Brandon Prehn

Effective Communications Skills

Lesson Plan: “Fire on the Mountain – The function of fire in ecology and global processes”

Standards of Learning:

The student knows the sources and flow of energy through an environmental system. The student is expected to:

explain the flow of energy in an ecosystem, including conduction, convection, and radiation;

The student knows the relationship between carrying capacity and changes in populations and ecosystems. The student is expected to:

analyze and make predictions about the impact on populations of geographic locales due to diseases, birth and death rates, urbanization, and natural events such as migration and seasonal changes.

analyze and describe the effects on areas impacted by natural events such as tectonic movement, volcanic events, fires, tornadoes, hurricanes, flooding, tsunamis, and population growth;

explain how regional changes in the environment may have a global effect;

examine how natural processes such as succession and feedback loops restore habitats and ecosystems;

Objectives:

Students will be able to identify parts of the fire triangle as well as optimal conditions for fire
Students will be able to identify management practices which increase the risk of catastrophic fires
Students will describe how a fire adapted tree species can survive a fire
Students will describe management alternatives to fire, and their drawbacks

Materials:

Bell work assignment
Fire whirl tube
Serotinous cone, hot plate
Appropriate safety gear (goggles, fire extinguisher, etc)

Bell Work (5 Minutes)

Have students write a short (1-3 sentence) paragraph describing fire’s purpose on the landscape and its benefits.

Introduction (Engagement activity, 5-7 minutes)

“Howdy, I’m Brandon Prehn and I’m a student at Texas A&M studying forestry, I’m here working on a project with PINEMAP…..”

Show the canopy fire video and explain that while catastrophic fires are a part of the natural cycle of ecosystems, appropriate management can reduce the occurrence of such fires without severe loss of fire dependent ecosystems.

Lecture Body

The Fire Itself (15 minutes)

Describe the fire triangle (fuels, oxygen, and ignition) and how fire cannot exist without all three. Describe the optimal conditions for fire, including the main weather factors such as temperature and humidity, but also explain that fuel build up is a huge component of catastrophic fires. Areas where fire has been suppressed can be full of ladder fuels (include 2 pictures, 1 with ladder fuels and 1 that has been on a burn regimen). Draw the combustion reaction and describe the importance of CO2 and other products of incomplete combustion. Fire whirl demonstration if we have the supplies.

Begin demonstration of serotinous cone opening, it should heat up and open by the end of this component of the lecture.

Begin to talk about fire tolerant/resistant species and their mechanisms for survival (sprouting, bark, grass stage of longleaf, ec). Include talk about colonizer species and spreading to fire disturbed habitats.

Finish demonstration of serotinous cone.

Importance of Fire (15 minutes)

Ask a few students to describe the importance of fires, knowing what they know at this point in the lecture. Answers should include some consideration of the species that have adapted to fire and their reliance on it, the carbon cycle, and the consequences of suppressing fire (catastrophic fires). Lecture will then lead into all of these subjects, including images of grasslands being burned, woody plant encroachment, satellite imagery of catastrophic fires, etc).

Continue lecture with management considerations, beginning by asking students if they can think of any reasons that fire is a difficult management challenge.

Conclusions/Extension (10 minutes)

A semi-open discourse with the students, asking for a “back-briefing” of the content of the lecture. Why is fire essential on the landscape? What management challenges do we face in the future? Is urban sprawl increasing? What are policy considerations for managing fire, as well as the construction of homes in high fire risk areas?

Learning Assessment (5 minutes)

Students will reflect on their bell assignment and highlight any misconceptions they had.