Chief Reader Report on Student Responses:

2024 AP® Human Geography Set 1

Free-Response Questions

- Number of Students Scored 262,253
- Number of Readers 1,208
- Score Distribution

Exam Score	N	%At
5	46,891	17.9
4	53,776	20.5
3	46,552	17.8
2	37,556	14.3
1	77,478	29.5

- Global Mean 2.83

The following comments on the 2024 free-response questions for AP® Human Geography were written by the Chief Reader, Dr. Lisa Benton-Short, Professor of Geography at The George Washington University. They give an overview of each free-response question and of how students performed on the question, including typical student errors. General comments regarding the skills and content that students frequently have the most problems with are included. Some suggestions for improving student preparation in these areas are also provided. Teachers are encouraged to attend a College Board workshop to learn strategies for improving student performance in specific areas.

Question 1

Task: Free-Response Question
Topic: The Green Revolution: Spatial Processes and Societal Change
Max Score: 7
Mean Score: 2.46

What were the responses to this question expected to demonstrate?

In this zero-stimulus question, students were asked to examine how the availability of food, in the context of a growing population, is influenced by social, environmental, and economic factors. Students were asked to draw predominantly from Unit 5 (Agricultural and Rural Land-Use Patterns and Processes) as well from some selected topics in Unit 2 (Population and Migration Patterns and Processes). The main skills for this question are drawn from Skill Category 1 (Concepts and Processes) and Skill Category 2 (Spatial Relationships).

In part A students were asked to define the concept of carrying capacity.

In part B students were asked to describe one way that humans have altered the environmental sustainability of agricultural lands.

Recognizing that contemporary commercial agriculture has vastly transformed agricultural landscapes around the world, part C asked the students to explain how transportation technology has increased economies of scales in the agricultural sector of less developed countries.

The Green Revolution, characterized by the use of high-yield seeds, chemicals, and mechanized farming, is an important topic for the geographic understanding of agricultural patterns and processes. Part D asked students to explain a likely negative economic outcome of Green Revolution agricultural practices on rural communities.

The relationships between agriculture and changes in populations are key topics in human geography. Part E asked students to explain one weakness of Malthusian theory in predicting the relationship between food production and population growth in contemporary society.

Connecting geographic scales from global to local, part F asked students to explain how the surplus resulting from increased food production has changed the global market for local agricultural products.

Part G asked students to engage more rigorously with the geographic effects of the Green Revolution by asking students to explain the degree to which Green Revolution agricultural practices were effective in reducing hunger in less developed countries.

How well did the responses address the course content related to this question? How well did the responses integrate the skills required on this question?

The highest percentage of students earning points in this FRQ earned them in part A. In part A students accurately defined carrying capacity as the number of people a particular place, area, and/or the Earth can support. Students who did not earn a point confused carrying capacity with population density and did not address the connection between a place, its resources, and population size. This question is based on information from PSO-2.D.2 in Topic 2.2 (Consequences of Population Distribution), with students demonstrating Skill 1.A (Concepts and Processes) to answer the question correctly.

In part B students were able to describe one way that humans have altered the environmental sustainability of agricultural lands by focusing on negative ways (decrease in the environmental sustainability of agricultural land as a result of human actions) or positive ways (increase in the environmental sustainability of agricultural land as a result of human actions). Most students addressed negative environmental impacts. Students were successful in describing multiple ways humans have altered the environmental sustainability of agricultural lands, but most earned 1 point by writing about how the overuse of the land reduces soil productivity or how the overuse of irrigation can lead to soil salinization. Students who did not provide a correct response failed to connect environmental sustainability to agricultural lands, as presented in the prompt. This question is based on information from IMP-5.A.1 in Topic 5.10 (Consequences of Agricultural Practices) and IMP-5.B.1 in Topic 5.11 (Challenges of Contemporary Agriculture), with students demonstrating Skill 1.D (Concepts and Processes) to answer the question correctly.

Part C asked students to explain how transportation technology has increased economies of scale in the agricultural sector of less developed countries. Many students earned 1 point by explaining that refrigerated transportation allowed perishable products to be transported further distances, therefore increasing their sales in other markets. Many students that failed to earn a point were unable to explain how specific transportation technology creates advantages that result in specific effects related to economies of scale (e.g., increased production, increased sales to new markets, improved efficiencies, reduced costs). This question is based on information from PSO-5.C.5 in Topic 5.7 (Spatial Organization of Agriculture) and SPS-7.B.2 in Topic 7.2 (Economic Sectors and Patterns), with students demonstrating Skill 2.C (Spatial Relationships) to answer the question correctly.

