

The “Geography I.D.” Assignment for students:

GEOGRAPHY I.D.

To begin: complete your personal *Geography I.D.* Use the maps in your text, an atlas, online, and additional library materials if needed.

Your instructor will help you find additional source materials for data pertaining to the campus.

On each map find the information requested, noting the January and July temperatures indicated by the isotherms (the small scale of these maps will permit only a general determination), January and July pressures indicated by isobars, annual precipitation indicated by isohyets, climatic region, landform class, soil order, and ideal terrestrial biome.

Record the information from these maps in the spaces provided. The completed page will give you a relevant geographic profile of your immediate environment. As you progress through your physical geography class the full meaning of these descriptions will unfold. This page might be one you will want to keep for future reference.

[* Derived from *Applied Physical Geography: Geosystems in the Laboratory*, eighth edition, by Robert W. Christopherson and Charles E. Thomsen, © 2012 Prentice Hall, Inc., Pearson Education]

Geography I.D.

Name: _____ Class Section: _____

Home Town: _____ Latitude: _____ Longitude: _____

College/University: _____

City/Town: _____ Province : _____

Standard Time Zone (for College Location): _____

Latitude: _____ Longitude: _____

Elevation (include location of measurement on campus): _____

Place (tangible and intangible aspects that make this place unique): _____

Region (aspects of unity shared with the area; cultural, historical, economic, environmental): _____

Population: Metropolitan Statistical Area (CMSA, PMSA, if applicable): _____

Environmental Data: (Information sources used: _____)

January Avg. Temperature: _____ July Avg. Temperature: _____

January Avg. Pressure (mb): _____ July Avg. Pressure: _____

Average Annual Precipitation (cm): _____

Avg. Ann. Potential Evapotranspiration (if available; cm): _____

Climate Region (Köppen symbol and name description): _____

Main Climatic Influences (air mass source regions, air pressure, offshore ocean temperatures, etc.)

Topographic Region or Structural Region (inc. rock type, loess units, etc.): _____

Dominant Regional Soil Order _____

Biome (terrestrial ecosystems description; ideal and present land use): _____

Essentials of Geography

1

Key Learning Concepts for Chapter 1

The following learning concepts help guide the student's reading and comprehension efforts. The operative word is in italics. These are included in each chapter of *Geosystems*. The student is told: "after reading the chapter you should be able to":

- **Define** geography in general and physical geography in particular.
- **Discuss** human activities and human population growth as they relate to geographic science, and **summarize** the scientific process.
- **Describe** systems analysis, open and closed systems, and feedback information, and **relate** these concepts to Earth systems.
- **Explain** Earth's reference grid: latitude and longitude, and latitudinal geographic zones and time.
- **Define** cartography and mapping basics: map scale and map projections.
- **Describe** modern geoscience techniques—the Global Positioning System (GPS), remote sensing, and geographic information system (GIS)—and **explain** how these tools are used in geographic analysis.

Overview

Welcome to the Fourth Canadian Edition of *Geosystems* and the study of physical geography! In this text, we examine the powerful Earth systems that influence our lives and the many ways humans impact those systems. This is an important time to study physical geography, learning about Earth's environments, including the systems that form the landscapes, seascapes, atmosphere, and ecosystems upon which humans depend. In this second decade of the 21st century, a century that will see many changes to our natural world, scientific study of Earth and environment is more crucial than ever.

Our study of physical geography begins with the essentials of this important discipline. The "Essentials of Geography" chapter contains basic tools for the student to use in studying the content of physical geography. After completion of this chapter you should feel free to follow the integrated sequence of the text or treat the four parts of the text in any order that fits your teaching approach.

Our study of geosystems—Earth systems—begins with a look at the science of physical geography and the geographic tools it uses. Physical geography uses an integrative spatial approach, guided by the scientific process, to study entire Earth systems. The role of humans is an increasingly important focus of physical geography, as are questions of global sustainability as the population of Earth grows.

Physical geographers study the environment by analyzing air, water, land, and living systems. Therefore, we discuss systems and the feedback mechanisms that influence system operations. We then consider location on Earth as determined by the coordinated grid system of latitude and longitude, and the determination of world time zones. Next, we examine maps as critical tools that geographers use to display physical and cultural information. This chapter concludes with an overview of new and widely accessible technologies that are adding exciting new dimensions to geographic science: global positioning systems, remote sensing from space, and geographic information systems.

