

# Deforestation

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**F**rom the boreal forests in Siberia and Canada to the temperate deciduous forests of eastern North America and Europe to the tropical rain forests that encircle the Earth's equator, forests occupy nearly a third of the land surface on our planet and provide a foundation for nearly all terrestrial ecosystems.

This month, the world watched in stunned disbelief as wildfires broke out across 5.5 million acres of the Amazon rainforest. Dry weather, wind, and heat has burned up an ecosystem already under threat from agriculture, logging, and mining.

Sadly, the inferno raging in one of the last few treasure troves of biodiversity on our planet is not an isolated ecological disaster. Wildfires are consuming wilderness in Siberia, Indonesia, Central Africa, and Alaska. Fires are not the only cause, however. Our forests are being cut down at an unprecedented rate.

Whether it's for expanding agriculture for cattle and palm oil, mining, or human development, an area equal to 27 soccer fields of the Earth's forests is destroyed every minute. Approximately 18.7 million acres of forest are felled annually, larger than the island of Ireland. In the last few months, Brazil has opened up even more of the precious remaining Amazon to resource extraction.

It's a tragedy that's particularly close to my heart. My love for science began during the time I spent exploring and playing outdoors in the forests near my parents' house. So how do we teach our students the urgency of the problem and empower them to address a global, and honestly, overwhelming problem? Getting our students to see the relevance of forest being destroyed thousands of miles away when the impacts may not be felt in their daily lives is our biggest challenge. The key is to highlight how fewer forests, whether it's down the street or

on another continent, will make their air and water dirtier, make them sicker, and make their world a hotter place to live.

We've written an article on the ecological impacts and economic drivers of deforestation on Science Over Everything, and paired it with an activity in which students use geographic data from Global Forest Watch to track the amount of deforestation by country and cause. Together, they make for a great introduction to the topic of deforestation. Understanding how the global economy affects the natural world is a great way to show deforestation's impact on students' lives and offers many potential cross-curricular projects for willing history and social studies teachers.

After giving the students some background on the causes and impacts of deforestation, the easiest and most obvious application is in biology, where teachers can use deforestation as a theme for discussing biodiversity, populations, trophic levels, and biogeochemical cycles. *National Geographic* has an entire unit where students analyze a map to identify deforestation in the Amazon rain forest and build an argument for the effects of deforestation on the local ecosystem and the water and nutrient cycles.

Energy cycling throughout ecosystems is another excellent concept to apply to deforestation. Middle Tennessee State University has a lesson plan in which students build an energy pyramid in an ecosystem and calculate how much energy is transferred from one trophic level to the next trophic level. Biology teachers could have students build energy pyramids, then recalculate how many consumers the ecosystem would support at different levels of deforestation. Physics and physical science teachers could use these lessons as a real-world application of energy transfer in a system. Many teachers have used a station-based game

similar to the one from *climatechange-live.org* to illustrate the carbon cycle: eliminate plants as part of the exercise to see where most of the carbon ends up accumulating with deforestation.

There are a ton of great PBL resources to get your students to take action. The US Fish and Wildlife Service has a free online handbook that walks you through building your schoolyard habitat. This would provide your school with a great place for species observation and ecosystem monitoring throughout multiple grade levels and subjects. For a project on a smaller scale, plan a tree-planting day with your students in your community. Project Learning Tree has some great tips to get yourself organized and grant opportunities to fund your project!

Understanding the human impact on the environment may be the most important lesson we teach our children. When kids understand that forests make our world a cleaner, cooler, healthier, and more peaceful place, they will fight to protect it. Which gives me hope, as I believe it is the only way to only way to protect our natural world.

## RESOURCES

- Science Over Everything: <http://scienceovereverything.com/2018/11/15/deforestation/>  
 Reforestation Impact on Climate Lesson: <https://bit.ly/32faekv>  
 Project Learning Tree: <https://bit.ly/30H7igh>  
 US Fish and Wildlife Service online handbook: <https://bit.ly/30K08b2>  
 Middle Tennessee State University energy pyramid lesson plan: <https://bit.ly/2Liz6Be>  
 Carbon Cycle game: <https://bit.ly/2gw3k4C>  
 National Geographic deforestation unit: <https://bit.ly/2LSPgPU>

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