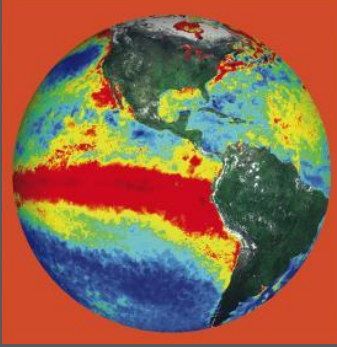
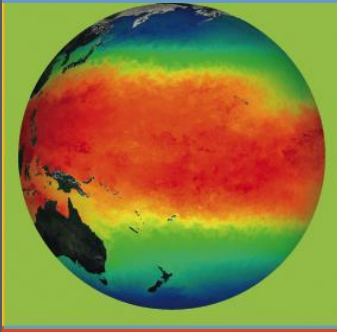
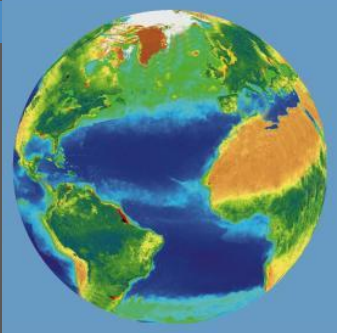


# CLEAN

CLIMATE LITERACY & ENERGY AWARENESS NETWORK

## CLEAN Resources to Support WA Clime-time

*Katie Boyd, Anne Gold, & Deb Morrison*



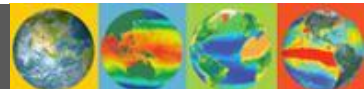
# Honoring Stewards of the Land

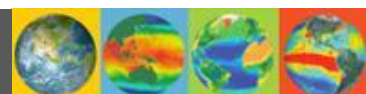
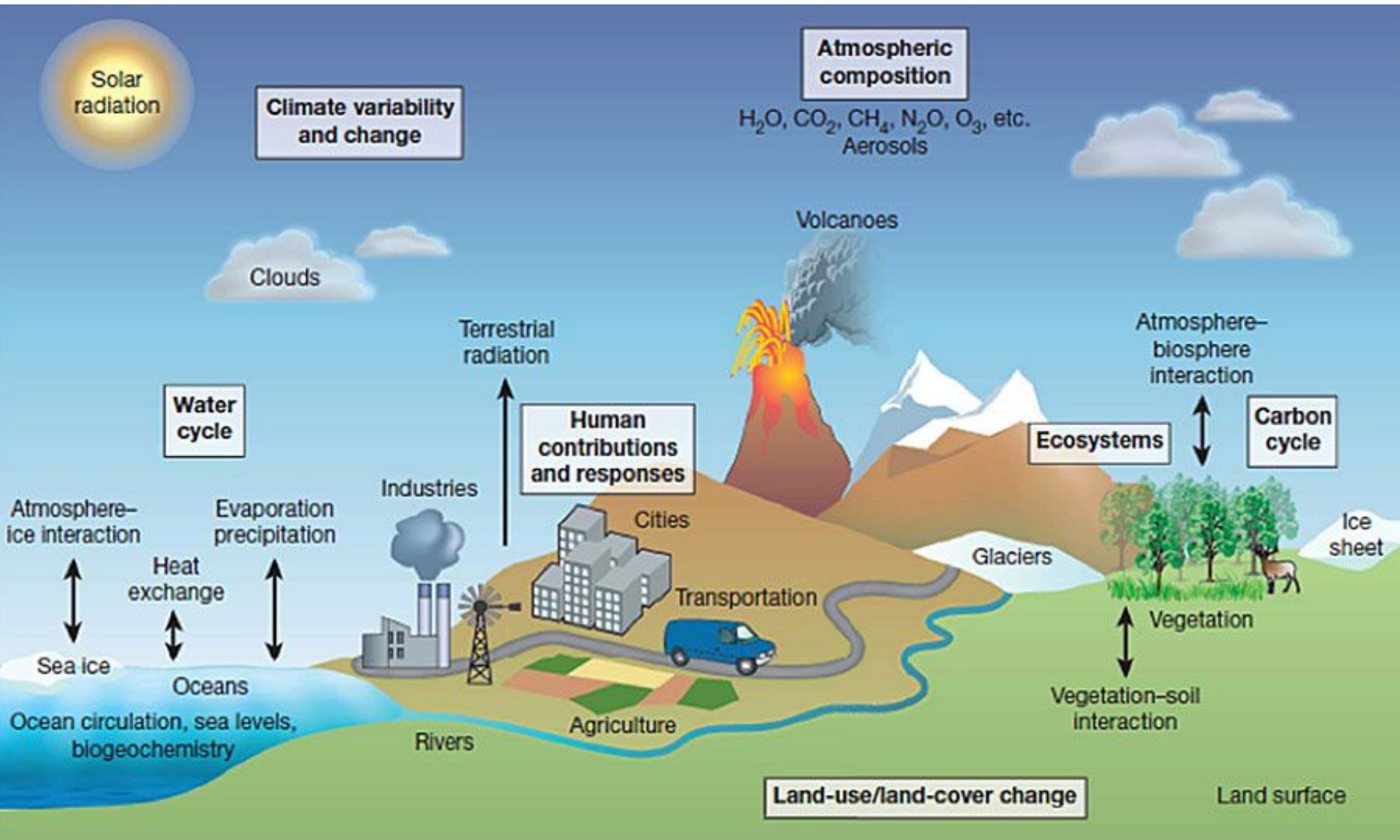
We honor their stewardship of the land, past, present and future and learn how to engage our students in climate science/NGSS so we can learn to make good decisions that heal our planet and protect our environment.



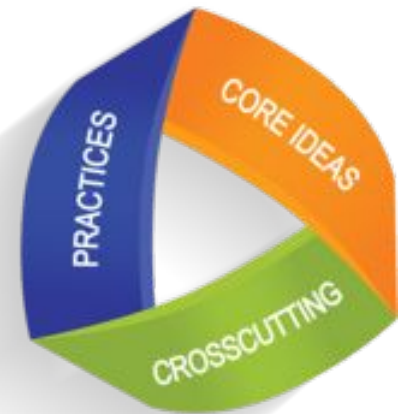
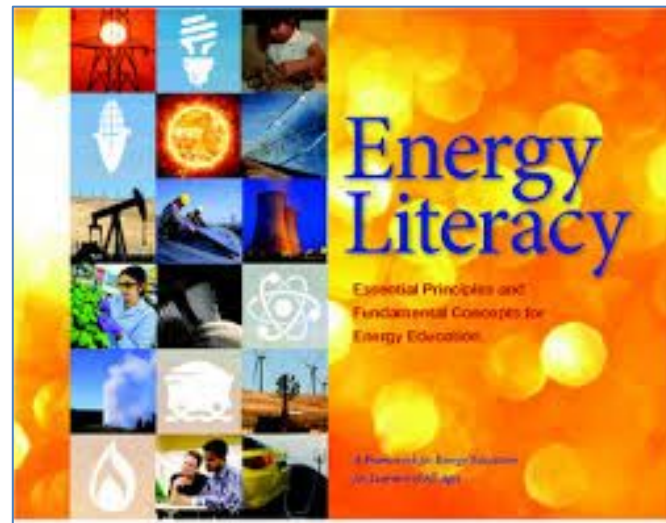
# Goals of Session

- Introduce the CLEAN collection.
- Find at least one resource to address a pressing need in your own teaching around climate change.
- Explore professional learning resources to support the teaching of climate.

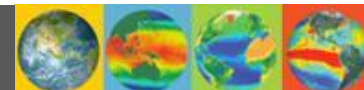




# Frameworks for Teaching about Climate and Energy System



A perspective and approach for solving problems centered on the whole system, including system elements and their inter-relationships.



