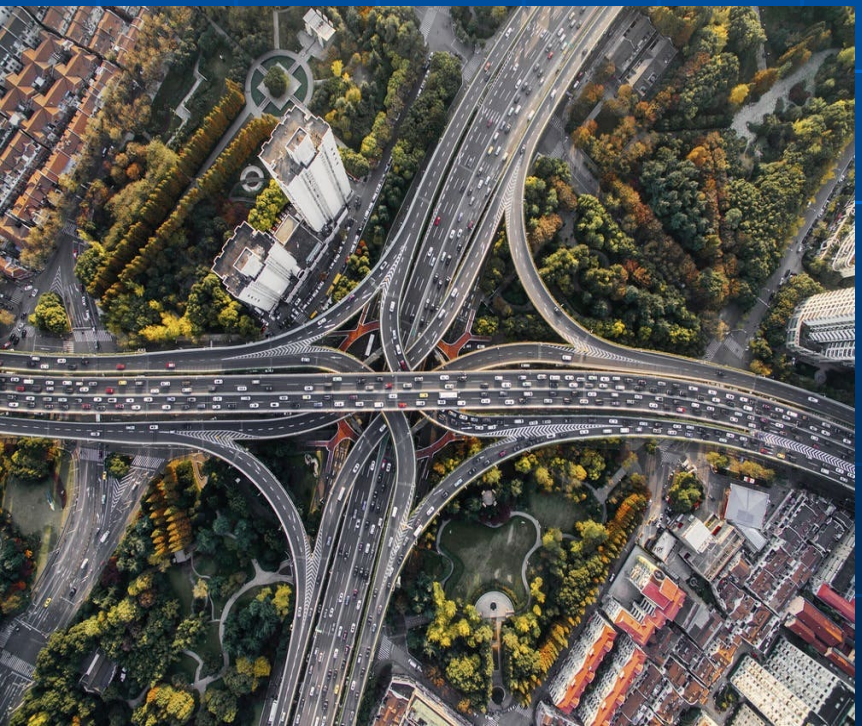
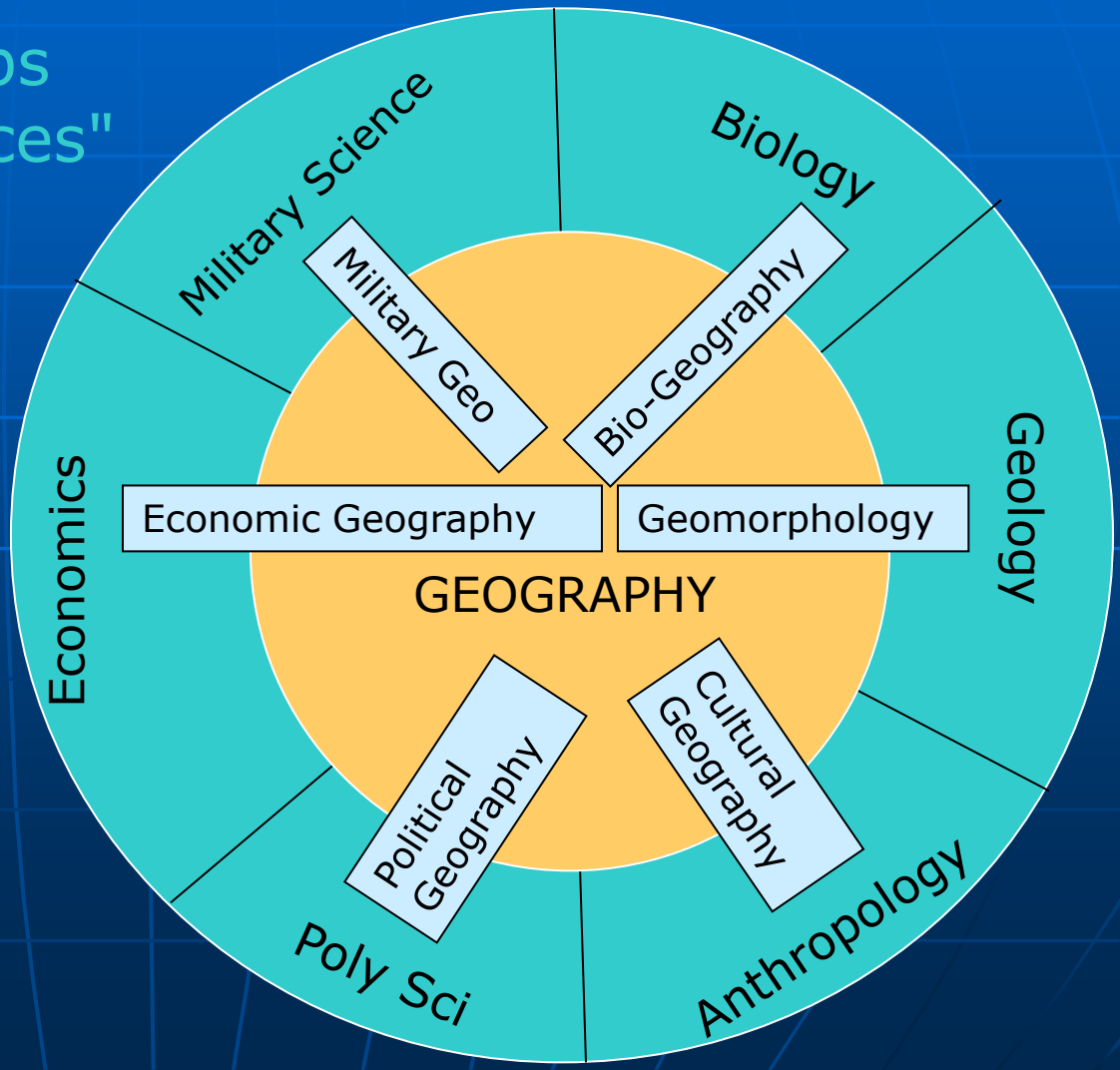
Fundamentals of Geographic Thinking and Spatial Intelligence