Most students have differing notions as to what geography is and what geographers do. Some think they are going to memorize the capitals of provinces, while others think that they are embarking on a search for lands and peoples or that they will be learning things for success with a popular "*Jeopardy!*" category. This uncertainty as to the nature of geography provides an excellent opportunity to review the state of affairs relative to geographic awareness. For information about geography as a discipline and career possibilities in North America, contact the Association of American Geographers and ask for their pamphlets, "Careers in Geography" by Richard G. Boehm, "Geography: Today's Career for Tomorrow," "Geography as a Discipline" by Richard E. Huke,

and “Why Geography?” Order by phone (1-202-234-1450), or E-mail at gaia@aag.org, or see their home page at www.aag.org.

In our own physical and cultural geography classes we found that many students are unable to name all the provinces and states or to identify major countries on outline maps. When we add the complexity of the spatial aspects of Earth’s physical systems, e.g. atmospheric energy budgets, temperatures, wind patterns, weather systems, plate tectonics, earthquake and volcano locations and causes, global ecosystems and biodiversity, and terrestrial biomes, the confusion even among the best informed is great, and therein lies our challenge!

As before, a list of key learning concepts begins the chapter and is used to organize the Summary and Review section, with definitions, key terms and page numbers, and review questions grouped under each objective. At the beginning of each chapter a section titled “**In This Chapter**” introduces the chapter’s content in a succinct statement.

Outline Headings and Key Terms

The first-, second-, and third-order headings that divide Chapter 1 serve as an outline. The key terms and concepts that appear **boldface** in the text are listed here under their appropriate heading in **bold italics**. All these highlighted terms appear in the text glossary. Note the check-off box () so you can mark class progress.

The outline headings and terms for Chapter 1:

Geosystems Now 1: Canada’s Borders, not just lines on a map

The Science of Geography

- geography**
- spatial**
- location**
- region**
- human–Earth relationships**
- movement**
- place**

The Geographic Continuum Geographic Analysis

- spatial analysis**

- process**
- physical geography**
- Earth systems science**

The Scientific Process

- scientific method**

Using the Scientific Method

Applying Scientific Results

Human–Earth Interactions in the 21st Century

The Human Denominator

Global Sustainability

- sustainability science**

Earth Systems Concepts

Systems Theory

- system**

Open System

- open system**

Closed System

- closed system**

Natural System Example

System Feedback

- feedback loops**

- positive feedback**

- negative feedback**

System Equilibrium

- steady-state equilibrium**

- dynamic equilibrium**

- threshold**

Models of Systems

- model**

Systems Organization in Geosystems

Earth’s Four “Spheres”

- abiotic**

- biotic**

Atmosphere

- atmosphere**

Hydrosphere

- hydrosphere**

- cryosphere**

Lithosphere

- lithosphere**

Biosphere

- biosphere**

- ecosphere**

Mount Pinatubo—Global System

Impact

Earth’s Dimensions

Evidence of Sphericity

Earth as a Geoid

- geodesy**

- geoid*
- Location and Time on Earth**
 - Latitude**
 - latitude*
 - parallel*
 - Longitude**
 - longitude*
 - meridian*
 - prime meridian*
 - Great Circles and Small Circles**
 - great circle*
 - small circle*
 - Meridians and Global Time**
 - Greenwich Mean Time (GMT)*
 - Coordinated Universal Time
 - Coordinated Universal Time (UTC)*
 - International Date Line
 - International Date Line (IDL)*
 - Daylight Saving Time
 - daylight saving time*
- Maps and Cartography**
 - map*
 - cartography*
 - The Scale of Maps**
 - scale*
 - Map Projections**
 - map projection*
 - Equal Area or True Shape?
 - equal area*
 - true shape*
 - Classes of Projections
 - Mercator projection*
 - rhumb lines*
- Modern Tools and Techniques for Geoscience**
 - Global Positioning System**
 - Global Positioning System (GPS)*
 - Remote Sensing**
 - remote sensing*
 - photogrammetry*
 - Satellite *Imaging*
 - Passive Remote Sensing
 - Active Remote Sensing
- Geographic Information Systems (GIS)**
 - Geographic Information*

System (GIS)

A Quantitative Solution: Map Scales
Geosystems Connection
Key Learning Concepts Review
Mastering Geography

