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Abstract

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INSTRUCTIONAL OBJECTIVES FOR A JUNIOR COLLEGE COURSE IN PHYSICAL GEOGRAPHY

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JC 690 410

PHYSICAL GEOGRAPHY OBJECTIVES: SET #_1_

Objectives

The following objectives specify what the student should be able to do at the end of the course. These should be used by the student as his principal guidelines to study.

I.A. General: The student will know what fields comprise the study of Geography.

Specific: Given a list of disciplines, the student will be able to denote those from which Geography borrows.

I.B. General: The student will show that he appreciates the great impact man has upon the physical environment.

Specific: The student will be able to analyze each of the physical elements in terms of the effect man has upon their distribution. He must compare their present stance with that which they might have had before man entered the scene.

I.C. General: The student will be able to differentiate between systematic and regional studies.

Specific: Given a list of topics within the realm of Geography, the student will be able to tell whether each topic is a regional or systematic study.

I.D. General: The student will know the physical elements of Geography.

Specific: The student will be able to list the elements of physical geography.

I.E. General: The student will be able to show the importance of interrelation within the physical elements.

Specific: Given a specific element of physical geography, the student will be able to analyze how this is influenced by all the other elements.

II.A. General: The student will demonstrate a knowledge of earth-sun relations

Specific: The student will be able to analyze the effect of the earth's inclination upon seasons.

Specific: The student will be able to:
-Show diagramatically the parallelism of the earth's axis.
-Differentiate between rotation and revolution.
-State the size and shape of the earth.
-Define insolation
-Define equinox and solstice and tell when they are.
-tell what the tropics and the antarctic and Arctic Circles represent.
-define aphelion and perihelion and analyze their effects upon the earth.

II.B. General: The student will be able to solve problems pertaining to latitude, longitude and time.

Specific: Given two longitudes and a time or two times and a longitude, the student will be able to solve for the respective time or longitude.

Specific: Given the elevation above the horizon of either the North Star or the Sun, the student will be able to determine latitude.

General: The student will be able to determine the theoretical basis for latitude and longitude.

Specific: The student will be able to define certain pertinent terms.
-relate standard time zones to longitude
-state characteristics of the earth globe grid

II.C. General: The student will be able to use his Atlas.

Specific: The student will be able to look up given information using his atlas.

General: The student will demonstrate a knowledge of map projections.

Specific: The student will be able to:
-state why no map can be an accurate representation of the earth.
- analyze certain simple projections in terms of their uses, values in portraying different information, and characteristics relative to one another.

General: The student will be able to read and use a contour map.

Specific: Given a list of symbols, the student must be able to match these with their meanings.

Specific: The student will be able to:

- draw a slope profile using contour lines.
- draw a crude contour map of a given landform.
- indicate direction of drainage using contour lines and the "rule of V's"

General: The student will be able to identify various methods for portraying relief on maps.

Specific: Given examples of maps which portray relief in different ways, the student will identify each.

General: The student will become acquainted with the concept of scale.

Specific:The student will be able to state the different ways of portraying scale.

Specific: The student will be able to work problems dealing with scale.

III.A.1. General: The student will be able to locate the major hydrographic features of the earth.

Specific: Given a blank world map and a list of features, the student will locate same on the map.

General: The student will be able to recognize and sketch the various stream patterns.

Specific: The student will be able to identify types of drainage patterns

Specific: Given the name of a drainage type, the student will be able to sketch it.

General: The student will know the location and characteristics of the major ocean currents.

Specific: Given a current, the student must locate it on a map and tell whether it is hot or cold.

III.A.3. General: The student will be acquainted with ground water and its importance.

Specific: The student will be able to:

-define certain terms dealing with ground water.

-differentiate between ground and underground water.

-diagram an artesian system

-analyze the importance of the geologic structure to the occurance of ground water.

-analyze the importance of soil moisture to the growth of vegetation.

III.B.1. General: The student will be able to characterize and locate the major landforms of the earth.