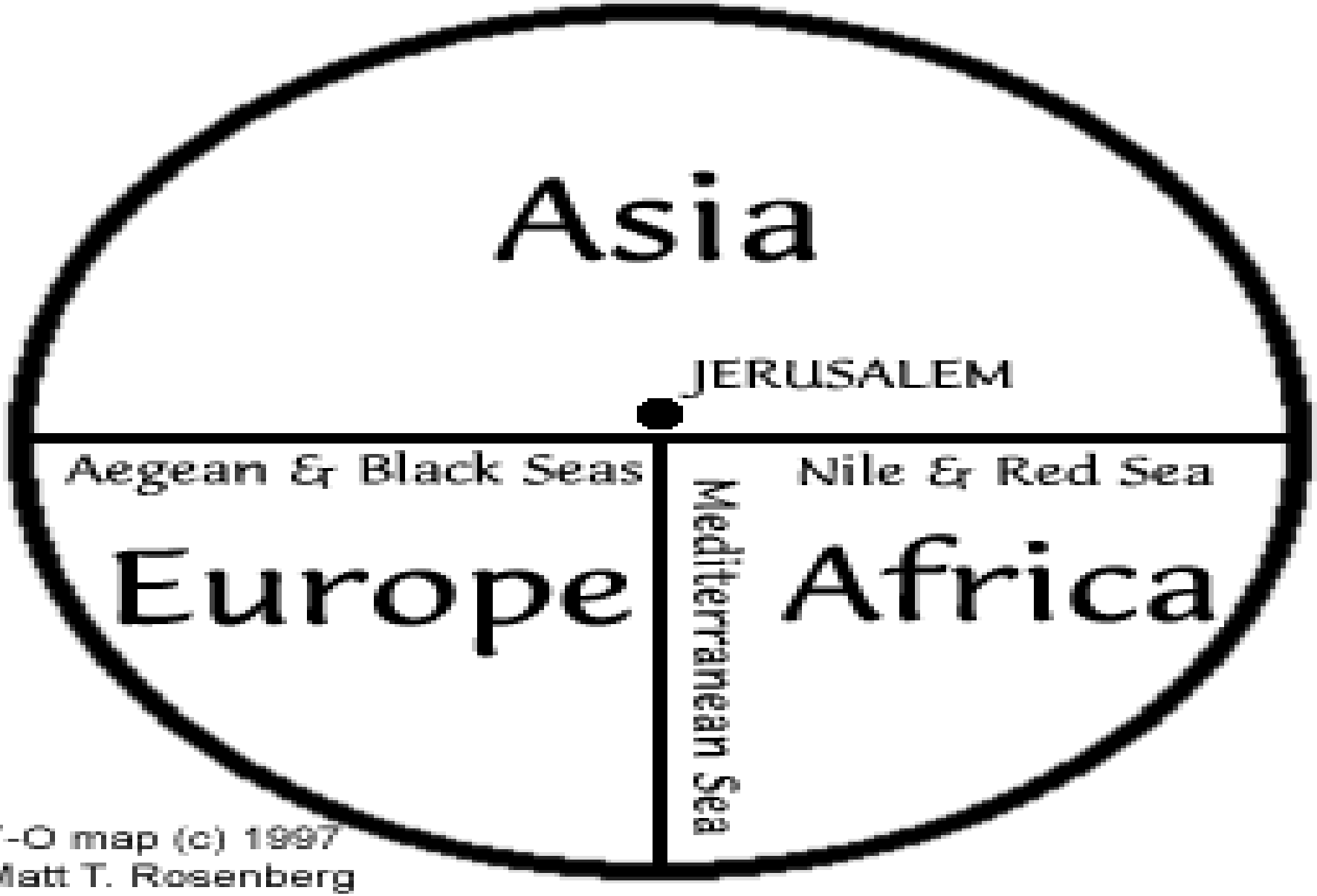
- **What is Geography?**
  - ***Geo*** **("Earth") and** ***grapheim*** **("to write")**
  - **Science that studies the relationships among geographic areas, natural systems, society, cultural activities, and the interdependence of all these over space**
  - **Geography examines both the structure of distributions and the processes that create them.**

