Resource consumption and wealth
from the Esri GeoInquiries™ collection for Environmental Science

Audience – Advanced environmental science   **Time required – 12 minutes**

Activity	This activity highlights patterns of poverty and wealth to address overconsumption and resource extraction.
Science Standards	APES:II. The Living World APES: III.B. Population: Strategies for sustainability; impacts of population growth
Learning Outcomes	• Students will determine patterns of wealth distribution globally. • Students will identify sustainable suggestions for regions of the world.

Map URL: http://esriurl.com/enviroGeoinquiry13

🔧 Engage

Where in the world is the wealth?

❓ Which regions of the world earn the highest annual salaries? *[Western Europe, North America, and Australia]*

❓ What are some of the top earning countries? Are there any surprises? *[Answers may include the U.S., Canada, the UK, Germany, and the United Arab Emirates. Students may be unfamiliar with smaller countries.]*

➜ In the Details pane, click the Show Contents Of Map button.

➜ Point to the Gross National Income By Country, 2014 layer, and click the Show Table button.

➜ In the table, click the Gross National Income Per Capita, PPP column header and sort descending.

❓ What countries have the top five highest gross national income (GNI) earnings in the table? *[Qatar, Singapore, the United Arab Emirates, Norway, and Hong Kong]*

❓ What are the lowest GNI earning countries? (Hint: In the same column, sort ascending.) *[The Central African Republic, the Democratic Republic of the Congo, Liberia, Burundi, and Malawi]*

🔍 Explore

What are the negative effects of high or low wages?

❓ What environmental issues have you heard about that one of these high-earning countries faces? *[Overconsumption, lots of garbage, unsustainable resource usage, and resource siphoning]*

❓ What environmental issues have you heard about in the low-earning countries? *[Selling raw resources, cash crops but local-goods poor, and exposure to toxins and disease]*

💬 Explain

Who leaves the lights on?

➜ Click the checkbox to the left of the layer named, Energy Use By Country, 2010.

❓ Per capita, what countries consume the most energy? *[U.S. Virgin Is, Trinidad & Tobago, Qatar, UAE, Iceland]*

– Energy use is a good indicator of industrial productivity.

❓ What are life expectancy and adult literacy like in low-energy-consuming countries? *[Countries using less mechanized labor often attend less school and live shorter lives.]*

more ▶

✏️ Elaborate

What does human quality of life look like in different countries?

- The Human Development Index (HDI) combines several country statistics to monitor progress toward improving quality of human life.
- → Turn off all selected layers, and turn on the Human Development Index By Country, 1980-2010 Time Series layer. Notice a new time slider bar appears at the bottom of the map.
- ? What areas of the world have made improvements? *[Answers may include North Korea, China – Hong Kong, Singapore, Vietnam, Argentina, Chile, and India.]*
- ? What do you think has contributed to this growth? *[Answers may include outsourcing, online services and less-expensive labor yet competitive skills.]*

✅ Evaluate

How do earnings and energy consumption vary with human development?

- ? How does GNI relate to HDI countries pre-2010? *[Health increase typically precedes income increase.]*
- ? How does GNI relate in countries with high HDI after 2010? *[Sweden or the UK, as opposed to Chile or India, still have a higher GNI, despite the HDI increasing in the latter countries. Presumably, Chile and India will increase their GNI in time.]*
- ? Does greater energy usage result in a greater increase in industrial production? *[Perhaps not for every country.]*

IDENTIFY A MAP FEATURE

- Click any feature on the map, and a pop-up window will open with information.
- Links and images in the window are often clickable.
- An arrow icon in the upper-right of the window indicates that multiple features have been selected. Click the button to scroll through the features.

TURN A MAP LAYER ON AND OFF

- Make sure that the Details pane is selected, and click the Show Contents Of Map button.
- To show individual map layers, select the check boxes next to the layer names. Hint: If a map layer name is light gray, zoom in or out on the map until the layer name is black. The layer can now be turned on.

Next Steps

DID YOU KNOW? ArcGIS Online is a mapping platform freely available to public, private, and home schools. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at http://www.esri.com/schools.

THEN TRY THIS...

- Use an ArcGIS Online organizational subscription to calculate hot spots of high consumption and unsustainable resource extraction via raw resource sales such as energy, building materials, food or fabric..
- Visualize the countries to show a life expectancy ratio to energy consumption. Who gets the most life from their produced goods?

📄 TEXT REFERENCES

This GIS map has been cross-referenced to material in sections of chapters from these texts.

- *Living in the Environment (15th edition) by Thompson Publishing — Chapter 1*
- *Biology Concepts and Connections (6th edition) by Pearson Publishing — Chapter 36*
- *Environmental Science for AP by Freeman Publishers — Chapter 20*
- *BSCS Biology by McGraw-Hill — Chapter 1*

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