Specific: Given a world outline map, the student will be able to locate the major occurances of hills, mountains, plateaus and plains. He will also differentiate between the four types.

General: The student will know the processes which form landforms.

Specific: The student will be able to:

-differentiate between endogenous and exogenous processes.

-tell what processes operate under the above headings

-analyze the geomorphic significance of weathering and erosion.

-differentiate between chemical and mechanical weathering

-given a list of landforms, match the process by which it was formed.

General: The student will be able to characterize landforms as to their stage within particular erosion cycles.

Specific: The student will be able to explain the fluvial cycle of Davis in terms of landforms produced during the different stages.

Specific: Given a particular landform, the student will be able to classify it according to its stage within its particular erosion cycle.

General: The student will be able to logically characterize rocks and recognize their significance to the geomorphology of an area.

Specific: By analyzing rocks in terms of texture, mineral structure and formation process, the student will be able to name the rock and identify its geomorphic characteristics.

Specific: The student will be able to analyze the geomorphic significance of different rock types in terms of differential rates of erosion.

Specific: The student will be able to state the four major rock-forming minerals.

III.B.2. General: The student will know the structures, stages, and climatic determinants of landforms caused by fluvial action.

Specific: In essay form, the student will differentiate between the fluvial erosion cycle in humid and arid lands in terms of the landforms produced and the succession of stages gone through.

Specific: Given a diagramatic expression of a landform the student will be able to identify what stage of the erosion cycle is represented and vice versa.

Specific: The student will be able to identify the structures and stages of Karst topography.

General: The student will be able to recognize the various landforms caused by waves and currents and tell how each is formed.

Specific: Given the name of a certain landform, the student will be able to draw it diagramatically, showing areas of aggradation and degradation.

Specific: given a list of marine landforms, the student will characterize each as occuring on coasts of emergence or submergence.

General: The student will know the landforms produced by the work of moving ice and be able to differentiate between various forms in certain ways.

Specific: The student will be able to

-differentiate between landforms of continental and alpine glaciation.

-tell whether a certain landform is of erosional or depositional character.

-sketch a given landform from a verbal description and vice versa.

-analyze the erosional power of moving ice in both continental and alpine glaciers

-analyze the effects of glaciation upon drainage patterns and man's usage of the land.

-state several possible causes which might have been responsible for the ice ages.

-sketch upon a map the farthest limit of continental glaciation during the Pleistocene.

General: The student will be able to recognize landforms produced by the action of wind.

Specific: The student will be able to

-differentiate between the different types of dunes.

-analyze the work of wind in terms of its importance relative to other processes of landform shaping.

-describe the formation of loess.

III.B.3. General: The student will be able to recognize and characterize the landforms caused by vulcanism.

Specific: Given a list of forms the student must differentiate between those of extrusive and intrusive origin

Specific: The student will be able to describe the various types of volcanos

Specific: The student will be able to define certain pertinent terms such as batholith, dike, pyroclastic, tuff, breccia, lava and magma.

General: The student will be able to recognize and characterize landforms produced by diastrophism.

Specific: The student will be able to

-analyze the landforms produced by folding, faulting and downwarping in regard to the different types caused by each process.

-sketch a given landform

-define certain terms.

III.C.1. General: The student will become acquainted with the elements and controls of climate, plus heating & cooling.

Specific: The student will be able to:

-show how insolation varies with season and latitude.

-state and define the four methods by which the air is heated and cooled.

-state the four major elements of climate

-describe the process of adiabatic heating and cooling, especially in regard to lapse rates and moisture holding capacity of the air.

-differentiate between relative and absolute humidity and be able to work problems solving for them.

- state sources of atmospheric moisture

-describe the processes and forms of condensation in the atmosphere.

-identify forms and causes of precipitation

-analyze the temperature characteristics of land and sea, describing some of the implications therein.

-describe the change in pressure regime which takes place seasonally between land and sea.

-sketch on a globe the idealized system of wind and pressure for the earth.

-describe the mechanics of air movement as wind.

-tell how landforms complicate the broad general patterns.