Geography=Synthesis

Holistic focus on Human-Environment relationships
"The Mother of all Sciences"



Spatial Representations

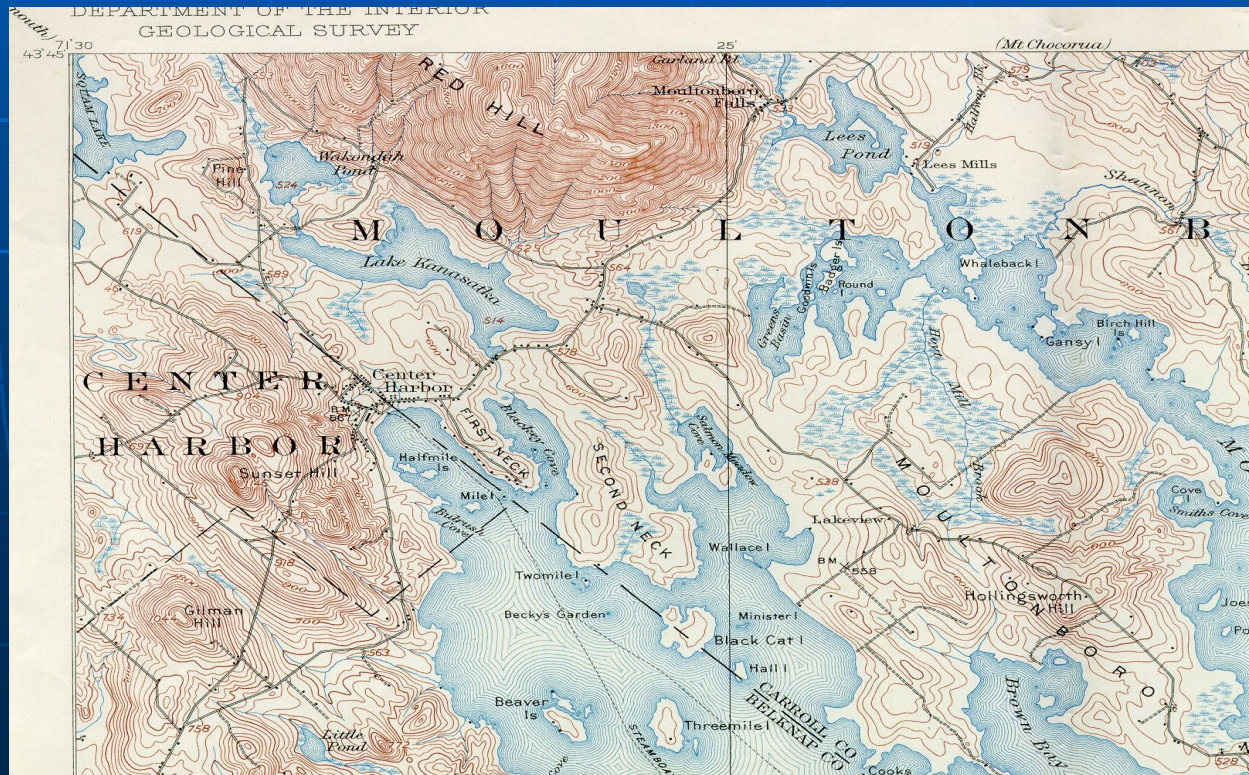


The BIG Questions in Geography

- What makes places and landscapes different from one another and why is this important?
- How has the Earth been transformed by human action?
- How and why do sustainability and vulnerability change from place to place and over time
- What is the nature of spatial thinking, reasoning, and abilities?

The BIG Questions in Geography

- **What is Where?**
  - The location and description of the issue.
- **Why There?**
  - Analysis of the issue
    - Connections, Physical characteristics, Interrelationships.
- **Why Care?**
  - The importance of the issue

