

Question 3: Two Stimuli**7 points**

A (Point 1)	Identify an example of a culture trait. Acceptable identification: A1. Culture traits include such things as food preferences, art, architecture, language, religion, music, clothing, media, technology, and/or land use.	1 point
B (Point 2)	Describe the spatial pattern of cow's milk production in Africa, shown in Map 1. Examples of acceptable responses may include the following: - B1. Medium and/or high amounts of cow's milk production are concentrated or clustered in the north, east, and/or south. - B2. Low amounts of cow's milk production are concentrated or clustered in west, central, and/or southwest Africa.	1 point
C (Point 3)	Based on Map 1 and Map 2, compare the spatial patterns of cow's milk production and pork production in Asia. (Response must include both maps in the comparison.) Examples of acceptable responses may include the following: - C1. Map 1 shows that cow's milk is produced in most Asian countries at high or medium volumes, whereas Map 2 shows that pork is produced at high or medium volumes in East Asia and/or parts of Southeast Asia, or in low volumes in South and/or Southwest Asia. - C2. Cow's milk is produced in most Asian countries, whereas pork is not produced in regions with large Islamic populations, such as the Middle East (Southwest Asia), Central Asia, South Asia, and/or parts of Southeast Asia. - C3. Cow's milk production and pork production are low in insular Southeast Asia (e.g., Indonesia, Malaysia, East Timor, Papua New Guinea).	1 point

D (Point 4)	Describe one environmental effect of agricultural land use such as commercial animal farms. Examples of acceptable responses may include the following: • D1. Environmental effects of agriculture land use include pollution (e.g., air, water, waste), land cover change (e.g., soil erosion), nutrient depletion, desertification, and/or soil salinization. • D2. The reduction of water supplies for agricultural purposes, such as depleting reservoirs, lowering the local water table, and/or draining aquifers. • D3. The reduction of biodiversity from changes in land cover (e.g., deforestation, grassification, feed-crop monoculture). • D4. The spread of disease between domestic and wild animal populations or between animal populations and humans. • D5. Climate change and/or global warming because such farms produce greenhouse gases (e.g., carbon dioxide, methane, water vapor). • D6. Agricultural land use can promote the survival or the growth of environmentally beneficial species (e.g., pollinators, working animals, heirloom varieties).	1 point
E (Point 5)	Explain how the globalization of agriculture may affect local culture traits. Examples of acceptable responses may include the following: • E1. Globalization of agriculture and/or the global system of agriculture may lead to changes in food preferences. • E2. Globalization may lead to people preferring to eat foods imported from other countries that were not previously available to them (e.g., tropical fruits in temperate climates). • E3. Globalization may lead to the availability of less expensive imported foods that are substituted for more expensive local foods (e.g., imported wheat replacing locally grown corn). • E4. Consumers may resist the globalization of the food supply and in response buy domestically produced food, local food, and/or purchase food from community-supported agriculture. • E5. Globalization of agriculture may lead to a reduction in the number of small family farms, which can affect local cultural traits (e.g., settlement patterns by prompting rural-to-urban migration, social roles by having fewer people working in agriculture). • E6. Globalization may lead to changes in agricultural land use or agricultural production methods through the implementation of new technologies, architecture, and/or equipment (e.g., data analytics, drones, vertical farming, autonomous tractors), affecting local culture traits (e.g., crops, farming practices).	1 point

F (Point 6)	Explain why regions of agricultural production may become interdependent. Examples of acceptable responses may include the following: • F1. Some regions and/or countries have become highly dependent on one or more export commodities, which causes different regions to depend on one another for specific agricultural commodities. • F2. Regions of agricultural production are connected through global food distribution networks that are affected by political relationships, infrastructure, and/or patterns of world trade. • F3. Global patterns of food-processing facilities and markets, economies of scale, distribution systems, and government policies all contribute to greater interdependence among agricultural production regions. • F4. Countries may develop comparative advantages, complementarity, specialty crops, and/or consumer markets that establish trade relationships and increase interdependence between two or more countries. • F5. Countries in a region may form trade relationships that result in increased trade in farm products (e.g., EU, ASEAN, MERCOSUR).	1 point
G (Point 7)	Explain how domesticated animals such as pigs spatially diffused to create the spatial pattern shown on Map 2. Examples of acceptable responses may include the following: • G1. Domesticated animals such as pigs diffused from their hearths of domestication through relocation diffusion (e.g., settlers bringing animals to new areas). • G2. Domesticated animals such as pigs diffused from their hearths of domestication through the Columbian Exchange. • G3. International trade, imperialism, and/or colonization introduced domesticated animals such as pigs that were transported to other regions of the world. • G4. Domesticated animals such as pigs spread through migration or expansion diffusion, altering food preferences and/or increasing demand for diverse animal products domestically and/or internationally. • G5. Domesticated animals such as pigs spread to areas where consumption of these animals was culturally acceptable and/or did not spread to areas where consumption of such animals was culturally unacceptable.	1 point

