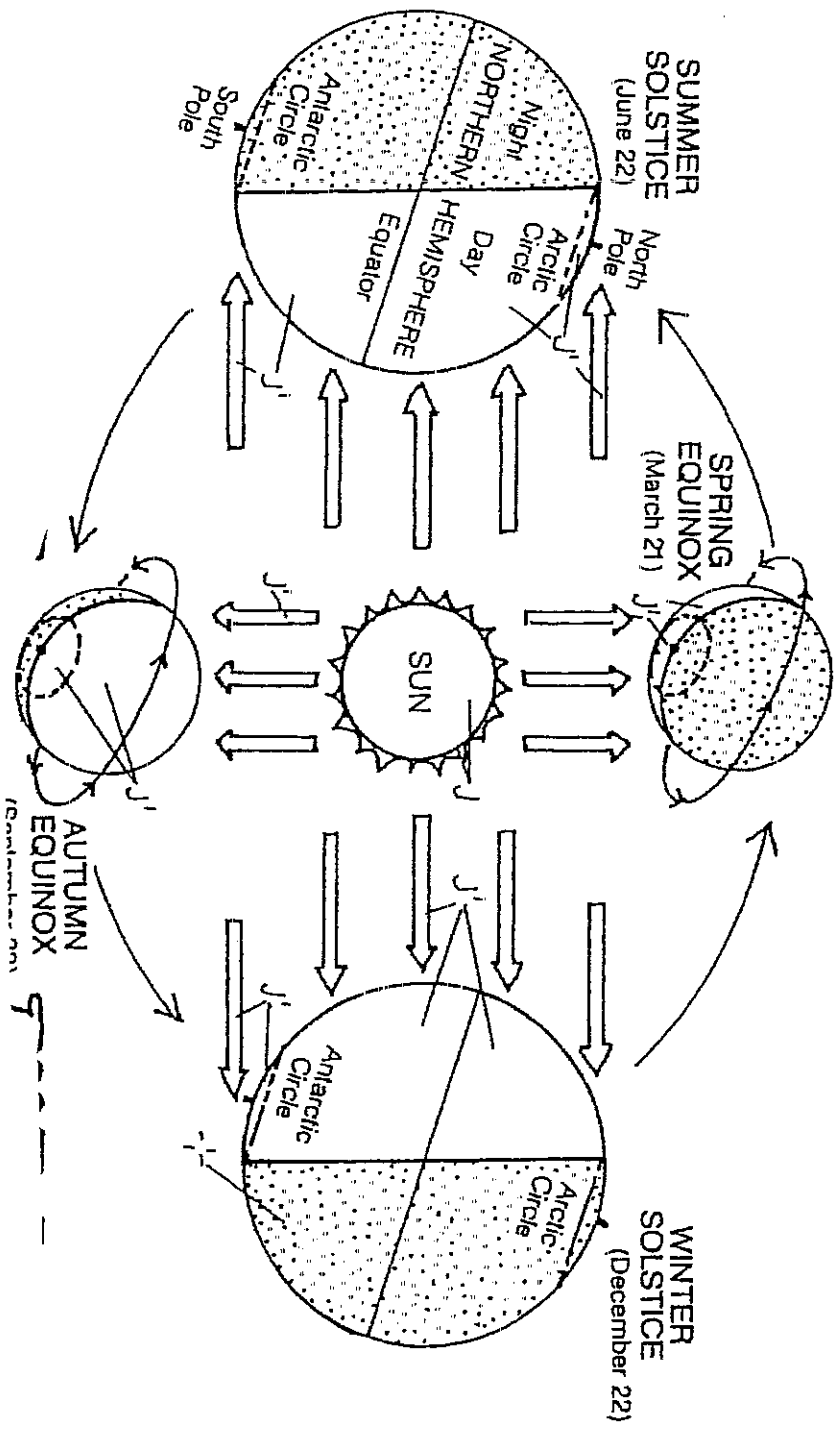
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