Focus Studies, Critical Thinking, Geo Reports and Geosystems in Action

- Critical Thinking 1.1:* What is your footprint?
- Critical Thinking 1.2:* Latitudinal geographic zones and temperature
- Critical Thinking 1.3:* Where are you?
- Critical Thinking 1.4:* Find and compare map scales
- Critical Thinking 1.5:* Test your knowledge about satellite imagery

- Geo Report 1.1:* Welcome to the Anthropocene
- Geo Report 1.2:* Amphibians at thresholds
- Geo Report 1.3:* Earth's unique hydrosphere
- Geo Report 1.4:* The world's most accurate clock
- Geo Report 1.5:* Magellan's crew loses a day
- Geo Report 1.6:* GPS origins
- Geo Report 1.7:* Polar-orbiting satellites predict Hurricane Sandy's path

Geosystems in Action 1 Exploring Earth's Systems

URLs listed in Chapter 1

- Canada's extended Continental Shelf:**
 - www.international.gc.ca/arctic-arctique/continental/summary-resume.aspx?lang=eng
- International Boundary Commission:**
 - www.internationalboundarycommission.org/index-eng.html
- US National Council for Geographic Education:**
 - www.ncge.org/
- Population Data:**
 - www.prb.org
 - www.census.gov/cgi-bin/popclock
- Ecological Footprint Calculator:**
 - www.footprintnetwork.org/en/index.php/GFN/page/calculators/
- Anthropocene:**
 - www.anthropocene.info
- EPA:**

- www.epa.gov/climatechange/ghgemissions/ind-calculator.html

Amphibian extinction:

- www.amphibians.org/

Latitude/Longitude:

- www.csgnetwork.com/gpscoordconv.htm

Time and UTC:

- www.greenwichmeantime.com/webexhibits.org/daylightsaving/aa.usno.navy.mil/faq/docs/world_tzones.html
- www.nrc-cnrc.gc.ca/eng/services/time/web_clock.html

Maps:

- www.nrcan.gc.ca/earth-sciences/geography/topographic-information/maps/9767
- www.atlas.gc.ca

GPS:

- www.gps.gov/

Satellites and remote sensing:

- News.bbc.co.uk/2/hi/science/nature/6450367.stm
- www.canadiangeographic.ca/magazine/oct11/space-age_farming.asp

- www.nasa.gov/centers/goddard/missions/index.html

- earthobservatory.nasa.gov

- www.nrcan.gc.ca/earth-sciences/geomatics/satellite-imagery-air-photos/satellite-imagery-products/educational-resources/9309

- npp.gsfc.nasa.gov/

- eros.usgs.gov/

- www.esa.int/ESA

- www.esa.int/Our_Activities/Observing_the_Earth

GIS:

- www.cio.gov.bc.ca/cio/intellectualproperty/index.page

- www.rcgs.org/awards/gold_medal/winner_gold2003.asp

- geogratias.gc.ca/geogratias/DownloadDirectory

- earth.google.com/

- www.ecu.edu/renci/Technology/GIS.html

- opensourcegis.org/disc.sci.gsfc.nasa.gov

Annotated Chapter Review Questions

- **Define** geography in general and physical geography in particular.

1. On the basis of information in this chapter, define physical geography and review the geographic approach.

Geography is the science that studies the interdependence of geographic areas, places, and locations; natural systems; processes; and societal and cultural activities over Earth's surface. Physical geography involves the spatial analysis of Earth's physical environment. Various words denote the geographic context of spatial analysis: space, territory, zone, pattern, distribution, place, location, region, sphere, province, and distance. Spatial patterns of Earth's weather, climate, winds and ocean currents, topography, and terrestrial biomes are examples of geographic topics.

2. Suggest a representative example for each of the five geographic themes; for example, atmospheric and oceanic circulation spreading radioactive contamination is an example of the movement theme.

Suggestion: use Figure 1.2, text and photographs, as cues for discussion of this question. The Canadian Association of Geographers (CAG), Association of American Geographers (AAG) and the National Council for Geographic Education (NCGE), in an attempt to categorize the discipline, set forth five key themes for modern geographic education: location, place, human–Earth relationships, movement, and region.

3. Have you made decisions today that involve geographic concepts discussed within the five themes presented? Explain briefly.

This may be a good assignment for the first day of class. Most students can easily complete a history, or chronological list, of a day's activities. Have students do a geography log of their day so far. Listing locations they visited, how they got there, and have them draw a map of their journey from home to school to work would also demonstrate how cartographers attempt to select information to include in their maps and how geographers attempt to select the most significant variables in a systems analysis.