# CLEAN Portal

The screenshot shows the CLEAN Portal homepage. At the top, the logo reads "CLEAN CLIMATE LITERACY & ENERGY AWARENESS NETWORK" with four globe icons. Below the logo is a large blue banner with the text "Collection of Climate and Energy Educational Resources" and "A collection of ~700 free, ready-to-use resources rigorously reviewed by educators and scientists. Suitable for secondary through higher education classrooms." There are two buttons: "Search the Collection >" and "Browse by NGSS >". To the right of the banner is a video player showing a classroom scene. Below the banner is a sidebar with "CLEAN Collection of Educational Resources", "Guidance in Teaching Climate and Energy", "CLEAN Network", and "About CLEAN". The "News" section includes: "Register for one or more webinars in the CLEAN Webinar Series!", "Teachers, check out the create-your-own CLEAN-NGSS unit resources!", "CLEAN was awarded the 2017 Friend of the Planet award by the NCSE!", "The CLEAN Collection is now aligned with NGSS!", and "CLEAN STEM Flashes: View and sign up for this topical newsletter >".

**CLEAN Collection**

**Guidance for Teaching Climate and Energy**

**CLEAN Network**

Collection of Climate and Energy Educational Resources  
A collection of ~700 free, ready-to-use resources rigorously reviewed by educators and scientists.  
Suitable for secondary through higher education classrooms.

Search the Collection > Browse by NGSS >

Guidance in Teaching Climate and Energy Science  
Background information, pedagogic approaches, links to relevant educational resources in the CLEAN collection.

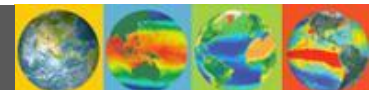
CLEAN Network  
A community of professionals committed to improving climate and energy literacy.

About the CLEAN Project

CLEAN Review Process

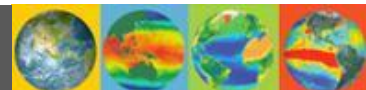


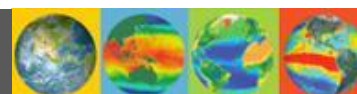
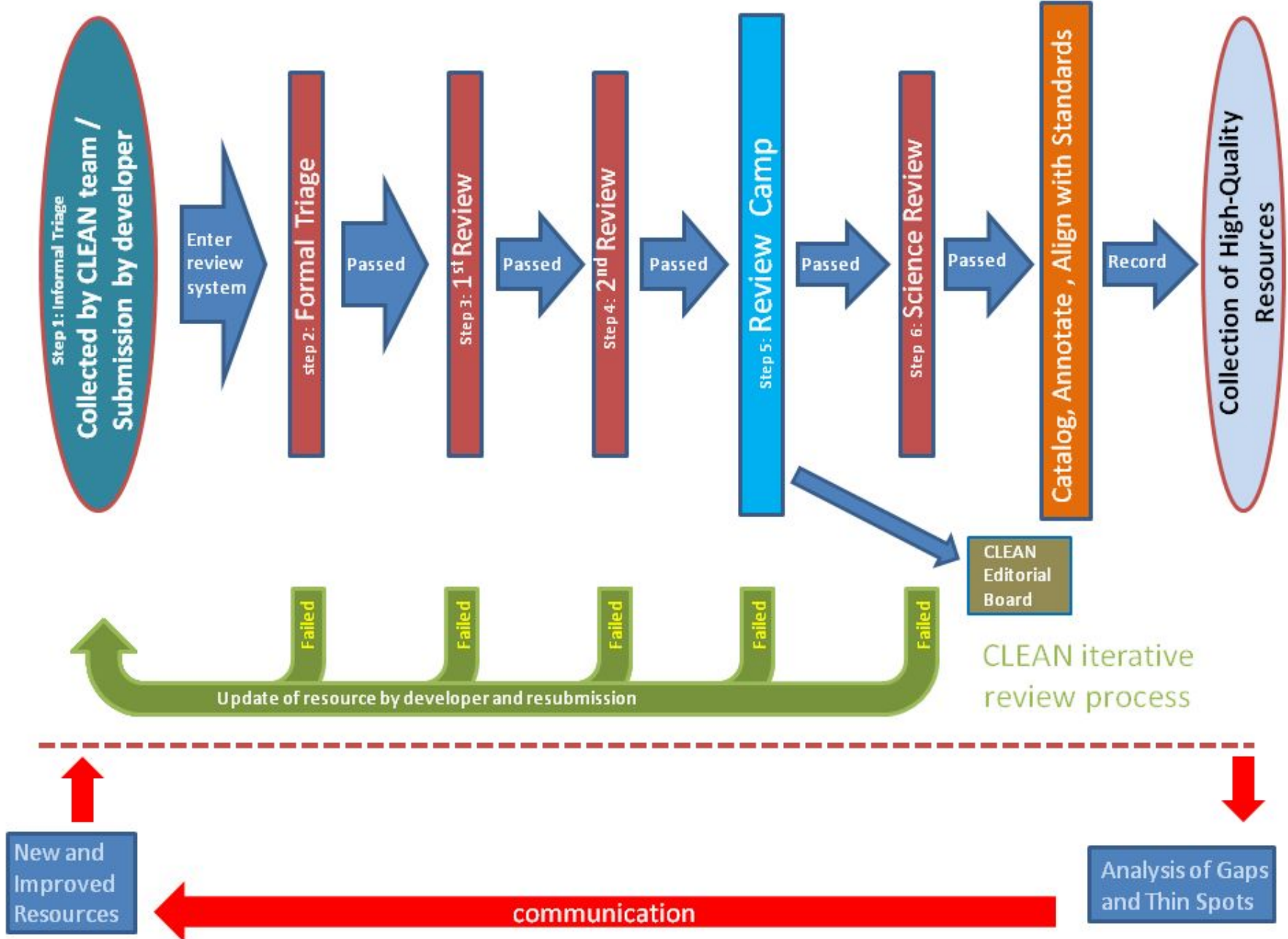
<http://cleanet.org>  
<https://www.climate.gov/teaching>



# CLEAN Collection

- 700+ online, free resources
- Activities, videos, visualizations
- Classroom ready
- Community & Expert scientist reviewed
- Aligned with NGSS, Literacy Frameworks
- Grades 6-16
- Curated collection – resources developed by others







# Animation About the Greenhouse Effect

[http://www.damocles-eu.org/education/Animation\\_about\\_the\\_greenhouse\\_effect\\_182.shtml](http://www.damocles-eu.org/education/Animation_about_the_greenhouse_effect_182.shtml)

DAMOCLES

[Jump to this Animation »](#)



This is a basic animation/simulation with background information about the greenhouse effect by DAMOCLES. The animation has several layers to it that allow users to drill into more detail about the natural greenhouse effect and different aspects of it, including volcanic aerosols and human impacts from burning fossil fuels.

[Learn more about Teaching Climate Literacy and Energy Awareness»](#)



[See how this Animation supports the Next Generation Science Standards»](#)

**Middle School:** 1 Disciplinary Core Idea, 2 Cross Cutting Concepts

**High School:** 2 Disciplinary Core Ideas, 1 Cross Cutting Concept

## Notes From Our Reviewers

The CLEAN collection is hand-picked and rigorously reviewed for scientific accuracy and classroom effectiveness. Read what our review team had to say about this resource below or learn more about how [CLEAN reviews teaching materials](#)  
[Teaching Tips](#) | [Science](#) | [Pedagogy](#) | [Technical Details](#)

### Teaching Tips

- Educators will need to scaffold this animation to ensure that the information presented is well understood by learners.
- When teaching about the greenhouse effect, using the term "heat," as this animation does, may confuse students, especially if they think of heat as a verb. The more accurate technical term "outgoing long wave IR radiation" may prove more difficult to convey, but ultimately is a clearer depiction of Earth's energy balance.

### About the Science

- The animation is an accurate general overview of Earth's energy balance, but educators should recognize some of the sun/Earth dynamics have been oversimplified.
- For example, the atmosphere does filter out some short wave energy from the sun, such as extreme ultraviolet and X-rays.
- In general, the animation provides a good overview of the incoming shortwave radiation from the sun, and Earth radiating long wave Infrared Radiation (IR) once it has been warmed by the short wave visible and IR.