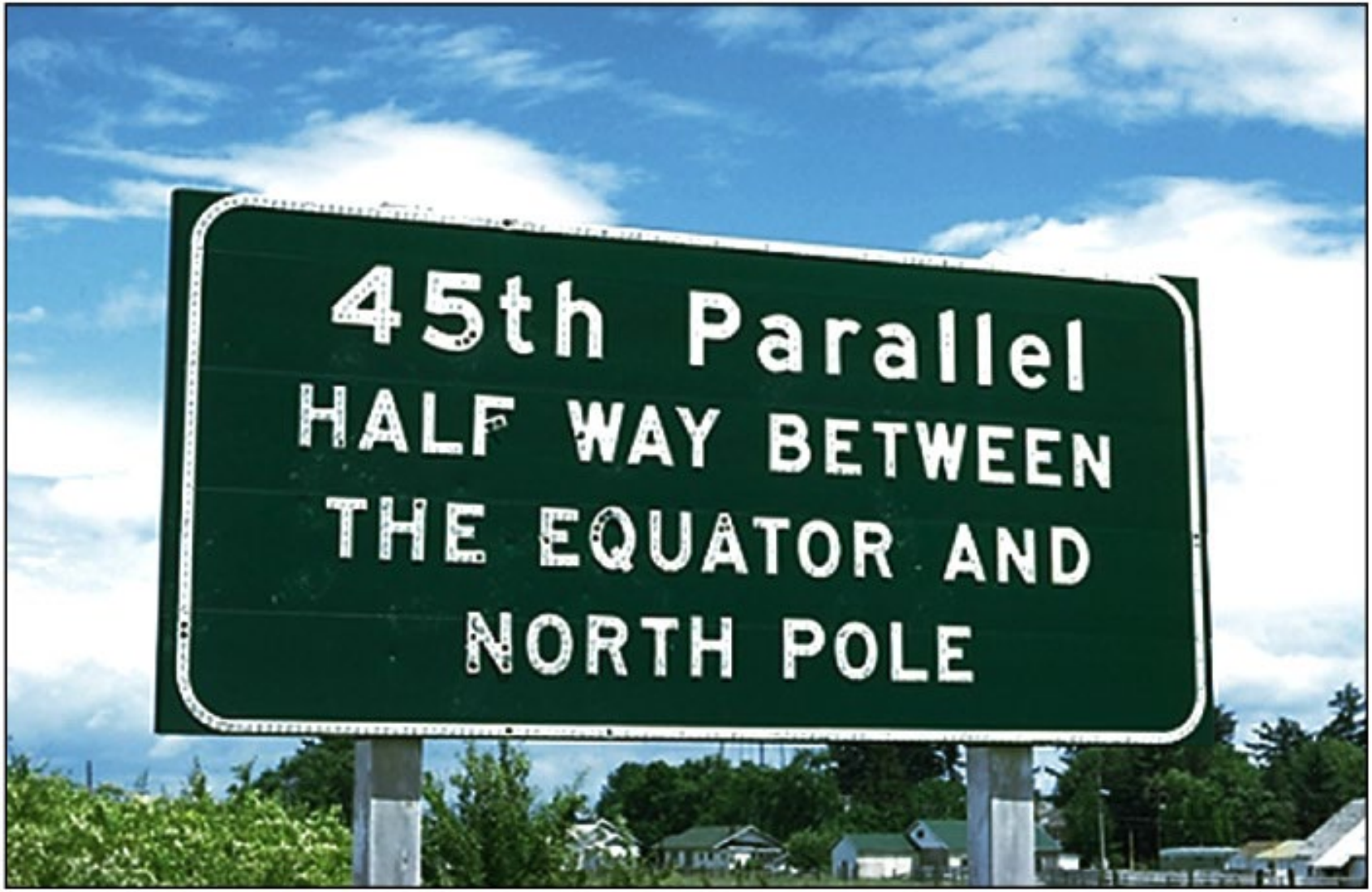


Five Themes of Geography

- Place
- Location
- Region
- Movement
- Human-Earth Relationships

Place

Tangible and intangible living and nonliving characteristics that make each place unique. No two places are identical. An ancient temperate rain forest in the Northwest in the Gifford Pinchot National Forest features huge old-growth Douglas fir, redwoods, cedars, and a mix of trees, ferns, and mosses.



Location

Absolute and relative location on Earth. Location answers the question "*Where?*" The specific planetary address of a location. This road sign is posted on Interstate 5 in Oregon.

Region

Areas having uniform characteristics; how they form and change; their relation to other regions. The great grain-producing areas on the unique soils of the Palouse grasslands form a vast agricultural region in eastern Washington.

Movement

Communication, movement, circulation, and diffusion across Earth's surface. Global interdependence links all regions and places. Winds and ocean currents form circulations of energy and water. The strong winds of Hurricane Mitch in 1998 devastated this banana plantation in Honduras.

Human-Earth Relationships

Humans and the environment: resource exploitation, hazard perception, and environmental modification. The 1998 landslides along the Pacific Coast south of San Francisco destroyed homes and property as bluffs collapsed.

Concepts in Geographic Thinking

- **Spatial Significance** - Importance of a place or region (unique physical characteristics or natural/human relationships in this location)
  - The first "Law" of Geography
- **Patterns and Trends** - Characteristics that are similar and repeat
- **Interrelationships** - Connections between environments (natural/ human, natural/natural, human/human) that form a system.
- **Geographic Perspective** - Environmental, economic, political, and/or social implications of the issues, events, developments, and/or phenomena

Geographic Conditions

What is it like in this location?

(What can you see, hear, smell, feel, etc. there?)

CLIMATE

ETHNICITY

VEGETATION

ART

POPULATION DENSITY

LAND USE

ROADS

LANGUAGE

LANDFORM

RELIGION

Geographic Connections

How is this place linked to other places?

What natural processes and human features help connect this place with others?

