Think Globally, Teach Locally

Resources for Environmental Awareness

January 19, 2022

Disclaimer

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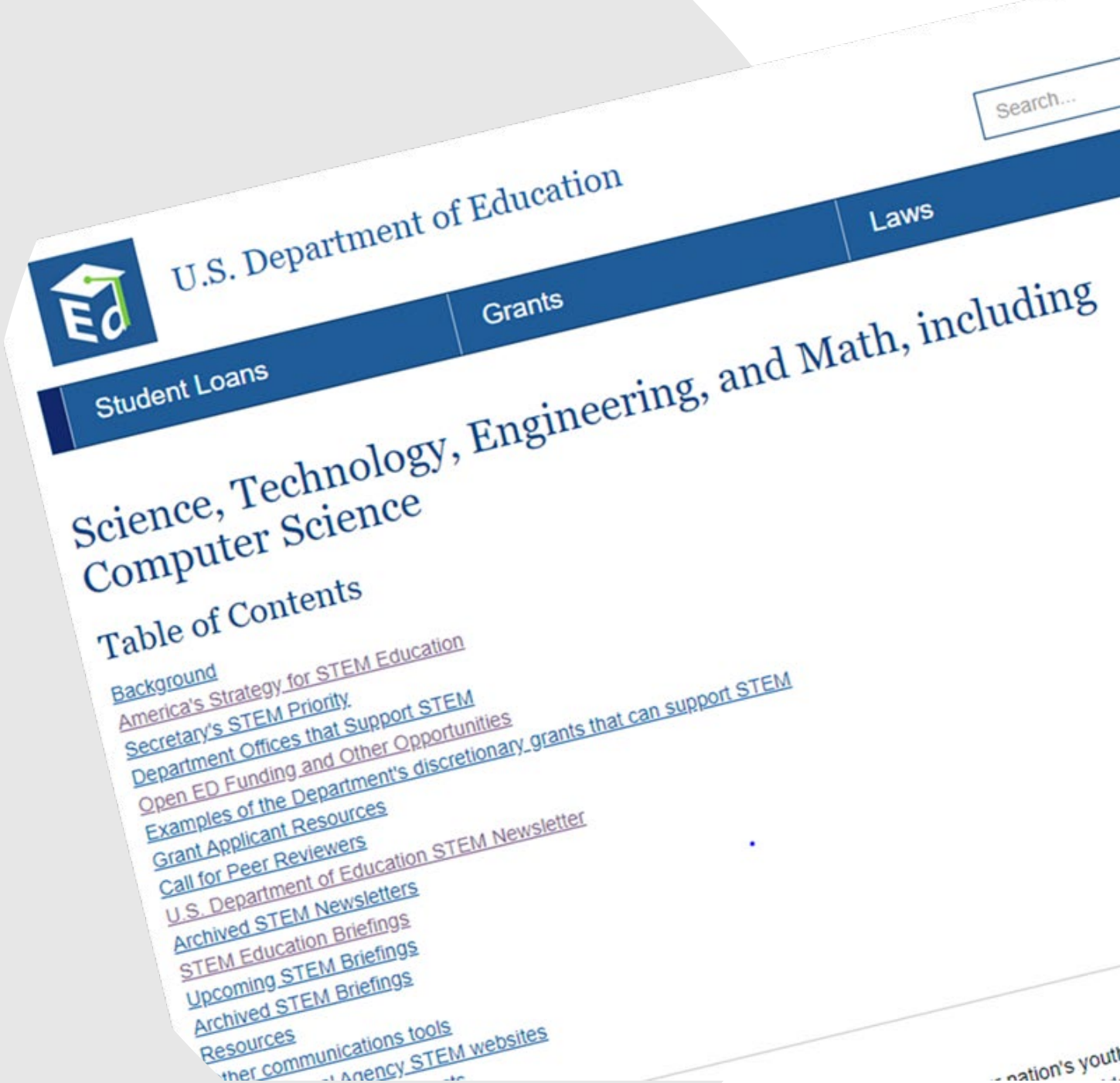
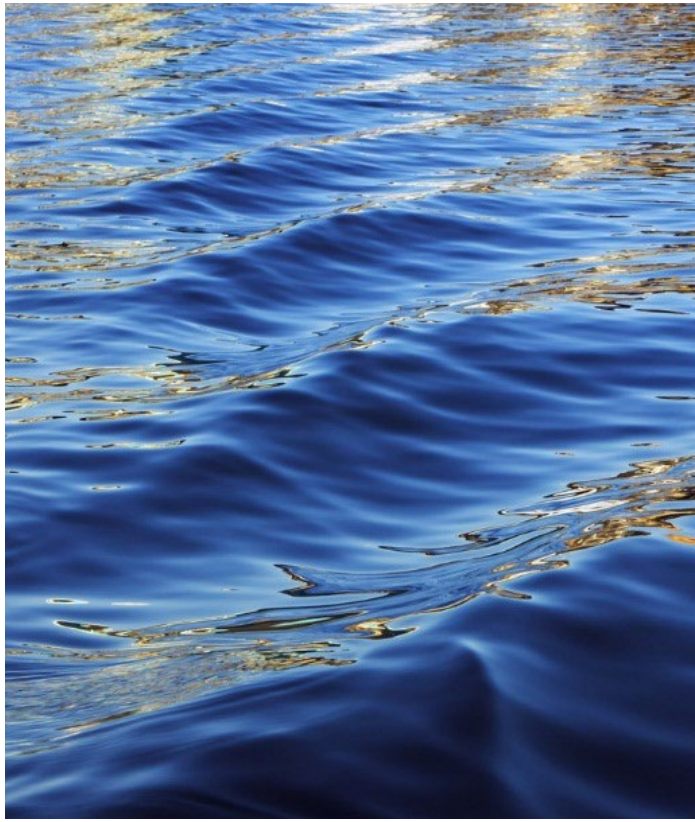


Andrea Falken



U.S. DEPARTMENT OF EDUCATION'S ROLE IN GREEN SCHOOLS AND ENVIRONMENTAL LEARNING

WHAT IS U.S. DEPARTMENT OF EDUCATION GREEN RIBBON SCHOOLS?

Three Pillars

Environmental Impact and Costs

Health and Wellness

Effective Environmental & Sustainability Education

Nominees Selected in States

Interested schools, districts, and postsecondary institutions must be nominated by their state education authorities

Up to 5 schools or districts and 1 postsecondary institution

Provisions for disadvantaged, private, charter, magnet, early learning, postsecondary, and district applicants.