In part D students who earned 1 point did so by explaining that a likely negative economic outcome of Green Revolution agricultural practices in rural communities was the expensive farm inputs that increased costs and reduced profits, especially for small farms. Many students did not earn a point because they associated GMOs with the Green Revolution, which is temporally incorrect. This question is based on information from SPS-5.D.1 and SPS-5.D.2 in Topic 5.5 (The Green Revolution), with students demonstrating Skill 2.C (Spatial Relationships) to answer the question correctly.

Many students earned 1 point in part E. Most students who earned 1 point made the connection between increased food production as a result of new technologies or slower than expected population growth as a weakness of the Malthusian theory. Students who did not earn a point did not explain a weakness of Malthusian theory in contemporary societies. This question is based on information from IMP-2.B.3 in Topic 2.6 (Malthusian Theory), information from PSO-5.C.5 in Topic 5.7 (Spatial Organization of Agriculture), and information from IMP-2.A.3 in Topic 2.4 (Population Dynamics), with students demonstrating Skill 1.E (Concepts and Processes) to answer the question correctly.

In part F students earned 1 point by explaining how actions taken by local farmers changed the value of the products they sold or by explaining that local farmers shifted production to a niche agricultural product that was not a part of the global surplus market, increasing their sales. Students who did not earn a point did not link global market conditions to actions taken at the local level and did not understand the scale analysis in this part of the question. This question is based on information from PSO-5.E.1 in Topic 5.9 (The Global System of Agriculture) and SPS-6.A.3 in Topic 6.10 (Challenges of Urban Changes), with students demonstrating Skill 5.B (Scale Analysis) to answer the question correctly.

In part G students earned 1 point if they explained how Green Revolution agricultural practices were effective in reducing hunger in less developed countries to either a high or low degree of effectiveness. Most students who explained a high degree of effectiveness did so by responding that high-yield seeds and mechanization increased food production. Some students who explained a low degree of effectiveness did so by explaining that farmers in less developed countries could not afford Green Revolution inputs, resulting in lower agricultural yields. Students who did not earn a point did not clearly state the degree of effectiveness and/or also mistakenly associated GMOs with Green Revolution practices, as they did in part D. This question is based on information from SPS-5.D.1 and SPS-5.D.2 in Topic 5.5 (The Green Revolution), with students demonstrating Skill 2.E (Spatial Relationships) to answer the question correctly.

What common student misconceptions or gaps in knowledge were seen in the responses to this question?

Common Misconceptions/Knowledge Gaps	*Responses that Demonstrate Understanding*
• In part A students confused carrying capacity with population density.	• In part A students who earned 1 point wrote that carrying capacity is the amount of people a particular place, area, and/or the Earth can support with available resources.
• In part B most students addressed negative environmental impacts; this was an accessible part of the FRQ. If students addressed positive environmental impacts, the most common response was how crop rotation supported soil fertility.	• In part B students who earned 1 point wrote about how the overuse of land reduces soil productivity or how the overuse of irrigation can lead to soil salinization.
• In part C students who did not earn the point did not understand economies of scale. Many students correctly addressed how improved transportation technology increased production but not how production cost would decrease (per unit) or how sales in other markets would increase.	• In part C students who earned 1 point explained, for example, how refrigerated transportation allowed perishable products to be transported further distances, therefore increasing their sales in other markets.
• In part D a common misperception from students was that GMOs were part of the Green Revolution, when they were commercially introduced in the late 1990s (See Advice to Teachers section). Students who also did not earn the point referenced environmental outcomes of the Green Revolution instead of economic outcomes.	• In part D students who earned 1 point explained how Green Revolution inputs were too expensive for small farms, which increased their cost and reduced their profits.

• In part E students who did not earn the point described Malthusian theory but did not explain a weakness of the theory in contemporary society.	• In part E students who earned 1 point understood Malthusian theory and explained how improvements in agricultural technology increased food production such that it outpaced population growth. A weakness of Malthusian theory is that it did not consider the impacts of agricultural technology on the ability to feed a rapidly growing population.
• In part F most students understood scales of analysis but lacked the skill to apply it to a specific scenario. Students who did not earn the point had trouble connecting the global market to an action taken by local farmers.	• In part F students who earned 1 point explained that local farmers could change what they sold (value added products) or shift to producing an agricultural product that was not a part of the global surplus market.
• In part G a common misperception from students was that GMOs are part of the Green Revolution. Students did not earn the point if they did not explain the degree to which a specific Green Revolution practice did or did not reduce hunger in less developed countries.	• In part G students who earned 1 point identified either a high or low degree of effectiveness. Students who earned the point for high degree of effectiveness responded that food production increased in less developed countries through the use of high-yield seeds and mechanization. Students who earned the point for low degree of effectiveness responded that because Green Revolution inputs were too expensive, farmers in less developed countries could not afford them, which resulted in low agricultural yields.

