Disaster Science and GIS Education Enabled by ArcGIS StoryMaps: Spatial Learning Tools for Advancing Youth Geography Education

NATIONAL GEOGRAPHIC

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TEXAS A&M UNIVERSITY Geography

Abstract

Geographic Information Systems (GIS) play a vital role in disaster management and resilience by providing extensive decision support for risk assessment, vulnerability mapping, emergency response, damage assessment, recovery, and public communication. However, the current education in natural hazards and environmental sciences for high school students primarily relies on textbooks, which often lack interactive and engaging components, resulting in a monotonous learning experience. To bridge this gap, we developed a series of AP Environmental Science and AP Human Geography ArcGIS StoryMaps specifically designed for high school students. These StoryMaps, funded by the National Geography Society, offer rich content on various environmental and geographic topics, featuring interactive elements such as traveling world maps, programmed galleries, and multiple-choice and free-response questions. By incorporating these StoryMaps into the curriculum, students can develop a deeper understanding of subjects like Earth System Resources, Atmospheric Pollution, and Industrial and Economic Development Patterns and Processes. Ultimately, this integration of StoryMaps lays the groundwork for enhanced youth education in GIS and disaster science.
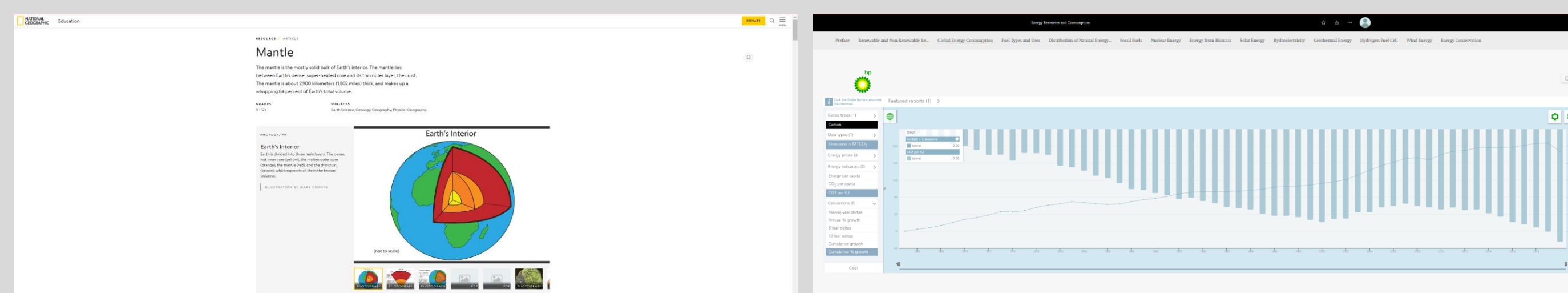
National Geography Society

The National Geographic Society is a non-profit scientific and educational organization that was founded in 1888 in the United States. Its mission is to inspire people to care about the planet by promoting conservation, exploration, and education. The society is known for its iconic yellow-bordered magazine, National Geographic, which features articles and photographs on a wide range of topics including geography, history, culture, wildlife, and the environment. The National Geographic Society also supports various scientific research and exploration projects, funds grants and scholarships, organizes educational programs, and operates a television channel. It is recognized worldwide for its contributions to the fields of geography, cartography, archaeology, and natural sciences.

