Resources in the Amazon Answer Key

Using the map, Amazonia: The Human Impact, explore the location of different natural resources in the rain forest. Think about the development that needs to occur to extract the resources (building mines, dams, and oil and gas blocks) and how this might change the rain forest and affect the indigenous people who live in the area. Before you get started, read the following information about the different resources:

Mining: The mining industry is very important to South America's economy. Mining is the process of extracting ore from the Earth. Mineral resources including iron ore, copper, gold, and tin are extracted through mining.

- **Iron ore:** South America contains about 20% of the world's iron ore reserves. Iron ore and steel (which is made from iron) are used in construction and machinery throughout the world.
- **Copper:** South America contains more than 25% of the world's copper reserves. Copper is used in electrical wiring and equipment because it is a good conductor of heat and is resistant to corrosion.
- **Gold:** Gold is also extracted through mining. Because of its value and high demand for luxury goods, illegal miners burn parts of the forest to quickly access areas with gold. They also use mercury to separate gold, which contaminates rivers and is a toxin that enters the food chain when it is taken up by fish.
- **Tin:** Tin is another mineral extracted through mining. It is used to solder metallic surfaces.

Oil and Gas: Oil and natural gas are also very important to South America's economy. They are drilled and then used for energy and fuel. Oil extraction can release toxic by-products into rivers and broken pipelines can result in leakage and oil spillage.

Hydroelectric energy: Moving water is used to make hydroelectric energy. To harness energy from flowing water, the water must be controlled. Usually a dam is constructed on a river to create a reservoir. The water is then channeled through tunnels in the dam that cause turbines to turn, which ultimately leads to the generation of electricity. While hydroelectricity relies on water, a clean renewable energy source, the construction of the dams needed to harness that energy can affect the local plant and animal life, as well as cause humans to relocate.

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Resources in the Amazon Answer Key, continued

Part 1. Where are different resources located in the Amazon?
Use the map, Amazonia: The Human Impact, to answer the questions below.

1. Mining: Locate the description of minerals under the heading Resources. Read the description and answer the following questions:

a. What mineral resources are mined in the Amazon? Gold, copper, tin, and iron ore are mined in the Amazon.

b. How much of the region is mined? 21% of the region is mined.

c. Where are most of the mines in production located? Students will have to draw an inference from the map based on their observations. Looking at the distribution of mines represented on the map, most of them seem to be located in the northern part of the Amazon, mostly in Guyana.

d. What are the consequences of mining? Landscape devastation, water contamination, and mercury pollution are all consequences of mining.

2. Oil and Gas: Locate the description of oil and gas under the heading Resources. Read the description and answer the following questions:

a. How many blocks are under production in the Amazon? 107 blocks

b. Where are most of these blocks located? The blocks are located mostly in the Andes in Peru, Ecuador, and Bolivia.

c. What are the consequences of developing more oil and gas blocks? The consequences are more roads and deforestation.

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Resources in the Amazon Answer Key, continued

3. Hydroelectric Projects: Locate the description of hydroelectric projects. Read the description and answer the following questions:

a. How much electricity does hydropower provide in the following countries:

Ecuador: more that one third

Bolivia: more that one third

Peru: about one fourth

b. Where are most of the operating hydropower plants located? They are located in southern Brazil and near the Andes in Peru, Ecuador, and Bolivia.

c. What threatens the future of hydropower? Deforestation is reducing rainfall and river flow. Hydropower requires flowing water, so if the water is reduced, so is the sustainability of hydropower.

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Resources in the Amazon Answer Key, continued

Part 2. Where are indigenous territories and managed areas located in the Amazon?
Managed areas include state and federal parks and reserves that are off-limits to any kind of development. Indigenous areas are set aside to respect the ancestral grounds and pristine wilderness of the indigenous people in the area. While it is illegal to develop in both managed areas and indigenous territories, it is difficult to enforce these laws. Those areas that are closest to mines, dams, and roads are at greatest risk of being damaged by illegal miners, loggers, and developers. This could lead to deforestation in areas that could destroy parts of the forest and cause indigenous populations to relocate.