Question 1: No Stimulus**7 points****(A) Define the concept of carrying capacity.****1 point**

Accept one of the following:

- A1. The number of people a particular place, area, and/or the Earth can support.
- A2. Population size, distribution, and/or density affects how many people the environment and its natural resources can support.
- A3. The number of living organisms that an area or habitat can support without environmental degradation.
- A4. Changes in population density and/or population distribution may affect the capacity of the environment to meet the population's needs.

(B) Describe ONE way that humans have altered the environmental sustainability of agricultural lands.**1 point**

Accept one of the following:

Decreased environmental sustainability

- B1. Overuse or use of synthetic fertilizers, pesticides, and/or herbicides that harm ecosystems (e.g., water, air, soil) and/or increase pollution.
- B2. Overuse or use of resources (e.g., water, air), reducing productivity.
- B3. Overuse, erosion, or nutrient depletion of soil, reducing productivity.
- B4. Overuse of irrigation, depleting water resources, reducing soil nutrients (via runoff), or contributing to soil salinization.
- B5. Agricultural practices (e.g., monocropping, commercial agriculture, increased use of high-yield seeds, GMOs, and/or biotechnology) have reduced biodiversity and/or depleted soil nutrients.

OR

Increased environmental sustainability

- B6. Improved management of farm resources (e.g., water, soil, fertilizers, pesticides) has helped ecosystems.
- B7. Use of organic agricultural practices, including natural fertilizers, pesticides, and/or herbicides.
- B8. Restoration of environmentally damaged areas by implementing sustainable agricultural practices.
- B9. Crop rotation which supports soil health (fertility) and/or avoids large-scale environmental damage.
- B10. Decreased irrigation and/or extraction of water from aquifers or groundwater resources.
- B11. Conservation of farmland (e.g., fallowing, erosion control) and/or local resources (e.g., water supplies, native species).

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- (C) Explain how transportation technology has increased economies of scale in the agricultural sector of less developed countries. 1 point**

Accept one of the following:

- C1. Trucks, trains, and/or shipping containers can move large and/or larger quantities of crops, increasing production and/or consumption.
- C2. Farm machinery (e.g., tractors, harvesters) has helped reduce the amount of human labor and/or increased the amount of production.
- C3. Farm machinery has allowed farms to increase the amount of farmland with reduced labor costs and/or improved efficiency.
- C4. Chemical herbicides, pesticides, and/or fertilizers applied by transportation technology (e.g., tractor, airplane) have reduced labor and/or increased crop yields.
- C5. Airplanes and/or ships are used to transport perishable products (e.g., flowers, fruits, vegetables), increasing their sales in other markets.

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- (D) Explain a likely negative economic outcome of Green Revolution agricultural practices on rural communities. 1 point**

Accept one of the following:

- D1. Pollution of water, air, and/or soil resources harms economic productivity or livelihoods.
 - D2. Smaller farms may close, and/or farmers may sell land because they cannot compete with larger farms that can afford Green Revolution technologies.
 - D3. Loss of agricultural jobs and/or loss of access to farmland may result in loss of income or migration (e.g., rural-to-urban).
 - D4. Expensive farm inputs (e.g., high-yield seeds, agricultural chemicals, fossil fuels) increase the cost of agricultural production and/or reduce profits for farms.
 - D5. Changes in land ownership (tenure), land use patterns, and/or agriculture-related jobs may economically disadvantage subsistence farmers.
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(E) Explain ONE weakness of Malthusian theory in predicting the relationship between food production and population growth in contemporary society. 1 point

Accept one of the following:

- E1. Population growth has not outpaced food production, and/or populations have not run out of food.
- E2. Malthusian theory did not consider changing social, political, and/or economic factors that decrease fertility.
- E3. Improvements in agricultural technology (e.g., mechanization, Green Revolution) increased food production at a rate that outpaced population growth.
- E4. Advances in transportation have improved the global distribution of food.
- E5. The challenges of feeding the world's population have led to the opening of new agricultural lands or the development of new technologies that overcome the constraints of the environment and/or produce more food.
- E6. Farmers learned to farm more intensively with new agricultural practices and/or technologies to increase yields, increase carrying capacity, or increase the amount of cultivated land.
- E7. Growing populations have more resources to problem-solve and/or develop new methods of increasing food supplies.
- E8. Growing populations can move to areas with food surpluses or move away from areas of food insecurity.

