

EARTH MATTERS | summary of activities

Alg = Algebra

APES = AP Environmental Science

APHG = AP Human Geography

Bio = Biology

Chem = Chemistry

Econ = Economics

ELA = English Language Arts

ES = Environmental Science

Geo = Geography

Gov = Government

H = Health

M = Mathematics

Stat = Statistics

USH = U.S. History

WH = World History

UNIT	ACTIVITY	DESCRIPTION	SUBJECTS	SKILLS
POPULATION DYNAMICS	Demographic Facts of Life	Students calculate the rate of natural increase and corresponding doubling time or half-life for several countries and explore factors that influence a country's birth and death rates.	APHG, Geo, Alg, Stat, ELA	Calculating doubling time and half-life, researching, writing, synthesizing research
	Double Trouble	Students observe and collect data on the exponential growth of yeast cultures in both a lab experiment and under a microscope, graphing their findings and comparing their results with human population growth.	Bio, APES, ES, Alg	Lab preparation, scientific modeling, collecting and recording data, graphing and analyzing data, interpreting line graphs, writing
	Power of the Pyramids	Students use real-world data to construct and interpret population pyramids and discuss differences in population growth rates among several different countries, including the U.S.	APHG, Geo, APES, ES, M	Calculating percentages, graphing and analyzing data, interpreting bar graphs, comparing and evaluating, writing
	Power of the Pyramids: Canada	Students use real-world data to construct and interpret population pyramids and discuss differences in population growth rates among several different countries, including Canada.	APHG, Geo, APES, ES, M	Calculating percentages, graphing and analyzing data, interpreting bar graphs, comparing and evaluating, writing
	Peopling of Our Planet	Students watch the video "World Population" and participate in guided exploration of an online timeline to explore how improvements in medicine, food and agriculture, and public health and sanitation during the Industrial Revolution contributed to population growth.	WH, APHG, Geo, APES, ES	Classifying historic events, identifying trends, understanding cause and effect
	Where Do We Grow From Here?	Students interpret UN population projections and visually model regional population changes from 1800 to 2100, before researching challenges to population stabilization in high-growth areas and organizations addressing them on the ground.	APHG, Geo, WH, APES, ES, Gov	Interpreting line graphs, reading comprehension, comparing and evaluating data, researching, synthesizing research, writing

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	Demographically Divided World	In small groups, students explore changes in regional fertility and mortality trends over time and discuss influencing factors. Students then conduct research on a single country to evaluate development and place it within the demographic transition model. Finally, the class explores how countries within the same DTM stage compare.	APHG, APES, WH	Classifying historic events, identifying trends, interpreting and analyzing data, comparing and evaluating data, understanding cause and effect, researching, synthesizing research, defending a position
	Migration Stories	In small groups, students take on the role of real-world migrants and take turns in the “hot seat” to answer questions about their unique journey.	APHG, Geo, ELA	Reading comprehension, researching, synthesizing research, critical thinking, developing questions, identifying trends, comparing and evaluating
CLIMATE CHANGE	Generating Heat	Students graph carbon dioxide emissions and population growth over time and discuss trends they observe.	APES, ES, APHG, Geo, Alg	Graphing and analyzing data, interpreting line graphs
	Carbon Crunch	Students use a timeline to explore energy-related environmental issues through history then compare countries based on their CO ₂ emissions and their climate vulnerabilities.	APES, ES, WH, APHG, Geo, Gov	Classifying historic events, interpreting and analyzing data, comparing and evaluating data, writing
	Methane Matters	Through graphing and guided questioning students examine the cause and effect relationship between human activities and methane production. They then research and prepare presentations on methane mitigation projects.	APES, ES, Bio, APHG, Geo, Alg	Understanding cause and effect, graphing and analyzing data, interpreting line graphs, obtaining, evaluating and communicating information
	Cap and Trade Game	Students play a game that simulates a cap and trade system, and analyze its successes and weaknesses as a policy to reduce emissions of pollutants and greenhouse gases.	APES, ES, Gov, Econ, APHG, Geo	Analyzing costs and benefits, recording data, strategizing with teammates
AIR POLLUTION	Acid Tests	Students test different pH solutions on radish seeds to determine the optimal level for seed germination and use the results to identify effects of acid rain.	APES, ES, Bio, Chem, Alg, H	Lab preparation, collecting and recording data, graphing and analyzing data, measuring, observing, sketching

