MAPPING THE EARTH

HOW DO YOU FIND A LOCATION ON THE EARTH?

UNIT TOPICS

- TOPIC 1: LATITUDE & LONGITUDE
- TOPIC 2: FIELD MAPS
- TOPIC 3: TOPOGRAPHIC MAPS
- TOPIC 4: NYS LANDSCAPES

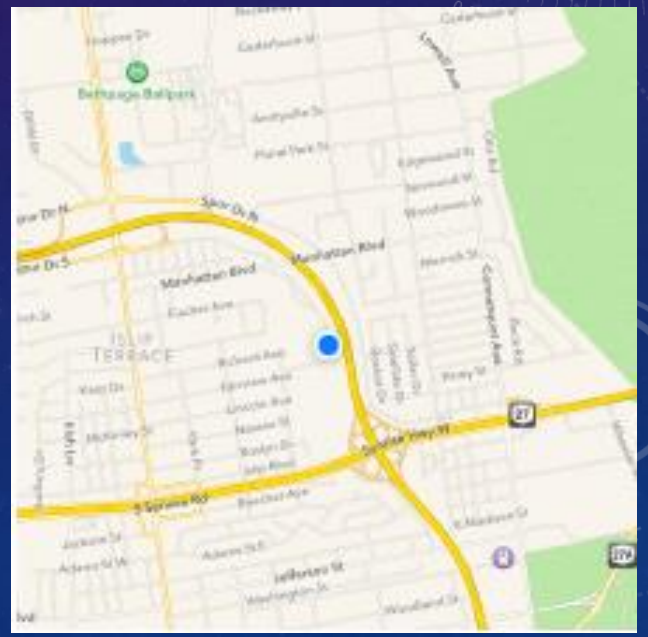
TOPIC 1: LATITUDE & LONGITUDE

- Essential Question:

  How do you find a location on the Earth?

TOPIC 1: LATITUDE & LONGITUDE

- Map: Representation of an area used to show physical features and exact locations



TOPIC 1: LATITUDE & LONGITUDE

- Latitude: Measuring lines running parallel to the equator
  - Also called parallels
  - These lines NEVER intersect

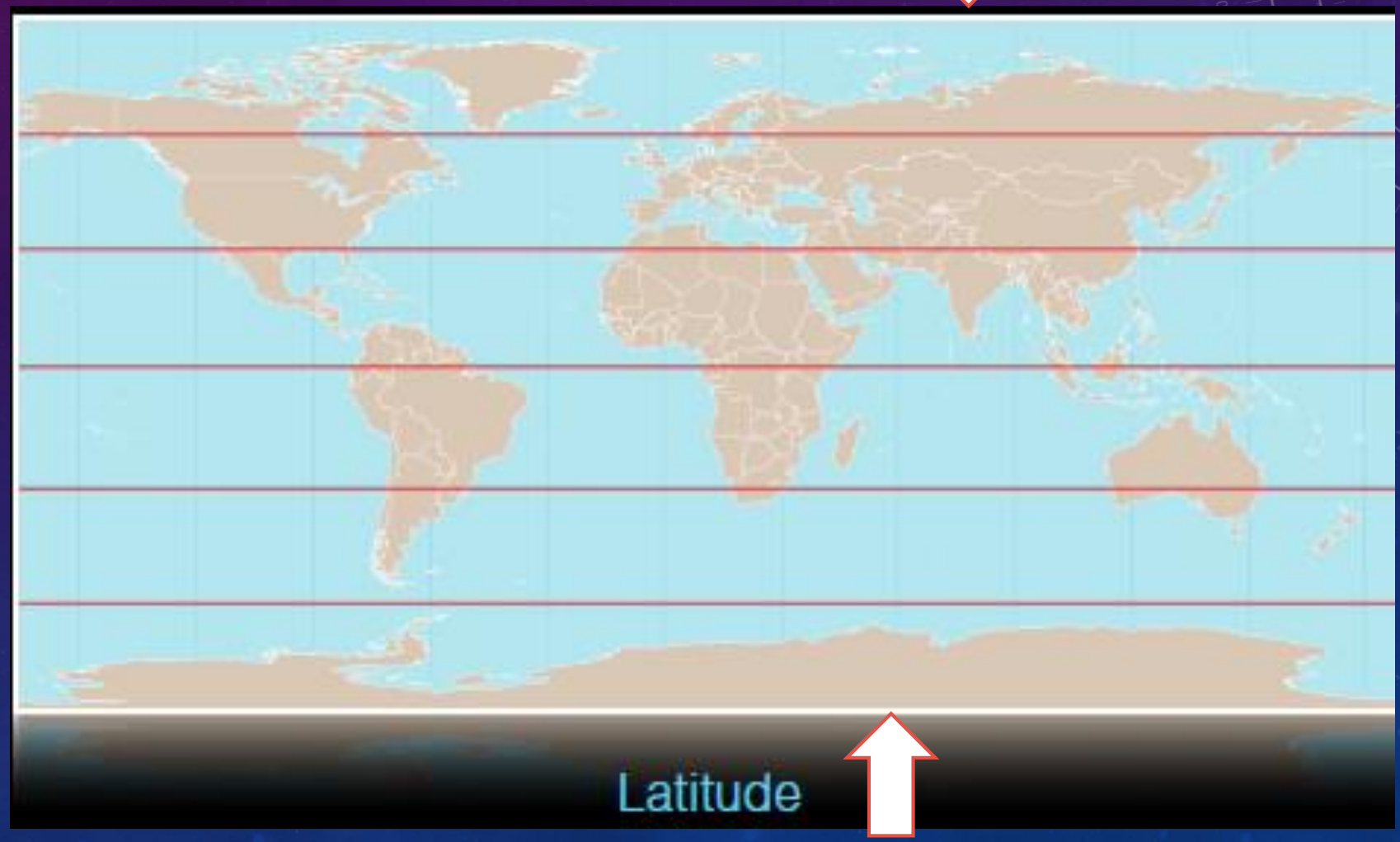
TOPIC 1: LATITUDE & LONGITUDE

- Equator: Main reference line of latitude (0°); divides Earth into Northern & Southern Hemispheres
- The North Pole is 90° north latitude

- The South Pole is 90° south latitude

TOPIC 1: LATITUDE & LONGITUDE

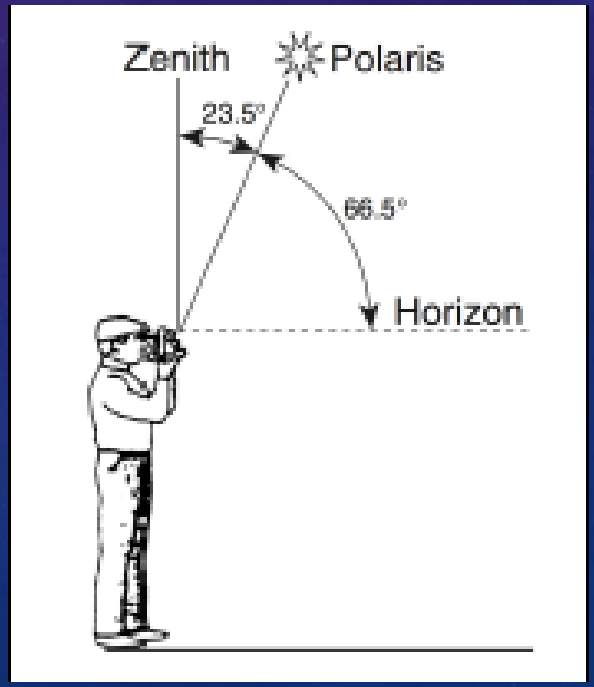
Label the Equator, Northern & Southern Hemispheres AND darken the latitude lines in your notes!



TOPIC 1: LATITUDE & LONGITUDE

- Finding your latitude
  - The altitude (angle) of Polaris is equal to your latitude

Zenith = 90°



Altitude of Polaris = 56.5°

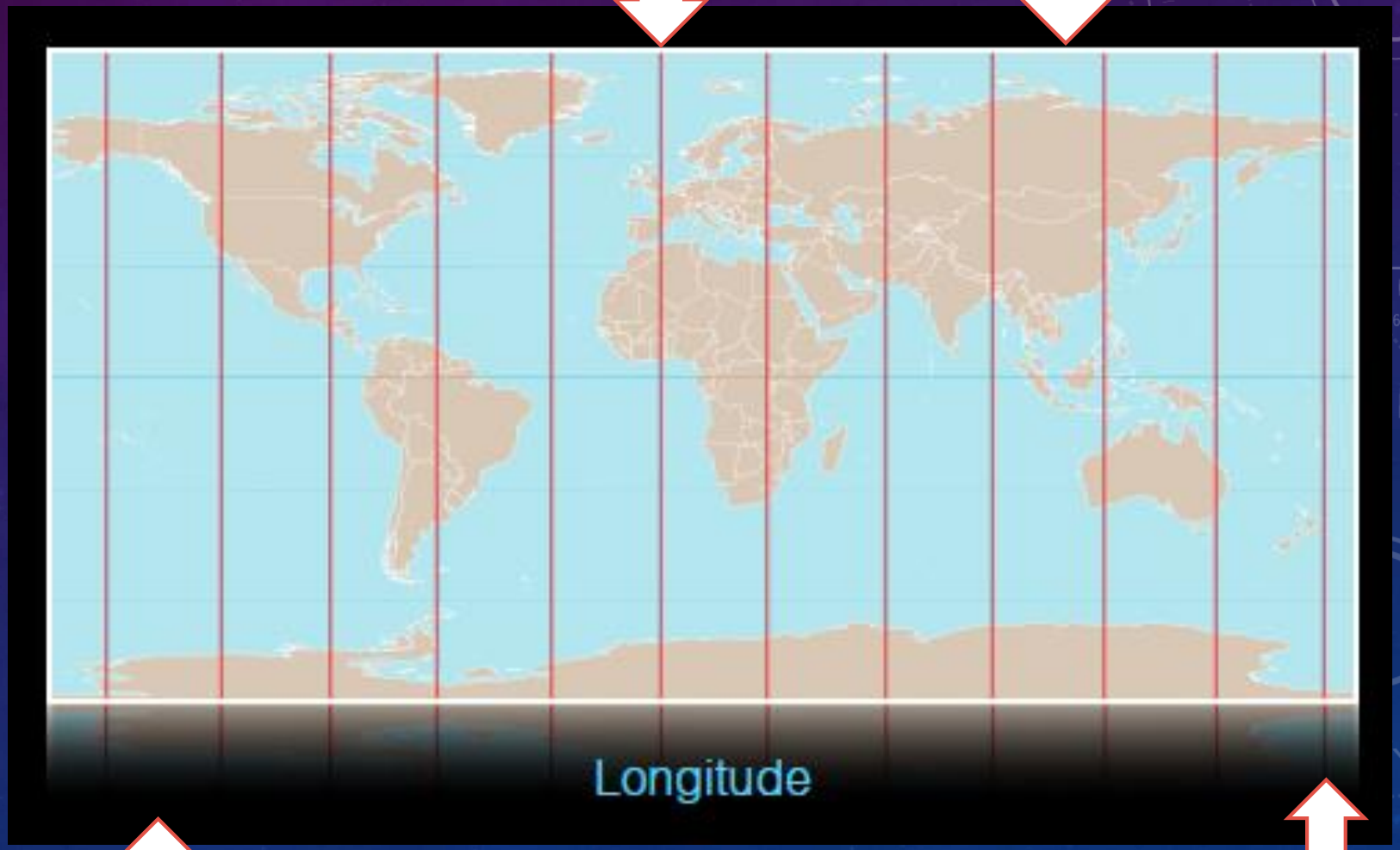
Horizon = 0°

TOPIC 1: LATITUDE & LONGITUDE

- Longitude: Measuring lines that measure distance East and West of the Prime Meridian
  - Also called meridians
- Prime Meridian: Main reference line of longitude (0°); divides Earth into Eastern & Western Hemispheres

TOPIC 1: LATITUDE & LONGITUDE

Label the Prime Meridian, Eastern & Western Hemispheres AND darken the longitude lines in your notes!



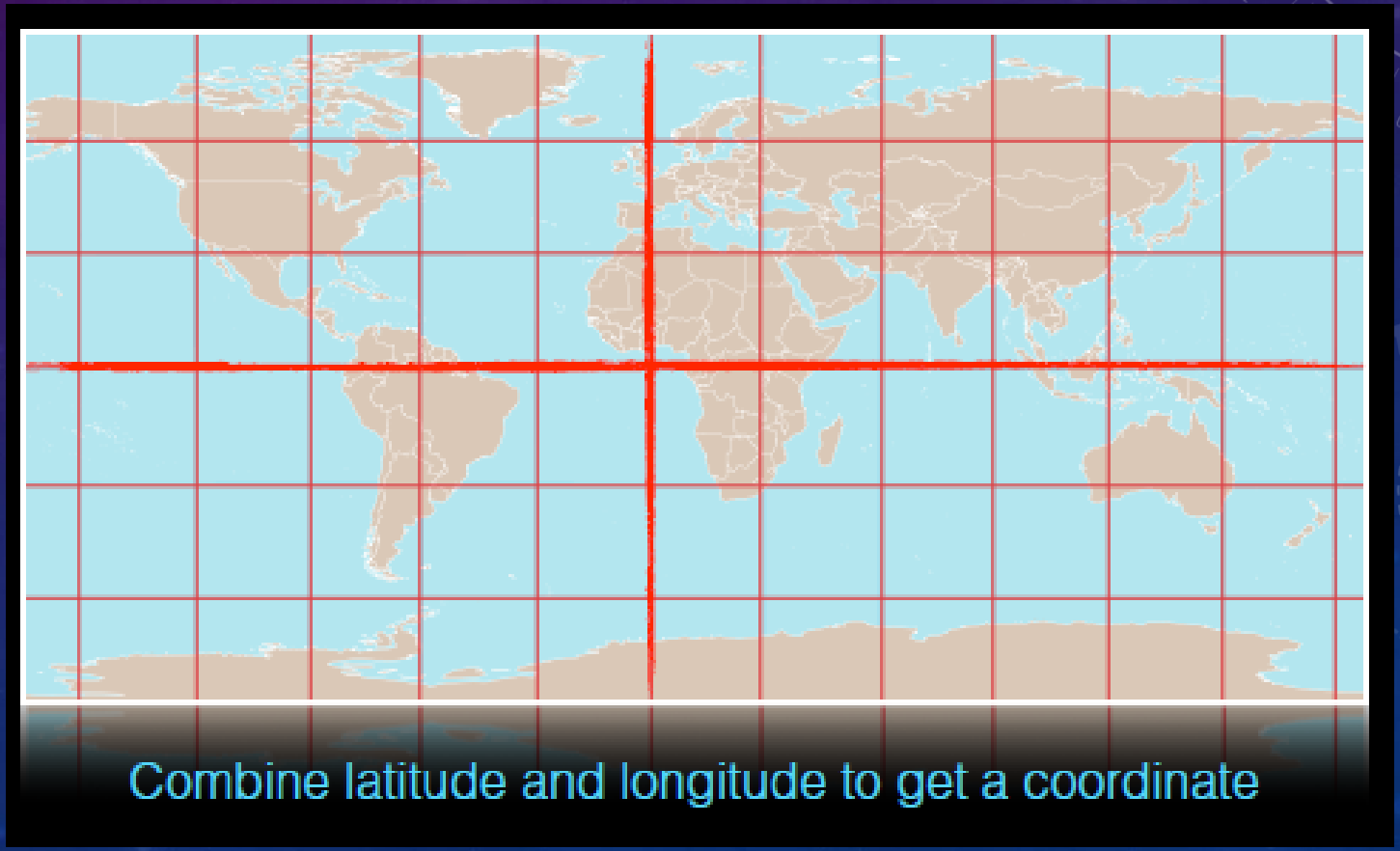
TOPIC 1: LATITUDE & LONGITUDE

- The Prime meridian is 0° longitude
- The International Date Line is 180° east or west of the Prime Meridian