Based on your experience at the AP Reading with student responses, what advice would you offer teachers to help them improve student performance on the exam?

- Teach the difference between population density and carrying capacity.
- Help students understand the relationship between the number of people and resource availability in a specific area.
- Teach students that genetically modified organisms (GMOs) were not part of the Green Revolution. GMOs were commercially introduced after the Green Revolution occurred. For example, both genetically modified Bt cotton and Bt corn were introduced commercially in the United States in 1996 and some years later in less developed countries (e.g., India began testing these crops in 2002). The accepted time frame for the Green Revolution is 1961-1989.
- Have students identify the difference between economic, environmental, social, and political factors/impacts and apply them to specific scenarios. Have students read the prompt carefully to ensure they can respond to the correct scenario.
- Beyond teaching what scales of analysis are, have students also practice applying different scales to specific scenarios.

- Practice cross-unit connections in quizzes, exams, and other assignments. As the academic year progresses, teachers should integrate concepts from previous units into quizzes, exams, and other forms of assessments to have students practice making connections across units. Students should expect FRQs to include topics from more than one unit.
    - For example, have students make frequent connections across course units throughout the course (e.g., how changes in economic geography, from Unit 7, can impact agricultural production and transportation, from Unit 5).
- Train students how to respond to the "explain the degree to which" task verb phrase:
    - Teach students to state the degree and use the words high, moderate, or low. Other acceptable indicators of the degree include minimal, a little, moderate, somewhat, a great deal, high, widely, substantial, etc.
    - Teach students it is best to begin the response by stating the degrees above. For example, "Green Revolution agricultural practices were effective to a high degree in reducing hunger in less developed countries due to the use of high yield seeds …"
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What resources would you recommend to teachers to better prepare their students for the content and skill(s) required on this question?

- The Course and Exam Description provides a section on "Developing the Skills" on pages 143–151. This section provides examples of questions and instructional strategies for incorporating the course Skills on page 14 into classroom instruction.
- Sign in to AP Classroom to access AP Daily videos and questions on the topics and skills addressed in this question. AP teachers can assign students short AP Daily videos as homework, warm-ups, lectures, reviews, and more. AP teachers can also use the AP Question Bank in AP Classroom to enable students to practice and get feedback on formative topic questions and past AP Exam questions.
- Resources related specifically to this prompt include:
    - 2.2: Daily Video 1 discusses how population distribution and density affect political, economic, and social processes.
    - 2.4: Daily Video 1 discusses the demographic factors that determine a population's growth and decline, including fertility, mortality, and migration.
    - 2.6: Daily Video 1 discusses how Malthusian theory and its critiques are used to analyze population change and its consequences.
    - 5.4: Daily Video 1 focuses on the agricultural advances and impacts of the second agricultural revolution.
    - 5.5: Daily Video 1 discusses how the Green Revolution was characterized in agriculture by the use of high-yield seeds, increased use of chemicals, and mechanized farming.
    - 5.6: Daily Video 1 focuses on how economic forces influence commercial and subsistence agricultural practices.
    - 5.6: Daily Video 2 focuses on how economic forces influence intensive and extensive farming practices.
    - 5.7: Daily Video 1 discusses how large-scale commercial agricultural operations are replacing small family farms.
    - 5.8: Daily Video 1 focuses on how von Thünen's model helps to explain rural land use by emphasizing the importance of transportation costs associated with distance from the market.
    - 5.8: Daily Video 2 focuses on how regions of specialty farming do not always conform to von Thünen's concentric rings.
    - 5.9: Daily Video 1 discusses how food and other agricultural products are part of a global supply chain.

    - 5.10: Daily Video 1 focuses on how agricultural practices have environmental consequences, including pollution, desertification, and soil salinization.
    - 5.10: Daily Video 2 focuses on how agricultural practices such as terraces, irrigation systems, deforestation, draining wetlands, and shifting agriculture can alter the landscape.
    - 5.11: Daily Video 1 discusses how innovations such as biotechnology, GMOs, and aquaculture accompany debates over sustainability, soil and water usage, reductions in biodiversity, and fertilizer and pesticide use.
    - 5.11: Daily Video 2 discusses how patterns of food production and consumption are influenced by movements relating to individual food choice.
    - 5.11: Daily Video 3 discusses the challenges of feeding a global population, including lack of food access, problems with distribution systems, adverse weather, and land use lost to suburbanization.
- Additional resources may be found on the AP Human Geography Course Page on AP Central at: https://apcentral.collegeboard.org/courses/ap-human-geography
- The AP Human Geography Online Teaching Community (OTC) is another great resource, which includes materials and resources posted not only by the College Board but also by other teachers. The OTC Discussion Board is the place to ask questions, share resources, and exchange teaching ideas at: https://apcommunity.collegeboard.org/group/aphumangeo/

Question 2

Task: Free-Response Question
Topic: Ethnic Neighborhoods in Los Angeles County, California: Cultural Patterns
Max Score: 7
Mean Score: 3.02

What were the responses to this question expected to demonstrate?