### Topics

**Greenhouse Effect**  
See more on this topic.

**Carbon Cycle**  
See more on this topic.

**Grade Level**  
Middle (6–8)  
See more at this grade level.

High School (9–12)  
See more at this grade level.

College Lower (13–14)  
See more at this grade level.

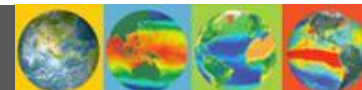
Informal  
See more at this grade level.

### Climate Literacy

[About Teaching Climate Literacy](#)

► [2c \(see details\)](#)  
[About Teaching Principle 2](#)  
[Other materials addressing 2c](#)

► [2d \(see details\)](#)  
[About Teaching Principle 2](#)



# Search the Collection

- Resource Type
- Grade Level
- Next Generation Science Standards (NGSS)
- Regional Focus / Dataset Use
- Climate & Energy Topics / Principles, etc.

## Refine the Results ↓

### Resource Type

Activity [101 matches](#)  
Short Demonstration/Experiment [5 matches](#)  
Teaching Guidance [10 matches](#)  
Video [49 matches](#)  
Visualization [67 matches](#)

### Grade Level

Intermediate (3–5) [6 matches](#)  
Middle (6–8) [151 matches](#)  
High School (9–12) [197 matches](#)  
College Lower (13–14) [130 matches](#)  
College Upper (15–16) [56 matches](#)  
Graduate/Professional [10 matches](#)  
Informal [30 matches](#)  
General Public [1 match](#)

### NGSS Performance Expectations

Middle School [37 matches](#)  
High School [78 matches](#)

### NGSS Disciplinary Core Ideas

Middle School [146 matches](#)  
High School [199 matches](#)

### NGSS Cross-Cutting Concepts

Middle School [114 matches](#)  
High School [157 matches](#)

### NGSS Science and Engineering Practices

Middle School [89 matches](#)  
High School [130 matches](#)

### Regional Focus

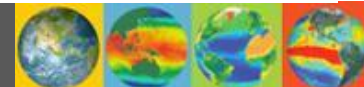
Africa [1 match](#)  
Asia [1 match](#)  
Europe [1 match](#)  
Islands, Oceans (Global) [10 matches](#)  
No Regional Focus [93 matches](#)  
North America [27 matches](#)  
Polar Regions [11 matches](#)  
South and Central America [1 match](#)

### Dataset Use

Students Use Scientific Dataset [53 matches](#)

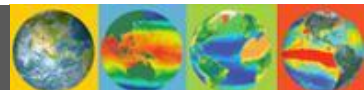
### Other Categories

[Climate and Energy Topics](#) (add this category)  
[Energy Literacy Principles](#) (add this category)  
[Environmental Education Guidelines](#) (add this category)  
[Climate Systems and Solutions](#) (add this category)



# Three Ways to Search CLEAN for NGSS

1. NGSS and CLEAN At-a-Glance Tables
2. Browse by NGSS
3. Search the entire Collection



# 1. Using the NGSS and CLEAN At-a-Glance Tables



## NGSS and CLEAN at a Glance

Clicking the blue text below will display tables with the NGSS Performance Expectations (PE) and Disciplinary Core Ideas (DCI) that address climate and energy topics. The tables include links to relevant CLEAN resources. Hovering on the green DCI concept bullet will display the full text.

### Middle School

- ▶ [Show Middle School – Life Science in CLEAN](#)
- ▶ [Show Middle School – Physical Science in CLEAN](#)
- ▶ [Show Middle School – Earth and Space Science in CLEAN](#)
- ▶ [Show Middle School – Engineering, Technology, and Applications of Science in CLEAN](#)

### High School

- ▶ [Show High School – Life Science in CLEAN](#)
- ▶ [Show High School – Physical Science in CLEAN](#)
- ▶ [Show High School – Earth and Space Science in CLEAN](#)
- ▶ [Show High School – Engineering, Technology, and Applications of Science in CLEAN](#)

[« Previous Page](#)

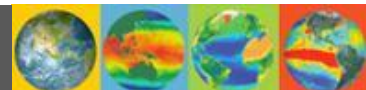
CLEAN

**Climate and Energy Educational Resources**

- NGSS Browse
- NGSS Middle School Climate Systems
- NGSS Middle School Climate Solutions
- NGSS High School Climate Systems
- NGSS High School Climate Solutions

**NGSS at a Glance**

- Teaching Climate and Energy Science
- CLEAN Network
- About CLEAN



# 1. Using the NGSS and CLEAN At-a-Glance Tables



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CLEAN

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- ▶ Show Middle School – Life Science in CLEAN
- ▶ Show Middle School – Physical Science in CLEAN
- ▶ Show Middle School – Earth and Space Science in CLEAN
- ▶ Show Middle School – Engineering, Technology, and Applications of Science in CLEAN

### High School

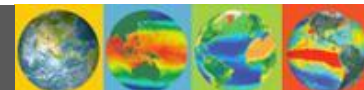
- ▶ Show High School – Life Science in CLEAN
- ▶ Show High School – Physical Science in CLEAN
- ▶ Show High School – Earth and Space Science in CLEAN

▼ Hide

#### High School - Engineering, Technology, and Applications of Science in CLEAN

Performance Expectation (PE)	Disciplinary Core Idea (DCI)	DCI Concept Bullet
HS-ETS1: Engineering Design (see <a href="#">CLEAN Resources</a> )	HS-ETS1.A: Defining and Delimiting Engineering Problems (see <a href="#">CLEAN Resources</a> )	<p>HS-ETS1.A: Criteria and constraints also include... (see <a href="#">CLEAN Resources</a>)</p> <hr/> <p>HS-ETS1.A: Humanity faces major global challenges... (see <a href="#">CLEAN Resources</a>)</p>
	HS-ETS1.B: Developing Possible Solutions (see <a href="#">CLEAN Resources</a> )	<p>HS-ETS1.B: When evaluating solutions... (see <a href="#">CLEAN Resources</a>)</p> <p><b>HS-ETS1.B: Both physical models and computers...</b> (see <a href="#">CLEAN Resources</a>)</p>
	HS-ETS1.C: Optimizing the Design Solution (see <a href="#">CLEAN Resources</a> )	<p>HS-ETS1.C: Criteria may need to be... (see <a href="#">CLEAN Resources</a>)</p>

Note: Limited to standards that are relevant to climate and energy science.



# 1. Using the NGSS and CLEAN At-a-Glance Tables

## Collection of Climate and Energy Educational Resources

- CLEAN
- Climate and Energy Educational Resources
- NGSS Browse
- NGSS Middle School Climate Systems
- NGSS Middle School Climate Solutions
- NGSS High School Climate Systems
- NGSS High School Climate Solutions
- NGSS at a Glance
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NGSS & CLEAN at a Glance »

The review process engages scientists and educators in vetting each resource for scientific accuracy, pedagogic effectiveness and useability.

### Explore the Collection

[Help](#)

### Current Search Limits:

**NGSS Disciplinary Core Ideas** [High School > Engineering, Technology, and Applications of Science > HS-ETS1.B](#) > HS-ETS1.B2: Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs.

### Results 1 – 8 of 8 matches



#### Energy Lab

<http://www.pbs.org/wgbh/nova/labs/lab/energy/>

This online activity challenges students to design a renewable energy system for one of five different cities, each with different energy resource potential and budgets. Students can test their ...

Reviewed Collection



#### Energy Lab

<http://www.learner.org/courses/envsci/interactives/energy/>

This activity challenges students to try and meet the world's projected energy demand over the next century, decade by decade, by manipulating a menu of available energy sources in the online ...

Reviewed Collection



#### Climate Modeling 101

<http://nas-sites.org/climate modeling/>

This resource is a website that is a self-contained, multi-part introduction to how climate models work. The materials include videos and animations about understanding, constructing and applying ...