4. In general terms, how might a physical geographer analyze water pollution in the Great Lakes?

There are many ways to answer here. First get map coverage of the Great Lakes Region. Describe the lake elevations, flows, volumes, and annual mixing patterns as temperatures change seasonally. Locate population centers and point sources of pollution, and by using population concentrations estimate non-point sources of pollution. Map published data of water chemical analyses. Using a GIS model develop a composite overlay of all the above elements.

• **Discuss** human activities and human population growth as they relate to geographic science, and **summarize** the scientific process.

5. Sketch a flow diagram of the scientific process and method, beginning with observations and ending with the development of theories and laws.

Observations lead to questions, to a hypothesis, that is tested and retested. If the results of the tests support the hypothesis, it may be considered a theory. A scientific theory is the result of several extensively tested hypotheses.

6. Summarize population-growth issues: population size, the impact per person, and future projections. What strategies do you see as important for global sustainability?

The global human population passed 6 billion in August 1999 and continued to grow at the rate of 82 million per year, adding another billion by 2011, when the 7 billionth human was born. Billion-mark milestones have occurred at ever closer intervals. A key strategy is reducing our footprint, which requires an awareness of the impact that our choices have.

• **Describe** systems analysis, open and closed systems, and feedback information, and **relate** these concepts to Earth systems.

7. Define systems theory as an analytical strategy. What are open systems, closed systems, and negative feedback? When is a system in a steady-state equilibrium condition? What type of system (open or closed) is a human body? A lake? A wheat plant?

Simply stated, a system is any ordered interrelated set of objects, things, components, or parts, and their attributes, as distinct from their surrounding environment. A natural system is generally not self-contained: inputs of energy and matter flow into the system, whereas outputs flow from the system. Such a system is referred to as an open system: the human body, a lake, or a wheat plant. A system that is shut off from the surrounding environment so that it is self-contained is known as a closed system.

As a system operates, information is generated in the system output that can influence continuing system operations. These return pathways of information are called feedback loops. Feedback can cause changes that in turn guide further system operations. If the information amplifies or encourages responses in the system, it is called positive feedback. On the other hand, negative feedback tends to slow or discourage response in the system, forming the basis for self-regulation in natural systems and regulating the system within a range of tolerable performance. When the rates of inputs and outputs in the system are equal and the amounts of energy and matter in storage within the system are constant, or, more realistically, as they fluctuate around a stable average, the system is in a steady-state equilibrium.

8. Describe Earth as a system in terms of energy and of matter.

Most systems are dynamic because of the tremendous infusion of radiant energy from reactions deep within the Sun. This energy penetrates Earth's atmosphere and cascades through the terrestrial systems, transforming along the way into various forms of energy. Earth is an open system in terms of energy. In terms of physical matter—air, water, and material resources—Earth is nearly a closed system.

9. What are the three abiotic spheres that make up Earth's environment? Relate these to the biotic sphere, the biosphere.

Earth's surface is the place where four immense open systems interface, or interact. Three nonliving, or abiotic, systems overlap to form the realm of the living, or biotic, system. The abiotic spheres include the atmosphere, hydrosphere, and lithosphere. The fourth, the biotic sphere, is called the biosphere and exists in an interactive position between and within the abiotic spheres.

• **Explain** Earth's reference grid: latitude and longitude, and latitudinal geographic zones and time.

10. Draw a simple sketch describing Earth's shape and size.

See Figure 1.12 and the discussion in the text. Use a simple map showing Syene and Alexandria, with latitude values, and a cross-section illustration demonstrating angles of measurements.

11. Define latitude and parallel and define longitude and meridian using a simple sketch with labels.

On a map or globe, lines denoting angles of latitude run east and west, parallel to Earth's equator. Latitude is an angular distance north or south of the equator measured from a point at the center of Earth. A line connecting all points along the same latitudinal angle is called a parallel. (Figures 1.13 and 1.14)

On a map or globe, lines designating angles of longitude run north and south at right angles (90°) to the equator and all parallels. Longitude is an angular distance east or west of a surface location measured from a point at the center of Earth. A line connecting all points along the same longitude is called a meridian. (Figure 1.16)

12. Define a great circle, great circle routes, and a small circle. In terms of these concepts, describe the equator, other parallels, and meridians.