TOPIC 1: LATITUDE & LONGITUDE

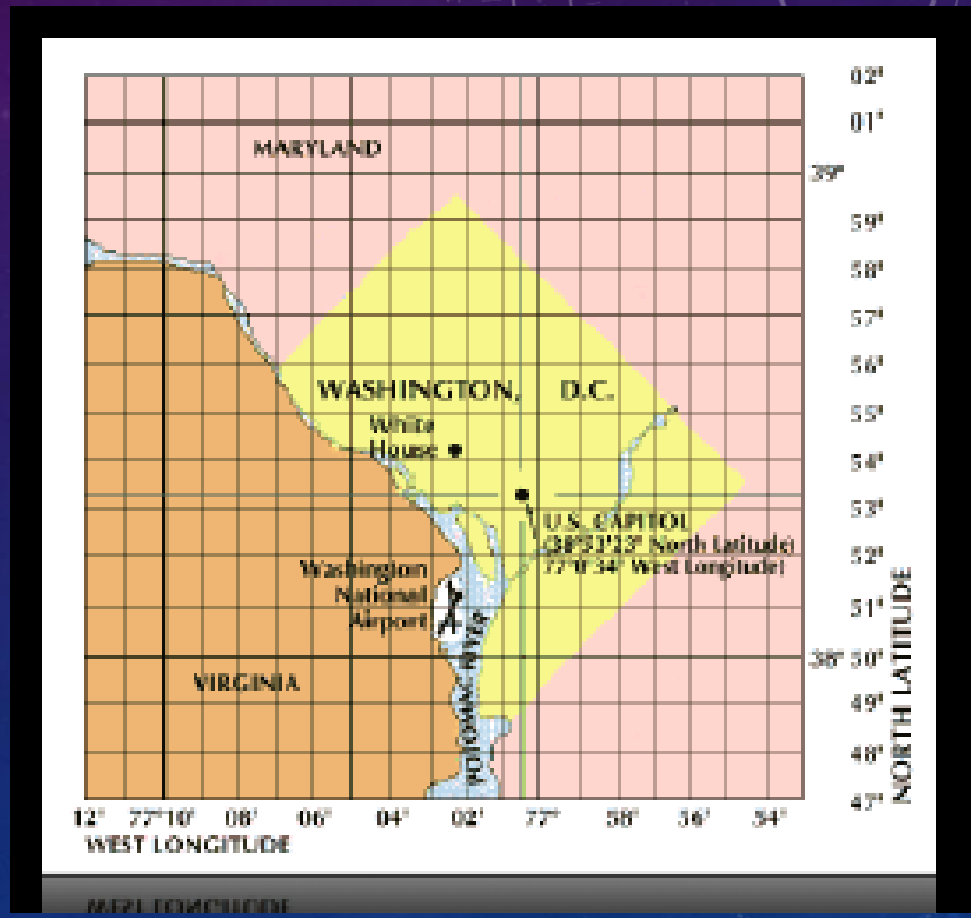
- Combine latitude and longitude to get a coordinate

Darken the latitude & longitude lines on the grid in your notes!



TOPIC 1: LATITUDE & LONGITUDE

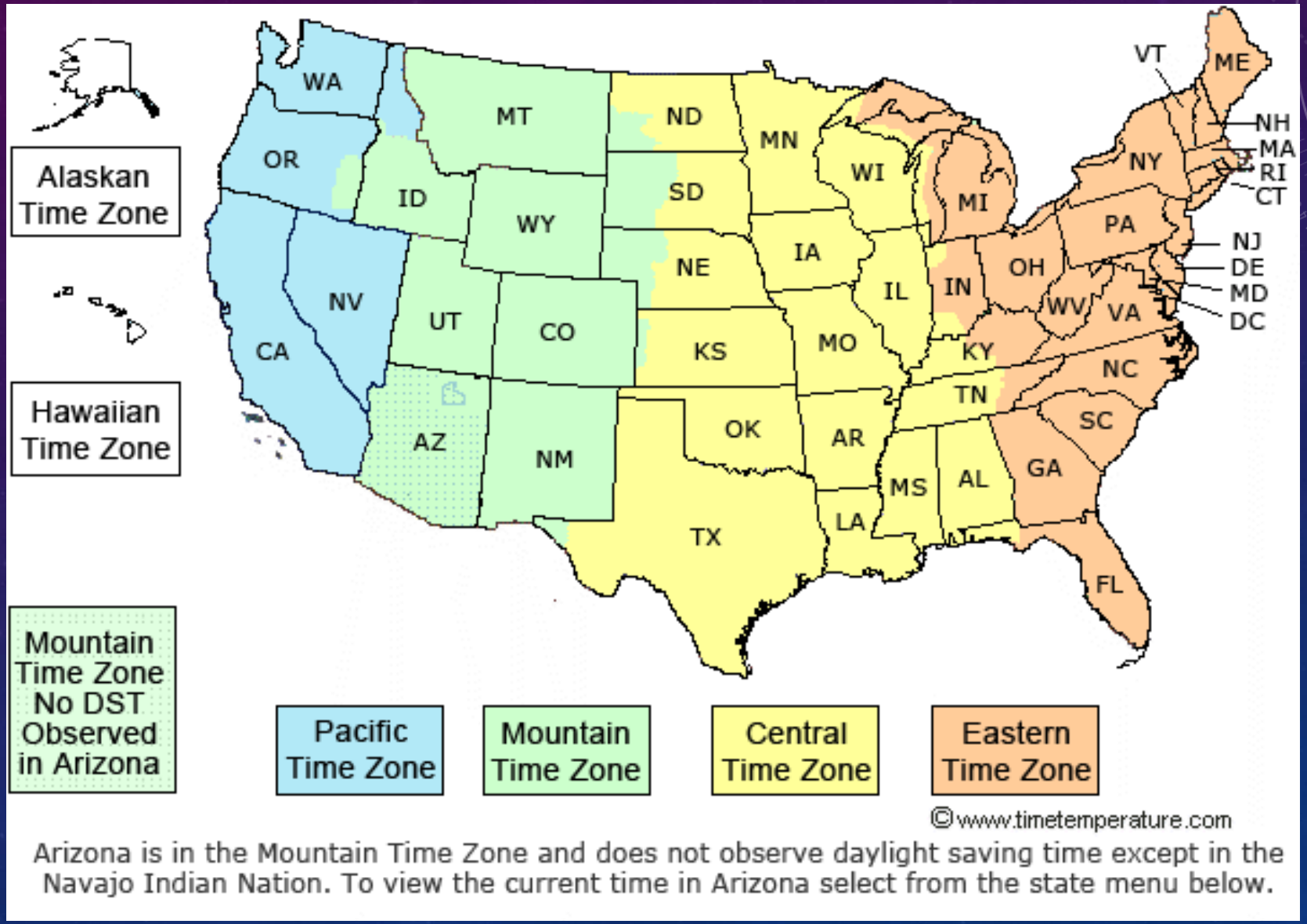
- Be sure you include direction with both latitude and longitude
  - Example: 20°30’ N and 75°30’ E
- Sub-divisions of Latitude and Longitude
  - One degree is divided into 60 minutes (60’)
  - One minute can be divided into 60 seconds (60”)



TOPIC 1: LATITUDE & LONGITUDE

- Time Zones
  - Earth's rotation (spin) is the basis for local time
  - The Earth rotates 360° in 24 hours
  - Earth rotates on an imaginary axis at 15° per hour
  - Earth is divided into 24 (15°) time zones
  - Each time zone is 1 hour different
  - Each time zone covers 15° of longitude
  - There are 6 time zones in the United States

TOPIC 1: LATITUDE & LONGITUDE



Arizona is in the Mountain Time Zone and does not observe daylight saving time except in the Navajo Indian Nation. To view the current time in Arizona select from the state menu below.

TOPIC 1: LATITUDE & LONGITUDE

QUESTIONS?

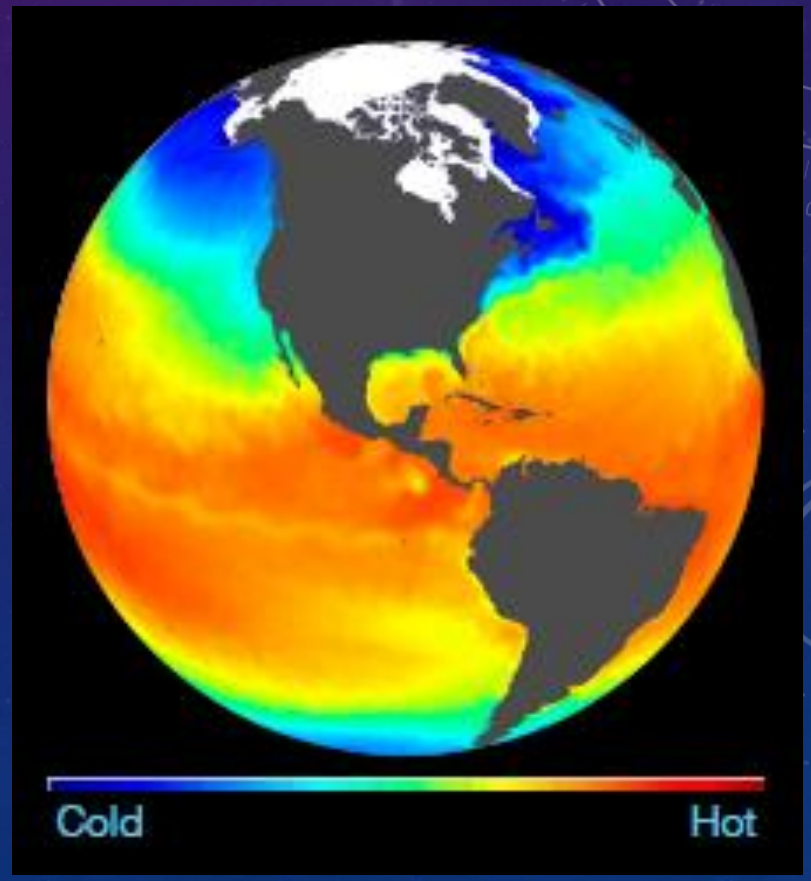
TOPIC 2: FIELD MAPS

- Essential Question:

  What are the different types of field maps?

TOPIC 2: FIELD MAPS

- Field: A region with a measurable quantity at every location
  - Example: Ocean temperature

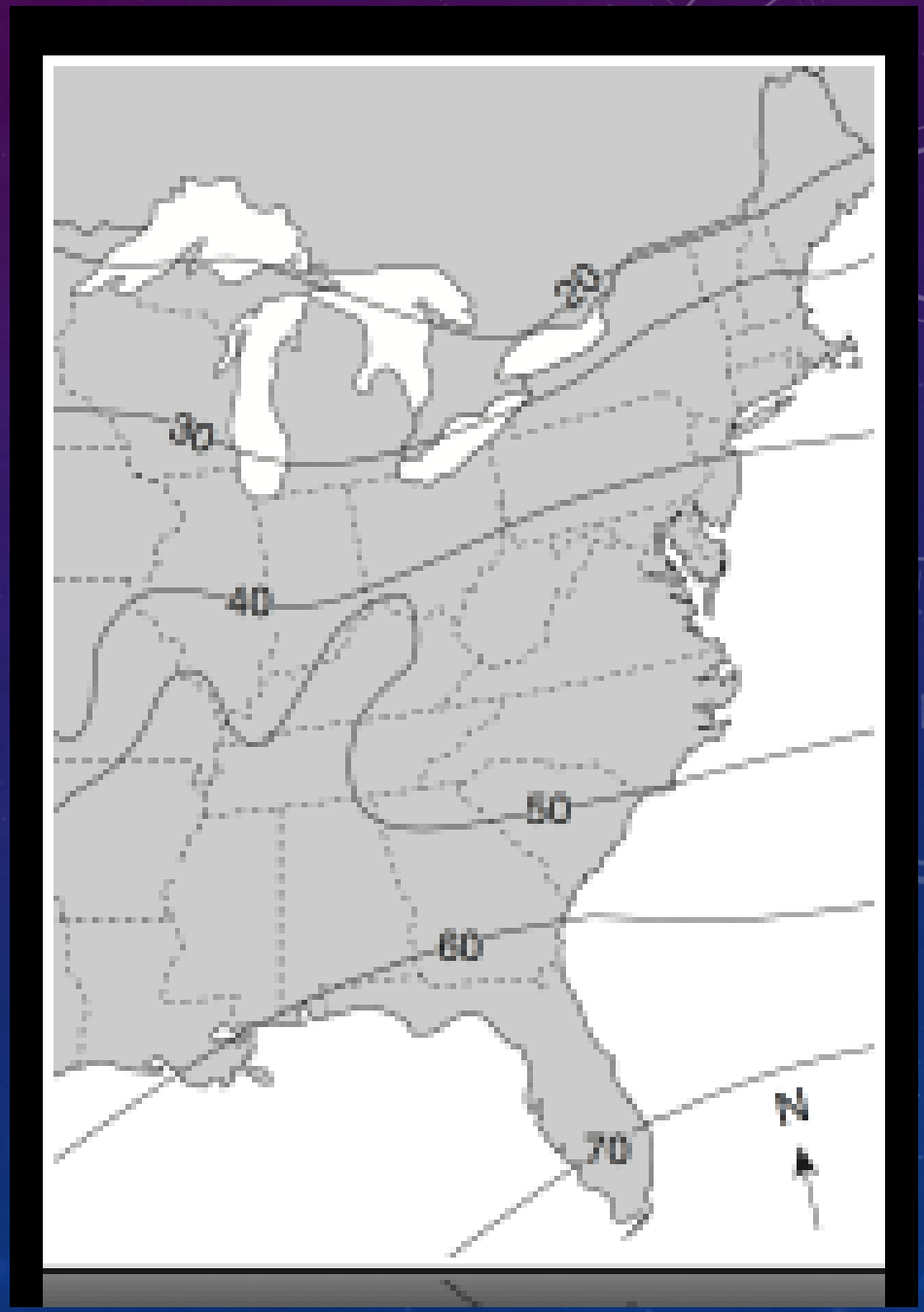


TOPIC 2: FIELD MAPS

- Isolines: Lines that are drawn on a field map to connect all the points on that map with equal values
  - Example: Precipitation amounts (in inches)