Reviewed Collection



#### 2050

<http://my2050.decc.gov.uk/>

This interactive addresses the question if we can reduce CO2 emissions by 20% of 1990 levels and help avoid dangerous climate change? Users of this interactive can manipulate changes to various ...

Reviewed Collection



#### Wind Maps

[http://apps2.eere.energy.gov/wind/windexchange/wind\\_maps...](http://apps2.eere.energy.gov/wind/windexchange/wind_maps...)

This is a utility-scale, land-based map of the mean annual wind speed 80 meters above the ground. This map

### Refine the Results ↓

#### Resource Type

Activity [5 matches](#)  
Video [1 match](#)  
Visualization [2 matches](#)

#### Grade Level

Middle (6–8) [4 matches](#)  
High School (9–12) [8 matches](#)  
College Lower (13–14) [6 matches](#)  
College Upper (15–16) [2 matches](#)

#### NGSS Performance Expectations

High School [3 matches](#)

#### NGSS Disciplinary Core Ideas

Show all

[High School > Engineering, Technology, and Applications of Science > HS-ETS1.B](#) > HS-ETS1.B2: [8 matches](#)

#### NGSS Cross-Cutting Concepts

Middle School [2 matches](#)  
High School [6 matches](#)

#### NGSS Science and Engineering Practices

Middle School [1 match](#)  
High School [6 matches](#)

#### Regional Focus

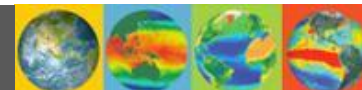
No Regional Focus [4 matches](#)  
North America [2 matches](#)

#### Dataset Use

Students Use Scientific Dataset [1 match](#)

#### Other Categories

[Climate and Energy Topics](#) (add this category)  
[Climate Literacy Principles](#) (add this category)  
[Energy Literacy Principles](#) (add this category)  
[Environmental Education Guidelines](#) (add this category)



# 1. Using the NGSS and CLEAN At-a-Glance Tables

## Collection of Climate and Energy Educational Resources

- CLEAN
- Climate and Energy Educational Resources**
- NGSS Browse
- NGSS Middle School Climate Systems
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NGSS & CLEAN at a Glance »

The review process engages scientists and educators in vetting each resource for scientific accuracy, pedagogic effectiveness and useability.

### Explore the Collection

[Help](#)

Current Search **Resource Type** Activity

NGSS Disciplinary Core Ideas **High School > Engineering, Technology, and Applications of Science > HS-ETS1.B > HS-ETS1.B.2: Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs.**

Dataset Use **Students Use Scientific Dataset**

1 match



[Exploring Regional Differences in Climate Change](https://serc.carleton.edu/eet/climate/index.html)

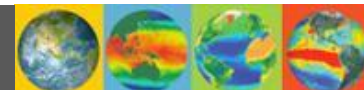
<https://serc.carleton.edu/eet/climate/index.html>

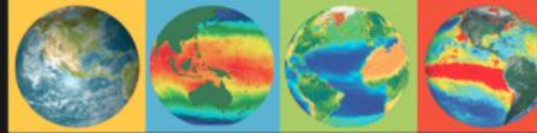
This teaching activity addresses regional variability as predicted in climate change models for the next century. Using real climatological data from climate models, students will obtain annual ...

Reviewed Collection

### Refine the Results ↓

Resource Type	Show all
Activity	<a href="#">1 match</a>
Grade Level	High School (9-12) <a href="#">1 match</a> College Lower (13-14) <a href="#">1 match</a>
NGSS Performance Expectations	High School <a href="#">1 match</a>
NGSS Disciplinary Core Ideas	Show all
High School > Engineering, Technology, and Applications of Science > HS-ETS1.B > HS-ETS1.B.2:	<a href="#">1 match</a>
NGSS Cross-Cutting Concepts	High School <a href="#">1 match</a>
NGSS Science and Engineering Practices	High School <a href="#">1 match</a>
Regional Focus	North America <a href="#">1 match</a>
Dataset Use	Show all
Students Use Scientific Dataset	<a href="#">1 match</a>
Other Categories	<a href="#">Climate and Energy Topics</a> (add this category) <a href="#">Climate Literacy Principles</a> (add this category) <a href="#">Energy Literacy Principles</a> (add this category) <a href="#">Environmental Education Guidelines</a> (add this category) <a href="#">Climate Systems and Solutions</a> (add this category)





### Collection of Climate and Energy Educational Resources

A collection of 650+ free, ready-to-use resources rigorously reviewed by educators and scientists.

Suitable for secondary through higher education classrooms.

[Search the Collection >](#)


[Browse by NGSS >](#)




## 2. Browse by NGSS


CLEAN  
Collection of Educational Resources  
Guidance in Teaching Climate and Energy  
CLEAN Network  
About CLEAN

### News

 Register for one or more webinars in the [CLEAN Webinar Series!](#)

 Teachers, check out the create-your-own [CLEAN-NGSS unit resources!](#)

 CLEAN was awarded the [2017 Friend of the Planet award](#) by the NCSE!

 The CLEAN Collection is now aligned with NGSS!

**CLEAN STEM Flashes:**  
View and sign up for this topical newsletter >



### Guidance in Teaching Climate and Energy Science

Background Information, pedagogic approaches, links to relevant educational resources in the CLEAN collection.

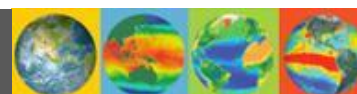


### CLEAN Network

A community of professionals committed to improving climate and energy literacy.

[About the CLEAN Project](#)

[CLEAN Review Process](#)





# 2. Browse by NGSS

## Search the CLEAN Collection

With over 600 lesson plans, activities, videos, and classroom demos, we understand that it can be hard to find exactly what you're looking for. We've provided different pathways to help you get straight to what you want.

[NGSS & CLEAN at a Glance »](#)



### Search the CLEAN collection by NGSS topics

#### Climate system and climate change



- climate data
- ice ages
- greenhouse gases
- carbon cycle
- Earth's energy balance
- ecosystems
- climate impacts
- scientific process
- and more

[Middle School »](#)

[High School »](#)



- Grade level
- Topic
- Type of activity or resource

Why these two choices?

#### Climate and energy solutions



- clean energy
- efficiency
- policy, economics
- restoring habitats
- reducing waste
- agriculture
- adaptations
- and more

[Middle School »](#)

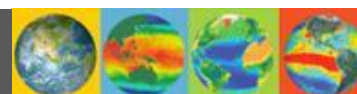
[High School »](#)

#### Learn more »



about teaching climate and energy, NGSS, and how to use the CLEAN collection.

- CLEAN
- Climate and Energy Educational Resources**
- NGSS Browse**
- NGSS Middle School Climate Systems
- NGSS Middle School Climate Solutions
- NGSS High School Climate Systems
- NGSS High School Climate Solutions
- NGSS at a Glance
- Teaching Climate and Energy Science
- CLEAN Network
- About CLEAN



# 2. Browse by NGSS

CLEAN

**Climate and Energy Educational Resources**

- NGSS Browse
- NGSS Middle School Climate Systems
- NGSS Middle School Climate Solutions
- NGSS High School Climate Systems
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## Teaching Climate Solutions: High School Resources Organized by Key NGSS Standards

[High School Systems](#) : [Middle School Systems](#) : [Middle School Solutions](#)

### Performance Expectations ? About

	Evaluate solutions for using energy and mineral resources. HS-ESS3-2
	Evaluate a technological solution that reduces human impacts on natural systems. HS-ESS3-4
	Design a solution to a complex problem by breaking it down into smaller problems that can be solved through engineering HS-ETS1-2
	Evaluate a solution based on priorities and trade-offs HS-ETS1-3

### Science and Engineering Practices

	Analyze data using tools, technologies, or models, in order to make scientific claims or determine solutions. HS-P4.1
	Analyze data to identify features of a proposed process or system in order to optimize it. HS-P4.6
	Design, evaluate, or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, and other criteria. HS-P6.5
	Communicate scientific or technical ideas in multiple formats. HS-P8.5