A great circle is any circle of Earth's circumference whose center coincides with the center of Earth (Fig. 1.17). Every meridian is one-half of a great circle that crosses each parallel at right angles and passes through the poles. An infinite number of great circles can be drawn on Earth, but only one parallel is a great circle—the equatorial parallel. All the rest of the parallels diminish in length toward the poles, and, along with other circles that do not share Earth's center, constitute small circles.

13. Identify the various latitudinal geographic zones that roughly subdivide Earth's surface. In which zone do you live?

Figure 1.15 portrays these latitudinal geographic zones, their locations, and their names: equatorial, tropical, subtropical, midlatitude, subarctic or subantarctic, and arctic or antarctic.

14. What does timekeeping have to do with longitude? Explain this relationship. How is Coordinated Universal Time (UTC) determined on Earth?

Earth revolves 360° every 24 hours, or 15° each hour, and a time zone of one hour is established for each 15° of longitude. Thus, a world standard was established, and time was set with the prime meridian at Greenwich, England. Each time zone theoretically covers 7.5° on either side of a controlling meridian and represents one hour. Greenwich Mean Time (GMT) is called Coordinated Universal Time (UTC), and although the prime meridian is still at Greenwich, UTC is based on average time calculations kept in Paris and broadcast worldwide. UTC is measured today by the very regular vibrations of cesium atoms in six primary standard clocks—the *NIST-F1* being the newest placed in operation by the United States in 2000.

15. What and where is the prime meridian? How was the location originally selected? Describe the meridian that is opposite the prime meridian on Earth's surface.

In 1884, the International Meridian Conference was held in Washington, D.C. After lengthy debate, most participating nations chose the Royal Observatory at Greenwich as the place for the prime meridian of 0° longitude. An important corollary of the prime meridian is the location of the 180° meridian on the opposite side of the planet. Termed the International Date Line, this meridian marks the place where each day officially begins (12:01 A.M.) and sweeps westward across Earth. This westward movement of time is created by the planet's turning eastward on its axis.

• **Define** cartography and mapping basics: map scale and map projections.

16. Define cartography. Explain why it is an integrative discipline.

The part of geography that embodies map making is called cartography. The making of maps and charts is a specialized science as well as an art, blending aspects of geography, engineering, mathematics, graphics, computer sciences, and artistic specialties. It is similar in ways to architecture, in which aesthetics and utility are combined to produce an end product.

17. Assess your geographic literacy by examining atlases and maps. What types of maps have you used—political? physical? topographic? Do you know what projections they employed? Do you know the names and locations of the four oceans, seven continents, and most individual countries? Can you identify the new countries that have emerged since 1990?

An informal quiz might be appropriate here, as in, Ouagadougou is the capital of Burkina Faso, formerly Upper Volta. Where are Kuwait, Iraq, and Afghanistan, and how many people live there? What is Burma's proper name today? What new nations have formed since 2000? What is the current spelling and name for Bombay, India? When did Rangoon, Burma become Yangon, Myanmar? Where are warm and wet, hot and dry, cool and moist, cold and dry regions? Where are you right now in terms of latitude, longitude, elevation, etc.? How many countries emerged from the collapse of the former Soviet Union?

18. What is map scale? In what three ways is it expressed on a map?

The expression of the ratio of a map to the real world is called scale; it relates a unit on the map to a similar unit on the ground. A 1:1 scale would mean that a centimetre on the map represents a centimetre on the ground—certainly an impractical map scale, for the map would be as large as the area being mapped. A more appropriate scale for a local map is 1:24 000. Map scales may be presented in several ways: written, graphic, or as a representative fraction.

19 State whether each of the following ratios is a large scale, medium scale, or small scale: 1:5 000 000, 1:10 000, 1:25 000.

Small, large, and intermediate scales (see Table 1.1).

20. Describe the differences between the characteristics of a globe and those that result when a flat map is prepared.

Since a globe is the only true representation of distance, direction, area, shape, and proximity, the preparation of a flat version means that decisions must be made as to the type and amount of acceptable distortion. On a globe, parallels are always parallel to each other, evenly spaced along meridians, and decrease in length toward the poles. On a globe, meridians intersect at both poles and are evenly spaced along any individual parallel. The distance

between meridians decreases toward poles, with the spacing between meridians at the 60th parallel being equal to one-half the equatorial spacing. In addition, parallels and meridians on a globe always cross each other at right angles. All these qualities cannot be reproduced on a flat surface. Flat maps always possess some degree of distortion.