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	Clearing the Air	Students find articles about air pollution and, as a class, create a chart depicting the causes and effects of air pollution and possible solutions.	APES, ES, APHG, Geo, ELA, H	Researching, synthesizing research, reading comprehension, understanding cause and effect, critical thinking
WATER RESOURCES	Roll on Mighty River	Small groups of students take on the role of a stakeholder vying for water from the Colorado River and debate their position in a mock arbitration.	APES, ES, APHG, Geo, Gov, ELA, Econ	Role playing, researching, synthesizing research, debating, public speaking, conflict resolution, creating an action plan
	Water, Water Everywhere	Students observe a brief demonstration on the distribution of the world's water and then calculate how much water they use on a daily basis, both directly and indirectly.	APES, ES, Geo, M	Observing, estimating, calculating, graphing data
FORESTS	Go for the Green	Students play a board game about the fate of a rainforest where they must strategically balance economic and environmental decisions.	APES, ES, APHG, Geo, Econ, Gov	Decision making, analyzing costs and benefits, conflict resolution
	What's at Stake for the Forest	Acting as different stakeholders with various interests, students play a strategy game where they work in groups to negotiate management of a publicly owned forest.	APES, ES, ELA, Econ, Gov	Reading comprehension, role playing, analyzing costs and benefits, evaluating, defending a position, decision making, conflict resolution
OCEANS	Code Blue: Endangered Oceans	As the instructor reads a story about the history of the world's oceans, students act as characters adding and removing items based on real-world events.	APES, ES, APHG, Geo, ELA	Listening comprehension, observing, understanding cause and effect
	Drop in the Ocean	A visual demonstration models the limited ocean area where most ocean life is found, followed by a discussion and research project exploring how human's food supply from the oceans can be managed more sustainably.	APES, ES, APHG, Geo, ELA	Observing, understanding cause and effect, researching, visually communicating research
	Like Oil and Water	Students use the engineering design process to create and test prototypes for cleaning up oil spills.	APES, ES, ELA	Lab preparation, collecting and analyzing data, reading a graduated cylinder, observing, researching, engineering design, problem solving

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FOOD & AGRICULTURE	Earth: The Apple of Our Eye	An apple is sliced into pieces to model the current amount of agricultural land on Earth. Then students read an article about soil erosion and conduct outside research to create presentations on threats to soil health for an “ask the experts” soil fair.	APES, ES, APHG, Geo	Observing, understanding cause and effect, identifying trends and patterns, conducting research to build and present knowledge, communicating research results
	Good News, Bad News	Students decide whether given statements on population growth and food issues are “good news” or “bad news” and design an action plan for a food issue of their choosing.	APHG, Geo, APES, ES, ELA	Comparing and evaluating, critical thinking, researching, creating an evidence based action plan
SOLID WASTE	The Great Bag Debate	Students conduct research either in favor of or against plastic bag bans and taxes, then debate their assigned stance.	APES, ES, Gov, ELA	Researching, debating, public speaking, defending a position using evidence
	Trash Trouble in Paradise	Role playing a city council meeting, students weigh various real-world economic, social, and environmental factors when siting a landfill on the Hawaiian island of O’ahu.	APES, ES, APHG, Geo, Gov, Econ, ELA	Reading and listening comprehension, role playing, researching, writing, public speaking, analyzing costs and benefits, decision making
	Secret Life of Tees	Students use guided research to perform a five-stage life cycle analysis on a t-shirt and brainstorm ways to reduce the garment’s social and environmental impact.	APES, ES, APHG, Geo, Econ	Guided research, critical thinking, analyzing costs and benefits, creating an evidence based action plan
BIODIVERSITY	Bye, Bye Birdie	Students determine a list of criteria to use when deciding the fate of endangered species, then conduct research on a specific species and create a presentation justifying its protection.	APES, ES, Bio, ELA	Critical thinking, researching, comparing and evaluating, public speaking, decision making
	The Sixth Extinction	Students read and discuss an article about the current mass extinction of species, then calculate extinction rates and analyze data to compare modern rates to the background extinction rate.	APES, ES, Bio, Alg, ELA	Reading comprehension, critical thinking, writing and solving proportions, analyzing scatterplot and line graphs, creating bar graphs
ENERGY	Lighting Up Lives	By taking on the role of a community member, students analyze how energy poverty impacts people living in Monrovia, Liberia and create an action plan for a sustainable solution.	APHG, Geo, Econ, ELA	Analyzing data, reading comprehension, researching, synthesizing research, creating an action plan, public speaking