### Disciplinary Core Ideas

	Humanity faces global challenges, such as the need for supplies of clean water and food, or for energy sources that minimize pollution. These can be addressed through engineering. HS-ETS1.A2
	When evaluating solutions, one should consider cost, safety, reliability, aesthetics, and social, cultural and environmental impacts. HS-ETS1.B1
	Resource availability has guided the development of human society. HS-ESS3.A1
	All forms of energy production have costs, risks, and benefits. New technologies and regulations can change these factors. HS-ESS3.A2

### Cross Cutting Concepts

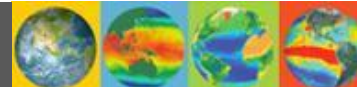
	Patterns of performance of designed systems can be analyzed and interpreted to improve the system. HS-C1.3
	Cause and effect relationships can be predicted by examining what is known about smaller scale mechanisms. HS-C2.2
	Changes of energy and matter into, out of, and within systems can be described. HS-C5.2
	Energy cannot be created or destroyed—it only moves between places, objects, or systems. HS-C5.3

Reset

[Activity](#) [Short Demonstration/Experiment](#) [Visualization](#) [Video](#)

**Selections:** Analyze data using tools, technologies, or models, in order to make scientific claims or determine solutions. HS-P4.1  
, Activity There are 22 matching resources

Explore this set of resources in the full search interface »



# 2. Browse by NGSS

- CLEAN
- Climate and Energy Educational Resources**
- NGSS Browse
- NGSS Middle School Climate Systems
- NGSS Middle School Climate Solutions
- NGSS High School Climate Systems
- NGSS High School Climate Solutions**
- NGSS at a Glance
- Teaching Climate and Energy Science
- CLEAN Network
- About CLEAN



## Teaching Climate Solutions: High School Resources Organized by Key NGSS Standards

[High School Systems](#) : [Middle School Systems](#) : [Middle School Solutions](#)

### Performance Expectations ? About

- Evaluate solutions for using energy and mineral resources. HS-ESS3-2
- Evaluate a technological solution that reduces human impacts on natural systems. HS-ESS3-4
- Design a solution to a complex problem by breaking it down into smaller problems that can be solved through engineering HS-ETS1-2
- Evaluate a solution based on priorities and trade-offs HS-ETS1-3

### Science and Engineering Practices

- Analyze data using tools, technologies, or models, in order to make scientific claims or determine solutions. HS-P4.1
- Analyze data to identify features of a proposed process or system in order to optimize it. HS-P4.6
- Design, evaluate, or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, and other criteria. HS-P6.5
- Communicate scientific or technical ideas in multiple formats. HS-P8.5

### Disciplinary Core Ideas

- Humanity faces global challenges, such as the need for supplies of clean water and food, or for energy sources that minimize pollution. These can be addressed through engineering. HS-ETS1.A2
- When evaluating solutions, one should consider cost, safety, reliability, aesthetics, and social, cultural and environmental impacts. HS-ETS1.B1
- Resource availability has guided the development of human society. HS-ESS3.A1
- All forms of energy production have costs, risks, and benefits. New technologies and regulations can change these factors. HS-ESS3.A2

### Cross Cutting Concepts

- Patterns of performance of designed systems can be analyzed and interpreted to improve the system. HS-C1.3
- Cause and effect relationships can be predicted by examining what is known about smaller scale mechanisms. HS-C2.2
- Changes of energy and matter into, out of, and within systems can be described. HS-C5.2
- Energy cannot be created or destroyed—it only moves between places, objects, or systems. HS-C5.3

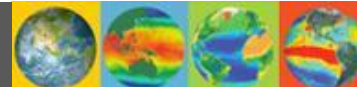
Reset

I can narrow my search with key words

- Activity**
- Short Demonstration/Experiment
- Visualization
- Video

**Selections:** Analyze data using tools, technologies, or models, in order to make scientific claims or determine solutions. HS-P4.1, Activity There are 22 matching resources

Explore this set of resources in the full search interface »



# 2. Browse by NGSS

- CLEAN
- Climate and Energy Educational Resources
- NGSS Browse
- NGSS Middle School Climate Systems
- NGSS Middle School Climate Solutions
- NGSS High School Climate Systems
- NGSS High School Climate Solutions
- NGSS at a Glance
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## Collection of Climate and Energy Educational Resources

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NGSS & CLEAN at a Glance »

The review process engages scientists and educators in vetting each resource for scientific accuracy, pedagogic effectiveness and useability.

### Explore the Collection


[Help](#)


Current Search Limits: **Resource Type** Activity **Grade Level** High School (9-12)


**NGSS Science and Engineering Practices** **High School** > **HS-P4** > HS-P4.1: Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.


**Climate Systems and Solutions** Climate and Energy Solutions


Results 1 - 10 of 22 matches

- 

**Clearing the Air**  
<http://sfrc.ufl.edu/extension/ee/climate/section1/activi...>  
In this activity, students learn about the scientific evidence supporting climate change, use this information to evaluate and improve conclusions some people might draw about climate change, and ... Reviewed Collection
- 

**Climate Change and Human Health**  
<http://www.niehs.nih.gov/lessons/climatechange>  
In this activity, students investigate the impacts of changing climatic conditions on human health and consider the benefits of climate mitigation and adaptation to human health. Reviewed Collection
- 

**Energy Lab**  
<http://www.pbs.org/wgbh/nova/labs/lab/energy/>  
This online activity challenges students to design a renewable energy system for one of five different cities, each with different energy resource potential and budgets. Students can test their ... Reviewed Collection
- 

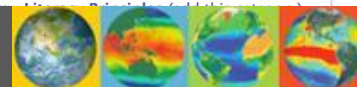
**Communicating Climate 1: The Science of Climate Change**  
[https://serc.carleton.edu/integrate/teaching\\_materials/c...](https://serc.carleton.edu/integrate/teaching_materials/c...)  
In this activity, students use climate data to develop a simple graph of how climate has changed over time and then present the result in a blog, emphasizing effective science communication. Reviewed Collection
- 

**A New Angle on PV Efficiency**  
[https://www.teachengineering.org/view\\_activity.php?url=c...](https://www.teachengineering.org/view_activity.php?url=c...)  
In this hands-on activity, students examine how the orientation of a photovoltaic (PV) panel -- relative to the

### Refine the Results ↓

- Resource Type** Show all  
**Activity**  
[22 matches](#)
- Grade Level** Show all  
**High School (9-12)**  
[22 matches](#)
- NGSS Performance Expectations**  
Middle School [4 matches](#)  
High School [12 matches](#)
- NGSS Disciplinary Core Ideas**  
Middle School [10 matches](#)  
High School [20 matches](#)
- NGSS Cross-Cutting Concepts**  
Middle School [10 matches](#)  
High School [18 matches](#)
- NGSS Science and Engineering Practices**  
**High School** > **HS-P4** > **HS-P4.1:**  
[22 matches](#)
- Regional Focus**  
No Regional Focus [15 matches](#)  
North America [3 matches](#)  
South and Central America [1 match](#)
- Dataset Use**  
Students Use Scientific Dataset [7 matches](#)
- Climate Systems and Solutions** Show all  
**Climate and Energy Solutions**  
[22 matches](#)
- Other Categories**  
[Climate and Energy Topics](#) (add this category)  
[Climate Literacy Principles](#) (add this category)

My search criteria are maintained and now I can narrow things down a bit more...



# 2. Browse by NGSS

Key word = cities

NGSS Cross-Cutting Concept = Systems

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NGSS & CLEAN at a Glance »

### Explore the Collection

[Help](#)

Current Search Limits:  cities  Activity  High School (9-12)

[High School](#) > HS-C4: Systems and System Models

[High School](#) > HS-P4 > HS-P4.1: Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

Climate and Energy Solutions

1 match



**Energy Lab**

<http://www.pbs.org/wgbh/nova/labs/lab/energy/>

This online activity challenges students to design a renewable energy system for one of five different cities, each with different energy resource potential and budgets. Students can test their ...