21. What type of map projection is used in Figure 1.15? Figure 1.19? (See Appendix A)

Figure 1.15: a Robinson projection; Figure 1.19: a Miller's cylindrical projection (see Appendix A).

• **Describe** modern geoscience techniques—the Global Positioning System (GPS), remote sensing, and geographic information systems (GIS)—and **explain** how these tools are used in geographic analysis.

22. What is GPS and how does it assist you in finding location and elevation on Earth? Give a couple of examples of GPS technology used for scientific purposes.

The Global Positioning System (GPS) comprises 24 orbiting satellites, in 6 orbital planes, that transmit navigational signals to a receiver that calculates latitude and longitude within 10-m accuracy and elevation within 15 m and displays the results. With the shutdown in 2000 of the Pentagon Selective Availability, commercial resolution is the same as for military applications and its Precise Positioning Service (PPS).

Scientists used GPS to accurately determine the height of Mount Everest in the Himalayan Mountains—now 8850 m compared to the former 8848 m. In contrast, GPS measurements of Mount Kilimanjaro lowered its summit from 5895 m to 5892 m.

23. What is remote sensing? What are you viewing when you observe a weather image on TV or on the internet? Explain.

Remote sensing refers to obtaining information about a distant subject without having physical contact. Remote sensors on satellites and other craft sense a broader range of wavelengths than can our eyes. They can be designed to “see” wavelengths shorter than visible light (ultraviolet) and wavelengths longer than visible light (infrared and microwave radar).

Active systems direct a beam of energy at a surface and analyze the energy that is reflected

back. Passive remote-sensing systems record energy radiated from a surface.

24. If you were in charge of planning for development of a large tract of land, how would GIS methodologies assist you? How might planning and zoning be affected if a portion of the tract in the GIS is a floodplain or prime agricultural land?

GIS enables you to gather, manipulate, and analyze vast amounts of geographic information from remote sensing or satellite technologies. Geographers may add layers of remote sensing information. This allows geographers to overlay analytical information from more than one data plane and analyze complex relationships rapidly.

Critical Thinking

Critical thinking 1.1 What is Your Footprint?

Personal answers, but students' footprints will probably be much larger than the worldwide average. Students might suggest reducing their footprint by eating lower on the food chain, eating more local food, using public transportation, carpooling, and bicycling.

Critical thinking 1.2 Latitudinal Geographic Zones and Temperature

1. Salvador, Brazil; equatorial
2. New Orleans, Louisiana; subtropical
3. Edinburgh, Scotland; midlatitude
4. Montreal, Quebec; midlatitude
5. Barrow, Alaska; Arctic

The general trend is that temperature ranges increase with increasing distance from the equator.

Critical thinking 1.3 Where are You?

Personal answers; an example would be Winnipeg, MB 49° 53' 0" N 97° 10' 0" W . One degree of longitude is approximately 85 km long at this latitude.

Critical thinking 1.4 Find and Calculate Map Scales

A world globe is a small-scale map because a scale of 1:20 911 475 would have little detail of a large area.

This enables geographers to manipulate variables within their study very rapidly.

The usefulness of GIS in analyzing a floodplain would be that the user could examine the frequency of flooding, and the areal or monetary extent of damage in the last ten or more years. For agricultural land, the user could examine levels of salinity soil fertility, and crop production statistics for previous crops, and locate areas within their land that may need extra care or different methods of farming. GIS is applicable to urban and transport planning because it is able to consider and model areas of hazard, agricultural land values, and routes of intensive transport use.

Critical thinking 1.5 Test Your Knowledge about Satellite Imagery

This natural, true-colour image is a composite mosaic of numerous images captured between 2000 and 2002 from NASA satellite *Terra*. The location it depicts is the meeting of the European and African continents at the Strait of Gibraltar, extending from France and Spain across the Mediterranean to Morocco and Algeria.

GIA GEOQuiz

1. Explain: Explain how the Sun is involved in Earth's physical systems. What is the Sun's role in the biosphere?

The sun is the source of energy for almost all life processes, as well as being the source of energy that drives global winds, ocean currents, and weather.

2. Compare: How are endogenic and exogenic systems similar? How are they different? Based on the illustration, give an example of each type of system.

In the endogenic system, internal processes produce flows of heat and material from deep below Earth's crust. The exogenic system involves external processes that set into motion air, water, and ice, all powered by solar energy.

An example of the endogenic system is the rock cycle, while the hydrologic cycle is an example of the exogenic system.

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