RIVER

WIND

SLOPE

RAILROAD

CANAL

RADIO

FAMILY

CORPORATION

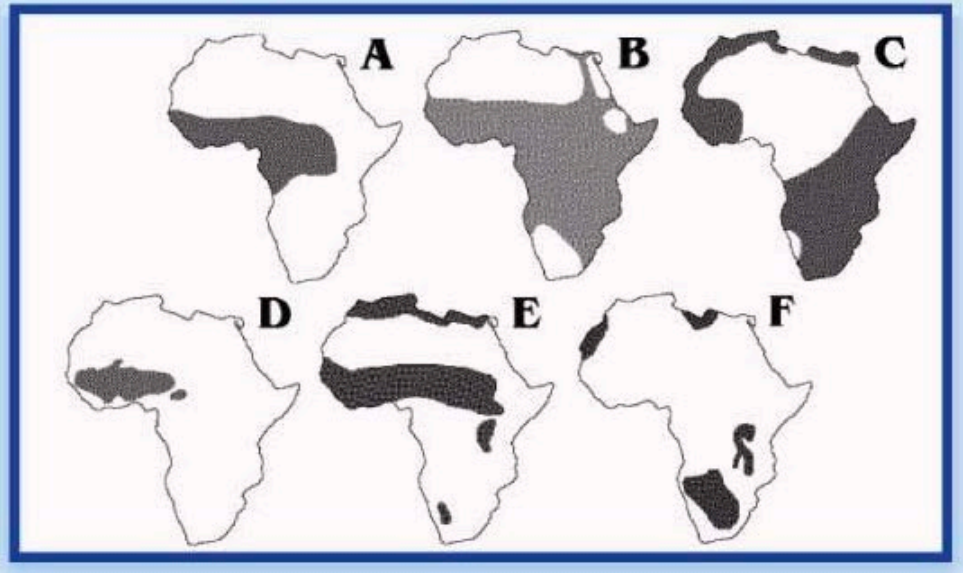
INTERNET

GOVERNMENT