ArcGIS StoryMaps

ArcGIS StoryMaps is an educational web-based platform developed by Esri, designed to create interactive narratives that incorporate maps, images, videos, and text. It is a powerful tool for educators to engage students in immersive learning experiences. With customizable templates and a user-friendly interface, ArcGIS StoryMaps allows educators to create lessons that integrate geographic information system (GIS) technology. It enables students to explore and analyze data, visualize concepts, and understand spatial relationships in a dynamic and interactive way. By combining storytelling with maps and multimedia, ArcGIS StoryMaps enhances the educational process, making it an invaluable resource for promoting deeper understanding and engagement in various disciplines.
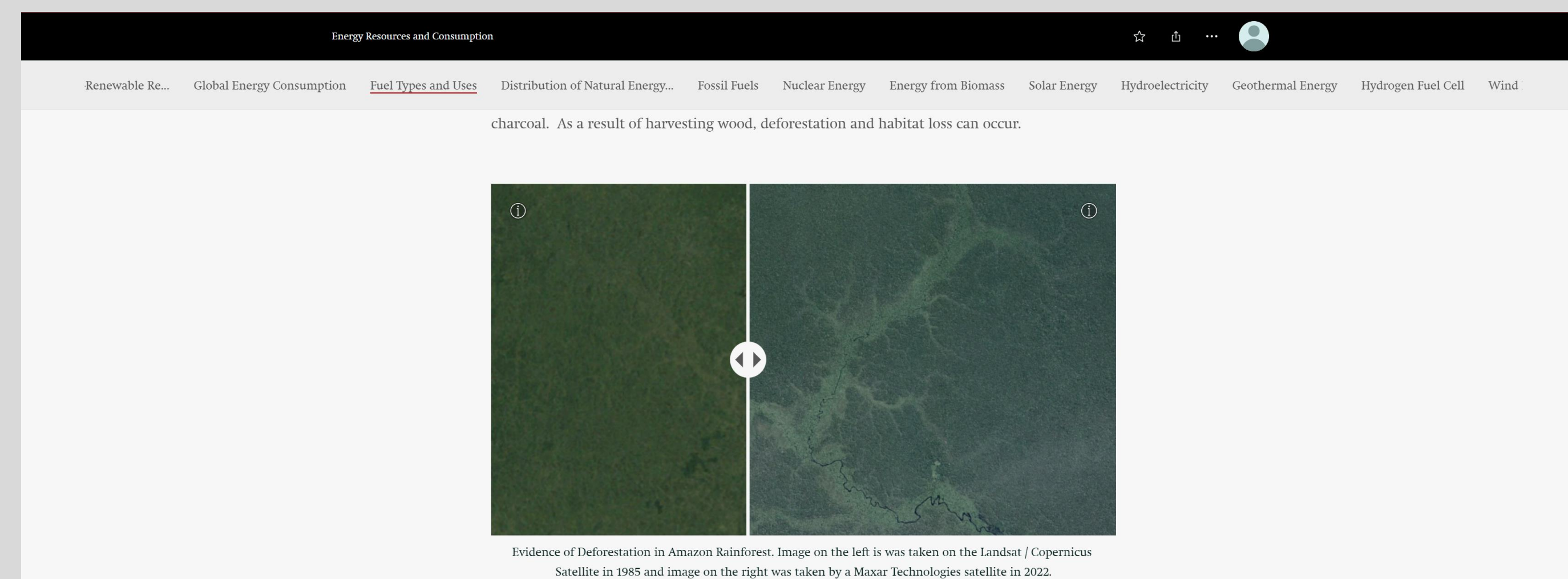
StoryMap Showcase: AP Environmental Science

Embedded extended readings from NatGeo Society online educational resources (left) and bp worldwide energy consumption report & trend analysis toolkit (right)

Rich textual & visual elements on key APES concepts (soil horizons on left) with interactive maps (global solar radiation on right)

Much room for educational creativity - programmed in arcpy code: an interactive slider demonstrating the evidence of Amazon Rainforest Deforestation
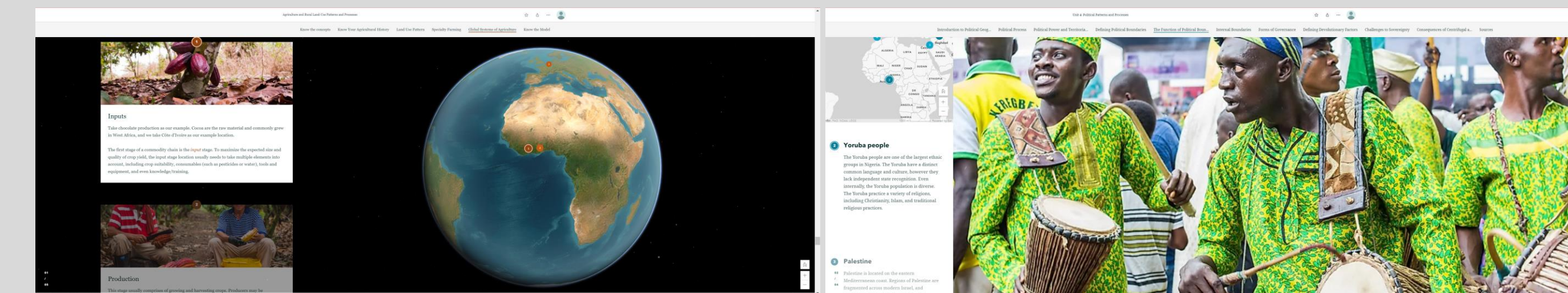
Check out our Storymaps!