Looking at the map, Amazonia: The Human Impact, read the description under Managed Areas and answer the following questions:

1. How many managed areas are in Amazonia? 713 managed natural areas

2. How many indigenous territories are in Amazonia? 2,467 indigenous territories

3. How much of Amazonia is covered by managed areas or indigenous territories? 51%

4. Compare the Managed Areas map with the Resources map.

a. What observations can you make about mines in production and indigenous territories? Why do you think you are observing these patterns? Answers will vary, but students should notice that there seems to be a pattern of high mining activity in Guyana and few indigenous territories. Where the mining activity ends, there are more indigenous territories. This could suggest that the mines caused indigenous people to relocate to areas that were not damaged.

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Resources in the Amazon Answer Key, continued

b. What observations can you make about oil and gas in production and indigenous territories? Why do you think you are observing these patterns? Answers will vary. There is a lot of oil and gas production in Ecuador and more is under exploration in Peru. There are still some indigenous territories in both of these areas. Students may suggest that there are not as many areas that are in production, so perhaps oil and gas production has had less of an effect on indigenous territories. But, if they look at areas in Peru that are under exploration, under tender, and open for bidding, they may be concerned about the indigenous people living in those areas.

5. Compare the large map with the Resources map.

a. What observations can you make about operating hydroelectric projects and indigenous territories? Why do you think you are observing these patterns? What observations can you make about operating hydroelectric projects and indigenous territories? Why do you think you are observing these patterns? Answers will vary, but there seems to be a pattern of high hydroelectric projects in southern/southeastern Brazilian Amazon and few indigenous territories. Where the power production ends, there are more indigenous territories. This could suggest that the development caused indigenous people to relocate to areas that were not damaged.

b. In general, what might be some consequences to indigenous territories if mining, oil and gas extraction, and hydroelectric power continue to develop in Amazonia? Based on the trends in this data, it seems to suggest that if development continues, indigenous people will have to relocate.

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Resources in the Amazon Answer Key, continued

Part 3. What areas of Amazonia are being explored for further resources?

1. Mining: Review the mine blocks legend and locate areas on the map that are under exploration, under tender, or open for bidding.

a. Where are most of the mining sites that are under exploration, tender, or open for bidding?

Where are most of the mining sites that are under exploration, tender, or open for bidding? They are on the border of Brazil and Venezuela, the border of Brazil and Colombia, and several areas in Brazil around the Amazon River and south/southeast.

b. What areas of proposed mining sites could encroach on indigenous territories? Circle those areas on the map. Answers will vary and may include the border of Brazil and Venezuela, the border of Brazil and Colombia, and several areas in Brazil around the Amazon River and south/southeast.

c. Identify one area of Amazonia that has the potential to be mined that you believe should be managed. Use other parts of the map (land cover, habitat loss, and roads) to provide more evidence to support your claim. Answers will vary.

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Resources in the Amazon Answer Key, continued

2. Oil and Gas: Review the oil and gas legend and locate areas on the map that are under exploration, under tender, or open for bidding.

a. Where are most of the oil and gas sites that are under exploration, tender, or open for bidding?
They are located in most of Peru, some of Colombia and Bolivia, and a patch in Brazil.

b. What areas of proposed oil and gas sites could encroach on indigenous territories? Circle those areas on the map. Answers will vary, but students should note any of the sites in Peru.

c. Identify one area of Amazonia that has the potential to extract oil and gas that you believe should be managed. Use other parts of the map (land cover, habitat loss, and roads) to provide more evidence to support your claim. Answers will vary.

3. Hydroelectric Projects: Review the hydroelectric plants legend and locate areas on the map that are planned or potential.

a. Where are most of the planned or potential hydroelectric plants? There are several planned or potential plants in the southern part of Brazilian Amazonia.

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Resources in the Amazon Answer Key, continued

b. What areas of planned or potential hydroelectric plants could encroach on indigenous territories? Answers will vary. This area does not have much of an indigenous presence, but there are two territories that stretch a little more south that could be affected by new plants.

c. Identify one area of Amazonia that has the potential to be a hydroelectric plant that you believe should be managed. Use other parts of the map (land cover, habitat loss, and roads) to provide more evidence to support your claim. Answers will vary.

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