Environmental Geography of Southeast Asia: Module Materials

TEKS Alignment

(8) **Geography.** The student understands how people, places, and environments are connected and interdependent. The student is expected to:
   (A) compare ways that humans depend on, adapt to, and modify the physical environment, including the influences of culture and technology;
   (C) evaluate the economic and political relationships between settlements and the environment, including sustainable development and renewable/non-renewable resources.

(19) **Science, technology, and society.** The student understands the impact of technology and human modifications on the physical environment. The student is expected to:
   (A) evaluate the significance of major technological innovations in the areas of transportation and energy that have been used to modify the physical environment;
   (C) examine the environmental, economic, and social impacts of advances in technology on agriculture and natural resources.

(20) **Science, technology, and society.** The student understands how current technology affects human interaction. The student is expected to:
   (B) examine the economic, environmental, and social effects of technology such as medical advancements or changing trade patterns on societies at different levels of development.

Key Vocabulary
- Double cropping
- Deforestation
- Biodiversity

Module Introduction
Environmental Degradation is a global problem, but some regions of the world have more difficulty addressing the issues and finding solutions than others. Less developed and newly industrializing countries often lack the resources needed to reduce the destruction caused by the primary and secondary economic activities which typically comprise the majority of their economic systems. In addition, governments in these countries may be unwilling to address environmental issues due to fear of losing industries and jobs vital to the future economic progress of the nation. Or, these governments may be unwilling to divert resources from issues they feel are more immediately pressing – such as education, health care, housing and sanitation. The final remaining obstacle facing countries both willing and able to address environmental issues is enforcement. Illegal activities are often even more destructive than legal

*This project is funded in part by a grant from the National Geographic Society Education Foundation.*
ones and enforcing the laws that are present again places governments in the position of diverting resources from other important issues.

There are numerous resources available online which deal with the various forms of environmental degradation across the globe. A few of the resources below focus on issues specific to Southeast Asia, but others address topics globally. Since Southeast Asia is taught towards the end of the school year in many districts, this unit provides an excellent opportunity to teach concepts at the regional level and apply them globally.

This module primarily deals with environmental issues such as deforestation and pollution. (Issues concerning climate change will be addressed in another module.) The video produced by TAGE provides an excellent introduction to the topic for teachers and students. The case study focuses on one of the world’s largest mining operations and its effects on the environment in Indonesia. The lesson provided with this module allows students to select a topic they are interested in pursuing. The students will produce their own “documentary” introducing the issue and presenting possible solutions.

**Case Study**
Grasberg Mineral District – Power Point

**Video Presentations**
- **Environmental Degradation**
  - http://stream.its.txstate.edu/users/tage/FullI柘_Version_Env.mov
- **Perspectives of Geography**
  - http://stream.its.txstate.edu/users/tage/PerspectiveOfGeo_Env.mov
- **Dams along the Mekong River**
  - http://stream.its.txstate.edu/users/tage/Dams_Env.mov
- **Deforestation**
  - http://stream.its.txstate.edu/users/tage/Deforest_Env.mov
- **Global Warming**
  - http://stream.its.txstate.edu/users/tage/Global_Warming_Env.mov
- **Wood Resources**
  - http://stream.its.txstate.edu/users/tage/WoodResources_Env.mov
- **Tsunami**
  - http://stream.its.txstate.edu/users/tage/Tsunami_Env.mov
- **Environmental Problems**
  - http://stream.its.txstate.edu/users/tage/Env_Problems_Env.mov
- **Flooding**
  - http://stream.its.txstate.edu/users/tage/Flooding_Env.mov
- **Physical Geography**
  - http://stream.its.txstate.edu/users/tage/Physical_Geo_Env.mov
- **Resource Base**
  - http://stream.its.txstate.edu/users/tage/ResourceBase_Env.mov
Readings and Visual Resources

Deforestation in Malaysian Borneo –

Collection of satellite photos, animations and a Google Earth kml file illustrating the impact plantation farming is having on the forests. Images are provided by NASA and Visible Earth.


Earth Pulse: State of the Earth 2010 Vital Statistics Interactive Map – National Geographic

This interactive map contains multiple layers of data including information on deforestation, cropland and pasture density, Population density and meat consumption.