Timeframe

- Application to state agency in Fall/ Winter
- State nominates to ED by Feb. 2022
- ED announces national honorees on Earth Day
- ED invites honorees to ceremony in summer

Common misconceptions

Certification, grant, or compliance mechanism

Cumbersome federal application

All states participate

THE GREEN STRIDES TOUR

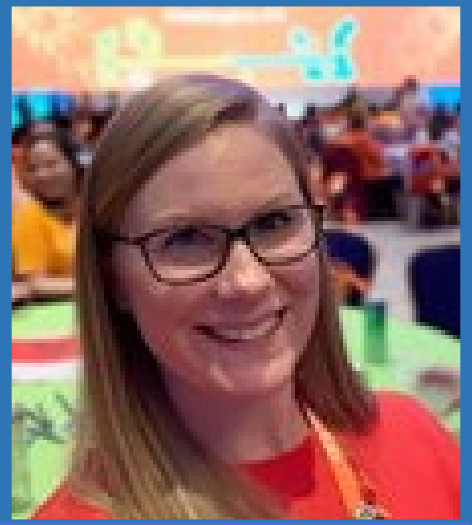
NEW CLIMATE ACTION LEADERSHIP

RESOURCES FOR ALL TO ADVANCE: GREEN STRIDES.ORG

U.S. DEPARTMENT OF EDUCATION
GreenRibbonSchools

Melissa Anley-Mills

Melissa Payne



Sarah Matthews

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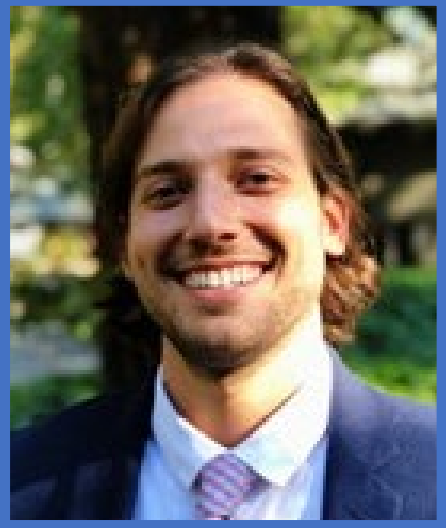


Michael Band

Air Quality Flag Program

Know the Air Quality

Forecast and Protect

Your Health

Department of Education
Webinar
2022

Co[illegible]artment of Energy and Environmental Protection

Air Quality Flag PROGRAM

History

- EPA started national program in 2010
- Now open to all organizations
- Over 1700 participants, plus Regions, States, Tribes, and local orgs, reaches 7-8 million people

Air Quality Flag PROGRAM

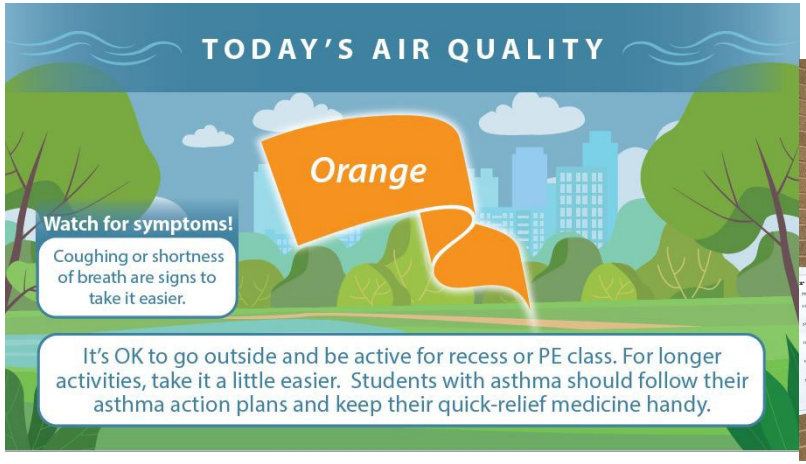
Flag program: Four Steps

1. Purchase or create flags
2. Educate and inform the community
3. Check the air quality forecast each day and fly the corresponding flag color
4. Follow the recommendations for outdoor activities

Air Quality Flag PROGRAM

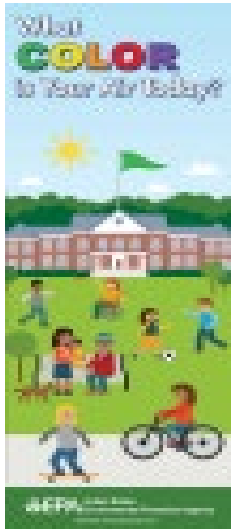
1. Purchase Flags

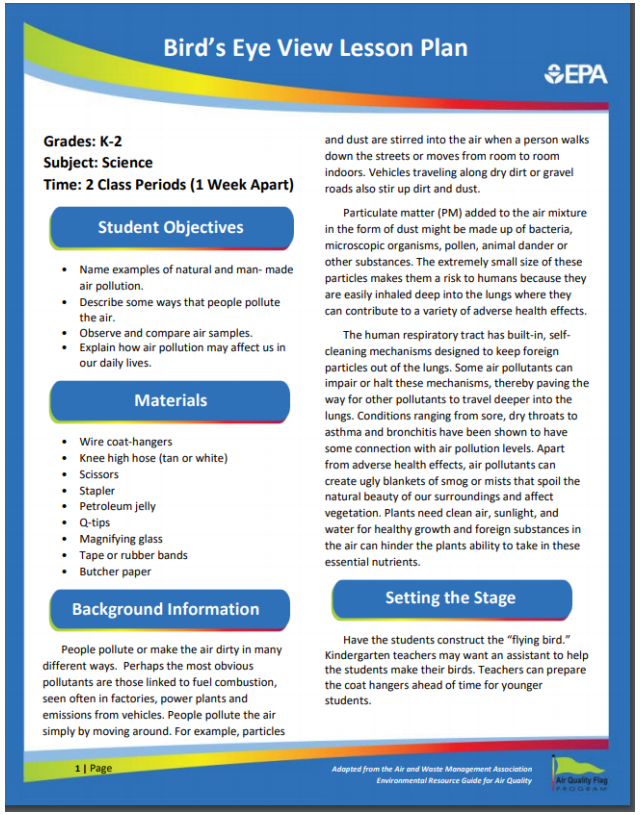
AQFP does not provide flags, but Federal, state, tribal agencies and educational institutions can order flags through GSA for a reduced cost



Air Quality Flag PROGRAM

2. Educate and Inform





Air Quality Flag PROGRAM

3. Check the Air Quality Forecast

- Download the free **AirNow APP**
- Install the **WIDGET** on homepage
- Enter your **Zip Code** on the flag website
- Subscribe to **ENVIROFLASH**

Air Quality Flag PROGRAM

4. Outdoor Activity Guidance

Air Quality and Outdoor Activity Guidance for Schools

Regular physical activity — at least 60 minutes each day — promotes health and fitness. The table below shows when and how to modify outdoor physical activity based on the Air Quality Index. This guidance can help protect the health of all children, including teenagers, who are more sensitive than adults to air pollution. Check the air quality daily at www.airnow.gov.