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	Energizing Policies	Students research an energy-related topic in the United States or Canada and consider possible alternatives, weighing costs and benefits in order to formulate a recommendation for the future.	APES, ES, APHG, Geo, Econ, Gov, ELA	Critical thinking, analyzing costs and benefits, researching, persuasive writing, defending a position using evidence
	Getting Around	Students create and conduct a survey to identify a local transportation issue and develop a strategy to make their community less dependent on fossil fuels.	APES, ES, Gov	Developing and administering a survey, collecting and analyzing data, creating an action plan
RICH AND POOR	Food for Thought	Acting as residents of five major world regions, students compare various statistics that affect people's health and well-being.	APHG, Geo, Stat, Econ, Gov	Analyzing data, critical thinking, identifying trends, comparing and evaluating, communicating reasoning
	Hill of Beans	Students compare wealth of the average person in the world to that of a person living in the U.S. and a person living in the Central African Republic, one of the poorest nations in the world.	APHG, Geo, Stat, Econ	Analyzing data, observing, comparing and evaluating
	The Global Goals	Students research and create a visual display summarizing a Sustainable Development Goal then consider the role of social progress in meeting the SDGs.	APHG, Geo, APES, ES, ELA, Econ	Critical thinking, understanding cause and effect, researching, synthesizing research, visually communicating research
	Making it in America	Students use wealth tokens to compare actual American wealth distribution to perceived distribution, then analyze historic documents related to the American Dream.	Econ, USH, Gov, ELA, M	Comparing and evaluating, analyzing data, guided research, reading and analyzing data on primary sources, synthesizing information, writing
URBANIZATION	Growing Smarter	In small groups, students analyze a map of an undeveloped area within a city in order to create and present a growth plan that incorporates smart growth concepts.	APHG, Geo, APES, ES, Econ, Gov	Collaborating, public speaking, conflict resolution, interpreting and analyzing maps
	Growing Pains in Texas Hill Country	Students read a news article about local population growth in San Marcos, TX and the resulting sprawl, then write a proposed solution and simulate a city council debate.	APHG, Geo, APES, ES, Gov, ELA	Critical thinking, reading comprehension, role playing, writing a position statement, defending a position using evidence, debating

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	In Search of Sustainable Life	Students develop an index of the ten factors they identify as most important to a sustainable community and develop models for measuring those factors.	APES, ES, APHG, Geo, Econ	Values identification, communicating, decision making, prioritizing, critical thinking, modeling
	Tale of Three Megacities	Students analyze data and images about three megacities, identifying challenges and benefits of growing urbanization, and then collaborate in small groups to compare and contrast social, political, economic, and environmental issues across the cities.	APHG, Geo, ELA	Analyzing maps, guided research, interpreting graphs, understanding cause and effect, reading and listening comprehension, critical thinking, communicating, comparing and evaluating, analyzing costs and benefits
THE WORLD'S WOMEN	A Woman's Place	Through an article, video, simulation game, and small group research, students explore factors that influence women's fertility decisions in countries around the world.	APHG, Geo, ELA	Reading and listening comprehension, collaborating, calculating averages and probability, researching, synthesizing research, analyzing data, public speaking, visually communicating research
	American HerStory	Students examine their own perceptions of gender roles through two short mental exercises, then research and present on the role of women in the home and workplace throughout U.S. history.	USH, ELA	Critical thinking, researching, synthesizing research, public speaking
HEALTH	Assessing Data on Maternal Mortality	Students investigate three different data sets covering maternal mortality, and articulate the benefits and shortcomings of each group of data.	APHG, Stat, Geo	Analyzing data, critical thinking, using evidence to support a claim, interpreting line graphs
	Catch it if You Can	Students mimic the spread of disease by exchanging liquids in test tubes in a hands-on simulation. They then graph and analyze data from the Ebola outbreak in Sierra Leone in 2014-2016, and watch and respond to short videos on the drivers of zoonoses and pandemics.	Bio, APES, ES, APHG, Geo, Alg, H	Lab preparation, deductive reasoning, graphing and analyzing data, interpreting line graphs, understanding cause and effect, listening comprehension, writing
	Our Earth, Ourselves	Students create flowcharts that link environmental issues with human health issues.	APES, ES, APHG, Geo, ELA, H	Researching, synthesizing research, understanding cause and effect, public speaking

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	Unfair Race	Representing different countries, students step forward or backward based on health conditions in their borders, to find which countries have an advantage in a final “race for health.” They then analyze different visual data on health spending and health coverage around the globe.	APHG, Geo, Econ, H	Analyzing data, comparing and evaluating, critical thinking, understanding cause and effect
PERSONAL CONSUMPTION	Needs vs. Wants in a Finite World	Students discuss the varying levels of human needs and then evaluate their own needs and wants and the resources required to meet them.	Econ, APES, ES	Critical thinking, decision making
	Watch Your Step!	Students take an online ecological footprint quiz to determine their resource use and test how changes to their daily actions impact its size.	APES, ES, APHG, Geo, Econ	Critical thinking, comparing and evaluating, reading comprehension, creating an action plan