

First Exam: New Date

❖ **Friday, March 2, 2018.**

- Combination of multiple choice questions and map interpretation. Bring a #2 pencil with eraser.
- Based on class lectures supplementing chapter 1. Review lecture slides.

➤ **If you miss this exam, a written make up consisting of definitions, concepts and explanations will be given.**

1

6 Geographers' Tools Maps and their Parts

Prof. Anthony Grande
Hunter College Geography

Lecture design, content and presentation ©2018. Individual images and illustrations may be subject to prior copyright.

MAP MAKING QUANDRY

How do we transfer information about a 3-D spheroid (Planet Earth) onto a smaller 2-D object (flat sheet) without distorting that information?

The mapmaker must deal with **3 obstacles**:

1. **Conversion** of a sphere (curved surface) to a plane (flat surface).
2. **Shrinking** of the earth's surface to fit the smaller flat object.
3. **Portrayal** of information to make it understandable to the viewer.

3

MAP MAKING

The mapmaker deals with them by using:

1. **PROJECTION** to **convert** a sphere to a flat surface.
2. **SCALE** to **shrink** the earth's surface proportionally to fit the object.
3. **SYMBOLIZATION** to **portray** information and make it understandable.

4

MAP PROJECTIONS

❖ **Only a globe can portray the earth's surface without distortion.**

➤ **Only a globe can show**

- ✓ true **shape**
- ✓ true **relative area**
- ✓ true **distance**
- ✓ true **direction**

Any flat map will sacrifice 1 or 2 or 3 or all 4 advantages of a globe.

➤ **A map cannot show more than three advantages at any one time!**

But which 3?






5

MAP PROJECTIONS

❖ **A map projection is a representation of the 3-D earth's grid on a flat surface.**

Each of these projections has a **combination of unique characteristics** to show shape, relative area, distance and direction.

If you have a thematic atlas read the section on maps and map projections.

6

MAP PROJECTIONS

❖ The basic concept behind a map projection is having a light source **within** the globe and having that light source project the earth's grid on to a flat object.

➤ However, most currently used map projections are **mathematically derived** and cannot be "projected."

<https://www.youtube.com/watch?v=nZ1z4lW8E> 1 min intro to map projections

Geometrical Map Projections

Cylindrical
 Conical
 Planar

- If the globe is wrapped in a **cylinder**, a "cylindrical" projection is created.
- A **cone** creates a "conical" projection.
- A **plane (flat sheet)** creates a "planar" projection.

Map Distortion

All maps distort shape in some way.

NOTE: In the illustrations the "circles" and "shape-of-head" diagrams are used to show distortion.

CYLINDRICAL PROJECTION

In this projection the lines of longitude are **parallel!**
Cannot show the polar regions.
 Star illustrates areas of distortion.
 Notice the unusual scale on the map.

CONICAL PROJECTION

In this projection the lines of longitude are **too close at the poles.**

Lines of longitude are **too far apart at the equator.**

Least distortion in the mid-latitudes

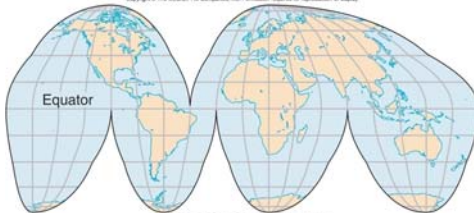
PLANAR PROJECTION

In this projection a plane (flat sheet) is placed tangent to the globe.

Used mainly for polar areas

Least distortion in the center of the map but perimeter areas are stretched.

Goode's Homolosine Projection



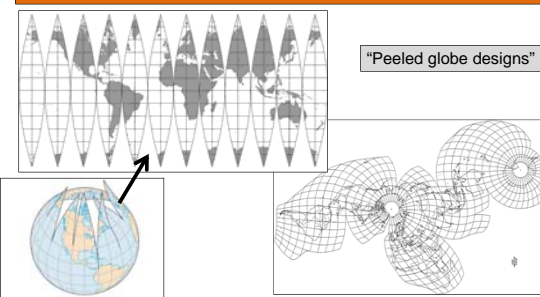
Copyright © The McGraw-Hill Companies, Inc. Permission is granted for reproduction or display.