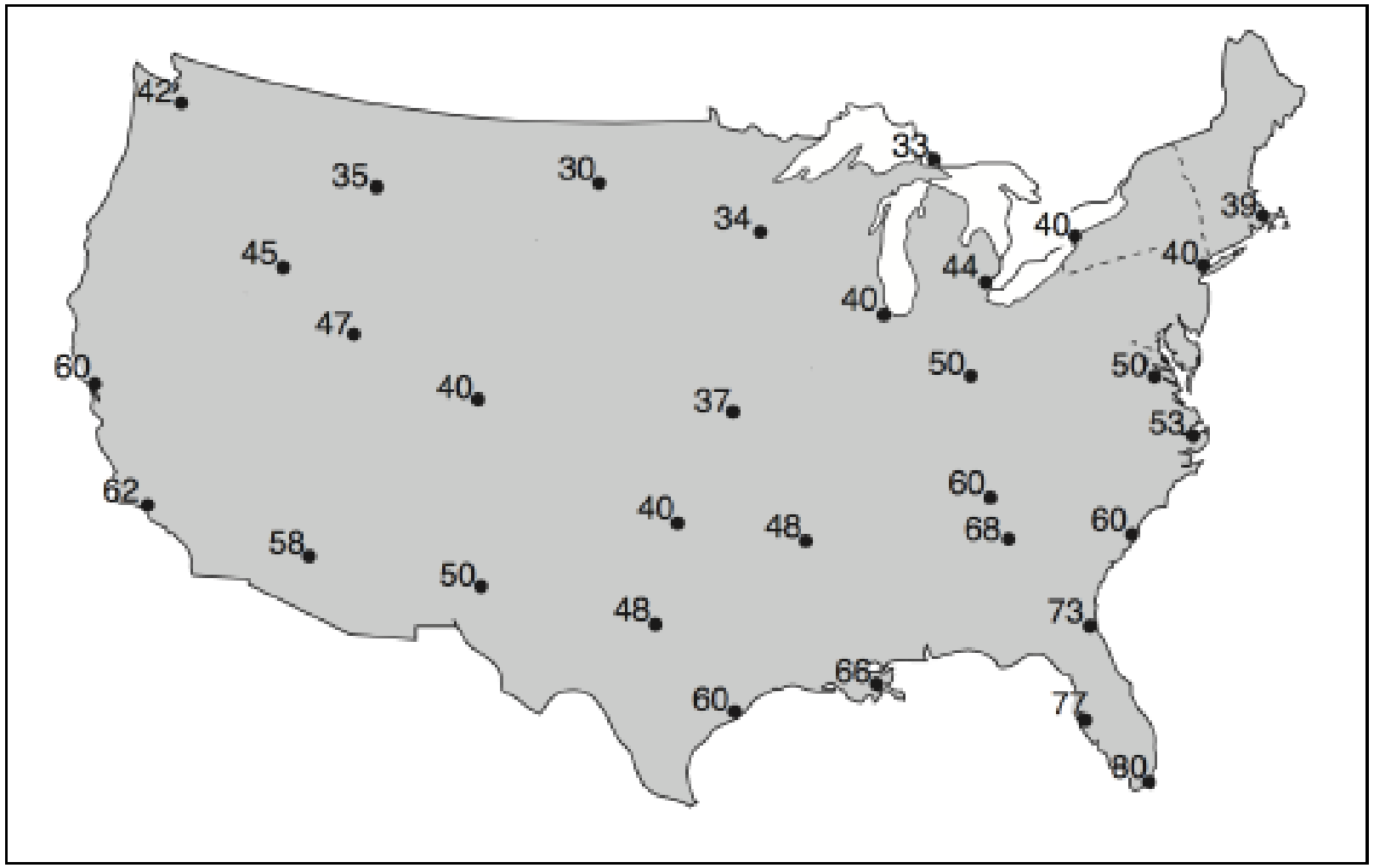
TOPIC 2: FIELD MAPS

- Points represent values of data found at a specific location
- To construct a field map, connect the points of equal data
  - Do not connect every value… just whole numbers
  - Isolines form complete circles or end at the edge of the map



