

2023

AP<sup>®</sup>



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# AP<sup>®</sup> Human Geography

## Sample Student Responses and Scoring Commentary

### Set 1

#### **Inside:**

#### **Free-Response Question 3**

- Scoring Guidelines**
- Student Samples**
- Scoring Commentary**

**Question 3: Two Stimuli****7 points**

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**(A) Describe the spatial pattern of the companies and institutions shown in the inset map. 1 point**

Accept one of the following:

- A1. Agglomeration of similar economic activities.
- A2. Cluster or clustering of similar economic activities.
- A3. The concentration of similar activities along transportation routes (e.g., rivers, arterial roads).
- A4. There is a concentration of similar economic activities within a metropolitan area in Massachusetts.

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**(B) Describe the concept of a growth pole. 1 point**

Accept one of the following:

- B1. A location where research, development, and/or innovation (e.g., new product or process) generate new products and/or services.
  - B2. An institution (e.g., university, hospital, laboratory) where scientific discoveries, inventions, and/or innovations create new economic opportunities.
  - B3. An area where new businesses start up and/or businesses locate to participate in the emerging market and/or attract investment for a new product and/or service.
  - B4. An area where new businesses start up and/or businesses locate to access a specifically skilled or educated pool of labor.
  - B5. An area designated by a government to facilitate economic activity for a specific purpose.
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**(C) Explain ONE way education infrastructure affects a region’s potential for high-technology development. 1 point**

Accept one of the following:

- C1. Graduates of educational institutions, who remain in the region throughout their careers, can promote regional economic development, create innovative products or services, and/or create a source of wealth for investment in the region’s high-technology businesses.
- C2. Educational institutions can develop a labor force with specialized capabilities that make an area better suited to attract high-technology businesses and/or investors from outside of the region to open new facilities and/or move existing facilities or headquarters into the region.
- C3. Educational institutions can sponsor research for new high-technology products and/or services that can be put into production or operation, thus creating new value, investment, and/or employment for the region’s economy.
- C4. Public investment in technical or specialized worker training, businesses, infrastructure, and/or equipment may divert funds away from investment in other community and social programs that support economic development.
- C5. Lack of educational infrastructure can negatively affect a region’s potential for high-technology development because there may not be a highly educated workforce, a specialized labor force, and/or sponsored research for high-technology products or services.

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**(D) Explain how the pattern shown on the map resembles the galactic city model. 1 point**

Accept one of the following:

- D1. The region has multiple development centers (e.g., edge cities, central business districts [CBDs], suburban CBDs), which are based on a specialized product or service.
  - D2. The pattern of business development is decentralized or spread across the region in different locations.
  - D3. The region has a circumferential, circular belt, or radial highway pattern associated with a galactic city’s transportation landscape.
  - D4. The region contains several highway intersections that serve as nodes for new business districts, central business districts, or development centers.
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**(E) Explain ONE way local economic changes may be a result of deindustrialization. 1 point**

Accept one of the following:

- E1. Deindustrialization may cause the local economy to shift from a manufacturing or industry-based economy (secondary sector) to a service and/or technology-based economy (tertiary, quaternary, or quinary sector).
  - E2. Outsourcing of manufacturing or industrial jobs to other countries can lead to a decline in local employment levels and/or an increase in the percentage of the workforce that is unemployed or receiving unemployment benefits.
  - E3. Increased unemployment in the central business district (CBD), declining investment, and/or declining real estate values may result from the loss of manufacturing firms, jobs, and/or services that were once supported by the former industrial economy.
  - E4. Increases in the local use of post-Fordist methods of production (e.g., highly specialized firms, just-in-time delivery supply chains, flexible production methods) by manufacturing firms can indicate a response to deindustrialization to make industrial production more efficient.
  - E5. Gross national income (GNI) per capita in the area may decrease as local people lose employment in manufacturing and/or are unable to find similar-paying jobs in another economic sector.
  - E6. Unemployment rates or underemployment may increase as local people lose employment in manufacturing and/or are unable to find similar-paying jobs in another economic sector.
  - E7. Cities and communities may see decreased tax revenues due to higher unemployment and/or a decrease in population as people move away to search for jobs elsewhere (e.g., backwash effects, migration).
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**(F) Explain how the products and services listed in the table demonstrate that this economy has moved into the quaternary sector. 1 point**

Accept one of the following:

- F1. The high-technology nature of the products and services listed demonstrates that the economy has moved into the quaternary sector.
- F2. The products and services rely on the knowledge and/or intellectual capabilities of the firms, institutions, and/or workforce that develop these advanced technologies.
- F3. The products and services are the outcomes of a highly educated, specialized, and/or creative class of employees who develop innovative solutions to consumer needs.
- F4. The products and services are dependent on the use of information technology for firms, institutions, and/or the workforce to be more productive, efficient, and/or cost-effective.