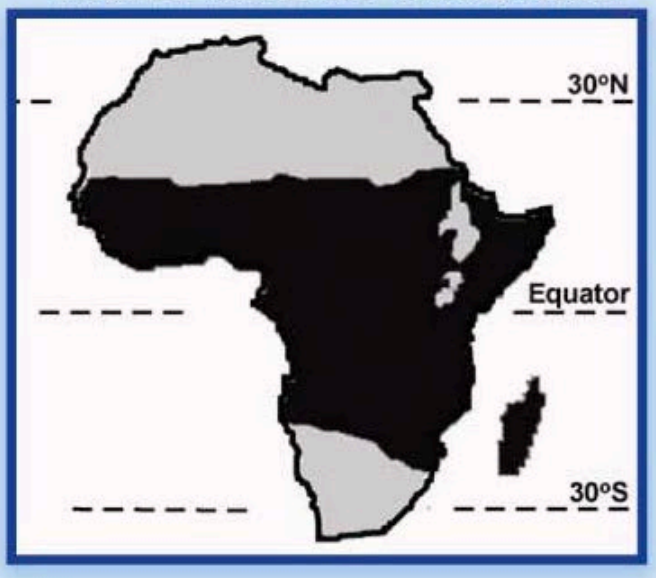
Geographic Association

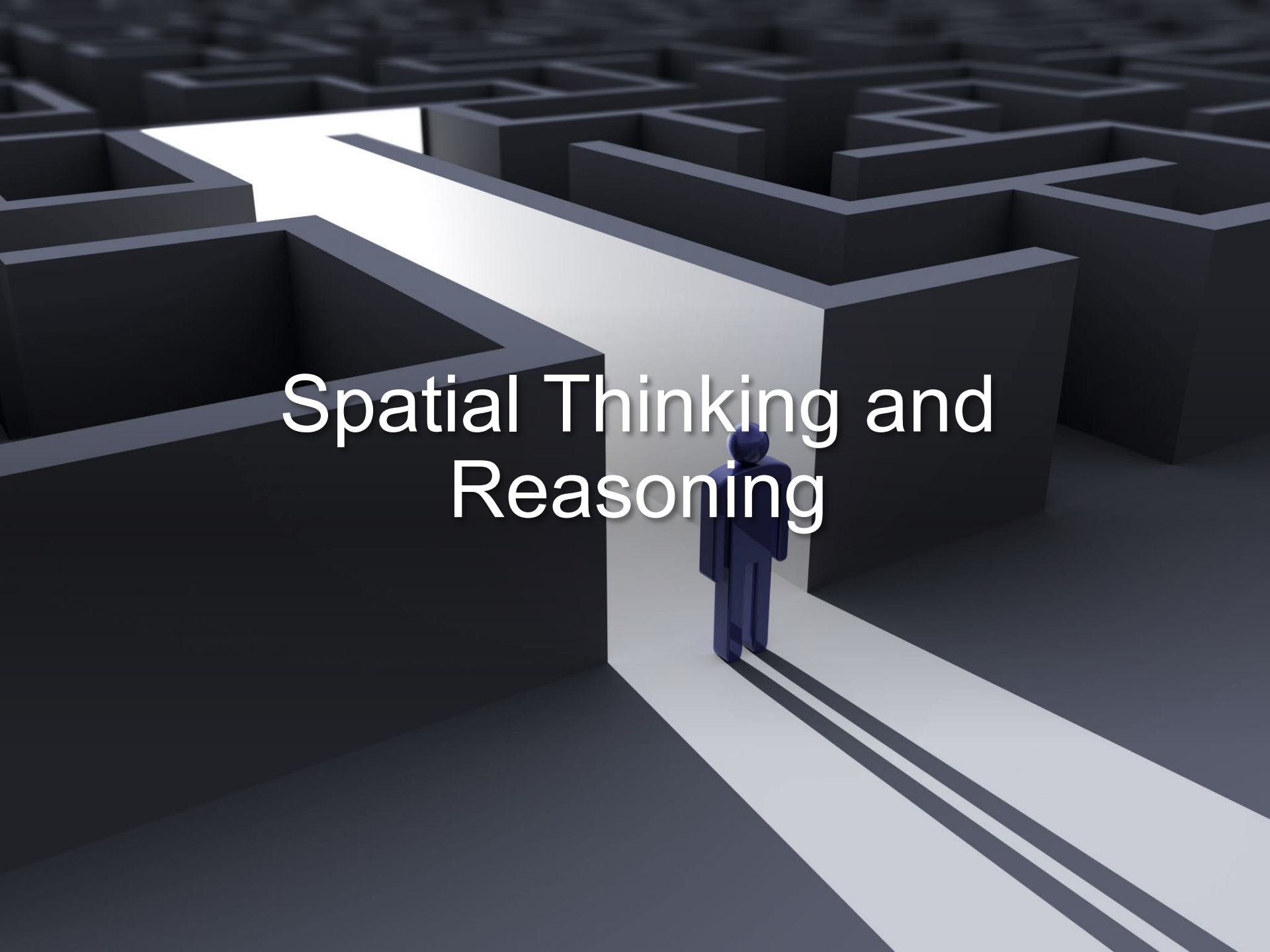
What features usually occur together?