-describe and analyze the seasonal shift of climatic phenomena

-describe in a general sense the worldwide distribution of precipitation
-identify the sources of precipitation and characterize them in terms of seasonal fall and effectivity.
-discuss variability of precipitation and its implications to man's use of the land.
-be able to diagram warm, cold and occluded fronts both in map view and in plan view.
-describe the mechanics of thunderstorms, tornados and hurricanes

General: The student will be able to classify climates according to systamatized data.

Specific: Using temperature and predipitation data, the student will be able to classify climates according to Koeppen's classification

III.C.2. General: The student will become acquainted with the climatic types of the world according to Koeppen's classification.

Specific: Given a general area of the world, the student will be able to state what type of climate would be encountered there

Specific: The student will be able to describe the characteristics of each of the general climatic types.

Specific: The student will be able to identify the dominant controls upon the climate of any of these areas.

III.C.3. General: The student will be able to interrelate climate, hydrography and landforms where possible. In the following sections this will become more complex in the relation of soils and vegetation to climatic situations.

Specific: Given certain characteristics of an area in terms of the above elements, the student will be able to supply the remaining charactic(s).

III.D.1. General: The student will be able to describe soils in regard to certain characteristics which thay exhibit.

Specific: The student will be able to:

-describe soil profile in terms of the horizons therein.

-discuss the implications of color of soils

-discuss texture of soil, its importance and changes from horizon to horizon

-describe soil structure

-define certain terms in regard to the above points.

III.D.2. General: The student will become acquainted with the agents and processes of soil formation.

Specific: The student will be able to describe the agents of soil formation and discuss their relative importance within the processes of soil formation.

Specific: The student will compare and contrast the three soil formation processes, with emphasis upon the climatic factors involved in the formation of each type.

III.D.3. General: The student will be able to recognize and analyze the controls of the soil-forming processes.

Specific: The student will be able to describe how each of the given controls influences the formation of soils.

Specific: The student will be able to list the the controls of the soilformation processes and describe each.

Specific: The student will be able to interrelate the various controls, i.e. their dependence upon one another for operation.

III.D.4. General: The student will be able to classify soils in different ways.

Specific: The student will describe the various methods of classifying soils.

Specific: The student will describe what is meant by the term "zonal soils."

III.D.5. General: The student will analyze zonal soils in terms of their nature and distribution.

Specific: The student will list the various types of zonal soils and describe the characteristics of each.

Specific: The student will be able to identify the soil of a given area of the world.

Specific: The student will be able to analyze the different zonal soils in terms of the climates under which each is formed--in other words, interrelation.

Specific: The student will describe the natural vegetation required for the formation of each of the great soil groups. This has to wait, however, until after vegetation is discussed.

III.E.1. General: The student will be able to describe the types and general areal distribution of native vegetation.

Specific: Given a map of the world with marked locations, the student will be able to describe the vegetation which should naturally occur there.

Specific: Given a general type of vegetative cover, the student will be able to identify in detail the types of plants to be found therein.

Specific: The student will be able to define certain terms important in plant geography.

III.E.2. General: The student will come to a realization of the great impact man has played in altering the whole theoretical picture of vegetation upon the earth.

Specific: Given examples of certain areas of the earth, the student will be able to describe how man has altered the natural vegetation, making the situation much different than might be gathered from the previous discussion.

Specific: In an essay, the student will analyze in detail the statement, "Is there any natural vegetation upon the earth today?"

IV. General: The student will be able to recognize the complex interrelations between the elements of the physical realm.

Specific: Given a list of features pertaining to climate, natural vegetation or soils, the student will be able to match each item with a type describing the other two. For example, if I gave you a certain type of soil, you would tell me what climate and vegetative type would most likely be found under that soil.

Specific: The student will be able to correlate other aspects of the physical realm to these principal three where applicable.

PHYSICAL GEOGRAPHY OBJECTIVES: SET # 2

Unit One

The Nature of Geography

Laymen generally have many misconceptions about the field of geography. This course deals only with the physical aspects of the discipline. However, a general overview of the entire subject and its relationships with the various physical, biological, and social sciences, will serve to place the material of this course in its proper perspective.