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Environmental Issues in Southeast Asia

This map highlights some of the major environmental issues in Southeast Asia

-  [http://www.roebuckclasses.com/105/regions/seasiaspac/seasia/seasiaphys/physseasia.htm](http://www.roebuckclasses.com/105/regions/seasiaspac/seasia/seasiaphys/physseasia.htm)
  #Environment
Agriculture

This map highlights some of the major crops and types of agriculture found in Southeast Asia

- [http://www.roebuckclasses.com/105/regions/seasiaspac/seasia/seasiaphys/physseasia.htm](http://www.roebuckclasses.com/105/regions/seasiaspac/seasia/seasiaphys/physseasia.htm) #Environment

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Population and Natural Resources Case Study: Is population growth responsible for the loss of rainforests?

This case study investigates deforestation in Vietnam and the effects of development, population and natural resources policies. As the reading level might be challenging for high students, the case study is listed here as a background source for teachers. However, it might prove to be a good resource for an AP Human Geography course. The module is part of a collection of online modules designed for college courses by the AAG Center for Global Geographic Education.

- [http://cgge.aag.org/PopulationandNaturalResources1e/CS_Vietnam_Sep10/index.html](http://cgge.aag.org/PopulationandNaturalResources1e/CS_Vietnam_Sep10/index.html)

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Lesson Plan

Environmental Degradation in Southeast Asia Documentary Lesson

Environmental Degradation Documentary Lesson Outline

Environmental Degradation Documentary Student Handout

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Texas Alliance for Geographic Education
http://www.geo.txstate.edu/tage/
September 2013
Environmental Geography of SE Asia: Environmental Degradation Documentary

Grade Level: 9-12

Created By TAGE Teacher Consultant: Michelle Crane

Time Frame: Five 55 minute periods + work outside of class as necessary.

Curriculum Connection: This lesson is intended to be used in a World Regional Geography course in a unit on Southeast Asia. Since this unit tends to fall towards the end of the year, it is assumed that students are already familiar with general concepts of economic activities and their effects on the environment, sustainable development, renewable and non-renewable resources, biodiversity, and the impact of technology on the environment. If students have not been exposed to these concepts prior to this lesson, a brief introduction will be necessary. In addition, prior to beginning this lesson, students should be familiar with economic activities and resources available in Southeast Asia.

Learning Outcomes:
Upon completion of this lesson, students should be able to:
1. Compare ways humans modify the environment in Southeast Asian countries,
2. Evaluate the economic and political relationships which effect renewable and non-renewable resources and their production in Southeast Asia,
3. Examine the economic, environmental, and social impacts of technological innovations in agriculture and natural resources have had in Southeast Asia,
4. Evaluate the significant technological innovations which have impacted the environment of Southeast Asia and how these impacts vary depending upon levels of development, and
5. identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution.

TEKS Strand(s) Objective(s):
(8) Geography. The student understands how people, places, and environments are connected and interdependent. The student is expected to:
   (A) compare ways that humans depend on, adapt to, and modify the physical environment, including the influences of culture and technology;
   (C) evaluate the economic and political relationships between settlements and the environment, including sustainable development and renewable/non-renewable resources.
(19) Science, technology, and society. The student understands the impact of technology and human modifications on the physical environment. The student is expected to:
(A) evaluate the significance of major technological innovations in the areas of transportation and energy that have been used to modify the physical environment;
(C) examine the environmental, economic, and social impacts of advances in technology on agriculture and natural resources.

(20) **Science, technology, and society.** The student understands how current technology affects human interaction. The student is expected to:
   (B) examine the economic, environmental, and social effects of technology such as medical advancements or changing trade patterns on societies at different levels of development.

(22) **Social studies skills.** The student communicates in written, oral, and visual forms. The student is expected to:
   (B) generate summaries, generalizations, and thesis statements supported by evidence;
   (C) use geographic terminology correctly;
   (D) use standard grammar, spelling, sentence structure, and punctuation; and
   (E) create original work using proper citations and understanding and avoiding plagiarism.