Equator

A mathematically derived projection providing the **illusion** of a "peeled orange".
Its classification is "**interrupted projection**".

13

Other Interrupted Projections



"Peeled globe designs"

<https://www.youtube.com/watch?v=bt1xXT1tFCo> 1.3 min video map projection (no sound)

14

SCALE

❖ **Scale is a RATIO.**

It is the **relationship between distance** on the map and the equivalent distance on the earth's surface (map to earth).

- Scale is a means of **measurement**.
- Scale influences **detail** (symbolization).
- There are **3 ways** to show scale.

15

Showing Scale

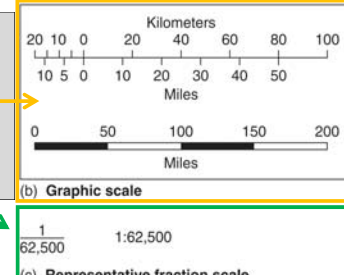
"1 inch to 1 mile"
"1 centimeter to 5 kilometers"

(a) **Verbal scale**

a) **VERBAL/Written:** in words

b) **GRAPHIC/Bar:** as a line or bar

c) **FRACTION/Ratio:** as a mathematical equation



(b) **Graphic scale**

(c) **Representative fraction scale**

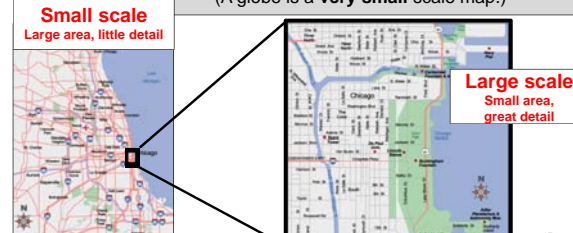
16

SCALE

Scale can be designated **large** or **small**.

Large scale:
Shows **greater detail** but less of an area.

Small scale:
Shows **greater area** but in less detail.
(A globe is a **very small** scale map.)

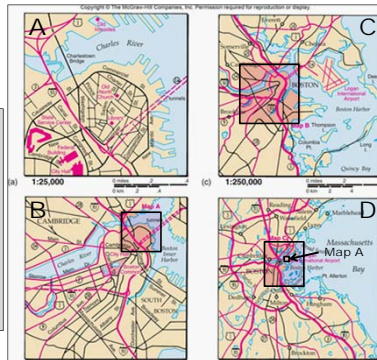


17

Effect of Scale on DETAIL

Same size squares but each square shows **different total surface area** and **different detail**.

✓ Note that each shaded box (a, b, c, d) fits into the next one.



18

SYMBOLIZATION



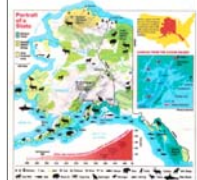
❖ **Symbolization is the portrayal of information.**

✓ Ideal maps should have the following seven elements:

1. Title
2. Date
3. Grid
4. Direction
5. Scale
6. Projection used
7. Legend or key

19

Maps and Symbolization

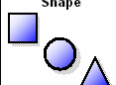


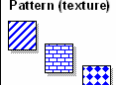

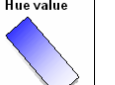




20

Map Symbols: with a legend or key

The reader must know what the shapes, colors, patterns and sizes mean.

Visual Variables

Shape 	Size 	Orientation 
Pattern (texture) 	Hue (colour) 	Hue value 

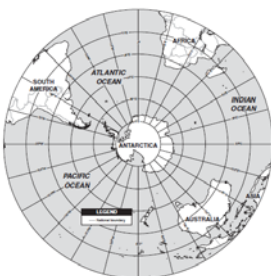
Therefore a **LEGEND** or **KEY** is needed. Without it, what is presented are just meaningless shapes and colors.

22

DIRECTION

Every map needs to have an indication of major compass points: north, south, east and west.

This can be done with a compass arrow, marking of lines of latitude and longitude and/or indication of quadrant.