This one-stimulus question on cultural patterns is focused on a selection of Asian ethnic neighborhoods in Los Angeles County in California. The stimulus for the question is a map of the southern portion of Los Angeles County showing predominantly Asian ethnic neighborhoods by their names and the densities (high or medium) of different Asian ethnic groups also indicated on the map.

To respond to this question, students were asked to draw on knowledge predominantly from Unit 3 (Cultural Patterns and Processes), focusing on patterns, spatial organization, and landscapes of ethnicity. Students were also asked to engage with Unit 4 (Political Patterns and Processes). The question cuts across several Skill Categories, including Skill Category 4 (Source Analysis), Skill Category 1 (Concepts and Processes), Skill Category 2 (Spatial Relationships), and Skill Category 5 (Scale Analysis).

In part A students were asked to identify one neighborhood labeled on the map where two or more Asian ethnic groups reside. In part B students were tasked with describing the spatial patterns of Chinese ethnic neighborhoods labeled on the map.

The concept of assimilation is tied to geographers' understanding of the way cultural practices change over time in particular places. In part C students were asked to explain one way immigrants may choose to assimilate into their new place of residence. Part D continued this theme of culture change and asked students to explain one way immigrants may preserve their ethnic traditions in their new place of residence.

Regional and local patterns of ethnicity contribute to the creation of a sense of place, a key element in the definition of "place" in human geography. In part E students were asked to describe one way that ethnic neighborhoods may contribute to a sense of place in large metropolitan areas such as Los Angeles.

Part F and part G connect Unit 3 and Unit 4 by asking students to explain the different ways in which internal political boundaries reflect balances of power that have been negotiated or imposed, in the context of ethnic communities. In part F students were asked to explain how the process of redistricting may be used to decrease an ethnic community's political power. Conversely, part G asked students to explain how the process of redistricting may be used to increase an ethnic community's political power.

How well did the responses address the course content related to this question? How well did the responses integrate the skills required on this question?

In part A most students were able to identify one neighborhood labeled on the map where two or more Asian ethnic groups reside by correctly naming the neighborhoods of Walnut, Cerritos, Chinatown, or Koreatown. Only a few students incorrectly used the map stimulus and misidentified neighborhoods where two or more Asian ethnic groups reside. This question is based on information from SPS-3.A.3 in Topic 3.6 (Contemporary Causes of Diffusion) and information from PSO-3.C.1 in Topic 3.2 (Cultural Landscapes), with students demonstrating Skill 4.A (Source Analysis) to answer the question correctly.

In part B many students earned 1 point by correctly describing the spatial pattern of Chinese ethnic neighborhoods in Los Angeles County. Students described the neighborhoods as clustered inland and/or away from the coast or clustered in the eastern or northeastern portion of the county. Both responses were correct. Students who did not earn a point described the neighborhoods as clustered without indicating a location on the map (the response did not use the stimulus as directed). This question is based on information from PSO-3.D.1 in Topic 3.3 (Cultural Patterns) and information from IMP-1.A.2 in Topic 1.1 (Introduction to Maps), with students demonstrating Skill 4.B (Source Analysis) to answer the question correctly.

In part C some students correctly explained that one way immigrants may choose to assimilate into a new place of residence is by adopting cultural traits from the majority population group. However, a significant number of students did not have a clear understanding of the concept of assimilation and struggled to correctly explain one way immigrants may choose to assimilate into their new place of residence. This question is based on information from SPS-3.B.1 in Topic 3.8 (Effects of Diffusion) and information from SPS-3.A.1 in Topic 3.5 (Historical Causes of Diffusion), with students demonstrating Skill 2.C (Spatial Relationships) to answer the question correctly.

In part D students who earned 1 point correctly explained that one way immigrants may preserve their ethnic traditions in their new place of residence is by engaging in placemaking using aspects of their traditional culture, such as architecture, toponyms, and/or signs to establish a sense of place. Other students correctly responded that immigrants may continue to celebrate their ethnic traditions by celebrating traditional holidays, consuming ethnic or traditional food, or wearing traditional clothing. Some students did not earn the point because their explanations focused either on acculturation or multiculturalism and did not fully explain ways in which immigrants may preserve their own ethnic traditions in their new place of residence. This question is based on information from PSO-3.C.1 in Topic 3.2 (Cultural Landscapes) and information from PSO-3.D.1 in Topic 3.3 (Cultural Patterns), with students demonstrating Skill 5.B (Scale Analysis) to answer the question correctly.