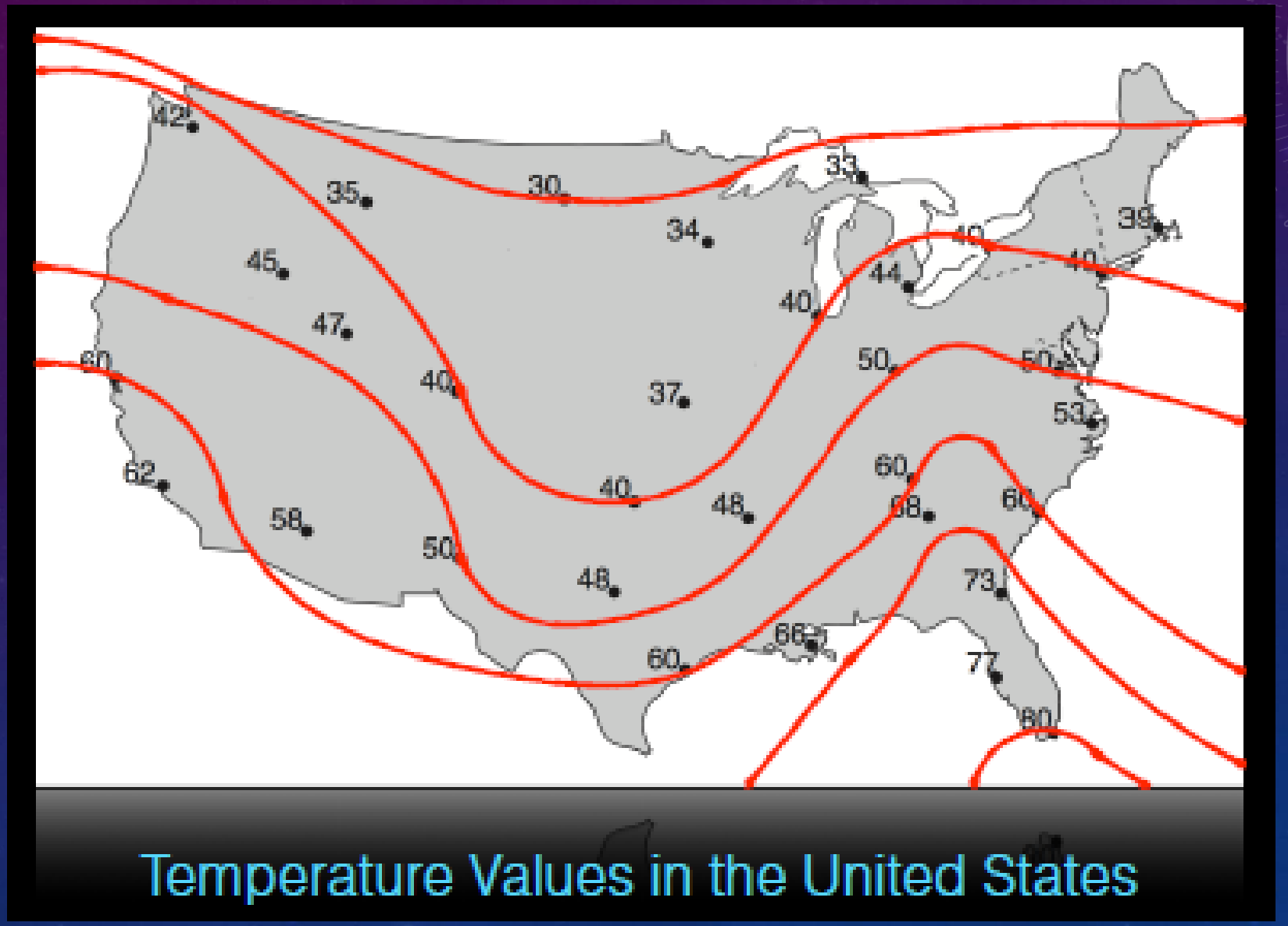
TOPIC 2: FIELD MAPS

Use a 10° isoline interval to create a field map in your notes



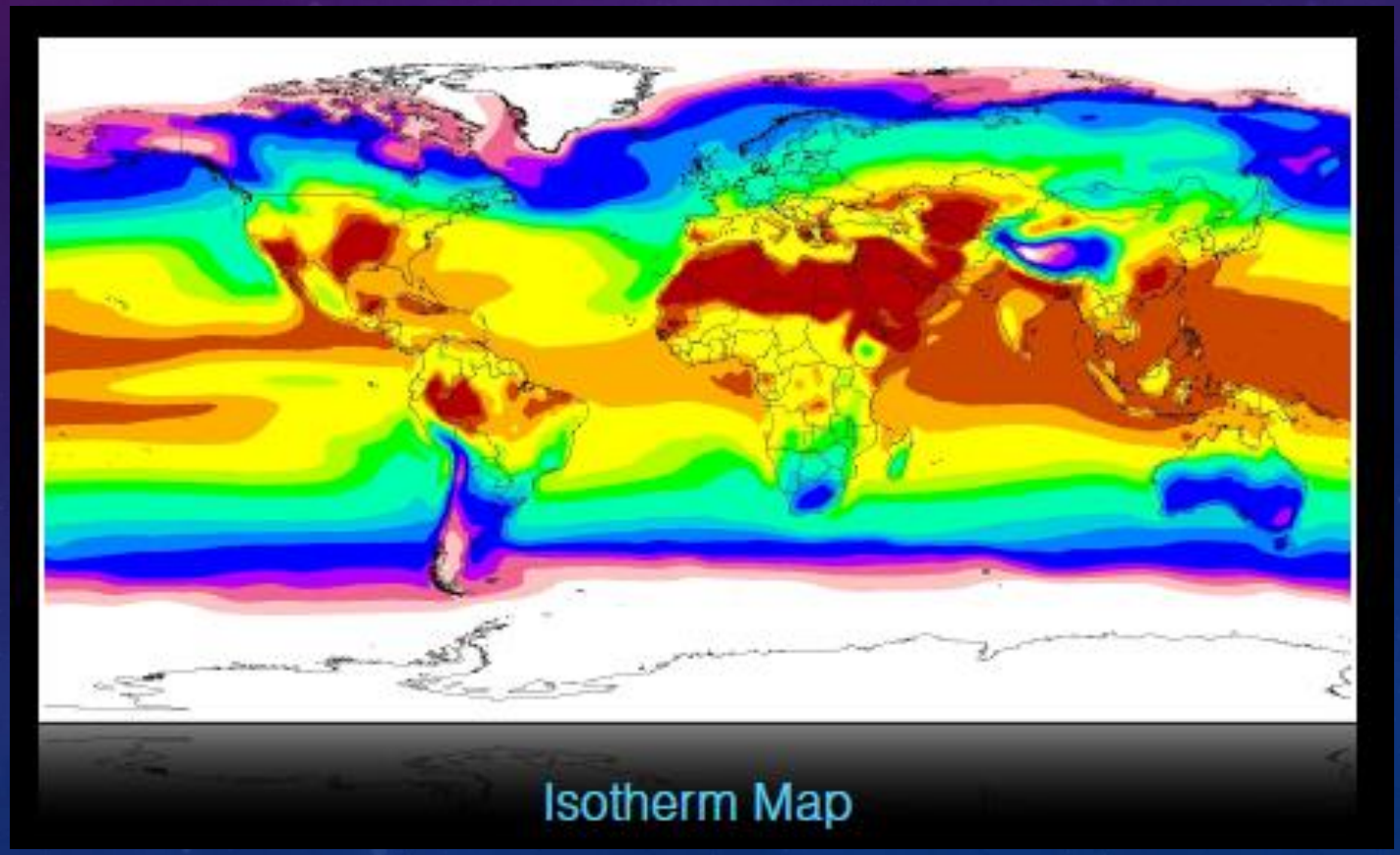
Temperature Values in the United States

TOPIC 2: FIELD MAPS



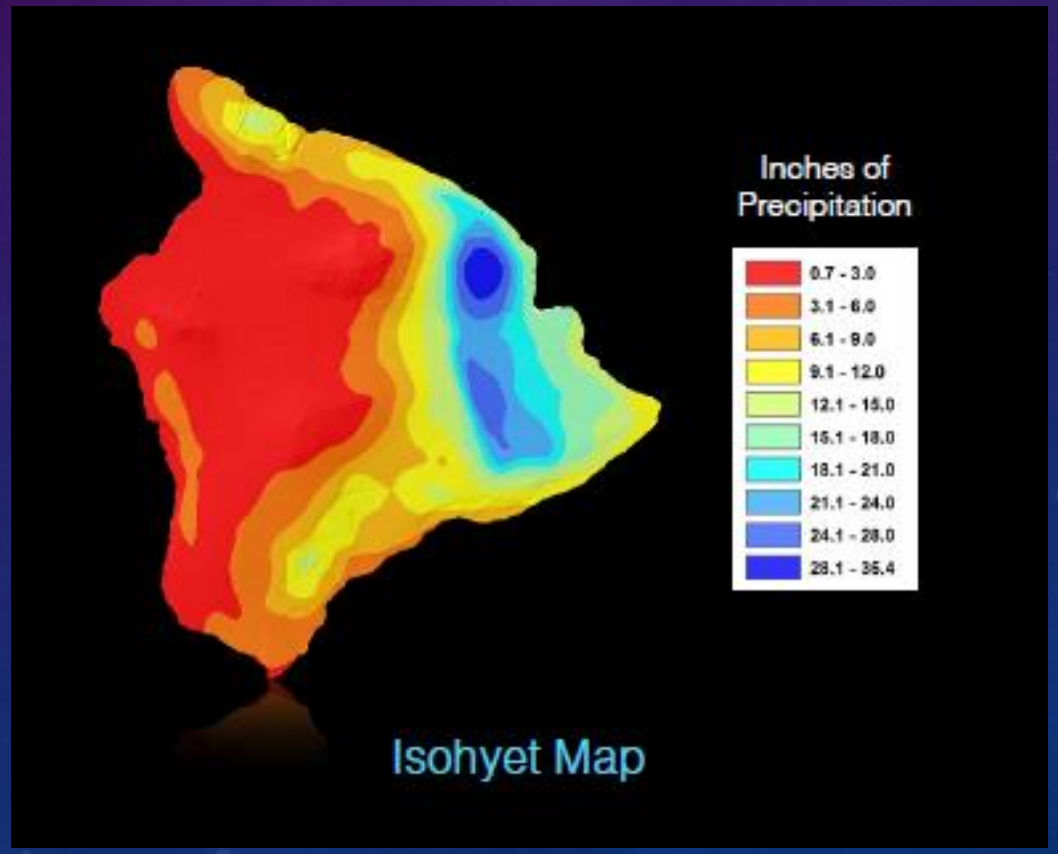
TOPIC 2: FIELD MAPS

- Different Types of Isoline
  - Isotherm: lines that connect equal points of temperature



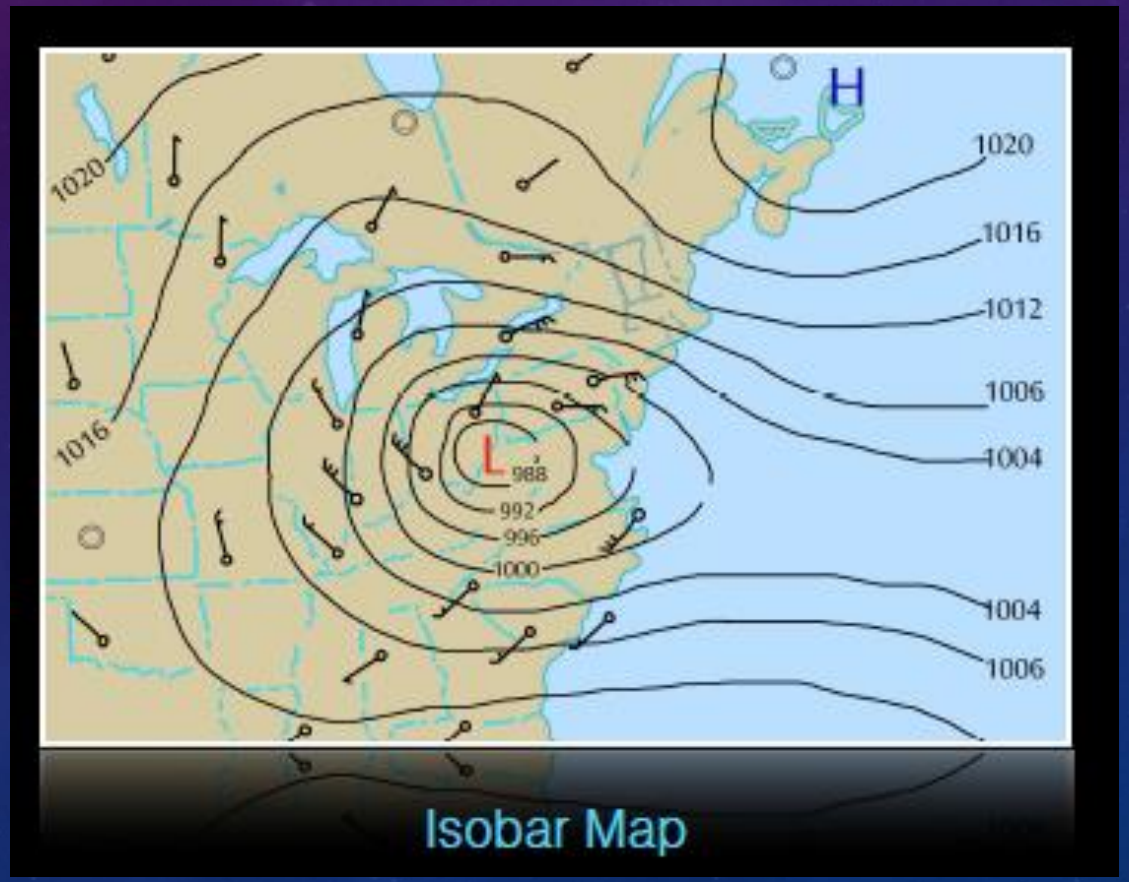
TOPIC 2: FIELD MAPS

- Different Types of Isoline
  - Isohyet: lines that connect equal points of rainfall amounts



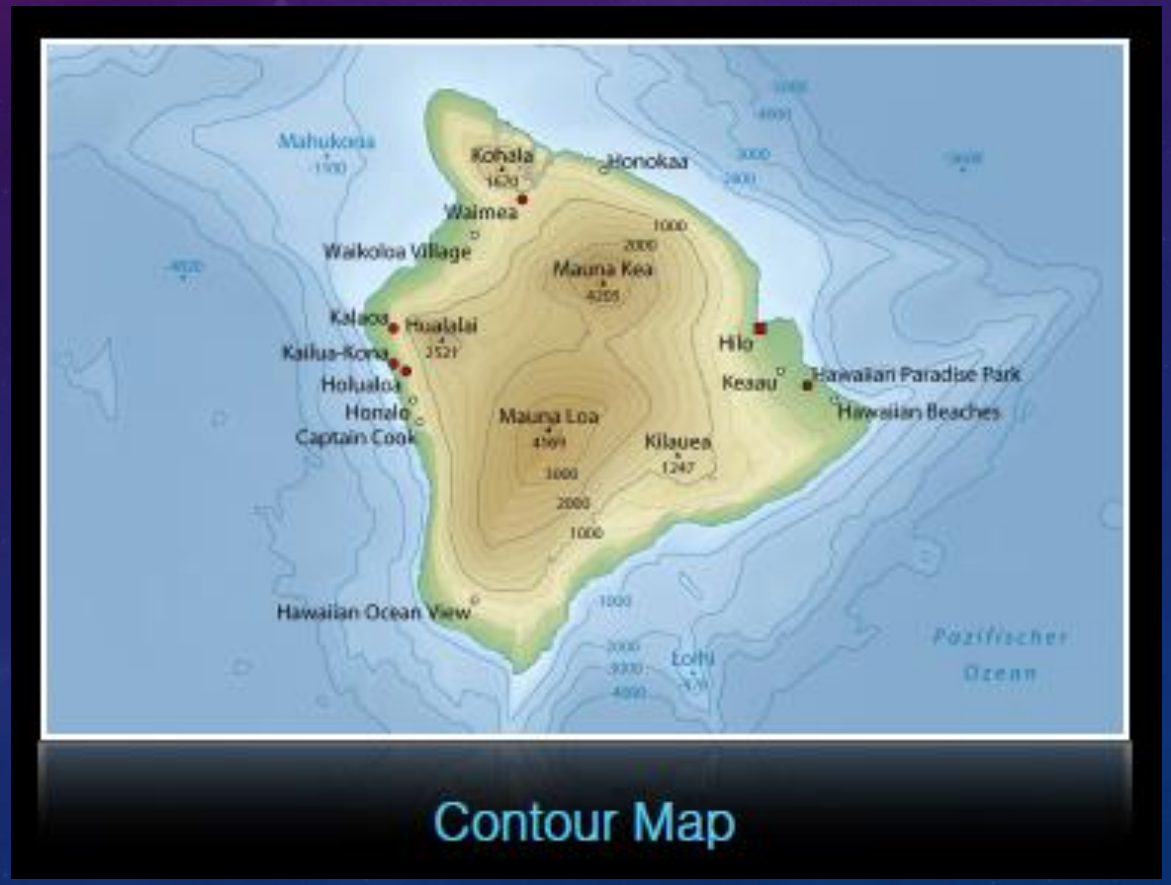
TOPIC 2: FIELD MAPS

- Different Types of Isoline
  - Isobar: lines that connect equal points of air pressure



TOPIC 2: FIELD MAPS

- Different Types of Isoline
  - Contour Line: lines that connect equal points of elevation



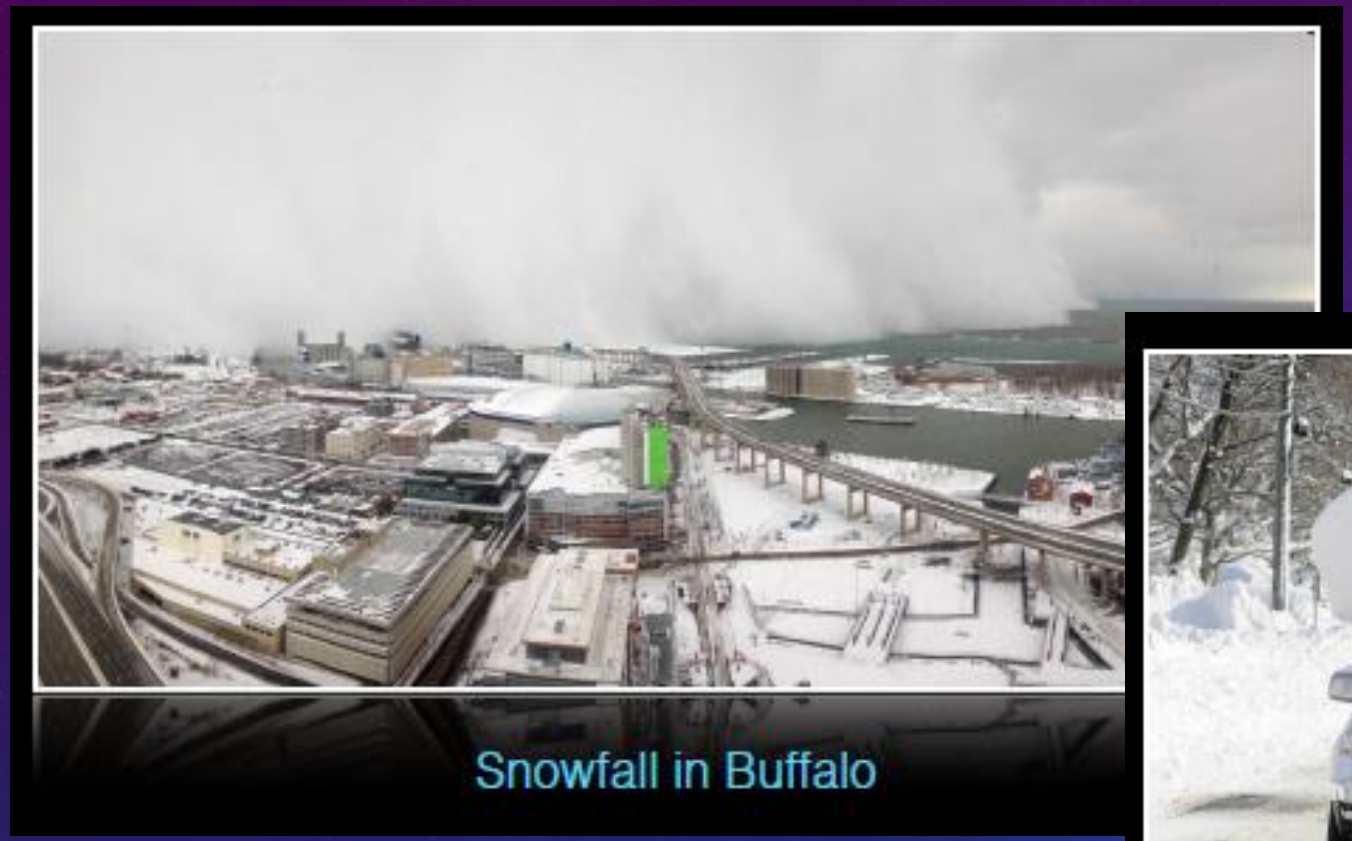
TOPIC 2: FIELD MAPS

- Gradient (slope): rate of change from one place to another

From the ESRT page 1:

$$\text{Gradient} = \frac{\text{change in field value}}{\text{distance}}$$

TOPIC 2: FIELD MAPS



TOPIC 2: FIELD MAPS

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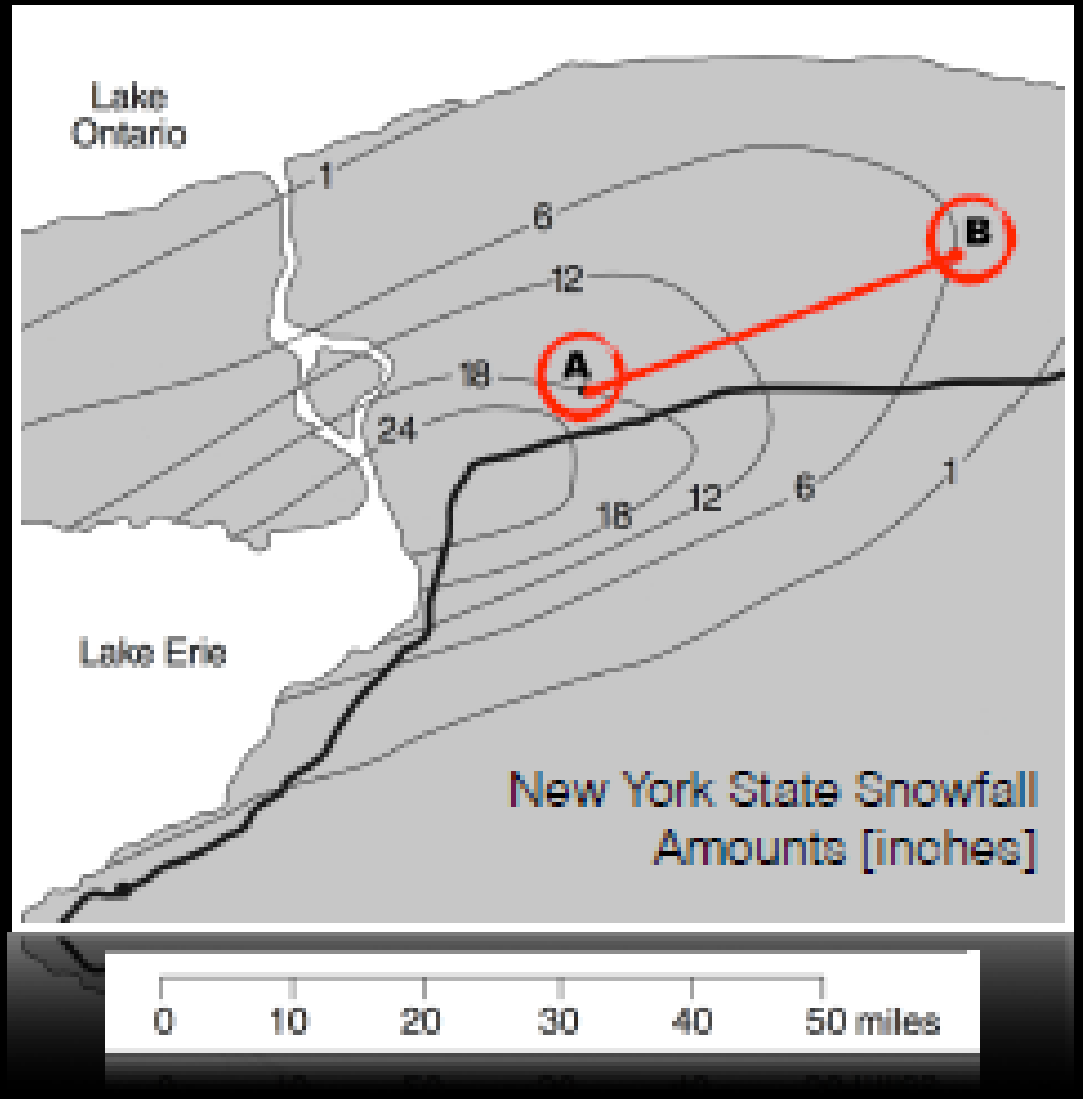


$$\text{Gradient} = \frac{\text{change in field value}}{\text{change in distance}}$$

$$\text{Gradient} = \frac{18 \text{ inches} - 6 \text{ inches}}{30 \text{ miles}}$$

$$\text{Gradient} = \frac{12 \text{ inches}}{30 \text{ miles}}$$

$$\text{Gradient} = 0.4 \ ^{\text{inches}}/_{\text{mile}}$$

QUESTIONS?

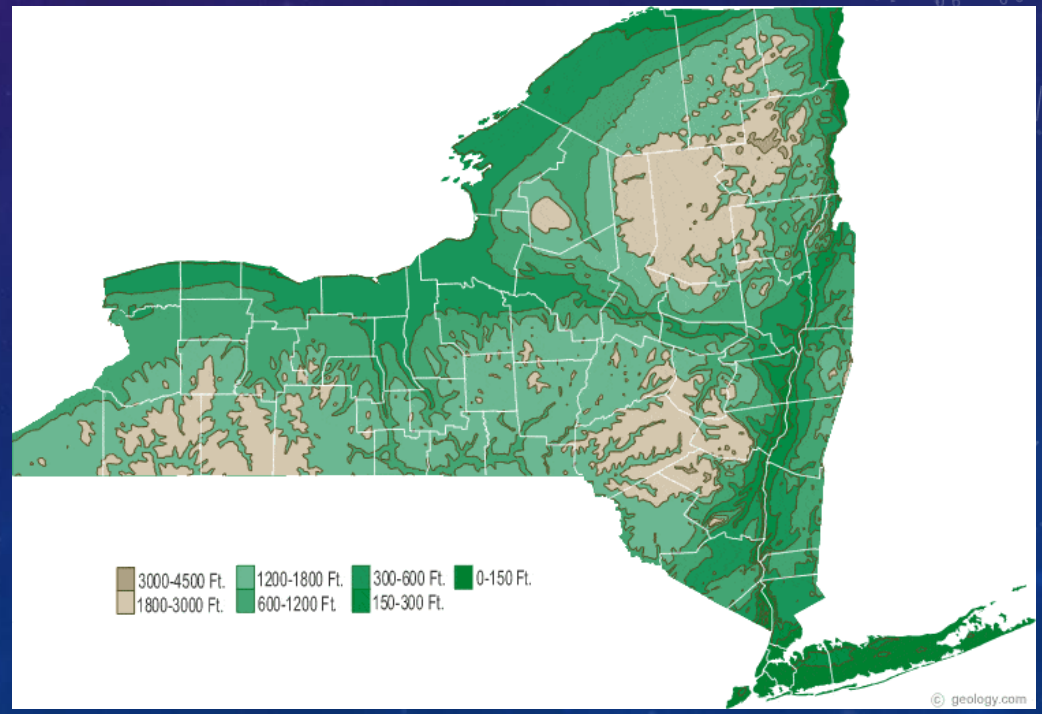
TOPIC 3: TOPOGRAPHIC MAPS

- Essential Question:

How do topographic maps help us interpret our planet?

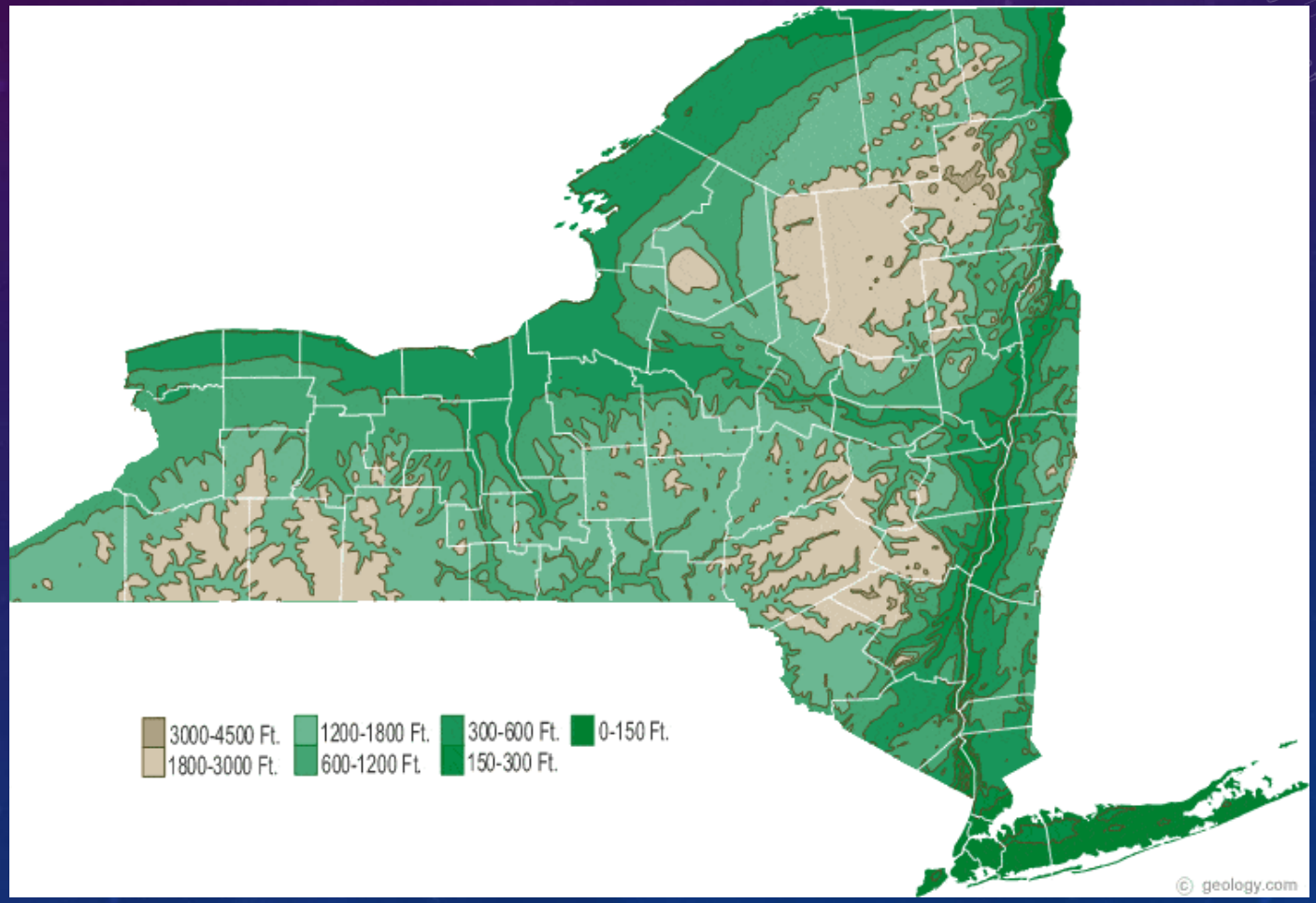
TOPIC 3: TOPOGRAPHIC MAPS

- Topographic Maps (contour maps): Commonly-used model showing the elevation field of Earth's surface
  - Topographic maps show three-dimensional (3D) shapes in two dimensions (2D)



TOPIC 3: TOPOGRAPHIC MAPS

- Elevation: height above or below sea level

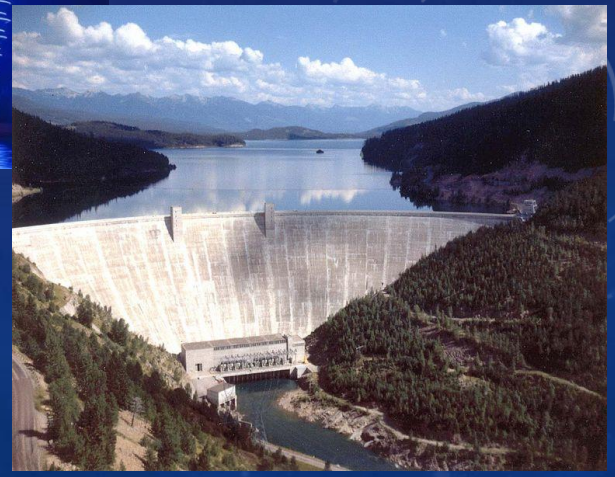


TOPIC 3: TOPOGRAPHIC MAPS

- Natural Features: features that are created by nature
  - Examples: mountains, hills, lakes, and rivers

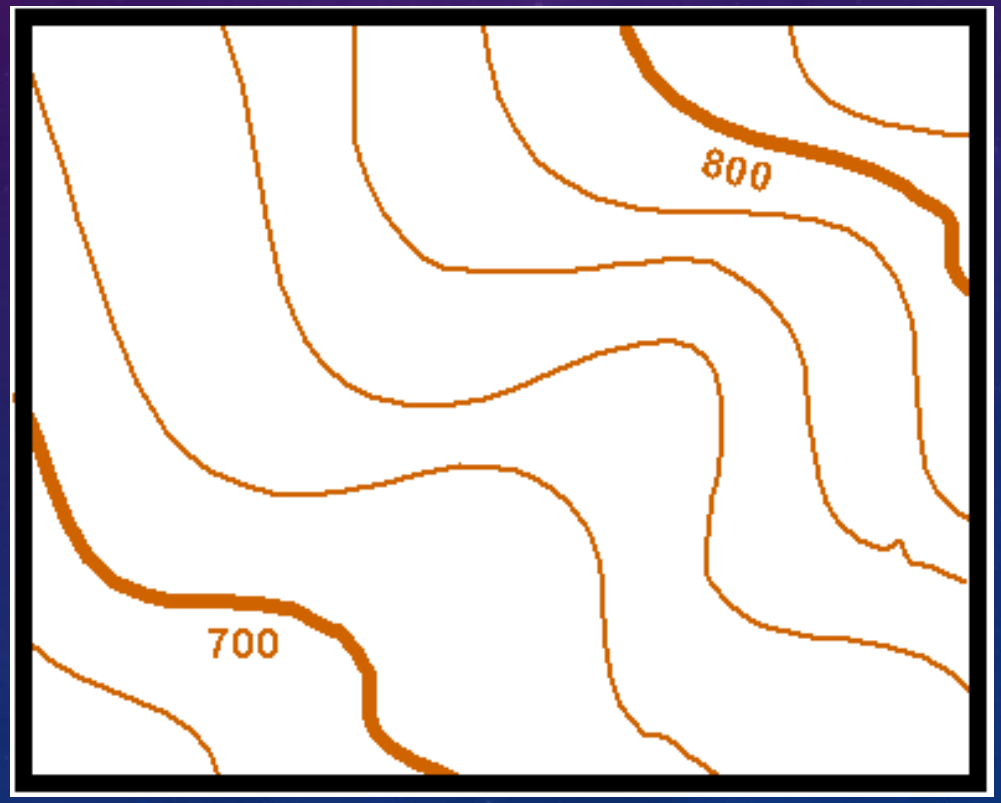
TOPIC 3: TOPOGRAPHIC MAPS

- <u>Cultural Features:</u> features that are created by humans
  - Examples: roads, cities, buildings, and dams