Air Quality Index	Outdoor Activity Guidance
green GOOD	Great day to be active outside!
yellow MODERATE	Good day to be active outside! Students who are unusually sensitive to air pollution could have symptoms.*
orange UNHEALTHY FOR SENSITIVE GROUPS	It's OK to be active outside, especially for **short activities** such as recess and physical education (PE). For **longer activities** such as athletic practice, take more breaks and do less intense activities. Watch for symptoms and take action as needed.* Students with asthma should follow their asthma action plans and keep their quick-relief medicine handy.
red UNHEALTHY	For **all outdoor activities**, take more breaks and do less intense activities. Consider moving **longer or more intense activities** indoors or rescheduling them to another day or time. Watch for symptoms and take action as needed.* Students with asthma should follow their asthma action plans and keep their quick-relief medicine handy.
purple VERY UNHEALTHY	Move **all activities** indoors or reschedule them to another day.

*** Watch for Symptoms**

Air pollution can make asthma symptoms worse and trigger attacks. Symptoms of asthma include coughing, wheezing, difficulty breathing, and chest tightness. Even students who do not have asthma could experience these symptoms.

If symptoms occur:
The student might need to take a break, do a less intense activity, stop all activity, go indoors, or use quick-relief medicine as prescribed. If symptoms don't improve, get medical help.

Go for 60!

CDC recommends that children get 60 or more minutes of physical activity each day. www.cdc.gov/healthyyouth/physicalactivity/guidelines.htm

Plan Ahead for Ozone

There is less ozone in the morning. On days when ozone is expected to be at unhealthy levels, plan outdoor activities in the morning.

Go for 60!

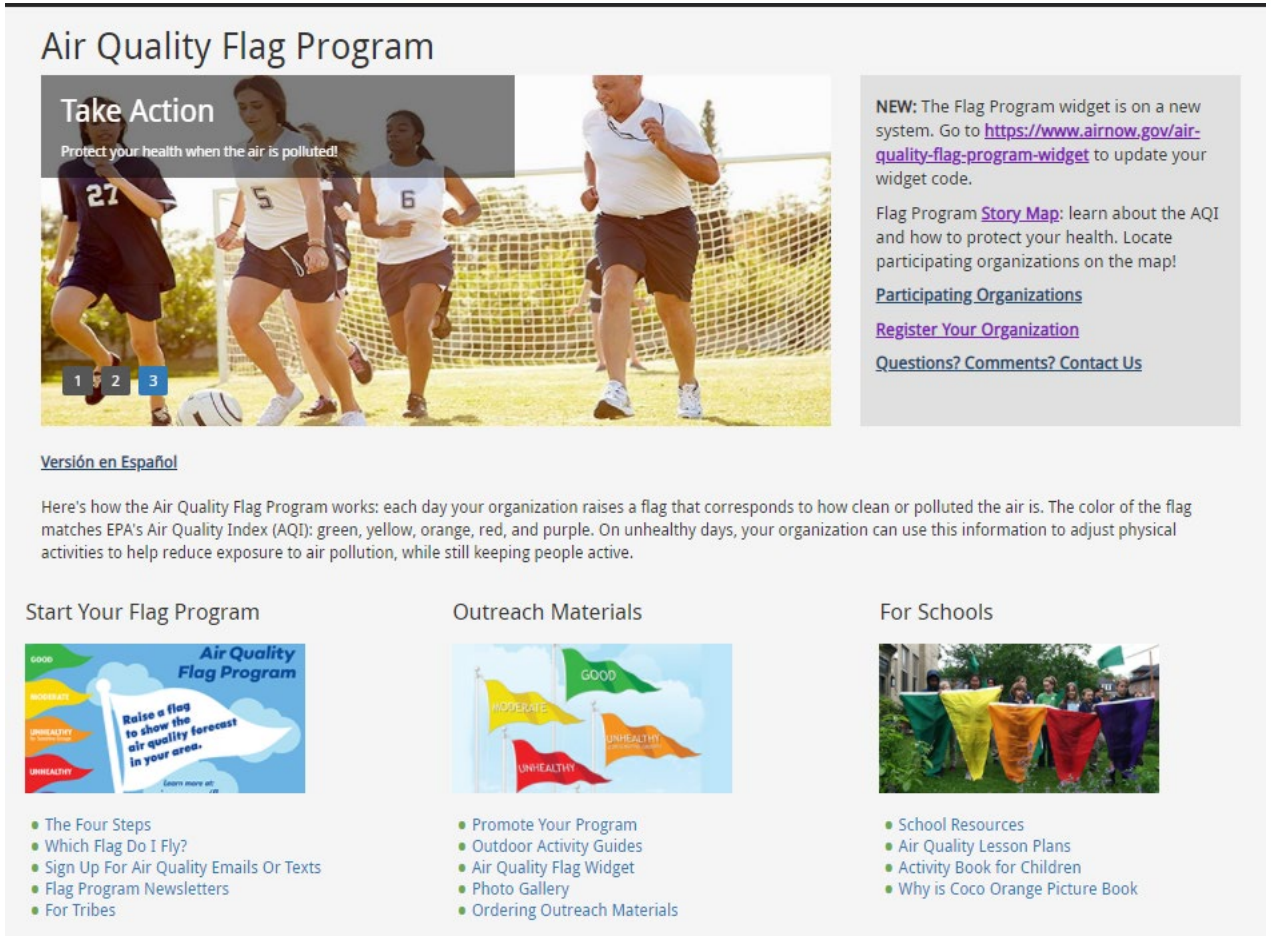
CDC recommends that children get 60 or more minutes of physical activity each day.

Air Quality Flag PROGRAM

Flag Program Website

- English and Spanish
- Online Registration
- Quick Start guide
- Coordinator's Handbook
- Story Map
- Activity Guidelines
- Teacher/student resources
- Participating organizations

www.airnow.gov/flag



Air Quality Flag PROGRAM

Air Quality Flag Program

WINTER 2021 NEWSLETTER

Air Quality Flag PROGRAM

EPA

FYI: PARTICIPATING IN A FLAG PROGRAM NEAR YOU

Do you ever wonder what other organizations are flying an air quality flag in your area? There's a map for that. Go to https://www.airnow.gov/flag and click on the Story Map in the grey box.