Part E was more challenging for students. Some students were able to describe one way that ethnic neighborhoods may contribute to a sense of place is by exhibiting architecture, signs, or symbols typical of an ethnic group. Students who did not earn a point did not make an explicit connection between a feeling of belonging with specific features of the cultural landscape, broadly construed, within an ethnic neighborhood. This question is based on information from PSO-3.D.1 in Topic 3.3 (Cultural Patterns) and information from PSO-3.C.1 in Topic 3.2 (Cultural Landscapes), with students demonstrating Skill 1.D (Concepts and Processes) to answer the question correctly.

In part F the majority of students who earned 1 point explained that redistricting may be used to limit the representation or political power of an ethnic community if voting districts are split into two or more districts. Students who did not earn a point did not provide a complete explanation of how cracking a district would impact a community's political power. This question is based on information from IMP-4.B.5 in Topic 4.6 (Internal Boundaries), with students demonstrating Skill 2.B (Spatial Relationships) to answer the question correctly.

In part G students who earned 1 point explained that redistricting or gerrymandering may be used to increase an ethnic community's political power if voting districts are redrawn to include more people of the same group in the same area. Students who did not earn a point incorrectly explained that ethnic groups could be spread throughout multiple voting districts and become the majority in each of those districts, increasing their political power. This question is based on information from IMP-4.B.5 in Topic 4.6 (Internal Boundaries), with students demonstrating Skill 2.B (Spatial Relationships) to answer the question correctly.

What common student misconceptions or gaps in knowledge were seen in the responses to this question?

Common Misconceptions/Knowledge Gaps	*Responses that Demonstrate Understanding*
• In part A many students earned 1 point; only a few students incorrectly used the map stimulus and misidentified neighborhoods where two or more Asian ethnic groups reside.	• In part A students who earned 1 point most frequently identified Cerritos or Walnut as a neighborhood where two or more Asian ethnic groups reside. Some responses also correctly identified Koreatown or Chinatown.
• In part B many students incompletely described the spatial pattern of Chinese ethnic neighborhoods labeled on the map as "clustered" rather than describing them as either clustered on the eastern side of Los Angeles or clustered away from the coast.	• In part B the most common response that earned 1 point was that the Chinese ethnic neighborhoods were clustered on the eastern side of the map.
• In part C some students did not know the definition of assimilation and incorrectly responded that immigrants choose to assimilate by residing near others who share similar culture traits.	• In part C some students earned 1 point by explaining that immigrants adopt the culture traits of the majority population group and used examples such as learning the majority language or wearing popular clothing styles.
• In part D some students did not earn the point because their explanations focused either on acculturation or multiculturalism and did not explain ways in which immigrants may preserve their own ethnic traditions in their new place of residence.	• In part D students who earned 1 point explained ways immigrants may preserve their ethnic traditions. Students used examples of continuing to speak their native language, practicing their faith, eating traditional foods, or teaching these ethnic traditions to their children.
• In part E students incorrectly described only the "feeling of belonging" or a "sense of welcome" in ethnic neighborhoods but did not connect these perceptions of sense of place to the cultural landscape, features of that built environment, or distinct culture traits or events in the ethnic neighborhood.	• In part E some students were able to describe place names in ethnic neighborhoods, architectural features on the cultural landscape, celebrations, retail shopping, or restaurants as being connected to the sense of place in ethnic neighborhoods.

• In part F some responses did not earn a point because they identified gerrymandering or terms such as "packing" or "cracking" without explaining how these concepts may be used to decrease an ethnic community's political power.	• In part F some students were able to explain that redistricting sometimes splits voters from an ethnic community into multiple voting districts which reduces their voice or reduces their chances of electing a candidate from their ethnic group.
• In part G students incorrectly explained that ethnic groups could be spread throughout multiple voting districts and become the majority in each of those districts, increasing their political power.	• In part G some students earned 1 point by explaining how the process of redistricting creates majority-minority voting districts or by explaining how redistricting results in voting districts being redrawn to maximize the number of ethnic group voters in that area.

Based on your experience at the AP Reading with student responses, what advice would you offer teachers to help them improve student performance on the exam?

- Teachers should ensure their students have well developed knowledge of key vocabulary concepts as outlined in the Course and Exam Description. In this question, key vocabulary includes assimilation, cultural landscape, sense of place, and redistricting. In particular, many students struggle to understand how the term "cultural landscape" relates to the built environment (e.g., architecture, signs, toponyms, etc.).
- Have students practice using a stimulus in FRQs, MCQs, and other assignments. Teach students that when the prompt directs them to, "use the map/table/image" or "based on the map/table/image" that their responses are expected to integrate specific information from the stimulus.
- Prepare students to write responses for the specified task verbs such as identify, describe, and explain.
- Using released FRQ prompts from AP Central and FRQ Progress Checks in AP Classroom can be an effective strategy to improve student responses and student scoring outcomes.