(F) Explain how surplus food production has changed the global market for local agricultural products. 1 point

Accept one of the following:

- F1. Consumption patterns, changed diets, and/or increased popularity of certain foods (e.g., local foods, seasonal crops, specialty crops) have expanded the global sales of these foods.
 - F2. Surplus food drives global prices down, resulting in less expensive items, higher sales or exports, and/or increased competition with other goods.
 - F3. Increasing global sales of popular crops can increase local farm profitability, increase local investment, and increase or decrease the number or type of local products for sale (e.g., value-added products, value-added specialty crops).
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- (G) Explain the degree to which Green Revolution agricultural practices were effective in reducing hunger in less developed countries. (Response must indicate the degree [low, moderate, high] and provide an explanation.) 1 point**

Statement of a moderate or high degree

AND

Supported by one of the following:

- G1. Food production increased due to high-yield seeds, chemical fertilizers, pesticides, irrigation, and/or mechanization.
- G2. Crop surpluses reduced food prices, making food items more accessible and/or more affordable.
- G3. More agricultural land came under cultivation, increasing food production.

OR

Statement of a moderate or low degree

AND

Supported by one of the following:

- G4. Green Revolution inputs (e.g., fertilizers, pesticides, high-yield seeds, irrigation, mechanization) were too expensive for many farmers, resulting in fewer farms and/or lower agricultural yields.
- G5. Irrigation systems led to the salinization of the soil, reducing food production.
- G6. The inputs (e.g., chemicals, fossil fuels) and/or land management techniques resulted in environmental degradation and/or abandonment of productive land, decreasing food production.

Total for question 1: 7 points

Question 1: No Stimulus**7 points**

(A) Describe ONE type of diffusion by which culture traits spread.**1 point**

Accept one of the following:

- A1. Expansion diffusion, as ideas or practices spread through a population into different areas.
- A2. Relocation diffusion, as ideas or practices spread from one location to a new or distant location, or to a location across a geographic barrier.
- A3. Hierarchical diffusion, as ideas or practices spread from one important or significant city, community, and/or person to another.
- A4. Contagious diffusion, as ideas or practices spread from person to person or along a transportation line.
- A5. Stimulus diffusion, as ideas or practices are borrowed from one culture and altered by another culture.

(B) Describe the process of creolization of language.**1 point**

Accept one of the following:

- B1. Interactions between or among culture traits and/or larger global forces lead to new forms of cultural expression and/or new languages.
 - B2. Two or more languages converge or mix to create a new language or new form of communication.
 - B3. People speaking two or more languages experience syncretism and/or combine their languages to form a new language.
 - B4. The development of a new language or dialect occurs due to the contact between groups that speak different and/or mutually unintelligible languages.
 - B5. The blending of two or more languages in which the new language includes selected features of either original language.
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(C)	Describe how the globalization of foods has influenced cultural patterns of food consumption.	1 point
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Accept one of the following:

- C1. Globalization has resulted in the global spread of various plants and/or animals.
- C2. Globalization has resulted in the spread of ingredients, cuisines, foods, and/or food cultures to people around the world.
- C3. Globalization has resulted in policies (e.g., safety regulations, labeling requirements) that may affect consumer preferences (e.g., organic, Kosher, Halal).
- C4. Globalization has popularized foods from different regions (e.g., sushi, tacos, kebabs).
- C5. Globalization alters the quantity, type, and/or cost of foods.
- C6. Globalization has expanded food options, changed diets, and/or changed levels of nutrition.
- C7. Globalization has reduced the consumption of local foods as people opt for globally distributed foods (e.g., fast food, processed, frozen).
- C8. Globalization provides access to crops that were formerly only available in certain climates and/or year-long access to foods that were formerly only seasonally available.