(23) **Social studies skills.** The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings. The student is expected to:
   (C) use problem-solving and decision-making processes to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution.

**Materials:**

<table>
<thead>
<tr>
<th>For Student Use</th>
<th>For Teacher Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Degradation Documentary Student Handout</td>
<td>One per student</td>
</tr>
<tr>
<td>Computer lab with access to the internet and PhotoStory 3 loaded; make sure the students have access to microphones for recording their dialogue.</td>
<td>PhotoStory 3 is a free software program available online. Make sure it is installed on the computer lab prior to beginning the lesson.</td>
</tr>
<tr>
<td>Land Use/Land Cover Map</td>
<td>Located on the module website</td>
</tr>
<tr>
<td>Computer with projection device and access to the internet</td>
<td></td>
</tr>
</tbody>
</table>

**References:**

**Strategies:** In this lesson, students will complete a map analysis activity based upon the Basic Modes of Spatial Thinking as a warm up. Then, students will use the Geographic Inquiry
method to explore a major environmental issue in Southeast Asia. Finally, students will use a software program entitled Photo Story to create a documentary film about the issue.

**Procedures to conduct the lesson:**

Starting the Lesson: 5 minutes

**Warm Up:** Display the map entitled *Land Use/Land Cover*. Found at: [http://www.roebuckclasses.com/105/regions/seasiaspac/seasia/seasiaphys/physseasia.htm#Environment](http://www.roebuckclasses.com/105/regions/seasiaspac/seasia/seasiaphys/physseasia.htm#Environment)

Have students answer the following questions:

1. **Conditions/Site:** What major environmental issues are depicted on this map? What type of land cover exists across the majority of the region?
2. **Comparison:** How are the issues found here similar or different to issues found in other world regions?
3. **Aura/Influence:** How would the issues depicted on this map affect the surrounding area (the areas adjacent to where each issue is found)?
4. **Pattern:** Is there a pattern to where these issues are found? If so, explain the pattern?

**Asking Geographic Questions:** 10-15 minutes

Each pair of students will create their own Geographic Question based upon the topic they chooses to explore. It is suggested that you give students some time to think about their topic before requiring them to submit their question for approval – perhaps 10 to 15 minutes. You may provide a basic question outline, if necessary, for example:

- How can the problem of (insert topic here) be solved in Southeast Asia?
- What are some possible examples of resource use that one would expect based on the type of land cover and how may “resource use” become “resource depletion”?

The Lesson:

**Acquiring Geographic Information:** Remainder of Day One

Students will use their handouts as guidelines for gathering information regarding their topic. It is recommended that students work in pairs – one skimming information online while the other takes notes.

**Organizing Geographic Information:** Day Two

Students will use the Storyboard handout to organize their information and write the script for their film. Once their storyboard has been completed, it is recommended that the teacher review the storyboard before the students begin making their film. Once the teacher has approved the storyboard, the students will use Photo Story to create their documentary. An excellent tutorial on how to use PhotoStory can be found at: [http://www.schooltube.com/video/e63ee182f74e098c72fd/](http://www.schooltube.com/video/e63ee182f74e098c72fd/)
NOTE: There are other software programs that students can use to create their film. Microsoft Movie Maker is an example. It is up to teacher discretion as to whether or not students may be allowed to use an alternate program. However, Photo Story is incredibly easy to use – the actual production of the film using this program goes very quickly. Movie Maker and other programs will give students more flexibility over their movie, but students often spend more time playing with the software than they do on the content. In addition, the greater complexity of these other programs makes them more difficult and time consuming than necessary for completion of this activity.

Analyzing Geographic Information: Day Three

Students will conduct their own analysis of the information they have gathered. They will present their analysis in their film.

End the Lesson:

Answering Geographic Questions: Days Four and Five

Students will answer their original question at the end of their film.

Once all of the films are completed, the films will be shown to the class. As a way to keep the students active during the films, have each student complete a brief review of each film – including his/her own. A template is provided below. If possible, the teacher can even create award categories for the students to vote on: Best Overall, Most Informative, Most Entertaining, etc.