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**(G) The map focuses on a regional scale. Explain a possible limitation of drawing country scale conclusions from a regional scale map. 1 point**

Accept one of the following:

- G1. Attempts to analyze research data from one scale of analysis to make claims about another scale of analysis may be inaccurate due to the change in scale's effect on spatial analysis.
- G2. Making research assumptions from map data at one scale of analysis to make claims about another scale of analysis may result in an incorrect calculation or an ecological fallacy due to the change in scale.
- G3. The region can be specialized in a sector or type of production that is different from the economic sectors or production types found in other regions of the country.
- G4. The region can have a long and continuing tradition of valuable or productive sectors that are very different from the changing mix of economic sectors that characterize the country's economy.

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**Total for question 3: 7 points**

**Important:** Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1

Question 2

Question 3

Begin your response to each question at the top of a new page. Do not skip lines.

- A. The similarly based companies and institutions such as medical schools form an agglomeration in similar areas such as Boston. This is due to benefits that occur when similar companies base near each other. They can share resources and land if they have to.
- B. A growth pole is a concept that when one institution pops up in a region others tend to follow, creating growth. ~~It~~ An example would be a pharmacy following a medical school and hospital for convenience. This allows for a region to ~~be~~ grow in a certain industry.
- C. High quality education at top schools such as MIT and Harvard allow for technological advancements. Engineering and medical students affect the regions potential by making an impact to its job sectors. When well educated students become workers, they can put their knowledge towards advancing technology.
- D. The area around UMass medical school forms a ring road which is a ~~key~~ defining feature of the galleite model. This allows for better and more efficient transportation around the city and its region. This is beneficial for residents or students in the city.
- E. The change from industrial production to medical and engineering in New England displays deindustrialization. There is a lower demand for primary or secondary product production in the country, and so it develops. Medical and engineering fields are highly specialized and important jobs for a developed region.
- F. Medical and engineering jobs are high salary and advanced jobs. They require skilled workers to specialize in their field of work. Highly specific jobs and industries are displayed by the given

Page 6

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Question 1

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Question 3



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infrastructure of the region,  
 G. With a larger national scale, you are unable to see the agglomerations and specific infrastructure within a region. You may be able to see an entire city, but not its specific details. Without these details you lose a sense of more specific locations like Harvard university, which is shown on the regional map.

Page 7

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Question 1

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Question 3



Begin your response to each question at the top of a new page. Do not skip lines.

- A The companies and institutions show agglomeration. They are clustered together.
- B A growth pole is an a high tech area that is highly developed and educated. It has many high skilled jobs, and usually consists of many tech / educational based businesses.
- C High quality education increases a places potential for high tech development. This is because if there are high level education facilities like universities it will attract researchers and professors. It will also lead to an increase in highly skilled / educated people in the area. These people would be able to complete the high skilled tasks needed to ~~do~~ do high tech development. Researchers brought to universities will also be able to add to the high tech development of an area.
- D The pattern shown on the map resembles the galactic city model because there are multiple central business districts and important infrastructure within Massachusetts. It shows how there are many focal points like schools universities and hospitals that create outer cities like in the galactic city model.
- E Deindustrialization can cause the economic focus to shift from the second sector to the third and quaternary sectors. There will be more service based and high skilled jobs in the area. Which can increase economic growth in an area. This can also increase local economic opportunity for high skill workers.

Page 6

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Question 1

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Question 3



Begin your response to each question at the top of a new page. Do not skip lines.

- (F) The products and services are all high tech and high skill occupations. This shows that they have moved out of manufacturing and into service based economy to a more skilled sector of the economy. The quaternary sector is focused on jobs that require good education and high level of skill. Biotechnology and gene therapy require a high amount of skill and technology which are found in the quaternary sector.
- (G) Drawing conclusions for ~~the~~ a county based on information provided at a regional scale does not ~~provide conclusions~~. Consider <sup>county</sup> regional variations. County scale is larger scale than regional, so it shows more detail. Regional scale does not show the differences between county's information so it would be inaccurate to use that <sup>regional</sup> information for individual counties, as not all counties would have the same data.

Page 7

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Question 1

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Question 3



Begin your response to each question at the top of a new page. Do not skip lines.

- A. In the inset map, the institutions such as the universities and schools tend to be located near companies and firms.
- B. A growth pole is where the growth of an industry grows and attracts services and companies near the industry to attract more people.
- C. Education infrastructure affects a region's potential for high-technology development because a region that has a lot of educational infrastructure will lead to a higher and more advanced region. For example, with more places such as universities for people/kids to learn, the increase in high-tech information that can be used by the students in the future.
- D. The pattern shown on the map resembles the galactic city model because it has a lot of isolated industries ~~and~~ that are outside of the CBD. Additionally, the pattern of universities and connection with transportation is commonly found in the galactic model.
- E. Local economic changes may be a result of deindustrialization because as an area becomes more developed, services and jobs start to become more specialized and advanced. Instead of a high secondary sector of jobs, society starts to deindustrialize and promote local changes that focus more on the future.
- F. The products and services listed in the table demonstrate that this economy has moved into the

Page 6

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quaternary sector because the services are more advanced and specialized to certain needs. For example, vaccines are an example of a product of the quaternary sector because they are focused on new medical technology that fit specific needs.

