Problem-Based Learning Unit Template

Topic

3.2 Simple Machines
3.6 Terrestrial Ecosystems

Goals/Objectives/SOL

3.2 The student will investigate and understand simple machines and their uses. Key concepts include

a) purpose and function of simple machines;
b) types of simple machines;
c) compound machines; and
d) examples of simple and compound machines found in the school, home, and work environments.

3.6 The student will investigate and understand that ecosystems support a diversity of plants and animals that share limited resources. Key concepts include

~~a) aquatic ecosystems;~~
b) terrestrial ecosystems;
c) populations and communities; and
d) the human role in conserving limited resources.

Theme

Simple machines are tools that make work easier and help solve problems.

Problem Question

What type of machine can be used to remove the large rocks from the area of unstable mountainside without damaging the area's ecosystem?

Scenario

The Virginia Department of Transportation has found an area of unstable mountainside along Interstate 77 on Fancy Gap Mountain in Carroll County. This area contains several large boulders that geotechnical engineers believe could fall on the interstate within the next month. The Virginia Department of Transportation has asked you to develop a unique machine to remove the rocks while preventing damage to the ecosystem on the mountainside.

Student Role

Mechanical Engineering Research Consultant for the
Virginia Department of Transportation

Resources

Internet
Gizmos
books
Virginia Department of Transportation

Culminating Activity

Build and present to the Virginia Department of Transportation a design of a compound machine to remove the rocks from the mountainside with the least possible impact on the area's ecosystem.