Goal: The student will demonstrate an understanding of the internal organization of the discipline of geography, and of its external relationships with other physical, biological, and social sciences.

Objectives:

1. The student will be able to list at least 5 major subdivisions within the fields of both physical and cultural geography, and the physical or social science with which each subdivision is most closely related. (80%)
2. In 50 words or less, the student will be able to distinguish between the regional and systematic approaches in geography, and list two examples of each. (75%)

Unit Two

The Earth in Space

An understanding of earth-sun relationships and basic earth movements is prerequisite to the study of all other aspects of physical geography.

Goal: The student will demonstrate a knowledge of earth-sun relationships and basic earth movements.

Objectives:

1. Given a list of 10 astronomical terms, the student will define 8 in 25 words or less. (75%)
2. The student will be able to list the factors responsible for the seasons. (90%)

Unit Three

Earth Measurements and Maps

Earth measurements, including latitude, longitude, time, and direction, are basic to the discipline of geography; as are maps, the fundamental tool of the geographer.

I. Goal: The student will learn how to use an atlas, and acquire a "mental map" of the world.

Objectives:
1. Given a list of 20 coordinates (latitude and longitude), the student, with the aid of an atlas, will determine the major city located at each. (75%)
2. Outside of class, and with a given list of the physical and cultural features to be known, the student will plot these features on one or more base maps (Goode's #201). These maps will be due in two weeks. They will be returned to the student to be used for further study. (95%)
3. On three separate quizzes during the semester (covering successive thirds of the above list), the student will be given a list of ten features to plot on a blank Goode's #201 base map without the aid of outside sources. (75%)

II. Goal: The student will demonstrate a knowledge of map projections

Objective:
1. The student will be able to list the major types of map projections, describe their advantages and disadvantages, and give one example of each type. (50%)

III. Goal: The student will be able to solve problems involving latitude, longitude, and time.

Objectives:
1. Given two longitudes and a time, or two times and a longitude, the student will be able to determine the respective time or longitude. (75%)
2. Given the angle of the sun above the horizon during the equinoxes or solstices, the student will be able to determine the latitude from which the reading was taken. (75%)

IV. Goal: The student will learn how to read a topographic map.

Objective:
1. Given a selected U.S.G.S. topographic quadrangle, the student will be able to answer the 20 questions found on page 14 of the workbook. (80%)

Unit Four

Weather Elements: Air Temperature and Solar Radiation

Solar radiation is the most important climatic control, and air temperature the climatic element it most directly affects. An understanding of the relationship between the two must preceed discussion of other climatic controls and elements.

Goal: The student will understand the characteristics and meteorological importance of solar radiation and air temperature.

Objectives:
1. Given a list of ten meteorological terms related to air temperature and solar radiation, the student will define eight in 25 words or less. (60%)
2. In 50 words or less, the student will explain the meteorological basis of air pollution in the Los Angeles Basin. (75%)

Unit Five

Weather Elements: Circulation of the Atmosphere, Pressure and Winds

Air pressure and winds, and the local and global circulation of the atmosphere are largely responsible for the world's weather and climate. An understanding of the mechanism and patterns of these features is prerequisite to an understanding of the distribution of the earth's major climatic types.

Goal: The student will gain an understanding of the mechanisms responsible for the world's general atmospheric circulation, its pattern, and the major modifications in the pattern.

Objectives:
1. The student will be able to diagram the earth's general atmospheric circulation pattern, labeling the major pressure centers and wind systems. (60%)
2. The student will be able to list and describe the 5 major modifications in the general atmospheric circulation, and the mechanism responsible for each. (60%)

Unit Six

Weather Elements: Atmospheric Moisture and Storms

In many respects the most important weather elements, atmospheric moisture and disturbances are of immediate interest to man. The type, amount, and areal and temporal distribution of these elements largely determine the climate of a given area.