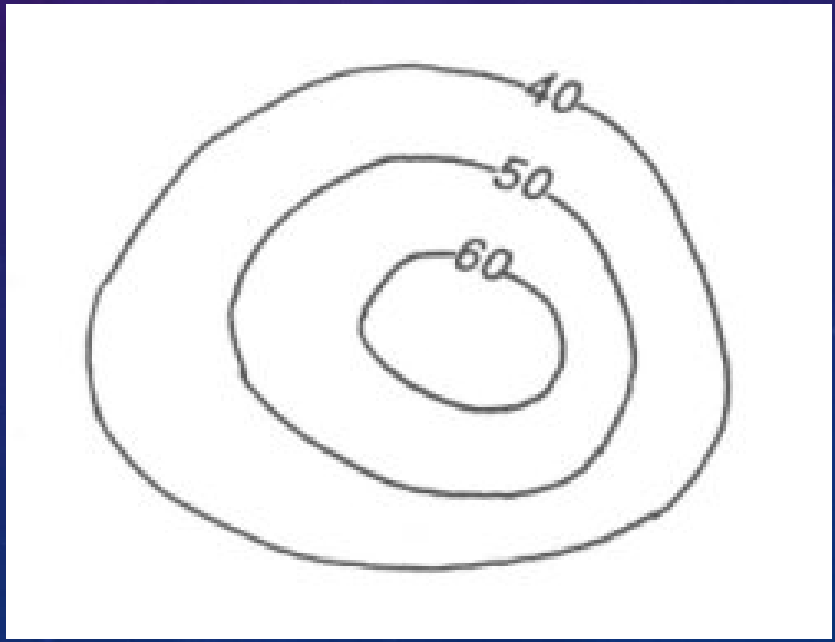
TOPIC 3: TOPOGRAPHIC MAPS

- Contour Lines: Lines drawn on a map that connect points of equal elevation



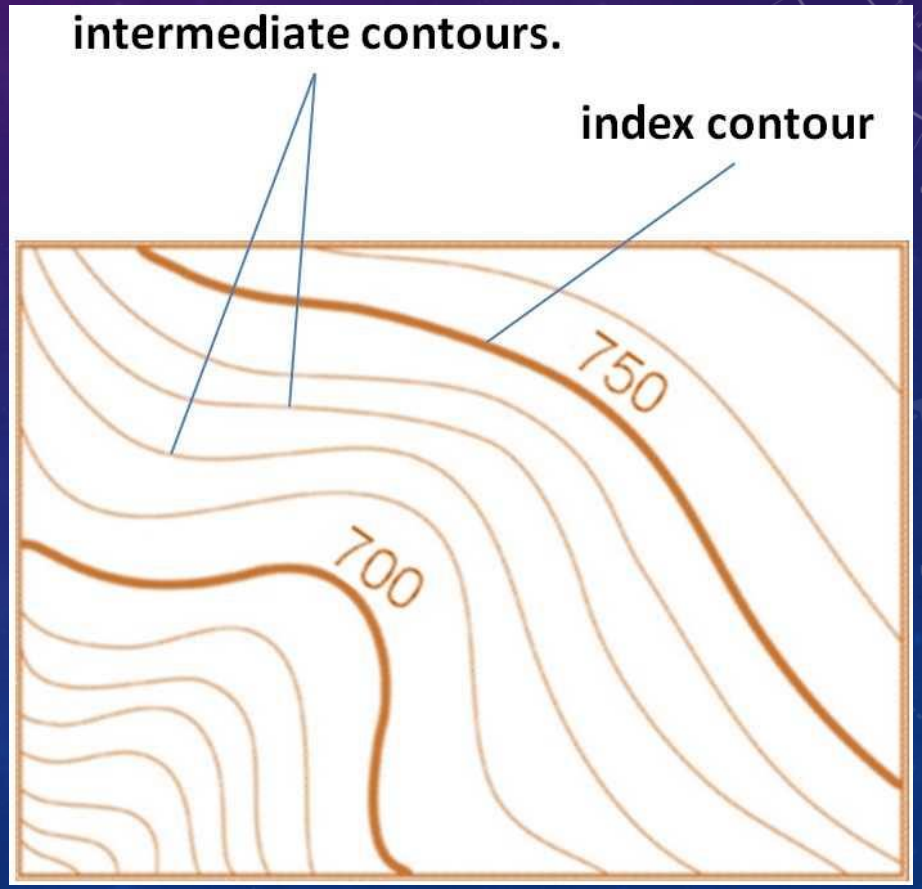
TOPIC 3: TOPOGRAPHIC MAPS

- Contour Interval: The difference in elevation between two side-by-side contour lines
  - The contour interval is usually found on the map key and legend



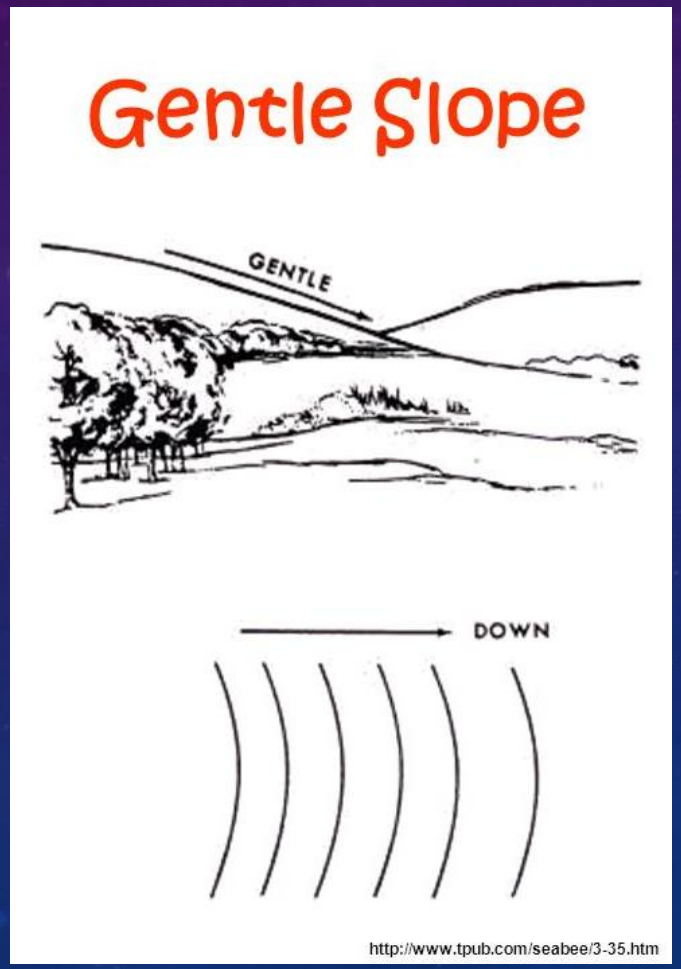
TOPIC 3: TOPOGRAPHIC MAPS

- Index Contour: lines that are BOLD and have an elevation labeled on a map



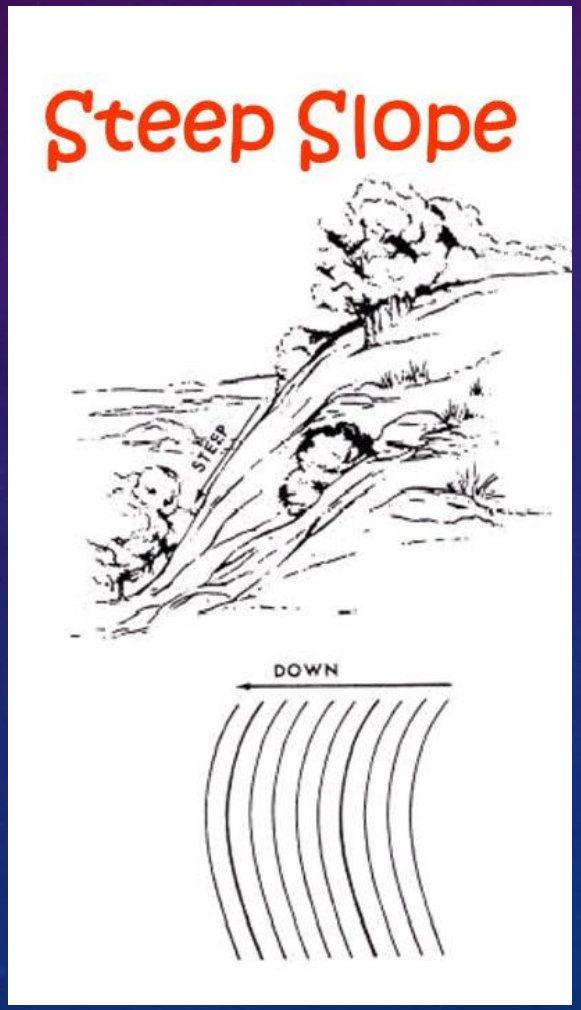
TOPIC 3: TOPOGRAPHIC MAPS

- Gentle Slope: when contour lines are spaced far apart



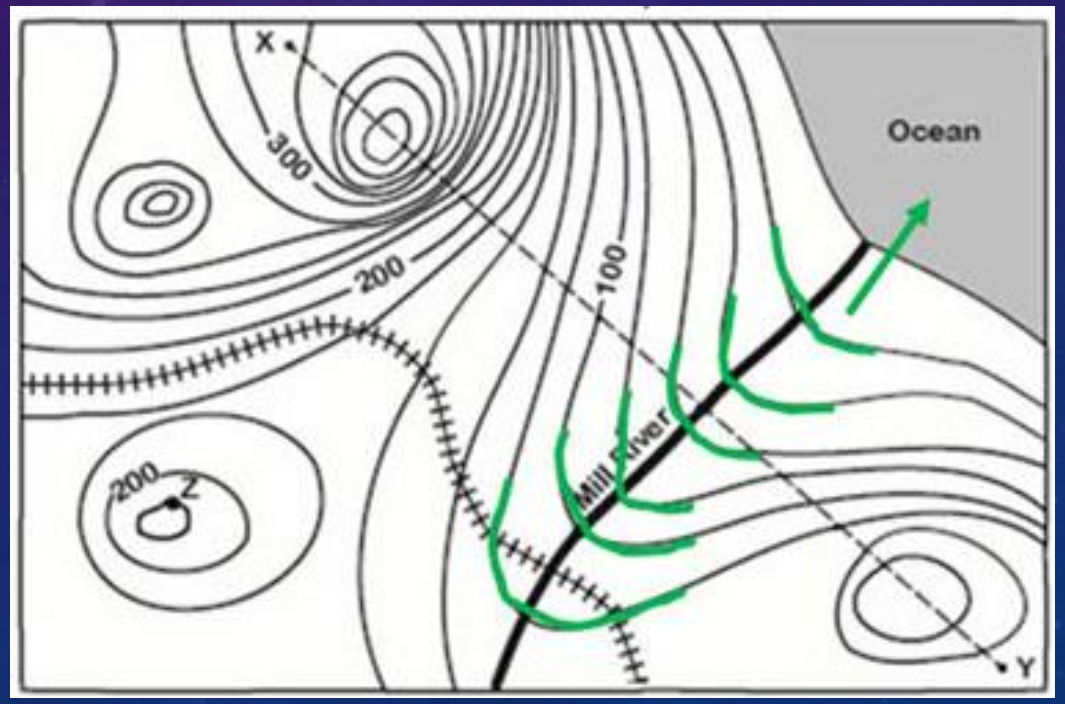
TOPIC 3: TOPOGRAPHIC MAPS

- <u>Steep Slope:</u> when contour lines are spaced close together



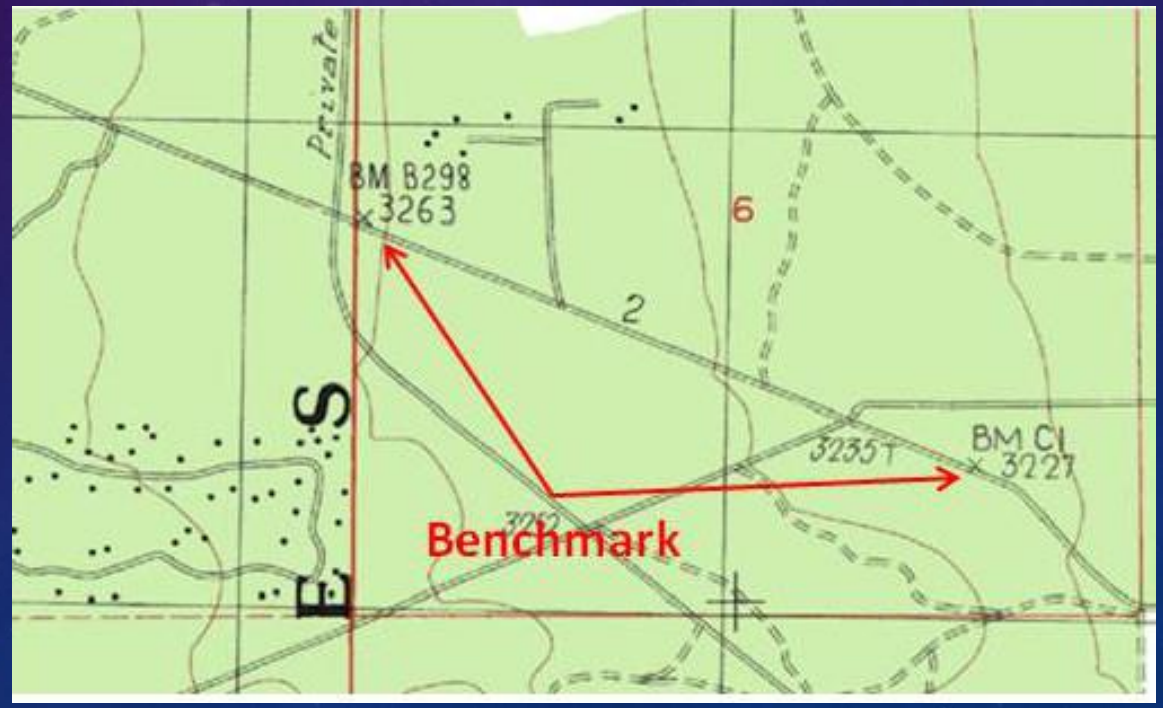
TOPIC 3: TOPOGRAPHIC MAPS

- When contour lines cross a river, they bend upstream
  - Note: rivers flow the opposite direction the contour lines point