Reviewed Collection

### Refine the Results ↓

Resource Type [Show all](#)

Activity

[1 match](#)

Grade Level [Show all](#)

High School (9-12)

[1 match](#)

NGSS Performance Expectations

NGSS Disciplinary Core Ideas

Middle School [1 match](#)

High School [1 match](#)

NGSS Cross-Cutting Concepts [Show all](#)

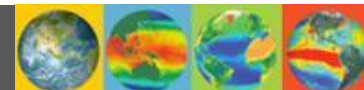
[High School](#) > HS-C4:

HS-C4.3 [1 match](#)

NGSS Science and Engineering Practices

[High School](#) > HS-P4 > HS-P4.1:

[1 match](#)



### 3. Search the entire Collection

**CLEAN** CLIMATE LITERACY & ENERGY AWARENESS NETWORK

Share f t e Like 70

## Collection of Climate and Energy Educational Resources

A collection of 650+ free, ready-to-use resources rigorously reviewed by educators and scientists.

Suitable for secondary through higher education classrooms.

[Search the Collection >](#) [Browse by NGSS >](#)

CLEAN virtual tour in 90 seconds

cleanet.org

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Collection of Educational Resources  
Guidance in Teaching Climate and Energy  
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**CLEAN STEM Flashes:**  
View and sign up for this topical newsletter >



#### Guidance in Teaching Climate and Energy Science

Background information, pedagogic approaches, links to relevant educational resources in the CLEAN collection.

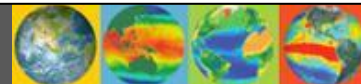


#### CLEAN Network

A community of professionals committed to improving climate and energy literacy.

About the CLEAN Project

CLEAN Review Process



# 3. Search the Entire Collection

## Collection of Climate and Energy Educational Resources

CLEAN

### Climate and Energy Educational Resources

- NGSS Browse
- NGSS Middle School Climate Systems
- NGSS Middle School Climate Solutions
- NGSS High School Climate Systems
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NGSS & CLEAN  
at a Glance »

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### Explore the Collection

Ocean Acidification

search

[Help](#)

Current Search Limits:  Text Search Ocean Acidification

Results 1 - 10 of 42 matches



#### [Ocean Acidification](#)

<http://www.explainingclimatechange.ca/Climate%20Change/s...>

This simulation allows students to explore the change in sea surface pH levels with increasing CO2 levels.

Reviewed Collection



#### [What Is Ocean Acidification?](#)

<http://www.pmel.noaa.gov/co2/story/What+is+Ocean+Acidifi...>

This static image from NOAA's Pacific Marine Environmental Laboratory Carbon Program offers a visually compelling and scientifically sound image of the sea water carbonate chemistry process that ...

Reviewed Collection



#### [Graphing Ocean Acidification](#)

<http://www.explainingclimatechange.ca/Climate%20Change/s...>

This applet is an ocean acidification grapher that allows user to plot changes in atmospheric CO2 against ocean pH, from 1988 to 2009, in the central North Pacific.

Reviewed Collection



#### [Changing Planet: Ocean Acidification](#)

<http://www.climate.gov/content/climate-101/understanding-climate/understanding-ocean-acidification>

### Refine the Results ↓

#### Resource Type

- Activity [14 matches](#)
- Short Demonstration/Experiment [2 matches](#)
- Teaching Guidance [2 matches](#)
- Video [16 matches](#)
- Visualization [8 matches](#)

#### Grade Level

- Middle (6-8) [30 matches](#)
- High School (9-12) [38 matches](#)
- College Lower (13-14) [18 matches](#)
- College Upper (15-16) [7 matches](#)
- Graduate/Professional [1 match](#)
- Informal [4 matches](#)

#### NGSS Performance Expectations

- Middle School [6 matches](#)
- High School [10 matches](#)

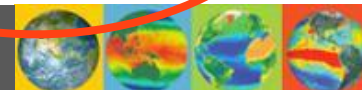
#### NGSS Disciplinary Core Ideas

- Middle School [28 matches](#)
- High School [36 matches](#)

#### NGSS Cross-Cutting Concepts

- Middle School [14 matches](#)
- High School [21 matches](#)

#### NGSS Science and Engineering Practices



# 3. Search the Entire Collection

## Collection of Climate and Energy Educational Resources

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**Climate and Energy Educational Resources**

- NGSS Browse
- NGSS Middle School Climate Systems
- NGSS Middle School Climate Solutions
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### Explore the Collection

[Help](#)

Current Search Limits: [Text Search](#) Ocean Acidification

[NGSS Disciplinary Core Ideas](#) [High School](#) > [Physical Sciences](#) > HS-PS1: Matter and its Interactions

[NGSS Science and Engineering Practices](#) [High School](#) > HS-P4

Results 1 - 3 of 3 matches



#### Our Acidifying Ocean

<http://web.stanford.edu/group/inquiry2insight/cgi-bin/vu...>

This 3-part interactive and virtual lab activity examines the life cycle of the sea urchin, and how the increasing acidity of the ocean affects their larval development.

Reviewed Collection



#### Off Base - Acidity of oceans

<http://oceanexplorer.noaa.gov/explorations/09lophelia/ba...>

This lesson guides a student inquiry into properties of the ocean's carbonate buffer system, and how changes in atmospheric carbon dioxide levels may affect ocean pH and biological organisms ...

Reviewed Collection



#### Atmospheric Carbon: Can We Offset the Increase?

<https://serc.carleton.edu/NAGTWorkshops/oceanography/act...>

This is a multi-step activity that helps students measure, investigate, and understand the increase in atmospheric CO2 and the utility of carbon offsets. It also enables students to understand that ...

Reviewed Collection

### Refine the Results ↓

**Resource Type**  
Activity [3 matches](#)

**Grade Level**  
High School (9-12) [3 matches](#)  
College Lower (13-14) [1 match](#)  
College Upper (15-16) [1 match](#)

**NGSS Performance Expectations**  
High School [2 matches](#)

**NGSS Disciplinary Core Ideas** Show all  
[High School](#) > [Physical Sciences](#) > [HS-PS1: HS-PS1.B](#) [3 matches](#)

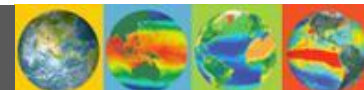
**NGSS Cross-Cutting Concepts**  
High School [2 matches](#)

**NGSS Science and Engineering Practices**  
[High School](#) > [HS-P4](#)  
HS-P4.1 [3 matches](#)

**Regional Focus**  
No Regional Focus [2 matches](#)

**Dataset Use**  
Students Use Scientific Dataset [2 matches](#)

**Other Categories**  
[Climate and Energy Topics](#) (add this category)  
[Climate Literacy Principles](#) (add this category)  
[Energy Literacy Principles](#) (add this category)  
[Environmental Education Guidelines](#) (add this category)  
[Climate Systems and Solutions](#) (add this category)

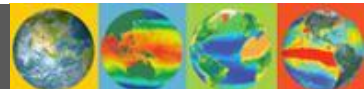




# Treasure Hunt in CLEAN

- Find a resource in CLEAN using one of the above search methods.
- Put the URL for the resource you find into the chat window with a note about what you found interesting about the resource

[https://cleanet.org/clean/educational\\_resources/collection/index.html](https://cleanet.org/clean/educational_resources/collection/index.html)



# Guidance for Teaching Climate and Energy

**CLEAN**  
CLIMATE LITERACY & ENERGY AWARENESS NETWORK

Collection of Climate and Energy Educational Resources  
A collection of ~700 free, ready-to-use resources rigorously reviewed by educators and scientists.  
Suitable for secondary through higher education classrooms.

