



HUMAN IMPACT ON THE CLOUD FOREST

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Grade Level: 6-8th

Introduction: Students will investigate the diversity of resources present within the cloud forest and how humans could benefit from this rich ecosystem. A debate structure is provided, through which students will discuss the role that humans should play in utilizing the cloud forest ecosystem of Monteverde, Costa Rica. Evidence and support for the statements used during the debate will come from within the *Canopy In The Clouds* media.

Major Themes: Human Impact

Connections to the National Science Standards: Interdependence of Organisms

Time: 60 minutes or more, depending on class size (5 minutes for intro, 5 minutes for debate directions and group assignments, 25 minutes for Cloud Forest Examination and debate preparation, 20+ minutes for debate [actual debate time will vary depending on the total number of groups required], 5 minutes for closing)

Materials: One computer with internet access for each student team. If fewer computers are available, groups may take turns using the computer. Timer. Student handouts included.

Objectives: Students will be able to 1) investigate the value of the cloud forest ecosystem and the benefits it may provide to humans 2) determine the role that humans should have in this ecosystem 3) defend a position using evidence from the cloud forest.

Potential Misconceptions: Student may have the following misconceptions:

- 1) Students may believe that humans do not rely on ecosystems around the world for food, water, and other resources. Younger students may not grasp the connection between food at the grocery or products at the store and resources from ecosystems. Humans rely on biotic and abiotic resources, or the knowledge gained from studying these resources, for millions of uses that may be surprising to students.

PROCEDURE

Opening: Provide students with an opportunity to view *An Introduction to Tropical Montane Cloud Forests* video and read the accompanying text, found in the *Learn* section of the *Canopy In The Clouds* website. Ask students to write down important information they learn from the media on page 1 of the Student Handouts (*Opening Questions*) and answer the question: Why should humans leave the cloud forest untouched? Next, ask students to answer the following question on their handout: How could the cloud forest be used for human benefit? Discuss a few student answers as a class and explain that their



ideas for both questions will be utilized in a debate about the role of humans in the cloud forest ecosystem.

Development: Students will use a debate format to share information about human impact on the cloud forest. Explain to students that today’s activity will be an educational conversation, and no “winner” or “loser” will emerge from the debate. They will all be presenting their thoughts using a debate structure and respecting the ideas of other groups, even if they differ from their own.

Debates run in the following sequence, although the teacher may alter as desired:

Team A Opening Statement – 3 minutes *(introduces team’s position and offers important evidence)*

Team B Opening Statement – 3 minutes

****additional time may be allotted here for teams to prepare rebuttals****

Team A Rebuttal – 2 minutes *(team’s response to opponent’s statements)*

Team B Rebuttal – 2 minutes

****additional time may be allotted here for teams to prepare second statements****

Team A Second Statement – 1 minute *(team’s chance to expand on their ideas and evidence)*

Team B Second Statement – 1 minute

Team A Closing Statement – 2 minutes *(summarizes team’s position, evidence, and final thoughts)*

Team B Closing Statement – 2 minutes

Page 1 of the student handouts, *Debate Sequence for Students*, provides a copy of the structure for students to use as a reference as they prepare.

Divide the class into two teams, depending on the number of students. Several smaller sub-groups may work on each team, if class size is too large. More than one debate can also be held, allowing each team to be small and facilitate greater individual involvement. Team A will be debating the value of leaving the cloud forest untouched. Team B will be debating the value of utilizing the cloud forest for human benefit.

Students will need a basic understanding of the cloud forest ecosystem. Introduce the panoramas and how to navigate the *Canopy In The Clouds* website and media, if students are not already familiar. Provide students with p.2 of the student handouts, *Cloud Forest Examination*, where they should record evidence that supports the points they will make during the debate. Students may also access the additional media from *Canopy In The Clouds* that correspond with their discussion.

Allow students to work on their evidence for 15 minutes. Circulate amongst the teams as students work, ensuring that each group is developing reasonable statements for their arguments. Below is a table of potential talking points for each side that the teacher can use to guide students.



Leave Cloud Forest Untouched	Use Cloud Forest for Human Benefit
<ul style="list-style-type: none"> - extensive diversity of plant and animal species - survival of endangered species - improves air quality, provides O₂ - regulates CO₂ and climate - water purification and cycling - prevent erosion - spiritual/aesthetic value - educational value 	<ul style="list-style-type: none"> - use land for people to live on - use land to grow food for growing human population (agriculture) or harvest wood for cooking - use land for building resources (mining or lumber) - use land and resources for financial profit, providing jobs for the people - use resources to develop medicines for human health or new products for human use

At the end of 15 minutes, students should begin to prepare the debate portion of their work. Page 3+4 of the student handouts, *Debate Preparation*, gives students a structure to help organize their thoughts. Give students 10 minutes to prepare the debate, reminding them that each student must have a voice within the team and a responsibility for sharing at least one portion of the debate with the class.

Begin the class debates. Position the teams so that there is a physical separation between them, helping observers to differentiate who is on which team. The teacher should act as the timer or choose a timer from the observers. Remind participating teams to take notes on the opposing team's ideas and evidence, so they can prepare a stronger rebuttal. Teams may use *Canopy In The Clouds* media during the debate, if an LCD projector is available.

Closing: Congratulate students on their hard work and contributions to the class debate. Remind them that everyone's ideas are valid and there is no winning or losing team in this debate. Ask them to answer the following questions:

- What idea did the opposite team in your group present that you thought was really strong?
- What idea from your own team could have used more evidence or thought?
- Do you think it is possible for humans to conserve the cloud forest ecosystem, while simultaneously benefitting from its resources? How?

Ask students to share their answers, especially for the first question. This will prevent animosity between teams as they leave the classroom and reinforce a positive academic culture and community amongst the students.

Suggested Student Assessment: Explain to students that they are to take the role of a Monteverde community leader who must decide what to do with the cloud forest nearby. As the leader, each student will write a letter to the community, explaining the decision that has been made and why. The students do not have to choose the same team they were assigned to, but must use arguments and evidence from the debate to support the decision. The other team must also be addressed, as not to



anger the community members that do not support the decision made by leader. Page 5 of the student handouts, *Student Assessment*, provides a writing space and rubric.

Extending the Lesson: Re-join the teams as a class and discuss what the students learned from listening to and participating in the debates. Divide the class into small groups again, mixing members from each team, and challenge them to create a proposal that would satisfy both sides of the issue. Lead a conversation on sustainable resource management and conservation, allowing students to understand the idea that ecosystems can be used for human benefit while simultaneously protecting the valuable resources found within. The following scenario could be used to initiate the discussion: Local residents of Monteverde need timber to build houses and a new school. They know the value and importance of the cloud forest, but it is also the easiest and most economical location from which to gather needed wood. How can they get the timber they need, without destroying the forest?

Vocabulary: Sustainability