The first graphic in the series shows a map of the country. The flags not only mark the organizations participating in the Flag Program-- they also show the local Air Quality Index forecast for the day for that organization.

GOT A GOOD STORY?

Has your organization overcome a roadblock related to your participation in the Air Quality Flag Program? Or have you discovered a great way to communicate about the air quality to your community? Let us know what you're up to-- we'd love to hear about it!

COCO IS BACK… AND IS ANIMATED!

Need some new videos for the classroom? Now you can watch the children's picture book *Why is Coco Orange?* as a narrated "action" video on the EPA YouTube channel at https://www.youtube.com/watch?v=4TAuzMniolU. Both English and Spanish captions are available. Go to Settings (the gear-like icon on the bottom right of the screen) and choose the appropriate language from the Subtitles drop-down. Check it out!

NEW: COMMUNITIES POSTER

Just in: a limited number of new posters aimed at community education about the Air Quality Index and local air quality.

The community poster is free, and you can order directly from EPA's National Service Center for Environmental Publications at https://www.epa.gov/nscep. Search for the poster using item number 456H20001. NOTE: The item number is also needed to place the order.

AQFP CONTACTS

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Air Quality Flag PROGRAM

Welcome to GENERATE: The Game of Energy Choices

Think Globally, Act Locally | January 19, 2022

Rebecca Dodder, U.S. EPA & Emma Refvem, Durham Public Schools

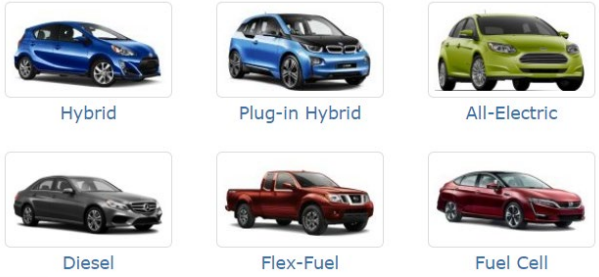
Disclaimer: The game and associated materials were developed in support of education and outreach, and do not represent official U.S. EPA opinion or policies. This document has been reviewed in accordance with U.S. Environmental Protection Agency policy and approved for publication.

Energy 101: The big picture

- **Primary energy resources**
  - Fossil: coal, natural gas, petroleum
  - Non-fossil, non-renewable: uranium
  - Renewable: wind, solar, hydro, geothermal, biomass

- **Technologies to convert primary resources to useable energy like electricity, gasoline, …**
  - Petroleum Refineries
  - Electric Power Generation

- **End-use sectors**
  - Residential
  - Commercial
  - Industrial
  - Transportation



- **Energy services –** What do people actually need and want? **Mobility** (vehicle miles of travel) or **accessibility** (accessing education, work, shopping), **lighting** (lumens of light), **comfort** (space heating and cooling). Energy is a “derived demand”

Energy and our environment: why it matters

Energy-system related impacts

Air pollutants
Nitrogen Oxides (NO_x)
Carbon monoxide (CO)
Sulfur Dioxide (SO_2)
Particulate Matter (PM)
…more

Greenhouse gases
Carbon dioxide (CO_2)
Methane (CH_4)
Nitrous oxide (N_2O)
Black carbon and short-lived climate forcers

Water use
~40% of total water withdrawals

Snapshot of Generate

- Teams get a grid and a mix of energy pieces
- Each piece has costs and emissions
- Teams compete to get the total lowest cost
- Each round presents new challenges (carbon price) and opportunities (more renewables, efficiency options)

"It was cool, funny and angering at times!" 6th grader

"This is the best science board game EVER!" 6th grader

Preview of mobility game

- Each student is set up with:
  - Career with salary
  - Location with cost of living
  - One of nine “commute cards” for VMT

“Do adults do these calculations when they buy a car?”

- They then choose from 18 vehicles
- Range of vehicle classes, costs, efficiencies, emissions, new/used.
- Gasoline, hybrid, PHEV, BEV
- Five non POV mobility options subway, bus (suburban), walk/bike, carpool

- Students calculate and compare transportation costs and emissions
- As a team they negotiate to lower team-wide CO_2 emissions
- Additional rounds introduce “give and take” cards

Drive!

Name _____ Fleet # ___

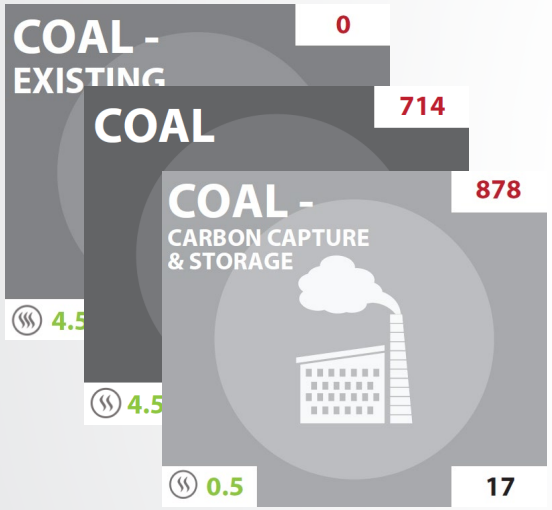
			Round One	Round Two	Round Three
Career	a.	Career Choice			
	b.	Average Monthly Salary	$	$	$
Lifestyle & Budget	c.	Location			
	d.	Cost of Living (COL)	$	$	$
	+ e.	Remaining Monthly Budget *Average Monthly Salary – COL (b – d)*	$	$	$
	+ f.	Monthly Mileage *(Daily Commute x 20 days) + Additional VMT*	miles	miles	miles
Vehicle	g.	Vehicle Choice			
	h.	Monthly Estimated Car Payment	$	$	$
	i.	Vehicle Average Miles Per Gallon *(MPG)* or Vehicle Average Miles Per Kilowatt hour(MI/kWh)	MPG or mi/kWh	MPG or mi/kWh	MPG or mi/kWh
Vehicle and Fuel Cost	+ j.	Monthly Fuel/Energy Cost (Round up to nearest $) GASOLINE: *(Fuel Cost x Monthly Mileage)/mpg ($3/gal x f / i)* ELECTRIC: *(Energy Cost x Monthly Mileage)/(mi/kwh) ($.10/kWh x f / i)*	$	$	$
	+ k.	Total Monthly Cost of Vehicle *(h + j)*	$	$	$
	+ l.	Remaining Monthly Budget *(e – k)*	$	$	$
CO_2	+ m.	Monthly CO_2 Emissions in lbs. *(Monthly Mileage x 19.6)/mpg (f x 19.6) / i*	lbs.	lbs.	lbs.
	+ n.	Annual CO_2 Emissions in lbs. *Monthly Emissions x 12 (m x 12)*	lbs.	lbs.	lbs.