Search the Collection - Browse by NCSS -

Guidance in Teaching Climate and Energy Science  
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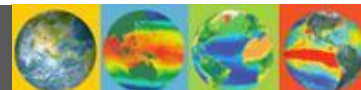
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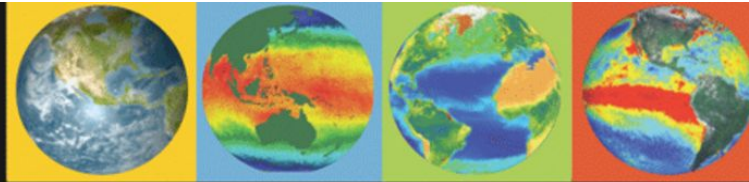
About the CLEAN Project CLEAN Review Process

Guidance for Teaching Climate and Energy



<http://cleanet.org>  
<https://www.climate.gov/teaching>



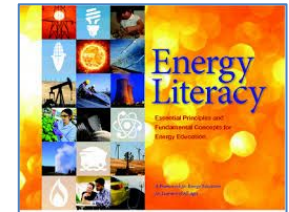
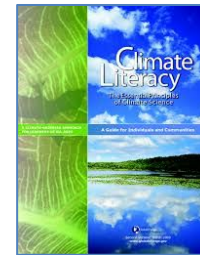


## Guidance in Teaching Climate and Energy

Climate and energy are complex topics, with rapidly developing science and technology and the potential for controversy.

See the following pages for:

- a summary of each of the climate and energy science principles and concepts
- possible challenges for educators
- suggested pedagogic approaches to teaching these topics, for each grade level
- relevant teaching materials from the CLEAN reviewed collection



### Teaching Climate

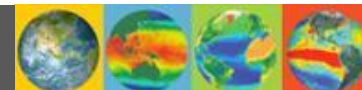
One of CLEAN's goals is to help teachers be as effective as possible when teaching climate science. This series of web pages introduces climate science in a sequence that illustrates different aspects of the climate system.



### Teaching Energy

Energy Literacy is an understanding of the nature and role of energy in the universe and in our lives and the ability to apply this understanding to answer questions and solve problems. Explore the Energy Literacy Framework along with scaffolding for teaching the energy science.

[Next Page »](#)



## CLEAN

Climate and Energy Educational Resources

Teaching Climate and Energy

### Teaching Climate

1. The Sun Provides Energy

2. Climate is Complex

3. Climate and Life

4. Climate is Variable

5. Understanding Climate

6. Humans Affect Climate

7. Climate Change has Consequences

GP. Humans can Take Action

Climate Literacy Quiz

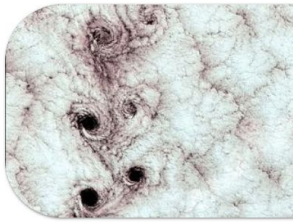
Teaching Energy

Tools for Educators

CLEAN Network

Get Involved

About this Project



# Climate is regulated by complex interactions among components of the Earth system.

## Climate Literacy Principle 2

Jump down to: [Teaching these ideas](#) [Find activities](#)

Teaching about climate interactions is supported by six key concepts:

a. Earth's climate is influenced by interactions involving the sun, ocean, atmosphere, clouds, ice, land, and life. Climate varies by region as a result of local differences in these interactions.

► There are 5 more fundamental concepts. See them all...

### Earth's climate is governed by several different types of processes.

Oceanic, atmospheric, biologic and geologic processes all drive the climate system and result in a regional differences in climates on Earth. Many climatic processes such as the greenhouse effect and the carbon cycle are the result of interplay between the "spheres" of the Earth system (atmosphere, cryosphere, geosphere, biosphere). Feedbacks between various components work to exacerbate or mitigate changes to the climate.

### Climate cycles, feedbacks, and interplay between causes and effects

These ideas address some of the natural complexities of our climate system and build a foundation for the understanding of key components such as the carbon cycle, the greenhouse effect, and interactions and feedback loops. These topics are active areas of climate research, and include important questions such as:

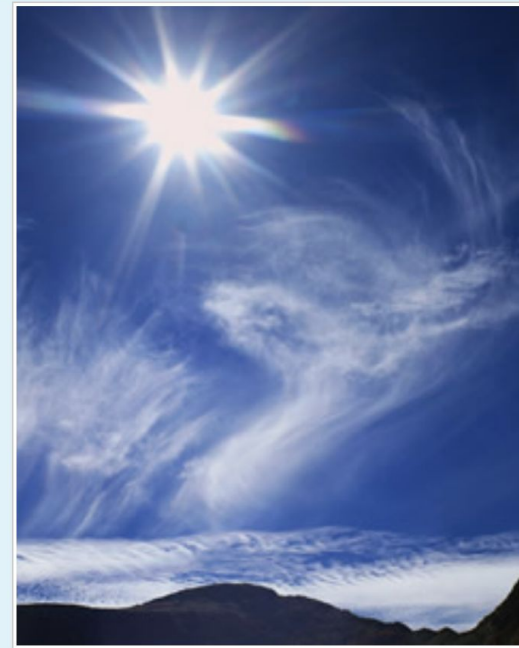
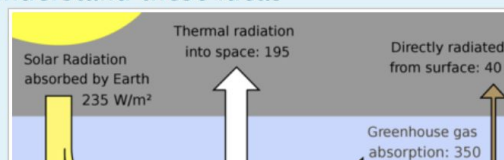
- How aerosols play a role in the changing climate. These small airborne particles have both a cooling and warming effect and originate from both natural and human-caused sources.
- How feedbacks in the climate system contribute to the effects of increasing atmospheric CO<sub>2</sub>.
- How oceanic processes are integral in the distribution of heat, absorption of CO<sub>2</sub>, and changes in circulation patterns.
- Why some past climate changes have been gradual and others abrupt.

On a more basic level, the processes covered in this principle can easily be observed, such as:

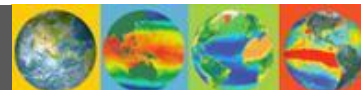
- Compared to air, water takes a longer time to warm up or cool down.
- A cloudy night will be warmer than a clear night (if all other factors remain equal).
- The overall climate of a region is not solely determined by its latitude, but is also influenced by factors such as proximity to oceans or mountain ranges.

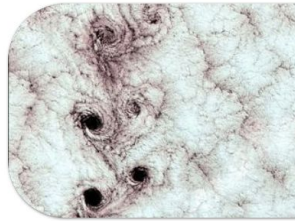
### Helping students understand these ideas

The natural greenhouse effect is a common area of misunderstanding. Educators should strive to explain this concept in a way that is as simple as possible, but is still



i





Climate is regulated by complex interactions among components of the Earth system.

## Climate Literacy Principle 2

Jump down to: [Teaching these ideas](#) [Find activities](#)

Teaching about climate interactions is supported by six key concepts:

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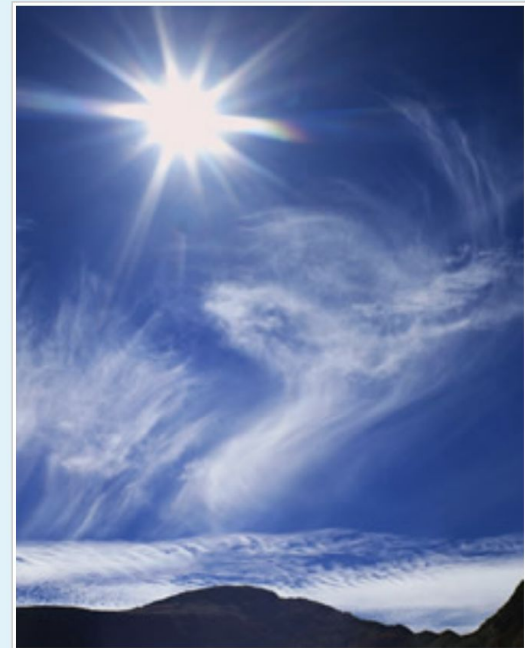
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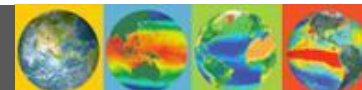
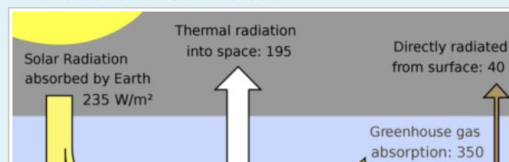
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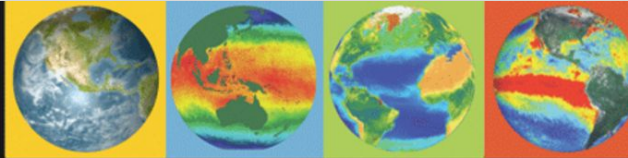
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### CLEAN