- G. A possible limitation of drawing country scale conclusions from a regional map is that we can't see any other areas of the country that may not be as advanced ~~or~~ or have as much access to medical and biotechnology. The rest of the state is also not depicted on the map, which could lead to misconclusions about other parts that don't have access to as much technology. For example, other parts of the US are isolated, which would have less medical centers and universities that are located near each other.

Page 7

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### Question 3

**Note:** Student samples are quoted verbatim and may contain spelling and grammatical errors.

#### Overview

In this two-stimulus question, students were expected to interpret two maps of major medical and biotechnological research institutions and industries in the Boston region: one larger Boston-area regional map and one inset map focused specifically on Boston and Cambridge. The maps showed the locations of major research and corporate centers as indicated in the map legend and, on the larger regional map, the location of major highways. The students were also asked to apply qualitative data from a table that listed selected medical research and development areas.

The responses to this question were expected to demonstrate students' abilities across several aspects of the course, requiring students to draw primarily from two units of the course—Unit 6: Cities and Urban Land-Use Patterns and Processes and Unit 7: Industrial and Economic Development Patterns and Processes. Responses required students to make use of Skill Category 2 (Spatial Relationships) and Skill Category 4 (Source Analysis).

In part A students were asked to interpret the inset map and describe the spatial pattern of the companies and institutions shown in Boston and Cambridge.

In part B students were asked to describe the economic geography concept of a growth pole.

Given the close ties between university medical schools and medical research and development, students were expected to broaden their perspectives in part C by explaining one way in which educational infrastructure affects a region's potential for high-technology development. Students could answer this in the positive (that a high degree of educational infrastructure could have a positive impact on high-tech development in a region) or in the negative (that a lack of educational infrastructure could limit high-tech development in a region).

In part D students were to use the map to show how the Boston region resembles one of the main 21st-century models of North American urban areas, the galactic city model.

Part E asked students to discuss local economic sector change by explaining how economic change can result from deindustrialization, meaning a decline in the secondary sector of a local economy.

In part F students were asked to explain how the products and services listed on the table demonstrate that the economy of this region has moved into the quaternary sector of the economy.

Finally, in part G, students were asked to explain why a regional map (such as the one of Boston showing medical and biotechnological research institutions) could not be used to draw countrywide conclusions because the regional scale map does not provide sufficient information to draw countrywide conclusions, i.e., the ecological fallacy).

#### Sample: 3A

#### Score: 7

The response to part A earned 1 point because it describes the agglomeration of similar economic activities, providing the example of medical schools.

### Question 3 (continued)

The response to part B earned 1 point because it describes the concept of a growth pole, providing the example of medical schools and hospitals stimulating the growth of pharmaceutical companies.

The response to part C earned 1 point because it explains one way that educational institutions produce students who are better suited to attract high-technology jobs.

The response to part D earned 1 point because it explains how the pattern shown on the map resembles the galactic city model because the area has a ring road pattern that is associated with the galactic city's transportation landscape.

The response to part E earned 1 point because it explains how deindustrialization creates lower demand for secondary jobs and higher demand for more specialized jobs, citing the examples of medical and engineering.

The response to part F earned 1 point because it explains how the products and services listed in the table require skilled workers.

The response to part G earned 1 point because it explains a limitation of drawing country scale conclusions from a regional scale map as agglomerations and local infrastructure not being visible at the national scale.

**Sample: 3B**  
**Score: 5**

The response to part A earned 1 point because it describes agglomeration of similar activities.

The response to part B did not earn a point because it does not describe the concept of a growth pole in terms of an educated pool of labor.

The response to part C earned 1 point because it explains how high-quality education attracts high-technology researchers and high-technology development.

The response to part D earned 1 point because it explains how the region has multiple development centers based on specialized products with the example of hospitals and universities.

The response to part E earned 1 point because it explains how deindustrialization caused the economy to shift from manufacturing to the quaternary sector.

The response to part F earned 1 point because it explains how the products and services listed are all linked to high-technology and high-skill occupations.

The response to part G did not earn a point because it does not explain a possible limitation of drawing country scale conclusions from a regional scale map.



### Question 3 (continued)

**Sample: 3C**

**Score: 3**

The response to part A earned 1 point because it describes universities and schools as tending to be located near companies and firms.

The response to part B did not earn a point because it does not describe the concept of a growth pole.

The response to part C did not earn a point because it does not explain how education infrastructure affects high-tech development.

The response to part D did not earn a point because it does not explain how the pattern shown on the map resembles the galactic city model.

The response to part E did not earn a point because it does not explain that deindustrialization affects local economic changes.

The response to part F earned 1 point because it explains that the services in the table are more advanced and specialized, using vaccine creation as a product example.

The response to part G earned 1 point because it explains how one limitation of drawing country level conclusions from a regional scale map is that it could lead to misconceptions about other parts of the country that may not have access to as much technology.