(D)	Explain ONE way that agricultural land use practices may have negative environmental effects.	1 point
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Accept one of the following:

- D1. Agricultural practices may result in increased pollution (e.g., soil, air, water) through chemical inputs (e.g., fertilizers, pesticides), resource use, and/or mechanized farming.
 - D2. Agricultural practices may contribute to water runoff that can pollute or degrade the quality of local or downstream water supplies (e.g., streams, rivers, lakes, oceans, groundwater, aquifers, wetlands).
 - D3. Agricultural pollution may contribute to global environmental problems (e.g., the greenhouse effect, climate change, ozone layer damage).
 - D4. Agricultural practices (e.g., plowing, terracing, deforestation, draining wetlands, grazing animals) may degrade and/or eliminate plant or animal habitats, change ecosystems, and/or reduce biodiversity.
 - D5. Agricultural practices (e.g., irrigation, dryland farming) may contribute to soil salinization, desertification, and/or soil erosion.
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- (E) Explain how a new style of music may be created as a result of cultural diffusion from different regions. 1 point**

Accept one of the following:

- E1. A new style of music may be created through a process of cultural interaction (e.g., syncretism, creolization, communication technologies).
- E2. When two or more musical styles come into contact, their elements may be combined to create a new musical style, tradition, instrument, dance, and/or genre.

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- (F) Explain how toponyms may result from the diffusion of religion across the cultural landscape. 1 point**

Accept one of the following:

- F1. The diffusion of religion may result in places (e.g., neighborhoods, cities, sub-national units, regions, countries) or natural features (e.g., rivers, mountains) being named after important religious figures, sacred sites, places of worship, events (e.g., holidays), and/or symbols.
 - F2. The process of colonization and/or sequent occupance leaves evidence of past religions through placenames or the names of natural features.
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- (G) Explain the degree to which the use of indigenous languages has been influenced by colonialism. (Response must indicate the degree [low, moderate, high] and provide an explanation.) 1 point**

Statement of a moderate or high degree

AND

Supported by one of the following:

- G1. Colonizers reduced or restricted indigenous language use by imposing their own languages to govern (e.g., by law), assimilate (e.g., religion), and/or communicate (e.g., as a lingua franca, taught in schools).
- G2. Colonization reduced the number of indigenous language speakers through disease and/or conflict.
- G3. Colonialism reduced or replaced indigenous languages with colonizers' languages in toponyms, maps, charts, and/or in other representations.
- G4. In some areas, colonialism encouraged indigenous language use (e.g., Nahuatl in Central America) through the employment of indigenous people (e.g., for administrative or religious purposes).

OR

Statement of a moderate or low degree

AND

Supported by one of the following:

- G5. In some areas (e.g., parts of Africa, parts of Oceania), indigenous languages remain widely used because of local resistance or indifference to colonial cultural influences and/or flourishing cultural centers.
- G6. In some areas (e.g., Paraguay, Oaxaca, Guatemala), colonizers' languages were not widely adopted, leaving indigenous languages largely unaffected.

Total for question 1: 7 points

Question 3: Two Stimuli**7 points****(A) Describe ONE reason for the migration patterns shown on the map.****1 point**

Accept one of the following:

- A1. Seasonal migration (transhumance) to move herds to grazing lands and/or water sources.
- A2. Migration to areas with more rainfall during the dry season.
- A3. Migration because the region's climate (arid or semi-arid) is too dry to support grazing year-round and/or to reduce stress on land that has been grazed.
- A4. Movement southward during the dry season and/or northward during the wet season.
- A5. Migration patterns based on cultural or agricultural practices.

(B) Describe ONE cause of desertification in the Sahel region.**1 point**

Accept one of the following:

- B1. Overgrazing has removed the grass cover and/or damaged the soil.
- B2. Human population growth and the use of arid land for growing food and/or demand for water have placed the land under added stress.
- B3. Runoff, wind, and/or erosion has removed fertile topsoil.
- B4. Soil erosion caused by climate change, natural drought, increasingly dry climate and/or human activities.
- B5. The use of wood for fuel and building materials has removed natural scrub or shrub landscapes.

