Name _____ Date _____

Exploring the Amazon Rain Forest
Answer Key

The MapMaker Interactive is an interactive Geographic Information Systems (GIS) mapping tool. It includes features that help you view and customize maps to explore questions you are interested in investigating.

Go to the MapMaker Interactive at natgeoed.org/mapmaker-interactive. Navigate to the Help section, located in the upper right corner of the page, and explore its different tools and features.

Part 1. General Information about the Amazon Basin

Open a MapMaker Interactive geo-tour using the following URL, which will load the Geography and Wildlife of the Amazon Basin geo-tour: natgeoed.org/geography-wildlife-amazon. At the bottom, you will see several bookmarks. Select the Where is the Amazon Basin? bookmark.

1. The Amazon Basin is outlined in red on the map. What countries are included in the Amazon Basin?

Brazil	Colombia	Guyana
Venezuela	Suriname	Peru
French Guiana	Ecuador	Bolivia

2. To the right of the map, you will see four tabs. Click on the **Layers** tab and select **Add Layer.** Select **Environment** from the list of categories on the left of the map. You will see **Land Cover** as an option. Read the description of what this layer will add to your map. Then click it (you know it is selected when the green plus sign turns to a red minus sign). Click **Done.** You should now see the Land Cover layer added to your list of layers. How did this change your map?

   Answers will vary. Possible response: Different colors popped up on the map representing different types of land cover. The Amazon Basin turned dark green with several tan and pink spots sprinkled throughout the basin.

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3. Click on the **Legend** tab. What are some of the most common land cover types you see throughout the Amazon Basin? (Hint: If it is hard to tell where the basin is, return to the Layers tab and move the Transparency button along the bar until you can see the outline of the Amazon Basin along with the Land Cover types represented within the basin. Zoom in (use the + tool) or out (use the – tool) so you can explore the area more closely.)

   Answers may vary. Students should identify at least one of the green forest colors as the most common land cover type (evergreen broadleaf, deciduous needleleaf, and/or woodland). In addition to the forest colors, they should also note the splotches of yellow/tan or reddish-brown (wooded grassland or grassland) and pink (cropland) on the map.

4. Locate the Amazon River in Brazil and zoom in around the river. What do you notice about the land cover around the river? Why do you think the map looks like this?

   Answers will vary. Students should note that there is a long band of tan around the river suggesting the land is not a dense forest like deeper areas of the Amazon Basin. Students may have more than one hypothesis: it is difficult for plants to grow around the river or this is due to human effects of deforestation from cutting timber or clearing trees for cattle.

Part 2. Scenario Research

In the MapMaker Interactive, use the following URL to load the Three Construction Scenarios in the Amazon geo-tour: natgeoed.org/three-scenarios-amazon.

1. Circle the scenario you are researching.
   Belo Monte Dam Pucallpa-Cruzeiro do Sul Road S11D Mine

2. Using the Construction Projects in the Amazon geo-tour, identify the location of your scenario by reading the information marked on the map. Look at the photograph associated with the information to get a sense of what the area really looks like. What are your observations?

   Answers will vary.

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3. Zoom in to your area at least three times, or until you see the cities. You should see some nearby towns and rivers labeled. (Hint: For the Pucallpa-Cruzeiro do Sul Road scenario, move the map so both towns are visible at the same time.)

4. Specify an area to explore.

   - For the S11D Mine and the Belo Monte Dam, select the square or circle from the tool bar and draw this shape around your study area. This is the area you will focus on for the questions that follow.
   - For the Pucallpa-Cruzeiro do Sul Road, draw a square or circle that includes both cities. Then draw a line starting in one city and ending in the other. How far is Pucallpa from Cruzeiro do Sul? about 138 miles Explore the area in your shape and around this line as your study area.

5. Add the **Land Cover** layer and describe the most common land cover types in that area. (Hint: If it is difficult to determine colors through your study area shape, move the Transparency bar for the land cover layer all the way to the right.)

   Belo Monte Dam: evergreen broadleaf forest, wooded grassland, water, some grassland

   Pucallpa, Peru: evergreen broadleaf forest, wooded grassland, water; Cruzeiro do Sul: evergreen broadleaf forest, wooded grassland, some cropland

   S11D Mine: forest (evergreen broadleaf and mixed), wooded grassland, woodland

6. Add additional layers (listed in the chart below) and make observations about each of those layers. To make observations about a layer, click on the **Legend** tab to identify what the different colors mean. If you are having a problem seeing a layer, try one of these three options:

   - Move the layer to the top of the layer list by clicking on the crosshairs in the picture.
   - Move the transparency bar to the left on the layers you are not interested in and move it to the right on the one you are interested in.
   - Remove layers you are no longer interested in. You can add them later.

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Below are some suggested layers. Add these layers and make observations about your study area in the table below.

Layer	Observations
Indigenous Populations	Answers will vary.
Population Density	Answers will vary.
Optional Layer 1*:	Answers will vary.
Optional Layer 2*:	Answers will vary.

*For optional layers, consider what else might be impacted by development in the area. As one example, food production, particularly soybean production, could be interesting to look at.

7. Continue exploring your scenario area in the MapMaker Interactive. Streets, for example, is not a layer but another base map that may be of interest. Change the **Base Map** to see what streets are in the area. It may be interesting to look at patterns between streets and land use. Consider that in order to construct a road, dam, or mine, many new streets will have to be constructed. What will this mean for the surrounding area?

   Answers will vary. Students should notice a pattern between deforestation and roads. In general, there is more open land or shrubland and less forest near roads. Statistically, research has found that deforestation does correlate with roads as they provide access for loggers, miners, and ranchers to get to areas of the forest that were previously untouched. This could have devastating effects on the rain forest.

8. In general, what patterns did you notice about your study area and the different layers of information you explored?

   Answers will vary.

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Part 3. Preparing to Present Findings

Use the online resources listed on the handout To Build or Not To Build? Three Construction Scenarios in the Amazon or in the Three Construction Scenarios in the Amazon geo-tour: natgeoed.org/three-scenarios-amazon to further investigate your assigned problem scenario. Then follow the steps below.

1. Based on your findings from the MapMaker Interactive and online research, list trade-offs between the advantages of building the dam, road, or iron mine and the respective impacts on the surrounding area covered in the scenario.

Advantages	Disadvantages
Answers will vary.	Answers will vary.

2. Prepare to share your findings with the class. Be sure to:
   - identify stakeholders (Who will be affected by the construction?);
   - address stakeholder concerns;
   - address trade-offs between the advantages of construction and its impact on the Amazonian ecosystem and other stakeholders; and
   - include a list of factors that should be investigated before a final decision is reached.

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