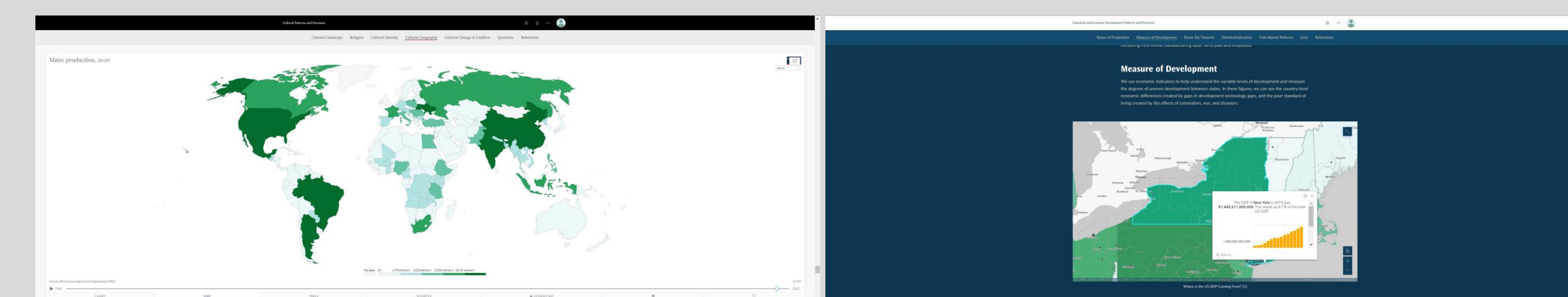AP Environmental Science Unit 6 - Energy Resources and Consumption

AP Human Geography Unit 5 - Agriculture and Rural Land-Use Patterns and Processes
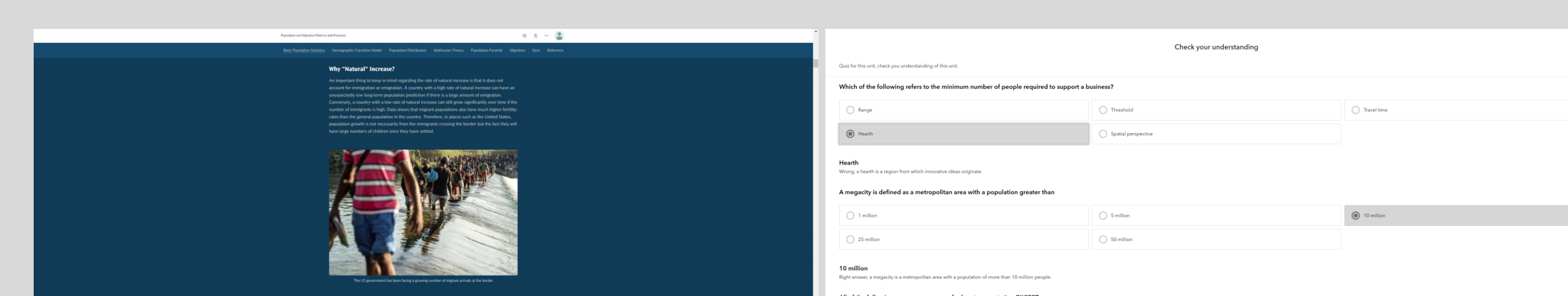
StoryMap Showcase: AP Human Geography

Interactive 3D and 2D world maps with graphic and textual slidecards introducing cocoa global supply chain (left) and stateless nations (right)

Embedded link to outside sources & statistics, ready for on-page interaction including zooming in regions of interests, clicking for more info and many other functionalities

Introduction to key concepts for AP exam preparation (left)
Embedded quick tests for the material covered on the Storymaps, enabled by Survey123 (right)

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