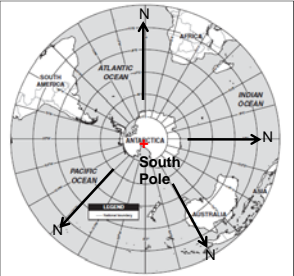
Where is north on this map?

22

Southern Hemisphere


Which way is north?

By following the meridians of longitude away from the South Pole, you will eventually end at the North Pole.




23

Which arrows point North?



24

This way is North!!



Must always follow lines of latitude and longitude to ascertain direction.

Representing the World


What is wrong with this world map?



Nothing. It's a Pacific Ocean-centered world map

World Map

What is wrong with this map?



It's a World Map Centered on Australia.

Presenting Mapped Information

Mapped data can be presented in various formats.

There are 5 general categories of maps.

1. Point
2. Flow line
3. Isoline
4. Choropleth
5. Cartogram

The five can be sub-divided into seven groups which present mapped information differently.

Map Formats

1. Point Symbol:

- a. **Dot** - Uses dots to indicate values at a location; shows distribution and density.
- b. **Graduated symbol** - Uses proportionally-sized circles or symbols to indicate quantities present.

2. Isoline: Uses lines to connect points of equal value.

3. Flow Line: Uses lines of varying widths with arrowheads to portray amount of movement.

4. Choropleth: Uses colors or shading to convey information

- a. **Qualitative** = characteristics
- b. **Quantitative** = amounts

5. Cartogram: Uses data other than land area to portray the size of a unit.

Types of Maps: Point Symbols

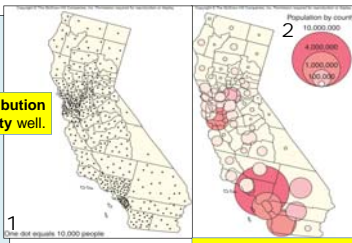
Both maps portray the population distribution of California.