Legend
+ - You will have to compute the answer to this.
- You can find this information on a card.

“Can I take this worksheet with me?”

Types of energy pieces

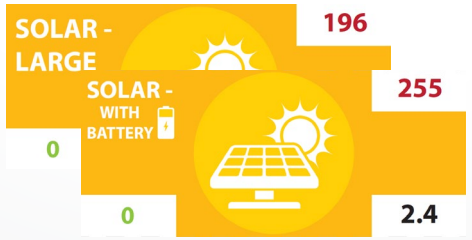
FOSSIL ENERGY



NUCLEAR ENERGY

RENEWABLE ENERGY

WIND	56
0	1



SOLAR	49
0	1

BIO-BASED ENERGY

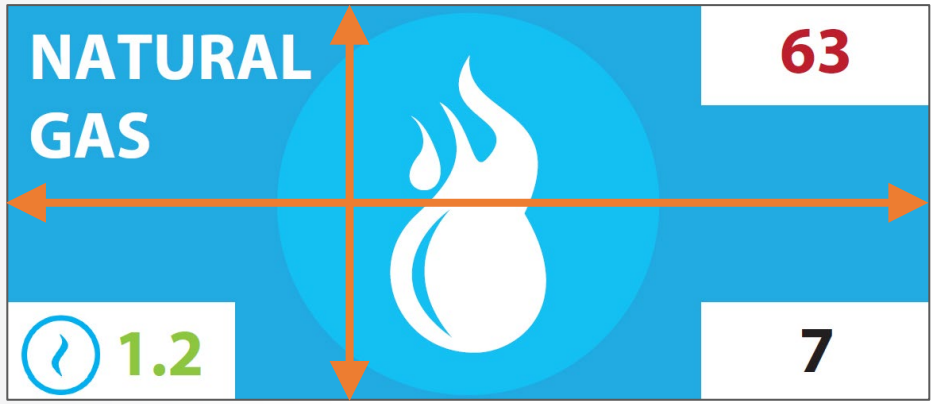
ENERGY EFFICIENCY

EE	10
0	0

Round 1: Parts of the energy pieces

Size:
How much energy does it produce?

Type:
What primary energy resource does it use?



Purchase Cost:
How much does it cost up front to build/purchase?

AQ Impacts:
How much air pollution is produced?
Scale of 0-3

CO_2 emissions:
How much CO_2 does it produce *each year*?

Annual Cost:
How much does it cost *each year* to run/operate?

= 273

Lifetime: All energy pieces will last 30 years

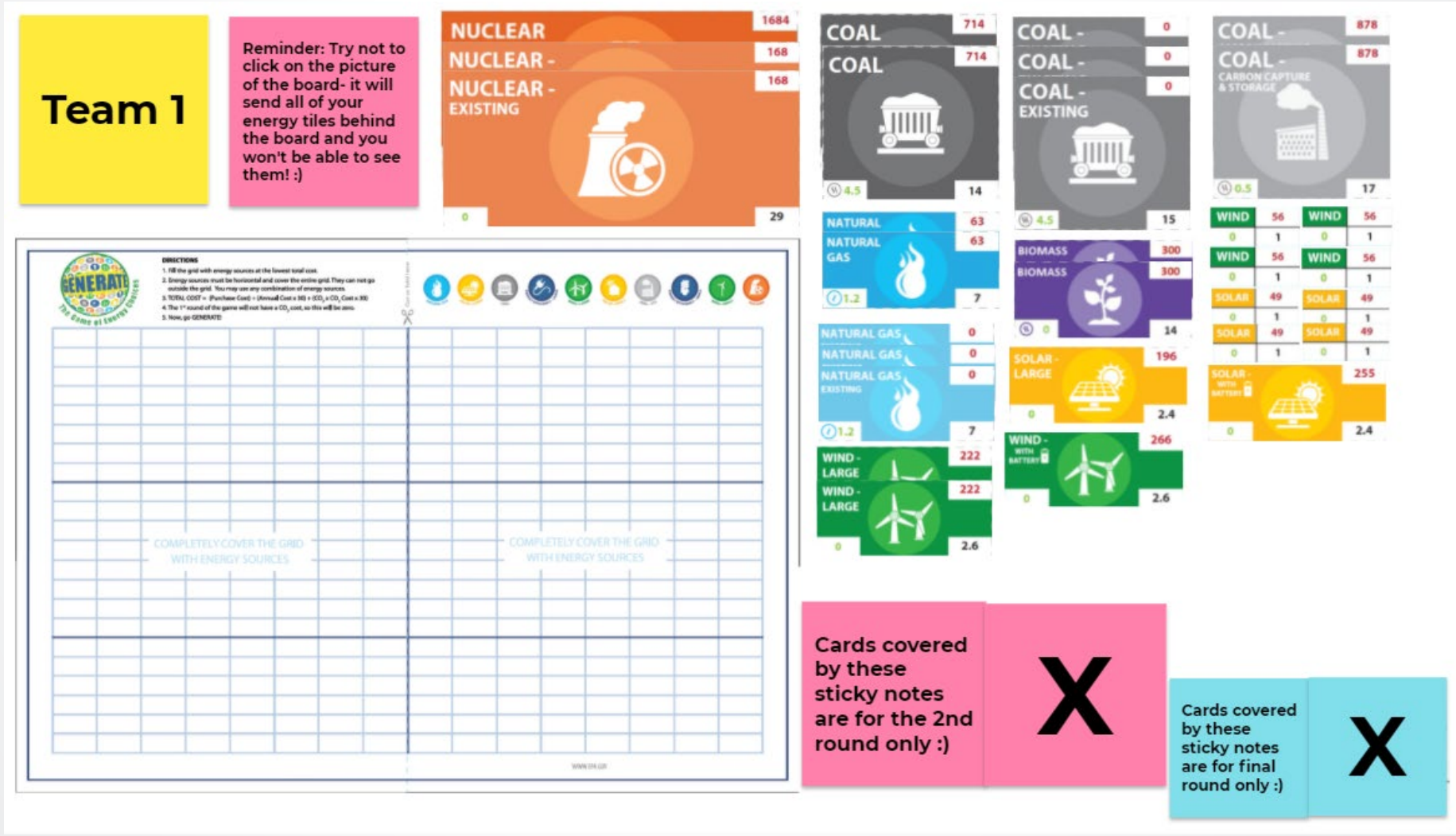
Round 1: Cost per piece = Purchase cost + (Annual Cost x 30)

Let's play!