I. Goal: The student will understand the methods of collecting data on atmospheric moisture and the forms and mechanics of evaporation and condensation.

Objectives:
1. Given 10 multiple choice questions dealing with the measurement of atmospheric moisture, the student will correctly answer at least 8. (75%)
2. Given 10 terms dealing with atmospheric moisture, the student will correctly identify at least 7. (60%)

II. Goal: The student will know the major types of storms and understand their causes.

Objective:
1. The student will be able to diagram and label the constituent parts of a middle latitude cyclone in a 15 minute examination. (60%)

Unit Seven

Introduction to Climate: Controls and Classification

Each area of the earth has its own specific climate, but the major outlines of all climates are a result of a limited number of elements and controls. Therefore, generalizations may be made which facilitate an understanding of worldwide climatic patterns.

I. Goal: The student will know and be able to apply the Koppen climatic classification system.

Objectives:
1. Given a list of 15 Koppen climatic symbols, the student will be able to define 10 in less than 15 words. (75%)
2. Given 10 multiple choice questions dealing with the Koppen system, the student will correctly answer at least 7. (70%)

II. Goal: The student will know and understand the major climatic controls.

Objective:
1. Given 15 multiple choice questions dealing with climatic controls, the student will correctly answer at least 10. (75%)

Units Eight through Eleven

(Common goals and objectives are listed in the preliminary syllabus as each climatic type will be treated in a similar manner.)

Unit 8: Tropical Wet Climates
Unit 9: The Dry Climates
Unit 10: Humid Mesothermal Climates
Unit 11: Humid Microthermal Climates

An understanding of the general worldwide pattern of climates will give insight into basic cultural patterns; for most of man's economic activities, particularly his agriculture, as well as his distribution over the earth's surface, are closely related to climate.

I. Goal: The student will acquire a "mental map" of the world's climatic patterns.

Objectives:

1. Given 25 multiple choice questions dealing with the distribution of the world's climates according to the Koppen system, the student will correctly answer at least 20. (70%)
2. Given a map of the world with 5 locations specified, the student will choose 3, name the climate of the area, give the Koppen symbol for the climate, and describe its major characteristics. (60%)
3. Given a number of climatic charts depicting the mean monthly precipitation and temperature of a station, the student will determine in which of the Koppen climatic zones the station is located, and list one possible specific location. (All charts will be for major cities.) (60%)

II. Goal: The student will gain an understanding of the favorable and unfavorable aspects each major climatic type presents to man.

Objective:

1. In 100 words or less, the student will list and discuss the particular problems man faces in a tropical rainforest climate (Af). (60%)

Unit Twelve

Natural Vegetation

One of the most conspicuous and important components of the physical environment (by its presence or absence), natural vegetation, directly or indirectly, supports virtually all life on the earth.

I. Goal: The student will know the terminology common to phytogeography.

Objectives:
1. Given a list of 10 terms descriptive of natural vegetation, the student will correctly define 7. (60%)
2. Given 20 multiple choice questions dealing with natural vegetation, the student will correctly answer 15. (75%)

II. Goal: The student will know the basic worldwide pattern of natural vegetation.

Objective:
1. Given a map of the world with 5 locations specified, the student will choose 3, name the vegetation association found in each area, describe it physiognomically, and indicate the utility of the area's vegetation to man. (60%)

Unit Thirteen

Soils

"The fabric of human life has been woven on earthen looms. It everywhere smells of the clay.... Howsoever high the spirit of man may soar... it is on the stomach that humanity, like an army, ever must advance. Beneath the stomach is vegetation, beneath vegetation the soil, and beneath the soil the ceaseless and varied turmoil of terrestrial forces." (J. H. Bradley, Autobiography of Earth)

I. Goal: The student will understand the basic terms and concepts associated with the physical and chemical make-up of soils.