Which of these six "bugs" occurs in the same areas as malaria and therefore is a plausible carrier of the disease?



INCIDENCE OF MALARIA





Spatial Thinking and Reasoning

Spatial skills

- Abilities that involve visualizing and mentally manipulating objects, shapes, and locations.

- We use spatial skills in everyday life
  - Following a diagram to put together a piece of furniture
  - doing a jigsaw puzzle
  - interpreting a graph in a news article
  - navigating through buildings and neighborhoods

- Spatial skills are linked to students' achievement in science, technology, engineering, and math.
  - In preschool, <u>children with stronger spatial skills tend to have stronger math skills</u>.

How to Achieve Spatial Thinking

Thinking *in* Space

- Be aware of your location in space and the role space plays in daily life.

Thinking *About* Space

- Use maps as a key resource. Help students to train themselves to look for patterns on maps, noting clusters, associations, outliers, and anomalies in the distributions of objects.
- Look for changes over space and time to help identify relationships among spatial patterns.

Thinking *with* Space

- Set nonspatial ideas into spatial contexts. For example, use concept maps as a tool to think; place similar things close and dissimilar things far away. Consider the connections between objects or ideas, and use lines to show relationships.

Geographic Inquiry Process

Step	What to do
1. Ask a geographic question	Ask a question about spatial relationships in the world around you
2. Acquire geographic resources	Identify data and information that you need to answer your question
3. Explore geographic data	Turn the data into maps, tables, and graphs, and look for patterns and relationships
4. Analyze geographic information	Determine what the patterns and relationships mean with respect to your question
5. Act on geographic knowledge	Use the results of your work to educate, make a decision, or solve a problem

CONCEPTS OF GEOGRAPHIC THINKING

Spatial Significance	Patterns and Trends	Interrelationships	Geographic Perspective
I can use the concept of Spatial Significance through the inquiry process, to: • identify where places are located on the earth's surface based on natural and/or human characteristics (What is Where?) • determine the unique characteristics of places (Why There?) • analyse the importance of spatial distribution of people, plants, animals, resources and earth's physical processes (Why Care?)	I can use the concept of Patterns and Trends, through the inquiry process, to: • identify characteristics that are similar and repeat within and between places or regions (What is Where?) • determine if these characteristics repeat over time (What is Where?) • analyse why characteristics are similarities and/or repeat (Why There?) • determine the importance of why the characteristics are similar and/or repeat (Why Care?)	I can use the concept of Interrelationships, through the inquiry process, to: • identify where human and/or natural characteristics and processes interact or connect within and between each other (What Is Where?) • determine how the connections interact to form a system (Why There?) • analyse the impact of an event, process or development on the natural characteristics, natural processes and human activities that occur through the system (Why Care?)	I can use the concept of Geographic Perspective, through the inquiry process, to: • identify the environmental, economic, political and/or social context of a geographic issue, event, development or phenomena (What is Where?) • determine the potential stakeholders and their points of view that should be considered in the analysis of a geographic issue, event, development or phenomena (What is Where?) • analyse the multiple points of view of the geographic issue, event, development or phenomena considering applicable environmental, economic, political and/or social lenses (Why There? Why Care?)