(C) Explain how pastoral nomadism may affect the cultural landscape of the Sahel region.**1 point**

Accept one of the following:

- C1. Pastoral nomadism affects land use patterns in the region, with much land used for grazing, leaving an imprint of agricultural patterns (e.g., migration routes, traditional sites for seasonal settlements, watering sites, market locations, corrals, animal pens) on the cultural landscape.
- C2. Pastoral nomadism contributes to specific cultural identities and/or shared practices in groups with migrant lifestyles, leaving an imprint on the landscape (e.g., types of temporary settlements, meeting places, market locations) and/or infrastructure that supports communication (e.g., signs, cell phone towers).
- C3. Pastoral nomadism affects the built environment, with many nomadic herders constructing portable and/or seasonal (temporary) dwellings.
- C4. Pastoral nomads follow long-established seasonal migration routes or seasonal temporary settlements, thus maintaining local traditions and/or agricultural practices (e.g., animal husbandry, dairying, celebrations) that leave an imprint on the cultural landscape.

(D) Explain ONE way mixed-crop farming could be affected by climatic conditions. 1 point

Accept one of the following:

- D1. The availability of annual or seasonal rainfall (e.g., drought) results in crop or animal losses.
- D2. Variables and/or extremes in annual and/or seasonal temperatures may prevent or enable the cultivation of certain plant crops or animals.
- D3. Farming is affected by floods in areas where there are seasonal monsoons, hurricanes, and/or intense storms.
- D4. Farming is affected by changes in temperature or rainfall which may cause farmers to substitute one crop for another, and/or change farming techniques.
- D5. Changes in temperature, precipitation, frequency, and/or the intensity of storms may limit plant crops or impact the overall health of animals.

(E) Using the map and table, explain why expanding protected natural areas may affect the migration routes of nomadic herders in the Sahel region. 1 point

Accept one of the following:

- E1. Nomadic herders may have to make detours to avoid crossing protected natural areas, or use corridors established by governments, thus altering their traditional migration routes.
 - E2. Newly expanded protected natural areas may disrupt established migration routes traditionally used by nomadic herders.
 - E3. Protected natural areas may bring nomadic herders into conflict with conservation organizations or forestry services as they may differ on the use of protected areas for grazing, and/or concern about the impact of herding on natural habitats.
 - E4. Nomadic herders who travel through or graze animals in protected areas may risk legal consequences (e.g., fines) and begin to avoid those routes.
 - E5. Protected areas may preserve grassland habitat and/or prevent the loss of potential grazing lands, allowing nomadic herders to continue their traditional migration routes.
 - E6. Protected areas may conserve traditional migration routes for herders under agreements with governments or conservation organizations.
 - E7. Nomadic herders who cross international borders may encounter tensions with government officials who enforce migration policies and/or inspect for contraband items.
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(F) Using the information in the table, explain why farmers' increased use of irrigation may increase conflicts with nomadic herders. 1 point

Accept one of the following:

- F1. Increased use of irrigation may increase the amount of land that can be cultivated for crops, cutting off migration routes and/or limiting the use of such lands for transporting or grazing herds during seasonal migrations.
 - F2. Increased use of irrigation may increase the amount of land that can be cultivated for crops and eliminate areas where nomadic herders could set up temporary settlements and/or corrals or pens.
 - F3. Increased use of irrigation may deplete water supplies used by nomadic herders and/or cause competition between herders and farmers to water livestock and/or crops during pasturing or seasonal migrations.
 - F4. Overuse of irrigation in dryland (arid) environments may lead to soil salinization that could reduce the amount of food for animals (forage) or land for grazing that is available for migrating herds.
 - F5. Irrigation may lead to runoff carrying chemical fertilizer or pesticides into bodies of water where herders drink and/or water their livestock, increasing tensions between nomadic herders and farmers.
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(G) Explain the degree to which increased access to communication technologies may create cultural convergence among nomadic herders. 1 point

Statement of a moderate to high degree

AND

Accept one of the following:

- G1. Increased use of mobile phones, television, and/or the internet may expose herders to cultural influences from outside of their community and make herder culture less unique and/or expose nomadic herders to the cultural or social norms of external communities.
- G2. Increased use of global communication systems may cause herders to use more widely spoken languages and make indigenous language use less common.
- G3. Increased consumption of external music, literature, art, and/or holidays may diminish the cultural interest of herders to practice or maintain indigenous traditions within herder communities.

OR

Statement of a moderate to low degree

AND

Accept one of the following:

- G4. Increased exposure to outside cultural influences (e.g., music, languages, information) may mobilize nomadic herders to unite to protect their culture, resulting in a stronger cultural identity among nomadic herders.
- G5. Limited access to communication technologies due to cost or connectivity may hinder cultural convergence.
- G6. Nomadic herder communities may reject increased access to communication technologies to resist the forces of globalization and/or maintain traditional lifestyles.

Total for question 3: 7 points