Objective:
1. Given 25 multiple choice questions dealing with soil texture and structure; soil color; soil water; soil chemistry; and soil profile, the student will correctly answer a minimum of 20 of the 25 items. (75%)

II. Goal: The student will know and understand the physical factors involved in the formation of soils.

Objective:
1. The student will be able to list and explain the significance of the five factors in soil formation, as well as the subdivisions of each factor. (60%)

III. Goal: The student will understand the soil forming processes (laterization, podzolization, and calcification) and their products.

Objectives:
1. Given a total of 20 multiple choice and short answer questions dealing with the soil forming processes, the student will correctly answer at least 15. (80%)
2. Given a list of climates, vegetation types, and soil types, the student will correctly match each item with the appropriate soil forming processes. (75%)

Unit Fourteen

The Oceans

Over 70% of the earth's surface is covered by the oceans; and there is a growing interest in maritime geography as minerals and food from the seas become more important.

I. Goal: The student will know the location and name of the earth's oceans and major currents.

Objective:
1. Given a map of the world and a list of oceans, seas, and currents, the student will locate each item and plot it on the map. (75%)

II. Goal: The student will gain a knowledge of the physiography of the ocean bottom.

Objective:
1. Given a 15 multiple choice questions dealing with the physiography of the ocean floor, the student will correctly answer at least 10. (70%)

Unit Fifteen

Waters of the Land

Water is man's most precious resource. Surface flow is the most important single agent of erosion; and subsurface water functions as a control of stream discharge and the water level of rivers and swamps, and particularly as a source of irrigation and potable water for a large part of the world's population.

Goal: The student will gain an understanding of the hydrologic cycle, and the occurrence of ground water in nature and its importance to man.

Objectives:
1. In a 15 minute examination, the student will be able to diagram the hydrologic cycle and an artesian system, label their constituent parts, and explain their functioning in less than 30 words each.
2. Given 15 multiple choice questions dealing with the hydrologic cycle and groundwater systems, the student will correctly answer at least 10. (75%)

Unit Sixteen

Introduction to the Lithosphere: Crustal Materials

The origin and nature of the material of the earth's crust play a very significant part in determining the landforms that develop as a result of the geomorphic processes.

Goal: The student will acquire a basic knowledge of the crustal materials, including an understanding of the processes responsible for their formations, and their importance in the development of landforms.

Objectives:

1. In 100 words or less, the student will note the difference between a rock and a mineral; list and define the majo. types of rocks, describe the processes responsible for each type, and give one specific example of each. (60%)
2. Given 25 multiple choice questions dealing with the orustal materials, the student will correctly answer at least 20. (70%)

Unit Seventeen

Landforms: Tectonic Forces

The tectonic or endogenous forces are those which originate within the earth. They are responsible for volcanic and seisemic activity, and for many of the earth's major landforms, particularly mountains.

Goal: The student will acquire an understanding of tectonic forces, including the mechanism responsible for these forces, and the resulting landforms.

Objectives:

1. Given a list of 15 terms relating to the tectonic forces and the resulting landforms (chosen from the list handed out in class), the student will correctly define at least 10 in 25 words or less. (70%)
2. Given 20 multiple choice questions dealing with the tectonic forces and their landform expressions, the student will correctly answer at least 15. (75%)
3. In a class discussion, dealing with the theories of continental drift and isostacy, the students called upon will correctly answer at least 75% of the instructor's questions.

Unit Eighteen

Landforms: Gradational Forces

The gradational or exogeneous forces are those which, in opposition to the tectonic forces, tend to reduce or erode and sculpture the surface of the earth. Many of the earth's most spectacular landforms, such as the Grand Canyon and Yosemite Valley, are products of these forces.

Goal: The student will acquire an understanding of the weathering process, and of the agents of erosion and their resulting landforms.

Objectives:

1. In 25 words or less, the student will distinguish between chemical and mechanical erosion and give an example of each. (70%)
2. Given a list of 15 terms relating to the agents of erosion and the resulting landforms, the student will correctly define at least 10 in 25 words or less. (70%)
3. Given 20 multiple choice questions dealing with the gradational forces and their landform expressions, the student will correctly answer at least 15. (75%)