What resources would you recommend to teachers to better prepare their students for the content and skill(s) required on this question?

- The Course and Exam Description provides a section on "Developing the Skills" on pages 143–151. This section provides examples of questions and instructional strategies for incorporating the course Skills on page 14 into classroom instruction.
- Sign in to AP Classroom to access AP Daily videos and questions on the topics and skills addressed in this question. AP teachers can assign students short AP Daily videos as homework, warm-ups, lectures, reviews, and more. AP teachers can also use the AP Question Bank in AP Classroom to enable students to practice and get feedback on formative topic questions and past AP Exam questions.
- Resources related specifically to this prompt include:
    - 1.1: Daily Video 1 covers the main types of maps—reference maps and thematic maps—and introduce maps used for depicting quantitative values as well as cartograms.
    - 1.1: Daily Video 2 discusses the types of spatial patterns represented on maps, including absolute and relative distance and direction, clustering, dispersal, and elevation.

    - 1.1: Daily Video 3 explains how all maps are selective in the information they present and introduce the significant map projections which distort spatial relationships in shape, area, distance, and direction.
    - 3.2: Daily Video 1 discusses the characteristics of cultural landscapes, including environmental, economic, and cultural features.
    - 3.2: Daily Video 2 discusses the analysis of photos in order to describe characteristics of cultural landscapes, which helps us to analyze different regions of the world.
    - 3.2: Daily Video 3 discusses how landscape features and land use reflect cultural beliefs and identities.
    - 3.3: Daily Video 1 discusses how regional patterns of language, religion, and ethnicity contribute to a sense of place, enhance placemaking, and shape the global cultural landscape.
    - 3.3: Daily Video 2 examines how languages, religion, and ethnicity are factors in creating centripetal and centrifugal forces.
    - 3.5: Daily Video 1 discusses how interactions between and among cultural traits and larger global forces (including colonialism and trade) can lead to new forms of cultural expression.
    - 3.6: Daily Video 1 discusses how cultural ideas change and diffuse through many processes, including globalization and urbanization.
    - 3.6: Daily Video 2 discusses how improving communication technology and the time-space convergence contribute to changing cultural practices.
    - 3.8: Daily Video 1 discusses the effects of diffusion, including acculturation, assimilation, syncretism, and multiculturalism, which result in changes to the cultural landscape.
    - 4.6: Daily Video 1 discusses how voting districts, redistricting, and gerrymandering affect election results at various scales.
- Additional resources may be found on the AP Human Geography Course Page on AP Central at: https://apcentral.collegeboard.org/courses/ap-human-geography
- The AP Human Geography Online Teaching Community (OTC) is another great resource, which includes materials and resources posted not only by the College Board but also by other teachers. The OTC Discussion Board is the place to ask questions, share resources, and exchange teaching ideas at: https://apcommunity.collegeboard.org/group/aphumangeo/

Question 3

Task: Free Response Question
Topic: Density and Land Use: Metacities and World Cities
Max Score: 7
Mean Score: 3.03

What were the responses to this question expected to demonstrate?

In this two-stimulus question, students were expected to interpret and use data from a map and a table that featured information about metacities and top-tier world cities. The map depicted data at the global scale and showed the locations of both metacities and top-tier world cities in 2020. The table featured data from four selected cities (Cairo, Dhaka, New York City, Paris), including the cities' population in the years 2000 and 2020, their population growth from the years 2000 to 2020, the city GDP per capita in the year 2020, and the cities' corresponding country GDP per capita in the year 2020.

This question was developed to demonstrate students' understanding of key concepts and geographic processes, primarily from Unit 6 (Cities and Urban Land-Use Patterns and Processes) and Unit 7 (Industrial and Economic Development Patterns and Processes). This question required students to apply skills from Skill Category 1 (Concepts and Processes), Skill Category 2 (Spatial Relationships), Skill Category 3 (Data Analysis), and Skill Category 5 (Scale Analysis).

In part A students were asked to interpret the world map and identify one city that is both a metacity and a world city.

In part B students were asked to describe the spatial pattern of world cities shown on the map.

Because urbanization processes vary across geographical locations and result in different spatial outcomes, in part C students were asked to compare the concept of a metacity with the concept of a world city. Students were instructed to include a comparison of both concepts in their response.

Large urban areas tend to be the centers of economic activity and provide significant opportunities for residents. In part D students were instructed to explain one reason why the cities shown on the table have higher GDP per capita than their respective country GDP per capita.

Large urban areas often experience economic, social, and environmental challenges. In part E students were asked to explain one way population growth in a metacity may challenge environmental sustainability.

Because a city's infrastructure directly affects its spatial patterns of economic and social development, in part F, students were asked to explain why migrants to metacities may have difficulty obtaining housing.

