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Criteria B Investigating

1. Research Planning
 - (a) Formulate a focused research question related to the impact of climate change on coastal regions. Ensure your question allows for geographic investigation and analysis.
 - (b) Identify three reliable sources of information (e.g., scientific reports, government publications, or reputable news articles) that could help answer your research question. Briefly explain why each source is credible.
2. Identify two types of data (qualitative and quantitative) that are relevant to investigating climate change in coastal regions. Provide one example of each.
3. Design a data collection plan that outlines the following:
 - (a) Methods for gathering information (e.g., surveys, maps, satellite images)
 - (b) Tools or techniques used to analyze the data.
 - (c) Timeline for data collection and analysis
4. Based on your analysis, provide a well-supported conclusion answering your research question. Include evidence from your data and external sources.

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Criteria A Knowing and Understanding

Case Study Analysis

1. (a) Select a case study of a natural hazard you have studied. Answer the following: (A -6)

i. Name the natural hazard and the affected region.

Mount Pinatubo eruption that occurred in the Philippines in 1991. The region most affected was Luzon in the central Philippines.

ii. Describe two causes of the natural hazard.

1. The main cause of the hazard was subduction of the Philippine sea plate under the Eurasian plate, this caused magma formation resulting in the activation of the Pinatubo volcano which then erupted to release the excess magma.
2. The second major cause of this hazard was the high pressure buildup of gasses that had been taking place for decades which culminated and was triggered by the movement of the plate thus causing the release of these gasses through the eruption.

iii. Explain one social and one economic impact of the hazard.

Social impact of the hazard:

This specific hazard had a variety of societal impacts on the people of Luzon especially. This came in the form of mass displacement due to pyrocrastic flows and a lava dome collapse. The mass displacement caused infrastructure of over 3 provinces to get wiped out and left hundreds of thousands without a home. This caused mass social unrest and led to heavy demands for new protocols that could withstand such hazards. Socially, the eruption was devastating and the effects it had on the populus of those regions are still being understood today.

Economic impact of the hazard:

The economic impacts this hazard had started right after it occurred and are still seen today. The primary impact it had was due to the agricultural devastation which occurred shortly after the eruption. The pyrocrastic flows and lahars resulted in mass evacuation and thousands of acres of crops were wiped out. Most of the Philippines relied on agricultural and tourist revenues which were both completely nullified due to the hazard. This slow in their economy

caused by the hazard can still be felt to this day and understanding the impacts it had will allow us to prevent it from occurring in that capacity again.

(b) Evaluate one strategy used to manage or mitigate the effects of the natural hazard. (A -4)

One of the main strategies used to mitigate the effects was a large scale evacuation of certain regions which was done in collaboration with the USGS. The international help provided allowed for over 200,000 people to get evacuated to safety thus keeping the loss of life below 1000 individuals. This was the most successful aspect of the mitigation strategy as simply moving infrastructure or important production centres was not easy and the plan did not account for the secondary effects of the hazard which included lahars. These secondary effects had further impacts like a continued devastation of the agricultural sector which the strategy had not accounted for.

2. Human and Physical Interactions

(a) Describe how climate change affects coastal regions. Provide two examples. (A -4)

Climate change has a variety of massive impacts on the world, specifically in coastal regions these effects are enunciated and form two groups, the primary effects and the secondary ones. The most prominent example of a primary effect is rising sea levels, this is particularly threatening towards island nations like Tuvalu. In 2017 the government realized the loss of land that was already occurring around their coasts. Furthermore, crop flooding has already begun and their agricultural sector is taking massive hits. To combat this the government implemented a plan called the Tuvalu coastal adaptation plan in 2017 to try and work with the UNDP and build coastal defenses. The secondary impacts of this are vast and span both the economic and social sector. The agricultural sector makes up around 10% of their GDP and the flooding events are causing mass social unrest and financial concern. Another example of the impact's climate change can have is seen in the little Haiti area in Miami. In recent years the Miami coastlines have flooded consistently and the risks are vast, many high-income individuals have been displaced as a result. These displaced individuals move to smaller communities that are elevated on the coast thus causing gentrification. These effects began in the 2010s and peaked after Hurricane Irma in 2017. The direct damage these climate induced events have are vast and include thousands displaced and many dead or injured. The secondary effects span a longer time frame and are only increasing as time passes. Solving these issues is paramount to developing a truly safe future not just for us, but for the generations that follow.

(b) Explain the relationship between economic development and resource consumption. (A -3)

Historically economic development has almost always lead to resource consumption. This can be attributed to the higher standard of living, higher population and a requirement of more

resources for those people. Moreover economic development has led to the rise of industrialization and manufacturing increases. For example China began growing economically in the 1980s. This was mainly as a result of the special economic zones policy that started changing agricultural areas to industrial ones. This change caused a massive increase in resource usage for manufacturing and resource extraction for further economic gain.

(c) Discuss one positive and one negative effect of tourism on the environment. (A -3)

Tourism is one of the most prominent forms of globalization, over 1 billion people travel each year. Most people believe tourism is harming our world more than its helping. The most prevalent examples used is the vast pollution that many forms of transportation produce. This is extremely concerning as the rate of greenhouse gas release is only increasing and the effects of climate changes are showing now more than ever. While this is a concerning aspect of tourism, we cannot forget the benefits it can present to our environment as well. Tourism pushes people to new places, they experience new aspects of nature and are as a result are further encouraged to protect it. An example of this is the eco-tourism schemes put in place by the tourism authority in Costa Rica. They use the natural landscape to get more tourists involved in activist activities by presenting the true beauty of the natural world. They use specific guidelines and rules to preserve their incredible ecosystems while also providing a glimpse into its beauty for any visitors.



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Criteria D: Thinking Critically

Analyzing Geographic Issues

1. Draft a letter to a local policymaker advocating for sustainable coastal management. In your letter:
 - (a) Identify a specific issue facing your local coastline.
 - (b) Propose a practical solution.
 - (c) Justify your proposal with geographic evidence.
2. Examine how the physical and human geography of coastal regions makes them vulnerable to climate change. Provide three examples to support your analysis.

Evaluating Solutions and Perspectives

3. Compare and contrast the approaches of two countries in responding to sea-level rise. Consider:
 - (a) Policies implemented.
 - (b) Successes and challenges faced.
 - (c) Long-term sustainability.



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Criteria C: Communicating

Structured Responses

1. Write a structured paragraph explaining how rising sea levels affect coastal communities. Include the following:
 - (a) A clear topic sentence
 - (b) At least two geographic examples
 - (c) Appropriate geographic vocabulary
2. Create a one-page report summarizing the effects of climate change on a specific coastal region. Your report should include:
 - (a) Introduction (brief background on the region)
 - (b) Main impacts of climate change (e.g., erosion, flooding, displacement)
 - (c) Mitigation and adaptation strategies
 - (d) Conclusion (summary and future outlook)
3. Draft a letter to a local policymaker advocating for sustainable coastal management. In your letter:
 - (a) Identify a specific issue facing your local coastline.
 - (b) Propose a practical solution.
 - (c) Justify your proposal with geographic evidence.