NOTE: While showing the films may take up a great deal of class time, this is an important step for a couple of reasons. First, if students know their peers will be assessing their work, they are more likely to put more effort into the final product. Second, students need the opportunity to practice assessing their own and others’ work. By judging the quality of the films themselves, they begin to understand how to improve their own work in the future. To protect students and ensure privacy, make sure that student film evaluations do not reveal the name of the student completing the evaluation. If desired, you can assign numbers, or merely leave the reviews anonymous. In addition, only the teacher’s assessment will determine the grade for the film. If awards are voted upon, the teacher may exercise the option to award bonus points for films which win awards, but the final grading will be done solely by the teacher.

Questions:
Find and compare solutions other countries have implemented to solve this problem.
- The answers to this will vary depending upon the countries and the topic each group chooses to research.

Explain how the level of development in this country impacts this issue.
- Higher levels of development are the result of stable governments, stable economies, higher levels of education, and sophisticated communication networks, all of which are important when dealing with environmental destruction. Stable governments/economies in countries where basic needs are being met are more able to spend resources on
protecting the environment. In addition, people with higher levels of education are more likely to promote protecting the environment and the communications networks are necessary for people to be able to see and understand the issues.

Explain how advances in technology have impacted this issue.
- Answers will vary depending upon the issue, but in all of the issues – information about the issue and how to resolve it is crucial. Advances in communications technology makes it possible for people to see how areas far away from their location are being affected by their actions. Technology such as the internet allows people to network and learn about issues and their solutions.

**Evaluation/Assessment**:
Use the following rubric to assess the students’ films. Content grade will be determined by both the completed storyboard AND the dialogue in the film. If desired, bonus points may be added to films which win awards voted upon by the class.

**Rubric:** Total Points: 5

<table>
<thead>
<tr>
<th></th>
<th>Not There Yet</th>
<th>Satisfactory</th>
<th>Clearly Outstanding</th>
</tr>
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<tbody>
<tr>
<td><strong>Content</strong></td>
<td></td>
<td>1 Point</td>
<td>2 Points</td>
</tr>
<tr>
<td></td>
<td>Storyboard is largely missing or incomplete.</td>
<td>Storyboard is complete and on time.</td>
<td>Storyboard is well-written and on time.</td>
</tr>
<tr>
<td></td>
<td>Storyboard/film merely describes the topic, with little to no attempt to analyze the problem or provide a solution.</td>
<td>Storyboard describes the topic and presents possible solutions. An attempt is made to thoroughly analyze the issue.</td>
<td>Storyboard thoroughly analyzes the issue, compares possible solutions and presents one as the most promising.</td>
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<tr>
<td></td>
<td>Storyboard and film do not utilize appropriate vocabulary.</td>
<td>Storyboard and film correctly utilize appropriate vocabulary.</td>
<td>Storyboard and film demonstrate mastery of appropriate vocabulary.</td>
</tr>
<tr>
<td></td>
<td>Storyboard is difficult to read due to spelling and/or grammar errors.</td>
<td>Storyboard is generally free from spelling or grammar errors.</td>
<td>Storyboard is largely free from spelling or grammar errors.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Appearance &amp; Sound</strong></th>
<th>0.75 Points</th>
<th>1.25 Points</th>
<th>2 Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No maps are included.</td>
<td>At least one map is included.</td>
<td>Numerous maps are included.</td>
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<tr>
<td></td>
<td>Few pictures are included, and photos are difficult to see.</td>
<td>Photos are numerous and easy to see.</td>
<td>A wide variety of visual images are included. Images enhance the presentation and reflect dialogue.</td>
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<tr>
<td></td>
<td>No music is added in the background or music is too loud and makes the dialogue difficult to hear.</td>
<td>Music is added and does not detract from the dialogue.</td>
<td>Music enhances the presentation by reflecting images and dialogue.</td>
</tr>
<tr>
<td></td>
<td>Dialogue is too quiet or difficult to understand.</td>
<td>Dialogue is clear and easy to hear.</td>
<td>Dialogue is clear and easy to hear. Dialogue is well-spoken.</td>
</tr>
</tbody>
</table>
### Template for Student Reviews:

<table>
<thead>
<tr>
<th>Film Title and Production Crew</th>
<th>Rating: see guide</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Film content:</td>
<td></td>
<td></td>
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<tr>
<td>Graphics:</td>
<td></td>
<td></td>
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<tr>
<td>Sound:</td>
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<td>Total score:</td>
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<td>Film content:</td>
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<td>Graphics:</td>
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<td>Film content:</td>
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<td>Film content:</td>
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<td>Film content:</td>
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<td>Film content:</td>
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<tr>
<td>Total score:</td>
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</tbody>
</table>
Guide for Student Ratings:

**Rubric:** Total Points: 10

<table>
<thead>
<tr>
<th>Film Components</th>
<th>Points</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td>1</td>
<td>• the film does not really address the issue</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>• the film tries to address the issue, but it is very confusing and unorganized</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>• the film addresses the issue, but lacks some important information or could be better organized</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>• the film addresses the issue and includes most of the important information; it is well organized and informative</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>• the film clearly addresses the issue in a well-organized manner; it is very informative and entertaining, as will.</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>1</td>
<td>• not enough visuals, pictures are poor quality or distract from the content</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>• good visuals; pictures clear and easy to see and support the content well</td>
</tr>
<tr>
<td><strong>Sound</strong></td>
<td>1</td>
<td>• sound is not audible; speakers cannot be understood; background music is inappropriate or too loud</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>• sound is difficult to hear, but audible; music is not distracting</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>• sound is very easy to hear; speakers are clear and understandable; music enhances the topic – creating emotional drama</td>
</tr>
</tbody>
</table>
Environmental Degradation Documentary

Student Handout

You and your partner will be investigating an environmental issue affecting Southeast Asia today. Your final product will be a documentary created using a software program called Photo Story 3. Microsoft Photo Story is a free photo presentation program for Windows XP.

Your documentary will explain the issue you have selected and present a solution for solving it.

I. Topic: You will need to begin by selecting a topic to research. You may select a topic from the map your teacher presented in class, or you may spend a few minutes looking online for another topic. Some topics to consider:
   a. Deforestation
   b. Air pollution over cities
   c. Water pollution
   d. Destruction of habitat – particularly the orangutans
   e. Overfishing
   f. Acid rain
   g. Effects of mining

   Our topic is: ________________________________________________________________

II. Asking Geographic Questions: Once you have selected your topic, you will need to write a Guiding Question. This question will guide your research and help give your project focus.

   Our Guiding Question: ______________________________________________________

   _______________________________________________________________________

III. Acquiring Geographic Data: Using the matrix below, begin researching your topic. Make sure to address each question, but feel free to add more questions or details. Also, you will need to collect photos and maps to illustrate the issue in your PhotoStory film. Your graphics should provide visual illustrations of the information you gather, so make sure you have one or more graphics for each set of information below. Store these in a location designated by your teacher. You will also want a song or two to play in the background. Store the mp3 files in the same location as your photos.

   This project is funded in part by a grant from the National Geographic Society Education Foundation.
<table>
<thead>
<tr>
<th>Guiding Question - Answer this question last after investigating all of the other questions. This is the overall focus of your film.</th>
</tr>
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<table>
<thead>
<tr>
<th>Location: Where is this issue occurring? List several places in Southeast Asia affected by this issue.</th>
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<table>
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<tr>
<th>Region: How are the places affected by this issue connected? What do they have in common with each other?</th>
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<tr>
<th>Movement: How is this issue affecting the distribution of people in the area? Are people moving in? Are they moving away? Is this issue affecting the migration of animals?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>HEI: Are humans responsible for creating this issue? If so, how have they done this and why? Who in particular is responsible? Are humans attempting to fix this issue? If so, how and why? What groups or organizations are responsible for attempting to solve this issue? Are humans being affected by this issue? If so, how?</th>
</tr>
</thead>
</table>

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<thead>
<tr>
<th>Solutions: What is being done about this issue? Who is attempting to solve the problem? Are these solutions working? Why or why not? Are there other places where this is occurring that have had more success finding a solution? What solutions have worked in these places? What is your recommendation about how to solve this problem?</th>
</tr>
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<thead>
<tr>
<th>Is there anything else about this feature you feel should be included in the film?</th>
</tr>
</thead>
</table>
IV. Organizing and Analyzing Geographic Information – Once you have completed your research, you will need to organize your information in order to create your film. You will organize your information in a Storyboard – a technique used for writing films. For each illustration you choose to use in your film, you will write a short dialogue piece explaining your topic and how the illustration relates to it. You can arrange your graphics and information as you see fit, but it is recommended that you follow the order used in your research matrix. You may add as many rows as necessary.