In part G students were asked to use the data from the table to explain the relationship between a city's level of economic development and the city's percent population growth over time.

How well did the responses address the course content related to this question? How well did the responses integrate the skills required on this question?

In part A most students earned 1 point as they were able to identify a city on the map that is both a metacity and a world city, including Beijing, Shanghai, or Tokyo, by using the symbol in the map legend that corresponds with "Metacity and world city" and matching it with the corresponding symbol on the map. A few students misread the map and did not earn a point because they selected Dhaka as the response, which is a metacity, but not a world city. This question is based on information from PSO-6.A.3 in Topic 6.2 (Cities Across the World) and information from PSO-6.B.1 in Topic 6.3 (Cities and Globalization), with students demonstrating Skill 3.A (Data Analysis) to answer the question correctly.

In part B most students were able to describe the spatial patterns of world cities shown on the map and earned 1 point. Students who did not earn a point provided vague responses, such as describing world cities as "clustered" or "dispersed" without indicating a location on the map (the response did not use the stimulus as directed). This question is based on information from PSO-6.B.1 in Topic 6.3 (Cities and Globalization) and information from IMP-1.A.2 in Topic 1.1 (Introduction to Maps), with students demonstrating Skill 3.B (Data Analysis) to answer the question correctly.

In part C many students were able to compare the concept of a metacity with the concept of a world city. Most students correctly responded that metacities are determined by their population size, whereas world cities are determined by their economic or cultural importance or because they drive globalization. A few students also responded that most metacities are located in less developed countries, whereas most world cities are located in more developed countries. Both ways of answering the question are correct. Students who did not earn a point did not provide a direct comparison or responded only with a definition for either a metacity or a world city—but not both. This question is based on information from PSO-6.A.3 in Topic 6.2 (Cities Across the World) and information from PSO-6.B.2 in Topic 6.3 (Cities and Globalization), with students demonstrating Skill 1.C (Concepts and Processes) to answer the question correctly.

In part D students were asked to explain one reason why cities on the table have higher GDP per capita than their corresponding country's GDP per capita. A majority of students correctly explained that the cities listed on the table are more economically productive than other parts of the same country because they offer greater opportunities and/or more goods or services. Some students also correctly responded that these cities function as centers of service economy that generate more economic value or output. Students who did not earn a point were incorrectly relating the difference between the city's and the country's GDP per capita to higher population density. This question is based on information from SPS-7.C.1 in Topic 7.3 (Measures of Development), with students demonstrating Skill 5.B (Scale Analysis) to answer the question correctly.

Part E was the most challenging for many students. Many students found it difficult to explain one way population growth in a metacity may challenge environmental sustainability. Students who earned 1 point were able to explain how population growth in a metacity led to changes in the landscape, such as the removal of forests or the conversion of arable land, resulting in losses to biodiversity or natural habitats. Some students described an impact of population growth but did not connect population growth to an environmental impact such as a larger ecological footprint or environmental degradation and, therefore, did not earn a point. This question is based on information from SPS-6.B.1 in Topic 6.11 (Challenges of Urban Sustainability), with students demonstrating Skill 2.C (Spatial Relationships) to answer the question correctly.

Many students earned 1 point in part F because they explained that population pressures in metacities, such as high densities, high population growth, or existing large populations, often result in high housing costs or a lack of available housing. Students who did not earn a point failed to specify that metacities experience population pressures as a result of high growth or high densities. This question is based on SPS-6.A.1 in Topic 6.10 (Challenges of Urban Changes) and SPS-6.B.1 in Topic 6.11 (Challenges of Urban Sustainability), with students using Skill 2.C (Spatial Relationships) to answer the question correctly.

When students earned 1 point in part G, they used data from the table, as instructed by the prompt, to explain the relationship between a city's level of economic development and the city's percent population growth over time. Students who did not earn a point may have correctly expressed an inverse relationship between economic development and percent population growth in the cities but did not use data from the table to fully explain the relationship. This question is based on information from SPS-7.C.1 in Topic 7.3 (Measures of Development), information from IMP-2.A.3 in Topic 2.4 (Population Dynamics), and information from PSO-6.A.2 in Topic 6.1 (The Origin and Influences of Urbanization), with students demonstrating Skill 3.D (Data Analysis) to answer the question correctly.

What common student misconceptions or gaps in knowledge were seen in the responses to this question?