- Each team has a different energy mix to from which to choose
- Goal is to fill the energy grid at the lowest cost
- Team Jobs: Cost Control, Timekeeper, Recorder (of type and number of each piece used)

- If playing virtually, facilitators will share your team Jamboard link in your room and move pieces
- Students – Be sure to unmute your mics and participate actively

Live demonstration on Jamboard

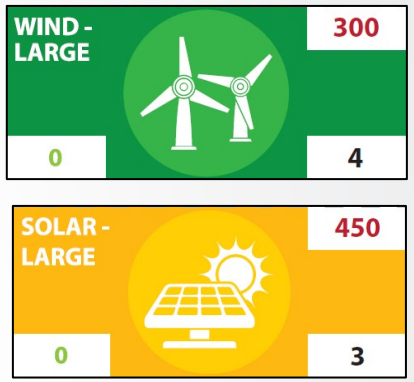


Round 2: CO_2 price + more renewables

AQ Impacts:
How much air pollution is produced?
Scale of 0-3

CO_2 emissions:
How much CO_2 does it produce *each year*?

+



Cost per piece = **63** + (**7** x 30)
+ (**1.2** x 1 x 30)

= 309

Lifetime: All energy pieces will last 30 years
CO_2 price = 1

Round 2:

Cost per piece = Purchase cost + (Annual Cost x 30) + (CO_2 emissions x CO_2 price x 30)

All materials available online

Generate: The Game of Energy Choices

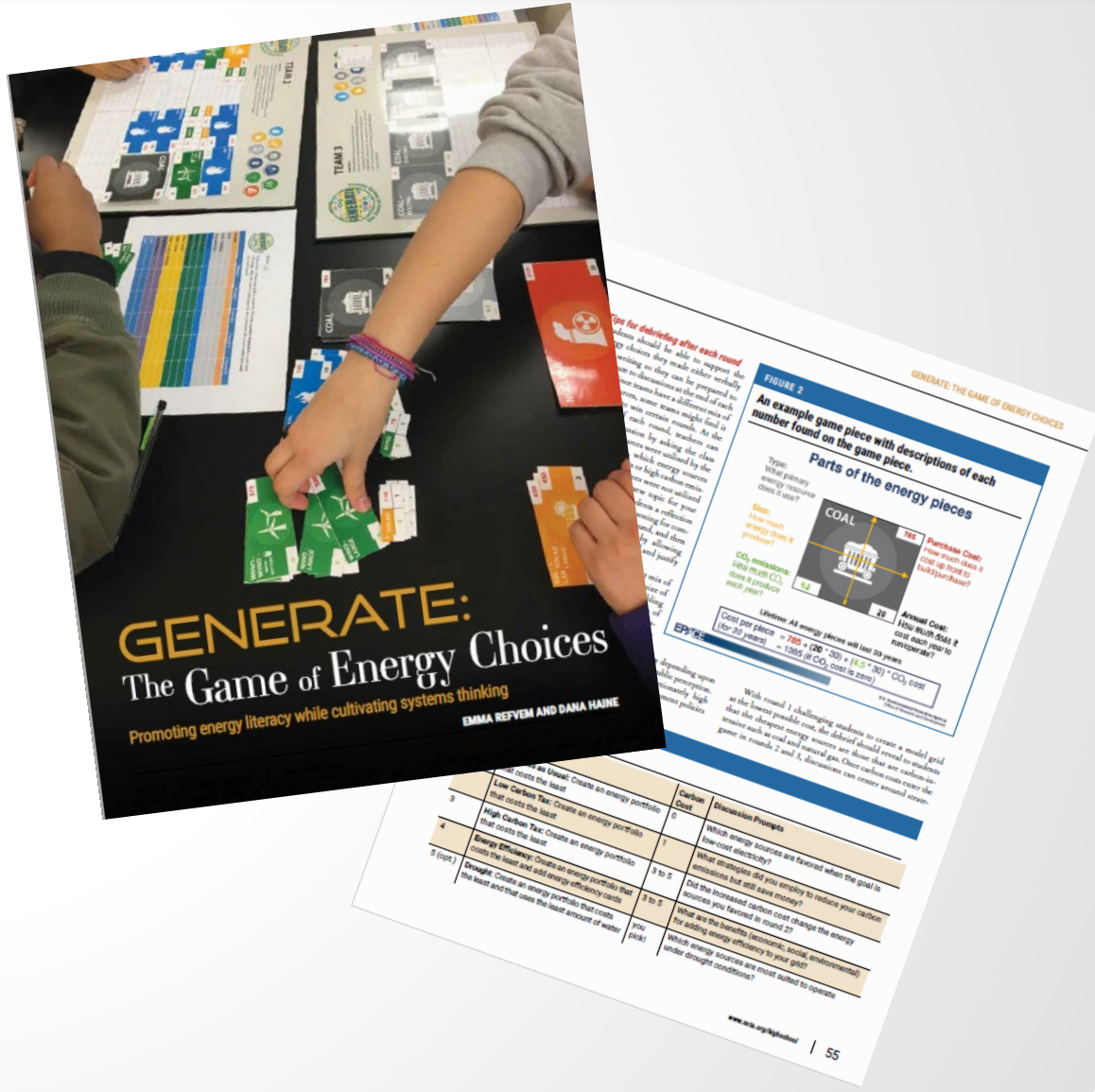
This page contains all of the printable materials for the Generate Game including the game board, game pieces and instruction manual. Generate is an interactive game that allows students to explore energy choices and teaches the considerations and costs in deciding what type of energy generation to build.

The 2021 update of the Generate Game is now available, including instructions for playing the game in a virtual setting.