<table>
<thead>
<tr>
<th>Graphic, map, picture or other illustration – write the name or sketch the image here.</th>
<th>Dialogue – write your text for each slide here</th>
</tr>
</thead>
<tbody>
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</table>
V. Answering Geographic Questions: The final step in writing your story is to answer the Guiding Question you wrote at the beginning of the project. Make sure to include your answer in your film.

VI. Assembling your PhotoStory:

There is an excellent tutorial on creating a PhotoStory at: http://gemini.utb.edu/jbutler/power_bytes/PS3manual/PS3manual.htm.

Some things to keep in mind:

a. Make sure your pictures are clear. If they are too pixelated, choose another photo.
b. Make sure your dialogue is spoken clearly and loudly. Speak directly into the microphone.
c. Make sure your background music is not too loud. There is a bar which will allow you to turn the background music down.
Environmental Geography of Southeast Asia Case Study:
Grasberg Mineral District
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Grasberg Mineral District

- Located on New Guinea in Indonesia
- Single largest reserve of gold in the world
- Second largest reserve of copper
- The mine is owned by Freeport McMoRan Copper and Gold, which has a controlling interest, the Government of Indonesia and 2 other companies.
- The mine is operated by PT Freeport Indonesia and employs 18,000 people.
Freeport-McMoRan

- Freeport-McMoRan is a global mineral mining company.
- Copper, gold, molybdenum, and cobalt are the primary minerals they mine.
- Freeport-McMoRan began mining in Grasberg in the early 1970’s.
- One billion pounds of copper and 1 – 2 ½ million ounces of gold per year are produced.
- Watch a video produced by Freeport-McMoRan about their global operations.
Open Pit Mine

- Mine was originally a mountain over 4000 meters high.
- The mine is 3000 meters deep at present.
- Open pit will be exhausted around 2015
Satellite view of the mine
A Perspective of how large the mine really is
Environmental Impact

- After extracting the minerals, the overburden and waste rock are discharged to the side of the mine.
- Overburden and waste rock amount to about 360,000 to 510,000 tons a day.
- A great deal of these tailings are discharged into the Aghawagon River and then on into the Otomona River.
- The tailings settle into the flood plain, which runs through the rainforest or are dumped into the Arafura sea.
Grasberg mine tailings
Environmental impact

- Waste rock is up to 900 feet deep and covers 3 square miles.
- Waste rock contains sulphurous minerals, which create sulphuric acid when exposed to water.
- Other heavy metals also infiltrate the ground water.
Environmental Impact

- Many of the nearby rivers and wetlands are now considered “unsuitable for aquatic life” – according to a study performed in 2002.
- Springs miles away have begun turning green – an indication of the presence of copper in the water.
- The pollution is threatening nearby Lorentz National Park – a rainforest protected as a UNESCO Heritage Site.
Social impact

- Local tribes do not always feel they are receiving their fair share.
- The area has long felt isolated from the rest of the country due to its distance and its religious and cultural differences.
- Freeport has invested heavily in Indonesia’s politicians in order to ensure their continued support of the project.
- Freeport also spends a great deal of money on military in the area to protect from riots and insurrections like the one in 1996 which resulted in the destruction of $3 million of equipment.
Mine borders a Unesco heritage Site
Notes & Credits

- Slide 3
  - Source: http://www.fcx.com/videos/Connect_English.htm
- Slide 4
  - Source: http://www.mining-technology.com/projects/grasbergopenpit/
- Slide 5
- Slide 6
- Slide 7
  - Source: http://www.minesandcommunities.org/article.php?a=8809
- Slide 8
- Slide 9
- Slide 11
- Slide 12
  - Screen clipping taken from Google Earth