Common Misconceptions/Knowledge Gaps	*Responses that Demonstrate Understanding*
• In part A there were few knowledge gaps. The most common incorrect response identified Dhaka as a city that was both a metacity and a world city. This was a map interpretation mistake.	• In part A the vast majority of students correctly identified one of the three cities (Beijing, Shanghai, or Tokyo) required for a correct response. Students were able to read the symbology on the map correctly.
• In part B when students did not earn a point, they were often writing in absolutes, such as "all world cities are in the Eastern Hemisphere" or "all world cities are located on a coastline." Some students responded with very vague responses, such as "world cities are dispersed on the map," which did not earn a point.	• In part B most students were able to describe the spatial pattern of world cities using distinct features on the map, such as continents, regions, coastal areas, or zones of development. Few students described that there were no world cities in Africa, South America, Northern Asia, and/or Australia.

• In part C a common error was using an incorrect numerical threshold for metacities, such as “metacities have a population of 5 million.” A population threshold was not required for a correct response but providing the incorrect population threshold did not earn a point. Some students also responded to only the metacity concept and did not include the concept of world cities, which did not provide the required comparison.	• In part C students who earned 1 point demonstrated a clear understanding of the difference between the concept of a metacity and the concept of a world city. The students most often earned a point when comparing the population threshold of metacities with the cultural or economic importance of world cities.
• In part D students who did not earn a point were incorrectly relating the difference between the city’s and the country’s GDP per capita to higher population density. Students also did not explain that jobs or opportunities in the city would be more productive or in higher sectors of the economy.	• In part D many students earned 1 point because they correctly explained that city’s GDP per capita was higher than the respective country’s GDP per capita because the city contains a higher share of opportunities that provide more economic value or economic output to the overall GDP.
• Many students were challenged by part E and did not make the connection between an impact of population growth and challenges to environmental sustainability. Most students successfully described a characteristic of population growth but were unable to connect that growth to an environmental impact such as a larger ecological footprint or environmental degradation caused by pollution or land use change.	• In part E most students who earned 1 point were able to explain how changes in the landscape associated with a growing metacity city, such as the removal of forests or the conversion of arable land, resulted in losses to biodiversity or natural habitats.
• In part F students who did not earn a point did not explain that the population pressures, including high population growth or high population densities, are common in metacities as part of their response.	• In part F most students earned 1 point because they were able to explain that high housing costs or lack of housing availability were due to population pressures such as high population densities, high population growth, or existing large populations.
• In part G students who did not earn a point provided statements that addressed economic development and population growth without providing data or variables from the table as indicated by the prompt.	• In part G most students earned 1 point when they used data from the table to explain the inverse relationship between economic development and percent population growth.

Based on your experience at the AP Reading with student responses, what advice would you offer teachers to help them improve student performance on the exam?

- Read the prompt and reply directly to what is asked. Pay attention to the task verb. Some students continue to provide descriptions when tasked to explain.
- Teach students to use the stimulus when directed in the prompt. Some students presented general responses for part G, but they did not link that response to data from the table.

What resources would you recommend to teachers to better prepare their students for the content and skill(s) required on this question?

- The Course and Exam Description provides a section on "Developing the Skills" on pages 143–151. This section provides examples of questions and instructional strategies for incorporating the course Skills on page 14 into classroom instruction.
- Sign in to AP Classroom to access AP Daily videos and questions on the topics and skills addressed in this question. AP teachers can assign students short AP Daily videos as homework, warm-ups, lectures, reviews, and more. AP teachers can also use the AP Question Bank in AP Classroom to enable students to practice and get feedback on formative topic questions and past AP Exam questions.
- Resources related specifically to this prompt include:
    - 6.1: Daily Video 1 discusses how the presence and growth of cities vary across geographical locations because of physical geography and resources.
    - 6.2: Daily Video 1 focuses on how megacities and metacities are distinct spatial outcomes of urbanization, increasingly located in countries of the periphery and semiperiphery.
    - 6.2: Daily Video 2 discusses how the process of suburbanization has created new land-use forms, including edge cities, exurbs, and boomburbs and new challenges.
    - 6.3: Daily Video 1 discusses how cities embody the processes of globalization.
    - 6.10: Daily Video 1 examines economic and social challenges in cities related to housing and housing discrimination, such as redlining, blockbusting, and affordability.
    - 6.10: Daily Video 2 examines how urban renewal and gentrification can have both positive and negative consequences in communities.
    - 6.10: Daily Video 3 focuses on squatter settlements and how conflicts over land tenure within large cities have increased.
    - 6.11: Daily Video 1 focuses on the challenges and responses to urban sustainability.
    - 7.3: Daily Video 1 focuses on the social and economic measures of development.
- Additional resources may be found on the AP Human Geography Course Page on AP Central at: https://apcentral.collegeboard.org/courses/ap-human-geography
- The AP Human Geography Online Teaching Community (OTC) is another great resource, which includes materials and resources posted not only by the College Board but also by other teachers. The OTC Discussion Board is the place to ask questions, share resources, and exchange teaching ideas at: https://apcommunity.collegeboard.org/group/aphumangeo