- Generate 2021 Introductory Presentation (pptx)
- Generate 2021 Instructor's Guide (pdf)
- Generate 2021 Game Board and Pieces (pdf)
- Generate 2021 Game Board - Large Version (pdf)
- Generate 2021 Score Card (pdf)
- Virtual Generate Jamboards: A How-to Guide (pptx)
- Editable Companion Excel File For Quickly Calculating Team Scores (xlsx)

How Teachers Use the Game

- Article in The Science Teacher – July/August 2021
- Students are more engaged
- Provides a break to the routine
- Simplifies a complex topic
- Students make nuanced connections to real-world issues



Additional information

- **Generate** materials available at: www.epa.gov/air-research/air-quality-and-energy-choice-stem-activities-educators
- **Mobility game:** materials under development and will be pending review and clearance

EPA

STUDENT CHALLENGES

EPA CHALLENGES & PRIZES

CAMPUS RAINWORKS CHALLENGE

ENVIRONMENTAL JUSTICE VIDEO CHALLENGE for STUDENTS

Companies Crushing Pollution" Video Challenge

EPA

CAMPUS RAINWORKS CHALLENGE

A Green Infrastructure Design Challenge for Colleges and Universities

Registration each September
Entries due early December
Winners Announced each Spring

With Prizes totaling $30,000
Share amongst to 1st and 2nd place winners (Student and Faculty Prizes)

For more information: **https://www.epa.gov/green-infrastructure/campus-rainworks-challenge-0**

EPA's Prize and Challenge Site:

https://www.epa.gov/innovation/epa-challenges-prizes

STUDENT CHALLENGES

Subscribe to the EPA challenge & prize competition email list to stay up-to-date on the latest news.

Questions about Challenges:

Please contact us at Innovation@epa.gov

EJ Video Challenge for Students

Presented by:
Sania W. Tong Argao
U.S. Environmental Protection Agency (EPA)
Office of Research and Development (ORD)

U.S. Department of Education STEM Webinar
January 19, 2022
1:30 - 3:00 PM ET

What's the issue?

- Many communities face greater environmental exposures and public health risks due to a history of inequitable environmental policies and access to the decision-making process.
  - Many lower-income or minority communities are located near industrial plants or waste disposal sites resulting in reduced air or water quality.
  - These communities may contain older and unsafe homes with lead-based paint, exposures to mold, or exposures to other hazards that put residents at higher risk of health problems.

What is environmental justice?

- Environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implement ation, and enforcement of environmental laws, regulations, and policies.

Identifying the EJ Issue(s)

- Multiple EJ concerns can affect a community
- Communities with EJ concerns may need help identifying what issues they may be facing
- Knowing what EJ issues are affecting a community is empowering

Publicly Available Tools & Data

- Publicly available tools and data exist that can help communities identify or characterize EJ issues in their community.
- These tools and data can also be used to come up with strategies to address identified EJ issues.

The Challenge!

Use data and publicly available tools to identify and address EJ issues in your community!

- Inspire students at accredited colleges and universities in the United States and its territories to work directly with communities in the identification and characterization of EJ challenges using data and publicly available tools, and
- Help communities (including residents and other stakeholders) address EJ challenges and/or vulnerabilities to environmental and public health hazards using data and publicly available tools.

Enhance Communities' Capacity to

Address Environmental Inequities using Data and Tools

Co-Sponsors

Federal Co-Sponsor

- U.S. Environmental Protection Agency – Office of Research and Development (EPA/ORD)

Non-Federal Co-Sponsors

- American Public Health Association (APHA)
- Educational Partnerships for Innovation in Communities – Network (EPIC-N)
- Environmental Defense Fund (EDF)
- *Environmental Justice* (peer-reviewed journal)
- Groundwork USA

EJ Video Challenge Phases

Phase 1: Create a video to demonstrate innovative approaches to identify and characterize an EJ issue(s) in a select community using data and publicly available tools.

Phase 2*: Develop a video to display how students used data and publicly available tools to identify strategies and opportunities to address an identified EJ issue(s) and worked with a community-based organization(s) to inform strategies for intervention and/or facilitated effective community engagement and advocacy on the EJ issue(s).

***NOTE**: Details for Phase 2 will be provided prior to the launch of Phase 2, which is tentatively scheduled to start in August 2022.

Visit EJ Video Challenge: Tools and Data Resources to view example tools that may be useful for the Challenge.

Prizes

- **Prizes – Phase 1 (For Students)**
  - (1) First Place Prize of $20,000
  - (1) Second Place Prize of $12,000
  - (1) Third Place Prize of $6,000
  - Up to (7) Honorable Mention Prizes of $1,000 each

- **Prizes – Phase 2**
  - To be announced at a later date.

- **Non-Monetary Awards – Phase 1**
  - Winning videos will be posted on EPA's EJ Video Challenge for Students webpage.
  - Winning videos will be shared on EPA social media channels and communications.
  - If a tool developed by EPA's Office of Research and Development was used, winners and their community organization partner(s) will have the opportunity to speak with a team member for that tool for Phase 2.
  - Challenge winners will have an opportunity to submit an article for publication (*subject to the journal's formal review/acceptance process*) in *Environmental Justice*.

Important Dates – Phase 1

Phase 1 Event	Date
Phase 1 Opens	November 2, 2021
Informational Webinar	December 6, 2021 @12 p.m. ET
Phase 1 Submissions Due	April 1, 2022 by 11:59 PM EST
Phase 1 Winners Announced	June 2022

Note: Phase 2 dates will be announced at a later date.

Questions?

Website for the Challenge:
https://www.epa.gov/innovation/environmental-justice-video-challenge-students

Questions:
Please contact us at EJVideoChallenge@epa.gov.

Social Media:
#EJVideoChallenge

EPA's Office of Environmental Education Resources

Michael Band, Education Grant Specialist

U.S. Environmental Protection Agency

OEE’s Award Programs

- OEE Currently OEE currently runs two Award Programs, one recognizing students and another recognizing educators

How to Apply

Apply for the President's Environmental Youth Award

Applications are due February 18, 2022

Presidential Innovation Award for Environmental Educators

Applications are due February 18, 2022

Environmental Education Resources
https://www.epa.gov/students

- **Homework Resources**
- **Lessons Plans**
- **Teacher Guides**
- **Games**

A Closer Look at https://www.epa.gov/students

Classroom Resources and Project Ideas

- Lesson plans, teacher guides and online resources for educators by environmental topic
- Community service project ideas
- Science fair project ideas