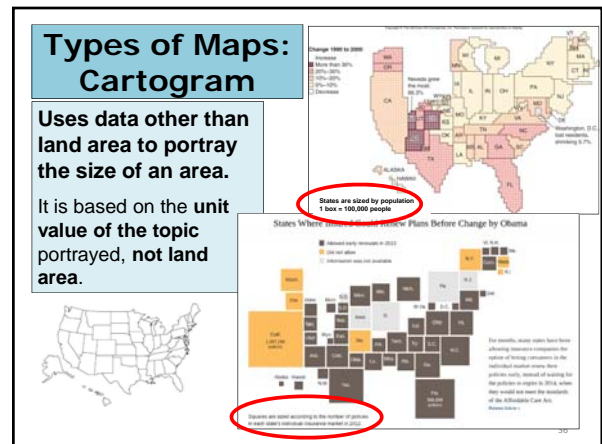
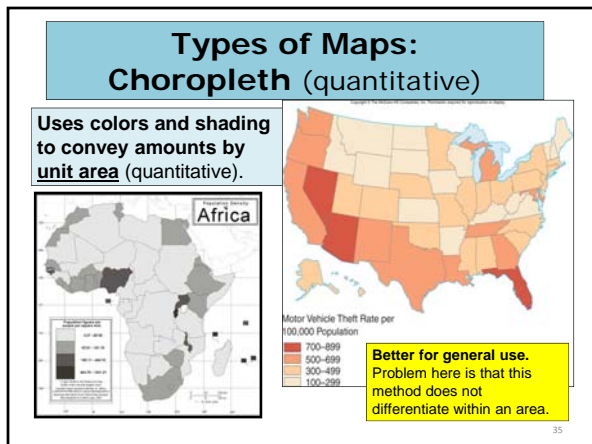
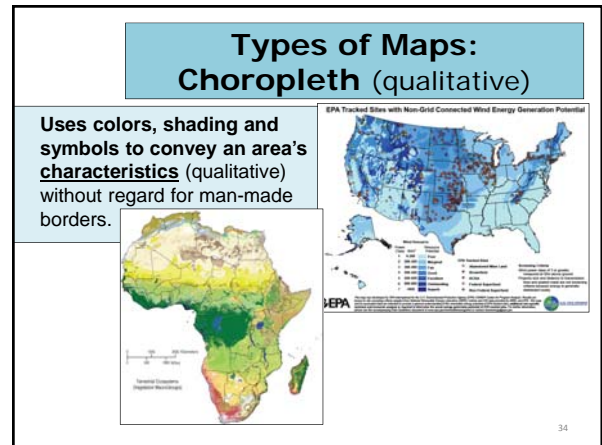
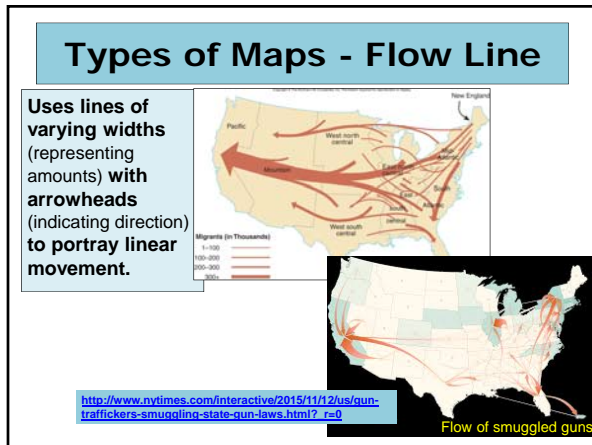
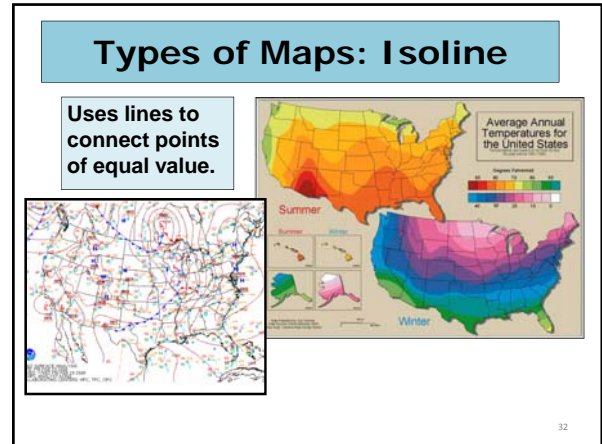
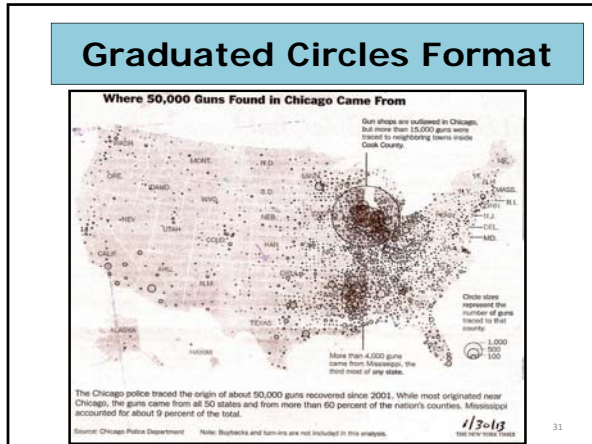
1. Dot: Uses dots to indicate point values at a location.

Shows distribution and density well.

2. Graduated: Uses proportionally-sized circles or other symbols to indicate quantities present at a location.

Good for comparing areas although the map may become visually cluttered.





Portraying Data

Based on the patterns can you guess what data is being shown?
Presentation of same data in 4 formats:

- Graduated Circle map
- Dot map
- Choropleth map
- Isoline map

Four ways to portray AIDS cases in Pennsylvania

37

Summary: TYPES of MAPS

- Point:** dot distribution
- Point:** graduated symbol
- Flow Line**
- Isoline**
- Choropleth:** qualitative
- Choropleth:** quantitative
- Cartogram**

This diagram is from your textbook.

38

NEXT

Gathering Information

39

First Exam: **New Date**

- ❖ **Friday, March 2, 2018.**
- Combination of multiple choice questions and map interpretation. Bring a #2 pencil with eraser.
- Based on class lectures supplementing chapter 1. Review lecture slides.
- **If you miss this exam, a written make up consisting of definitions, concepts and explanations will be given.**

40