3.2 Guided Notes

Objectives

- **Explain** two ways that scientists get data to make maps.
- **Describe** the characteristics and uses of three types of map projections.
- **Summarize** how to use keys, legends, and scales to read maps.

How Scientists Make Maps

- Because most _____ are too small to show details of Earth's surface, such as streams and highways, a great variety of maps have been developed for studying and displaying detailed information about Earth.
- The science of making maps is called _____. Scientists who make maps are called *cartographers*.
- Cartographers use data from a variety of sources, such as from field _____ and remote sensing.
- **remote sensing** the process of gathering and analyzing information about an object without _____ being in touch with the object

Map Projections

- A map is a _____ representation of Earth's _____ surface.
- Transferring a curved surface to a flat map results in a distorted image of the curved surface. An area shown on a map may be distorted in _____, shape, _____, or direction.
- Over the years, cartographers have developed several ways to transfer the curved surface of Earth onto flat maps. These methods are called *map* _____.
- **map projection** a flat map that represents a spherical surface
- No map projection is entirely accurate, but each kind of projection has advantages and disadvantages.

Cylindrical Projections

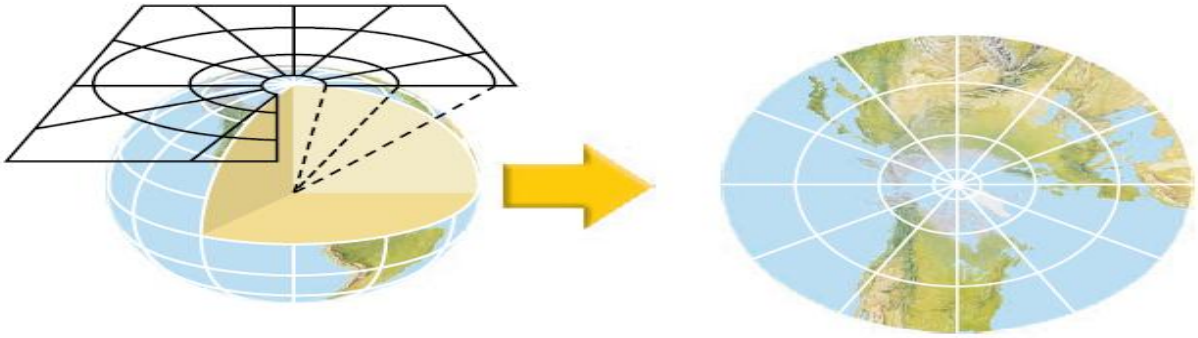
- If you wrapped a cylinder of paper around a lighted globe and traced the outlines of _____, oceans, _____, and meridians, a *cylindrical projection* would result.
- A cylindrical projection is accurate near the _____ but distorts distances and sizes near the _____.
- One advantage to cylindrical projections is that parallels and meridians form a _____, which makes locating positions easier.
- On a cylindrical projection, shapes of small areas are usually well _____.

The diagram below shows a cylindrical projection.

Azimuthal Projections

- A projection made by placing a sheet of paper against a globe such that the paper touches the globe at only one point is called an *azimuthal projection*.
- On an azimuthal projection, little distortion occurs at a the point of _____, but the unequal spacing between parallels causes a distortion in both direction and distance that increases as distance from the point of contact increases.
- One advantage of azimuthal projections is that on these maps, great circles appear as _____ lines. Thus, azimuthal projections are useful for plotting _____ paths.

The diagram below shows an azimuthal projection.



Conic Projections

- A projection made by placing a paper cone over a lighted globe so that the axis of the cone aligns with the axis of the globe is known as a *conic projection*.
- Areas near the parallel where the cone and the globe are in contact are distorted _____.
- A series of conic projections can be used to increase accuracy by mapping a number of neighboring areas and fitting the adjoining areas together to make a _____ *projection*.
- On a polyconic projection, the relative sizes and shapes of small areas on the map are nearly the same as those on the _____.

The diagram below shows a conic projection.

Reading a Map

- Maps provide information through the use of _____.

Direction on a Map

- Maps are commonly drawn with north at the top, east at the right, west at the left, and south at the bottom.
- Some maps use parallels of latitude and meridians of longitude to indicate _____ and _____.
- Many maps also include a compass _____, which is a symbol that indicates the _____ directions (north, east, south, and west), or an arrow that indicates north.

Symbols

- Symbols are commonly used on maps to represent features such as _____, _____, rivers, and other points of interest.
- Symbols may resemble the features that they represent, or they may be more abstract.
- Symbols are commonly explained in a _____.
- **legend** a list of map symbols and their meanings

Map Scales

- scale the relationship between the distance shown on a map and the _____ distance
- Map scales are commonly expressed as _____ scales, _____ scales, or _____ scales.
- A _____ scale is a printed line that has markings that represent units of measure, such as meters or kilometers.
- A _____ scale is a ratio that indicates how distance on Earth relates to distance on the map.
- A _____ scale expresses scale in sentence form.

Isograms

- **isogram** a line on a map that represents a _____ or equal value of a given quantity
- The second part of the word, *-gram*, can be changed to describe the _____ being graphed. For example, when the line connects points of equal temperature the line is called an *isotherm*. When the line connects points of equal atmospheric pressure, the line is called an *isobar*.
- Isograms can be used to plot many types of data, such as atmospheric pressure, _____, precipitation, _____, magnetism, _____, elevation, _____ composition, and many others.