TOPIC 3: TOPOGRAPHIC MAPS

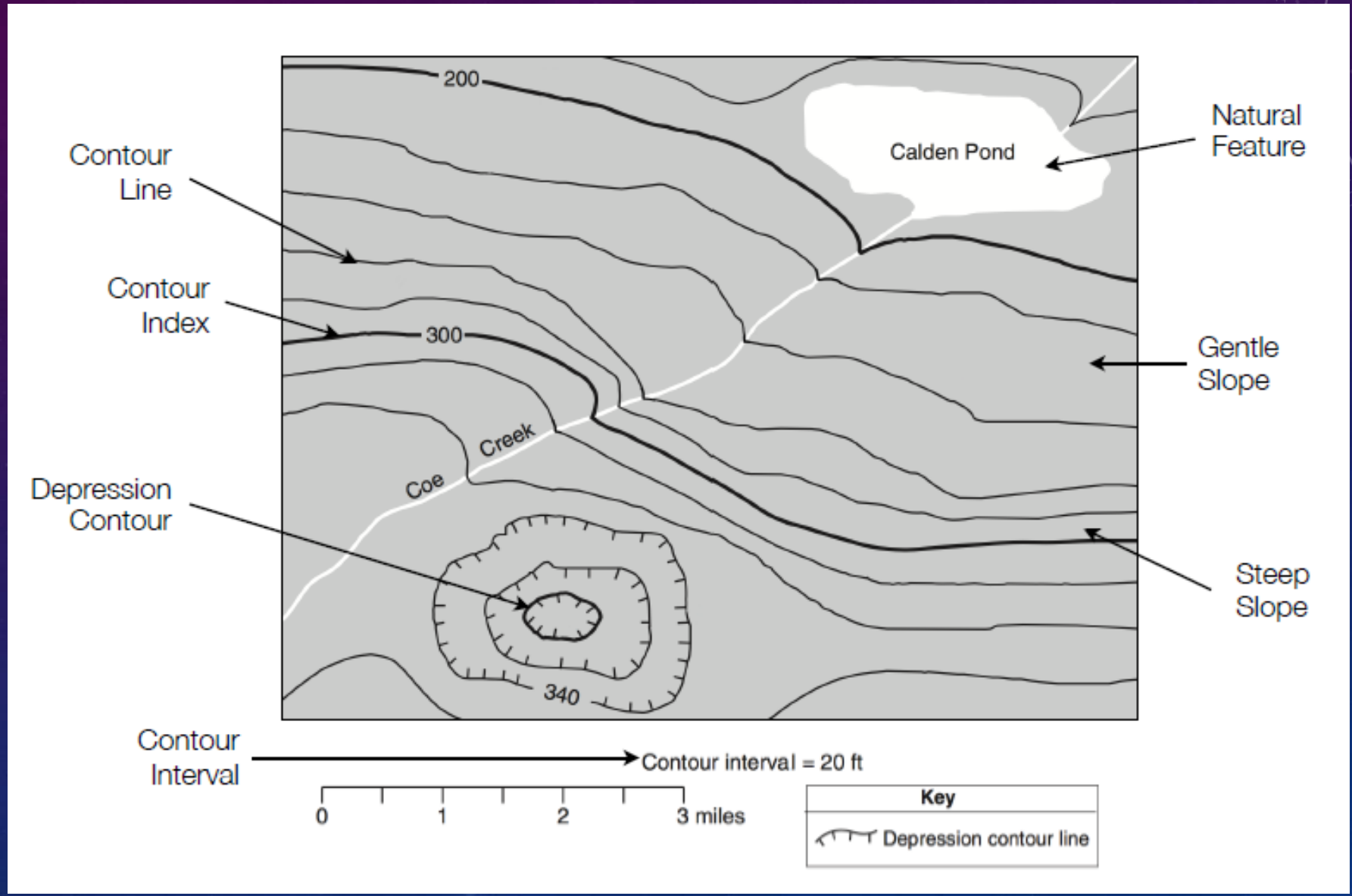
- Benchmark: a marker that shows the exact latitude, longitude, and elevation of that position
  - Labeled on a map as BM.X.



TOPIC 3: TOPOGRAPHIC MAPS

- Depression Contours: marked with small lines (called *hachured lines*) that are pointed towards the center of the depression (dip)
  - This allows you to distinguish a hill from a hole

TOPIC 3: TOPOGRAPHIC MAPS



TOPIC 3: TOPOGRAPHIC MAPS

- Calculating the Highest Point:

1. Find the last (highest) contour line on that hill
2. Imagine you drew another line
3. Subtract one from the imaginary line you just "drew"

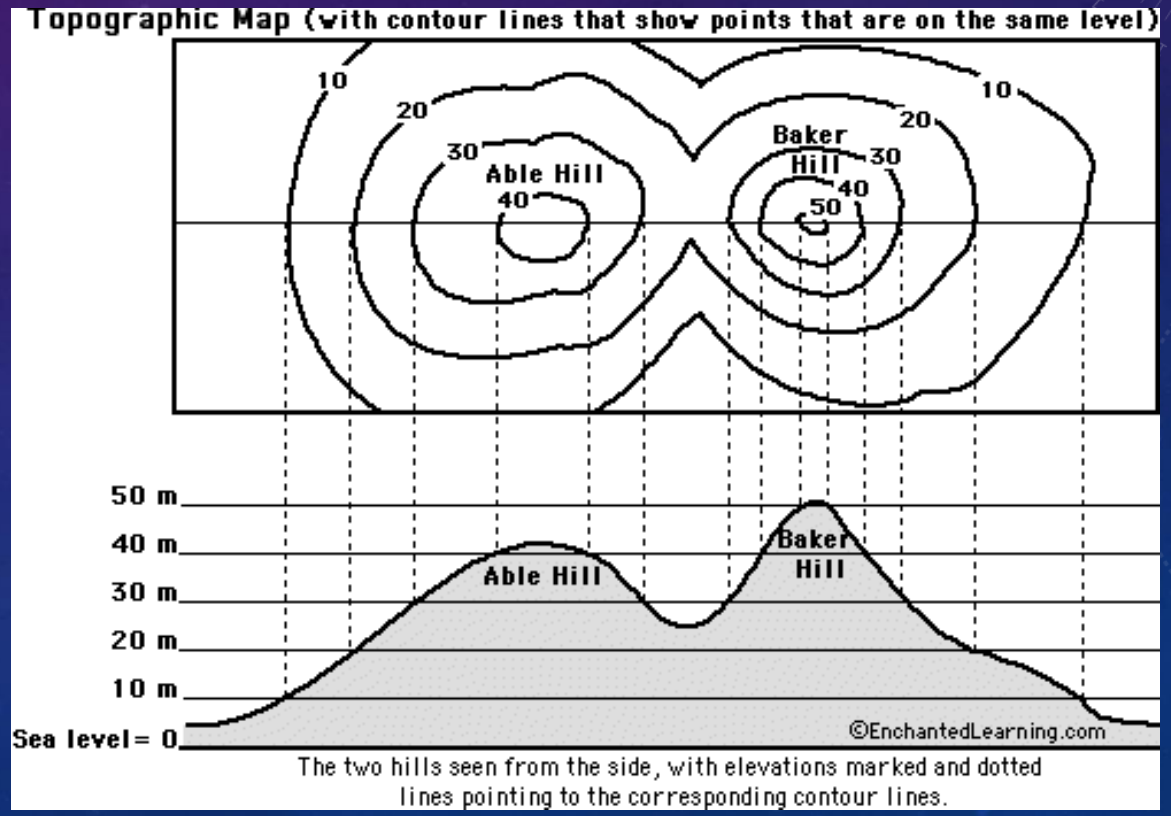
TOPIC 3: TOPOGRAPHIC MAPS

- Contour Line Rules:

1. Contour lines close around hills, basins, and depressions or extend to the edge of the map
2. Contour lines never EVER cross
3. Contour lines form V's that point upstream whenever crossing a stream

TOPIC 3: TOPOGRAPHIC MAPS

- <u>Topographic Profile:</u> the side view of a geologic feature (ex.: what you see when looking at a mountain, volcano, hill, valley)

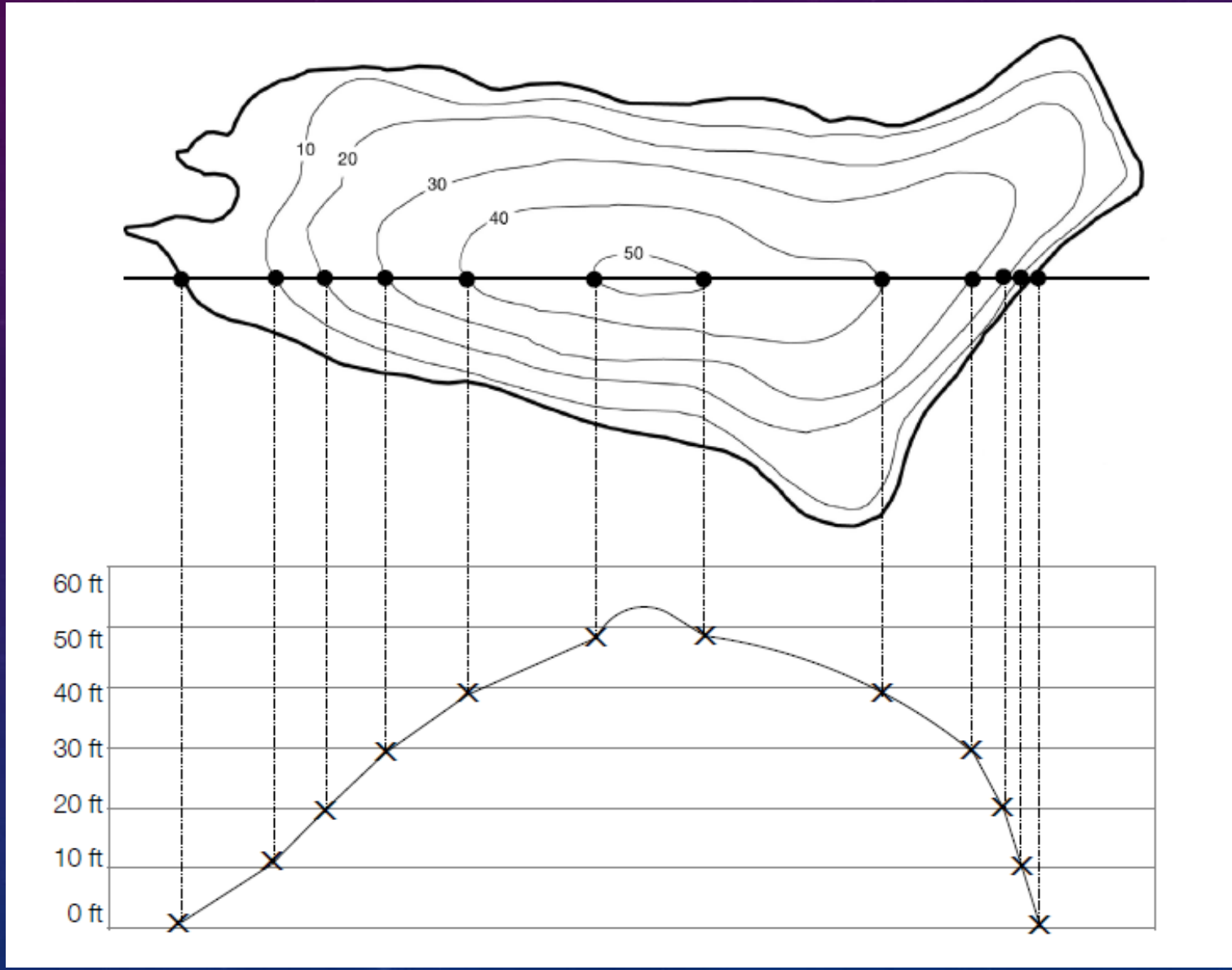


TOPIC 3: TOPOGRAPHIC MAPS

- Creating a Topographic Profile:

1. You need 2 points AND a horizontal grid (ex.: piece of paper) to measure between the 2 points
2. Transfer the points from the map to the horizontal grid
3. Connect the points with a smooth line to draw a profile

TOPIC 3: TOPOGRAPHIC MAPS



QUESTIONS?

TOPIC 4: NYS LANDSCAPES

- Essential Question:

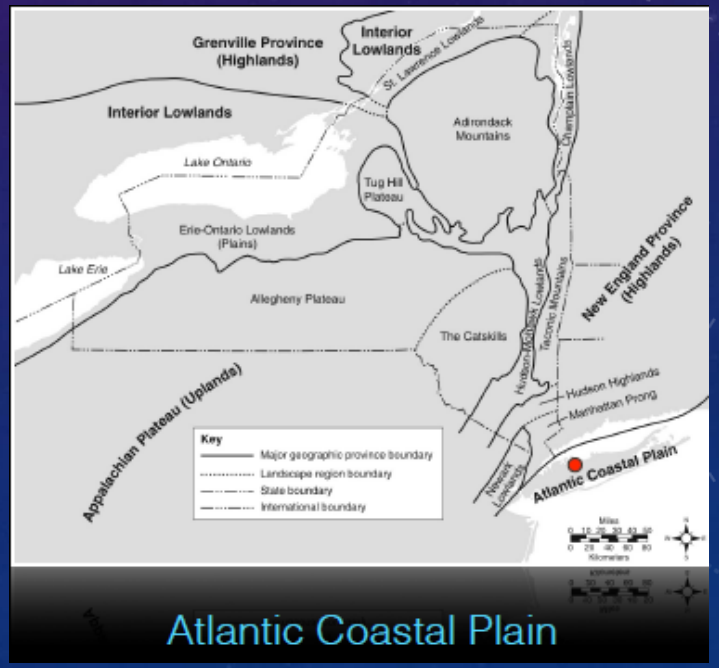
  What are the different landscape regions in New York?