Homework Help and Activities for K-12 Students

- Homework resources by environmental topic
- Games, quizzes, videos, and more

Key Features

Topics: Air | Climate Change | Ecosystems | Energy | Health | Waste | Water

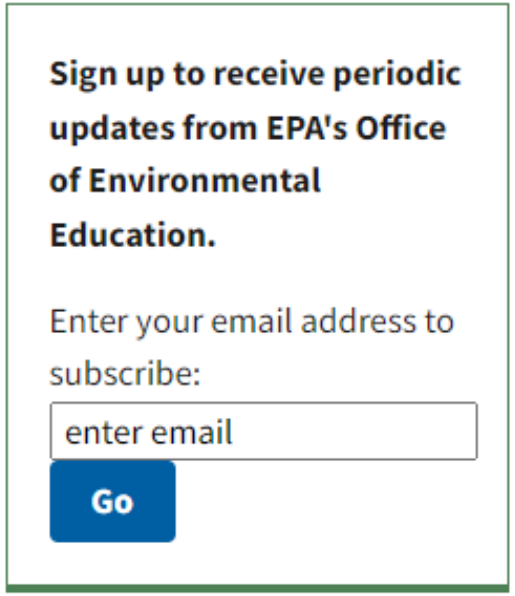
Acid Rain: A Teacher's Guide (PDF 56 pp, 4.6 MB)
Lesson plan and activities from EPA for teachers on acid rain.
Grades: 6-8
Type of Resource: Lesson plan

Acid Rain Student Pages
Find the acid rain student pages, as well as general information for older students or adults.
Grades: K-12
Type of Resource: Lesson plans and experiments

AIRNOW
Get up-to-the-minute information about air pollution in your community, through a joint project from EPA, the National Oceanic and Atmospheric Administration, the National Park Service and other partners. The AIRNOW website includes maps, forecasts, and information about the health effects of air pollution.
Grades: 9-12
Type of Resource: Website

Stay Up-To-Date on OEE News!

Subscribe to the Office of Environmental Education listserv on https://www.epa.gov/education



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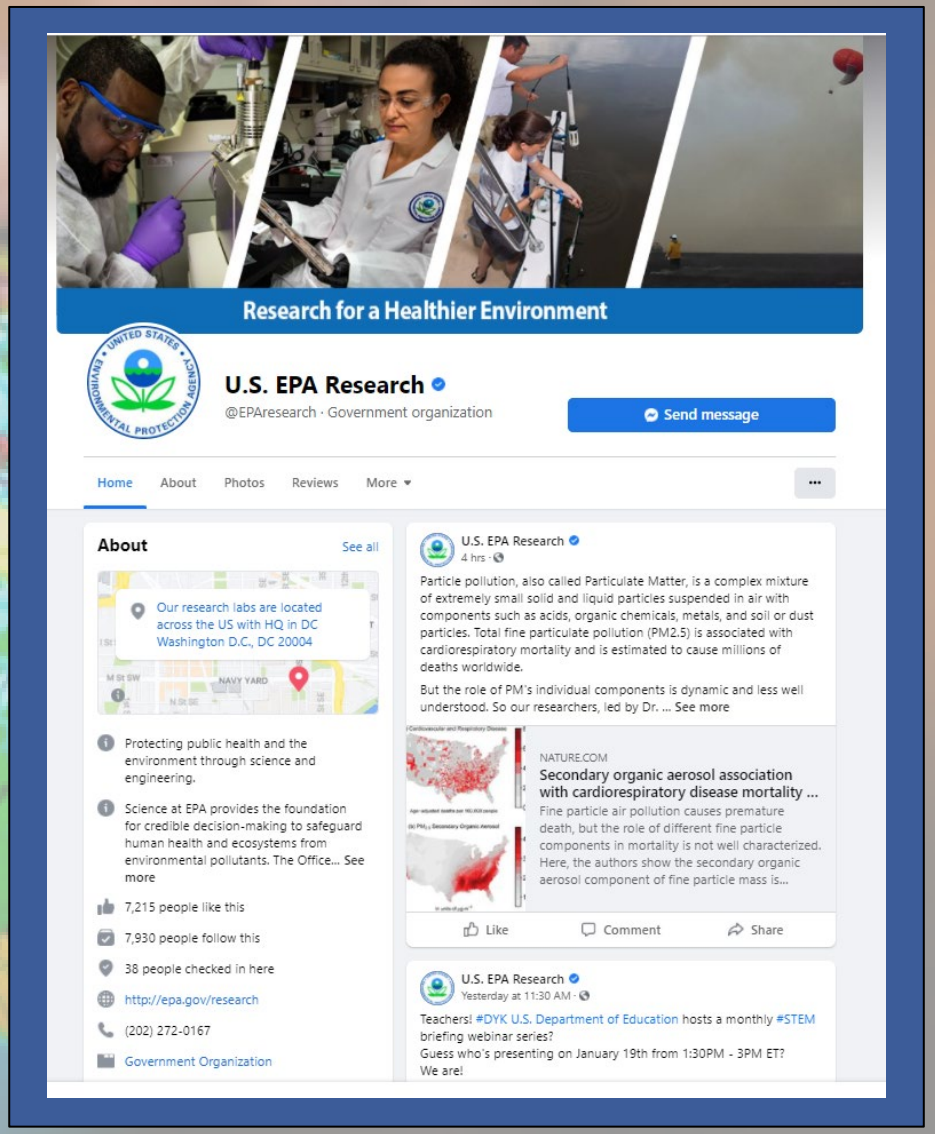

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College students / Professors: Don't miss the #WaterReuse task in the WERC Environmental Design Contest that was developed by our #EnvironmentalEngineering experts. Learn more: iee.nmsu.edu/2022-tasks-faq... #STEM

> **NMSU Engineering** @NMSU_engineer · Jan 10
> 🚨Engineering students🚨 Design the best #virus-monitoring process for Waste Water! Task designed by EPA and CDM Smith. WERC Environmental Design Contest task: Monitoring Virus Removal by MBRs. #WERCDC.
> Learn more👉bit.ly/3IXdiYU

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https://iee.nmsu.edu/2022-tasks-faqs

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Explore the #EnviroAtlas education materials: ready-made lesson plans for every grade level, from kindergarten through undergraduate and aligned with Next Generation and State Science Standards: epa.gov/enviroatlas/en... #EPAEnviroAtlasEd #STEM #BackToSchool #WakeEdSummerSTEM

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https://www.epa.gov/enviroatlas/enviroatlas-educational-materials

Thank you!

Additional Resources Mentioned in the Q &A

Executive Order 14008 *Tackling the Climate Crisis at Home and Abroad*
(EPA's) National Environmental Justice Advisory Council Recommendations: https://www.epa.gov/sites/default/files/2021-05/documents/whiteh2.pdf

Funding opportunity Improving Public Health Data Systems to Address Health Equity Challenges for At-Risk Communities in the U.S. Gulf Coast,: https://www.nationalacademies.org/our-work/funding-opportunity-improving-public-health-data-systems-to-address-health-equity-challenges-for-at-risk-communities-in-the-us-gulf-coast

EPA P3 program: www.epa.gov/p3