

# MATH AND THE ENVIRONMENT

California's Environmental Principles & Concepts<sup>1</sup> (EP&Cs) examine the interactions and interdependence of human societies and natural systems.

## Some Terminology

Natural systems: Interconnected elements that function as a whole, encompassing both living and non-living components.

Examples: forests, coral reefs, ocean depths, solar system, planetary atmosphere circulation, human body

Human social systems: The functions, processes, and interactions among individuals, human communities, and societies including political, social, cultural, economic, and legal systems.

Examples: nuclear families, schools, businesses, communities, nations, corporations, online social networks

Ecosystem goods: Tangible materials produced by natural systems, that are essential to human life, economies, and cultures.

Examples: food (e.g. fish, crops), timber, water, raw materials (e.g. minerals, natural fibers)

Ecosystem services: The functions and processes that occur in natural systems that support or produce ecosystem goods and help sustain human life, economies, and cultures.

Examples: food production, water purification, pollination, climate regulation, and aesthetic/recreational values

## Principles and Concepts



### **Principle 1: People Depend on Natural Systems**

The continuation and health of individual human lives, and of human communities and societies depend on the health of natural systems that provide essential goods and ecosystem services



### **Principle 2: People Influence Natural Systems**

The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationship with human societies.



### **Principle 3: There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing Between Systems**

Natural systems proceed through cycles that humans depend on, benefit from, and can alter.



### **Principle 4: Natural Systems Change in Ways that People Benefit From and Can Influence**

The exchange of matter between natural systems and human societies affects the long-term functioning of both.



### **Principle 5: Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors**

Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes.

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## **MathLinks: Grade 8 and the Environment**

See Program Information (print copy or on the Teacher Portal), page 34, Mathematics and the Environment, for more information.

**Student Activity ideas:** Ask students to research, do a project, do a presentation, or have a class discussion / debate about how the subject of each problem affects the environment.

<b>Location</b>	<b>Title / Problem #</b>	<b>Connection to Environmental Principles</b>
Unit 1, Task	The Math of Collecting Rain Water	Collecting rainwater offers several benefits, such as environmental conservation, reduced water bills, and may help mitigate the effects of drought and flooding.
Unit 3, TE pg 11	What in the World?	Population growth may negatively affect the environment with respect to increased demand for resources and waste production. It may lead to pollution, habitat reduction, and climate change, to name a few.
Unit 6, TE pg v	Using Data to Understand Our World	Collecting and interpreting data allows us to understand the world we live in, and to use that knowledge to create a better world.
Unit 6, Math Talk	Data Talk A: Water Used to Make Various Food Items	Excessive use of water to produce foods contributes to water depletion and pollution. Furthermore, fertilizers, pesticides, and other pollutants can harm aquatic life.
Unit 7, Task	Recycling Plastic Bottles	Recycling plastic bottles reduces waste and minimizes environmental harm. For example, it helps to reduce pollution, especially in the oceans.
Unit 9 TE, pg 28	Spiral Review / #6: Healthy Earth Club	School and park cleanups maintain and enhance these environments for those who use them regularly, leading to a better quality of life.