TOPIC 4: NYS LANDSCAPES

- New York State contains many different landscape regions characterized by different elevations and various rock types
  - High Elevations: mountains & highlands
  - Medium Elevations: plateaus
  - Low Elevations: plains & lowlands

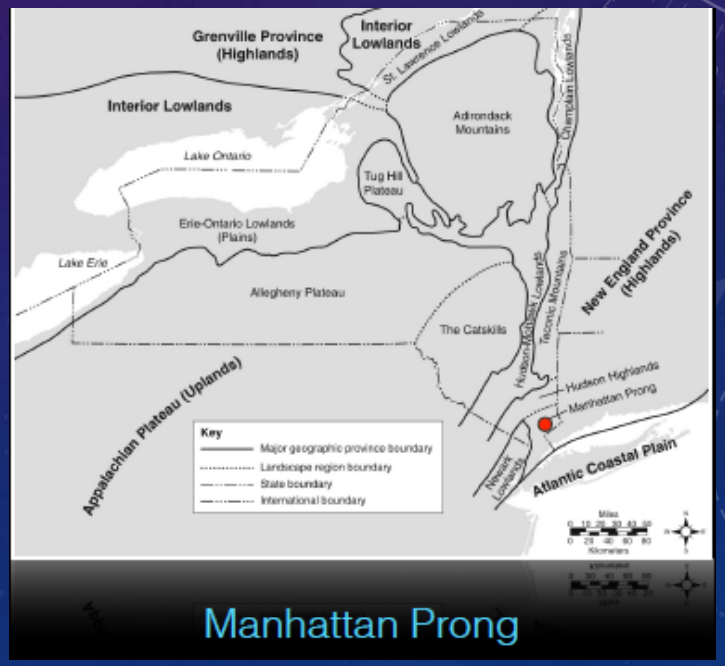
TOPIC 4: NYS LANDSCAPES

- Atlantic Coastal Plain: landscape region formed during the Cretaceous and Pleistocene (time periods)
  - Composition: sedimentary rock
  - Elevation: low



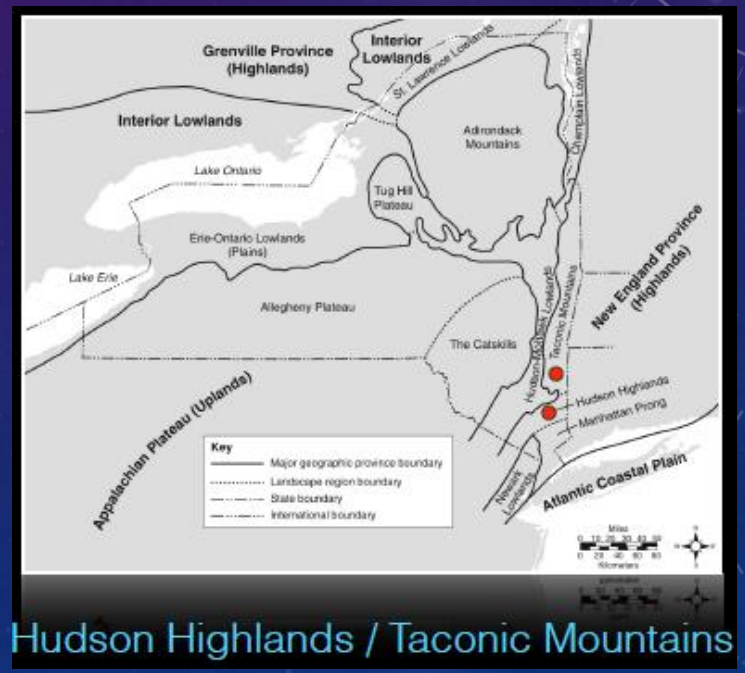
TOPIC 4: NYS LANDSCAPES

- Manhattan Prong: landscape region formed during the Cambrian and Ordovician (time periods)
  - Composition: metamorphic rock
  - Elevation: low



TOPIC 4: NYS LANDSCAPES

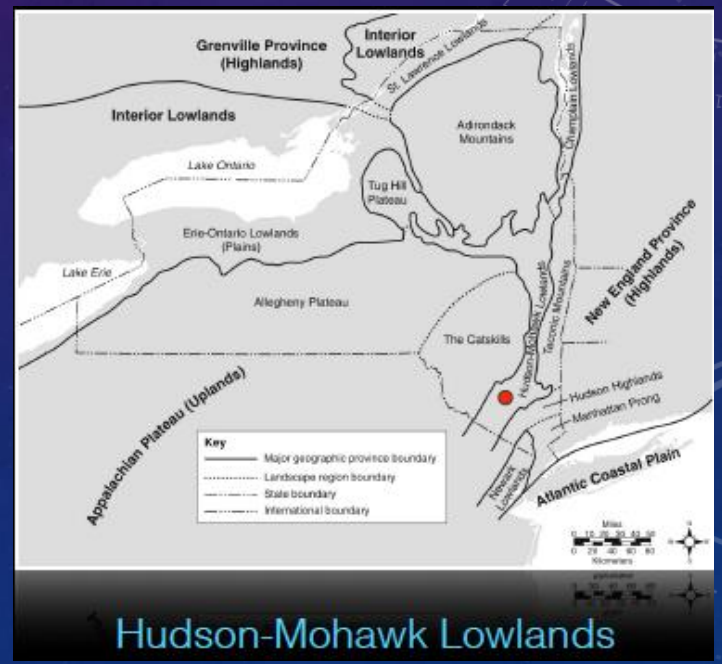
- <u>Hudson Highlands/Taconic Mountains</u>: landscape region formed during the middle of the Proterozoic (time period)
  - Composition: metamorphic rock
  - Elevation: high



Hudson Highlands / Taconic Mountains

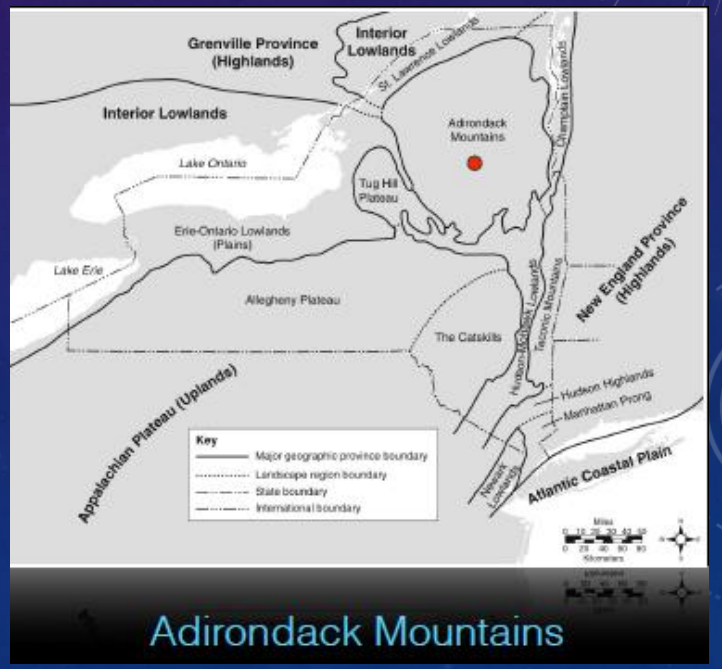
TOPIC 4: NYS LANDSCAPES

- Hudson/Mohawk Lowlands: landscape region formed during the Ordovician (time period)
  - Composition: sedimentary rock
  - Elevation: low



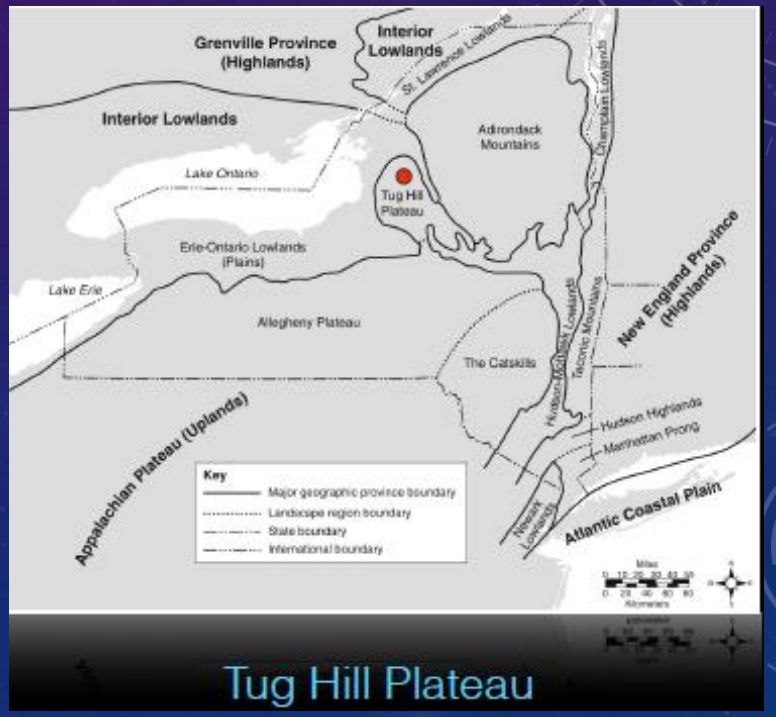
TOPIC 4: NYS LANDSCAPES

- Adirondack Mountains: landscape region formed during the middle of the Proterozoic Cambrian (time period)
  - Composition: metamorphic rock
  - Elevation: high



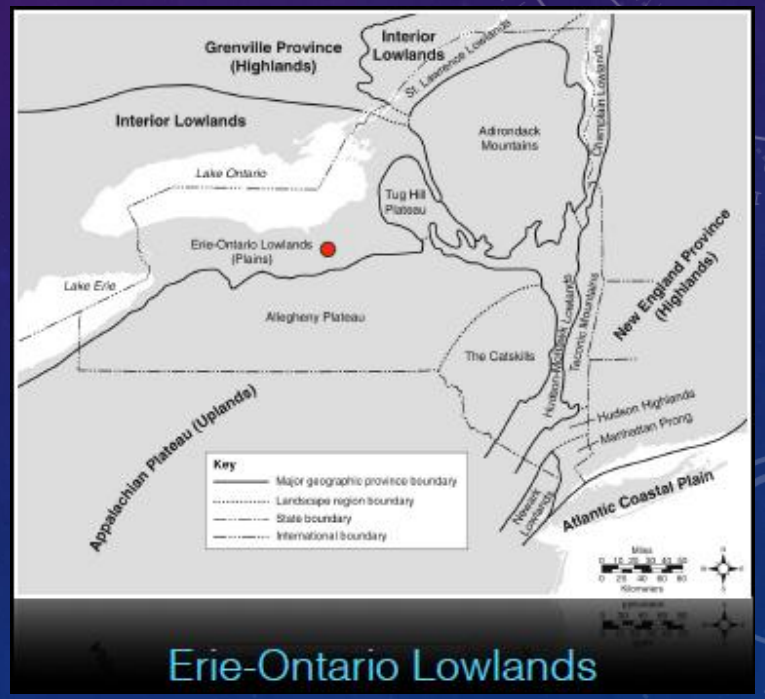
TOPIC 4: NYS LANDSCAPES

- Tug Hill Plateau: landscape region formed during the Ordovician (time period)
  - Composition: sedimentary rock
  - Elevation: medium



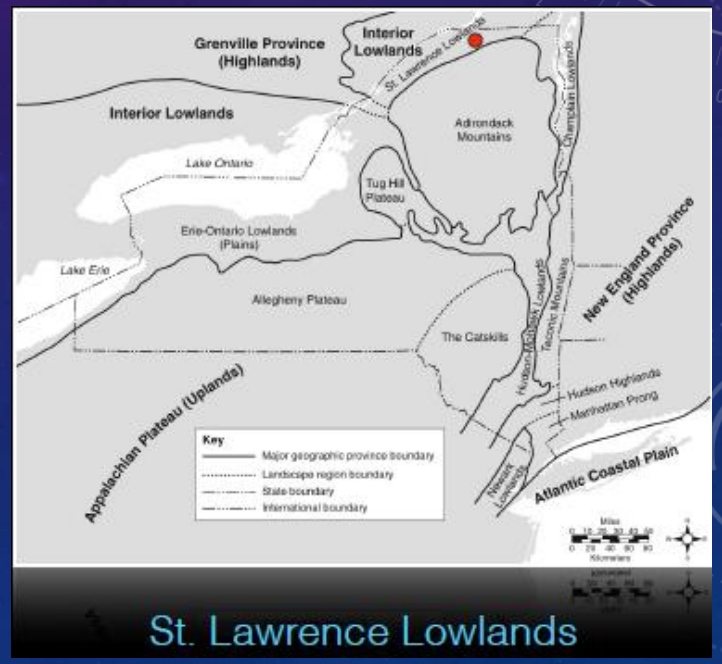
TOPIC 4: NYS LANDSCAPES

- Erie-Ontario Lowlands: landscape region formed during the Silurian (time period)
  - Composition: sedimentary rock
  - Elevation: low



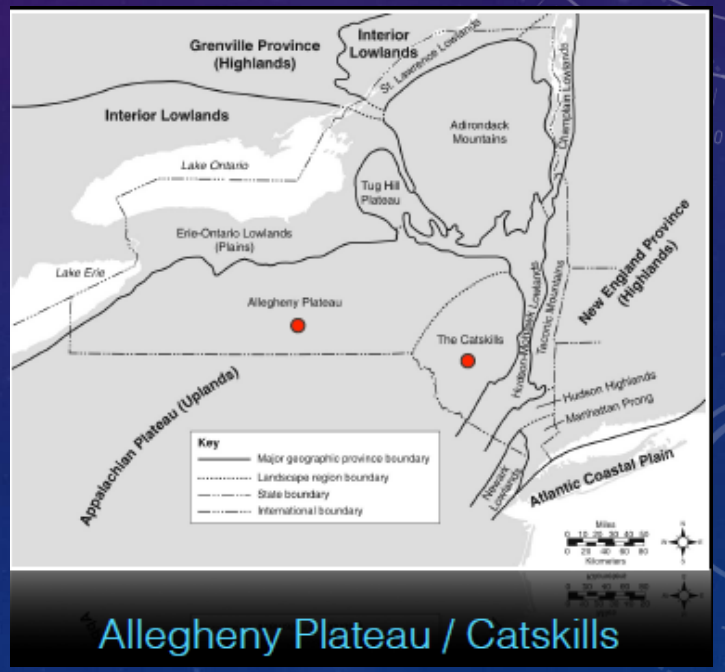
TOPIC 4: NYS LANDSCAPES

- St. Lawrence Lowlands: landscape region formed during the Ordovician and Cambrian (time periods)
  - Composition: sedimentary rock
  - Elevation: low



TOPIC 4: NYS LANDSCAPES

- Allegheny Plateau/Catskills: landscape region formed during the Devonian (time period)
  - Composition: sedimentary rock
  - Elevation: medium



QUESTIONS?