Climate and Energy Educational Resources

Teaching Climate and Energy Science

Teaching Climate Science

**Teaching Energy Science**

**1. Energy is a Physical Quantity**

2. Energy in Physical Processes

3. Energy in Biological Processes

4. Energy Sources

5. Energy Decisions

6. Energy Use

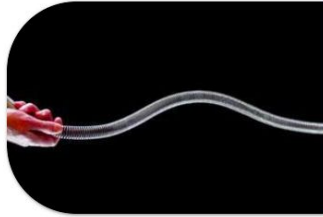
7. Energy and Society

Energy Awareness Quiz

Earth Systems Investigations

CLEAN Network

About CLEAN



Energy is a physical quantity that follows precise natural laws.

### Energy Literacy Principle 1

Jump down to: [Teaching these ideas](#) [Find activities](#)

#### Teaching about the nature of energy is supported by 8 key concepts:

1.1 Energy is a quantity that is transferred from system to system. Energy is the ability of a system to do work. A system has done work if it has exerted a force on another system over some distance. When this happens, energy is transferred from one system to another. At least some of the energy is also transformed from one type into another during this process. One can keep track of how much energy transfers into or out of a system.

▶ There are 7 more fundamental concepts. See them all...

### Energy is a word with many meanings yet no universal definition

In our daily lives, we constantly interact with different forms of energy. Energy is contained in gasoline, cat food and stars, and energy moves from one form to another via wind, motion and heat. So where to begin teaching something that is both intuitively obvious yet abstract and complex?

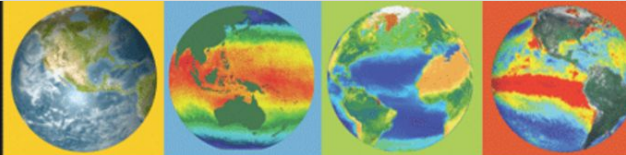
This principle helps students become familiar with some of the fundamentals about energy, much of which is based in physics. We want students to become comfortable with the concept that energy comes in many forms, can be transferred from one system to another, and can be measured.

While it is difficult to define the term energy, it is not difficult to identify, describe and measure specific types of energy.

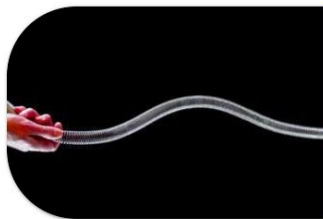
**Mechanical energy** is the energy of mechanical systems, such as a ball rolling on a ramp, or a marble fired from a slingshot. Mechanical energy can be in three forms:

- **Gravitational potential energy** is the energy of an object or system due to gravitational attraction. For example, we can calculate the mechanical energy of a ball that is going to be released from a high window, or the





- CLEAN
- Climate and Energy Educational Resources
- Teaching Climate and Energy Science
- Teaching Climate Science
- Teaching Energy Science
- 1. Energy is a Physical Quantity**
- 2. Energy in Physical Processes
- 3. Energy in Biological Processes
- 4. Energy Sources
- 5. Energy Decisions
- 6. Energy Use
- 7. Energy and Society
- Energy Awareness Quiz
- Earth Systems Investigations
- CLEAN Network
- About CLEAN



Energy is a physical quantity that follows precise natural laws.

### Energy Literacy Principle 1

Jump down to: [Teaching these ideas](#) [Find activities](#)

#### Teaching about the nature of energy is supported by 8 key concepts:

1.1 Energy is a quantity that is transferred from system to system. Energy is the ability of a system to do work. A system has done work if it has exerted a force on another system over some distance. When this happens, energy is transferred from one system to another. At least some of the energy is also transformed from one type into another during this process. One can keep track of how much energy transfers into or out of a system.

► There are 7 more fundamental concepts. See them all...

### Energy is a word with many meanings yet no universal definition

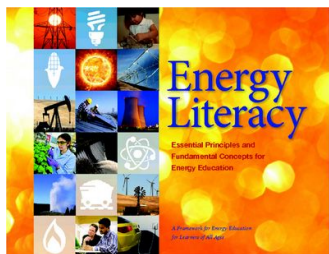
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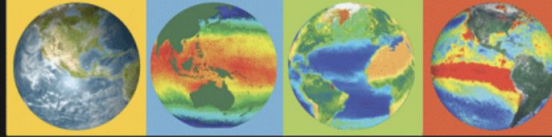
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- Teaching Climate and Energy**
- Teaching Climate
- Teaching Energy
- Tools for Educators
- CLEAN Network
- Get Involved
- About this Project

## Guidance in Teaching About Climate and Energy

Climate and energy are complex topics, with rapidly developing science and technology.

These pages offer easy-to-read explanations of science and policy, designed to step students through the key principles of climate and energy. Each page is illustrated with examples to bring these topics alive in your classroom.

- A summary of each of the climate and energy science principles
- Ideas to support learners
- Suggested teaching approaches, selected for various grade levels
- Relevant resources from the CLEAN collection



### Teaching Climate

Walk students through key components of the climate system: the Sun, the atmosphere, life on Earth, human impacts, how scientists study climate, and actions humans can take.



### Teaching Energy

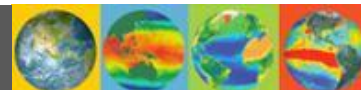
Trace the story of energy in our lives, beginning with the physics of energy and how energy flows throughout the earth system. Explore energy's influence on human society, sources of energy, the ways we use energy, how we make decisions about energy, and the impacts of energy use.



### Check out the Educator Toolbox to find more teaching resources

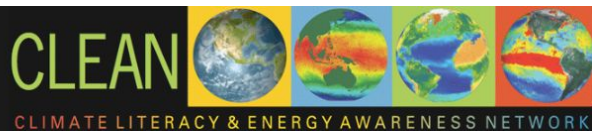
Explore tools for teaching about climate and energy science, including pedagogical approaches, activities, and instructional ideas:

- Creating Your Own Climate and Energy Units
- Earth Systems Investigations
- Webinars
- NCA Teaching Resources
- Newsletters
- Workshops





# CLEAN Webinars



CLEAN > Teaching Climate and Energy > Tools for Educators > Webinars

Share Like 0

## CLEAN

Climate and Energy Educational Resources

Teaching Climate and Energy

Teaching Climate

Teaching Energy

**Tools for Educators**

National Climate Assessment (NCA) Teaching Resources

STEM Flash Topical E-Newsletter

Create NGSS-CLEAN Units

Earth System Investigations

**Webinars**

CLEAN Webinar Series

Webinars for Secondary Level Science Educators

Workshops

CLEAN Network

Get Involved

About this Project

## CLEAN Webinars

Miss an important topic? Most of the webinars can be accessed after each event as a screencast.



### CLEAN Webinar Series (*ongoing*)

Learn about CLEAN and how you can use CLEAN resources in your classroom.



### Webinars for Secondary Level Science Educators

View screencast recordings from the 2011 series, which featured teaching each of the climate and energy literacy principles.



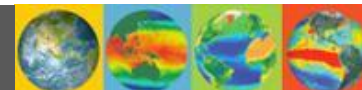
## Format

The ongoing Webinar Series uses the online Zoom platform with screenshare and integrated audio.

All webinars are being recorded and archived on the CLEAN website.

## Contact

For questions or more information, please contact us at [clean AT colorado.edu](mailto:clean@colorado.edu)



# CLEAN STEM Flash

<https://cleanet.org/clean/literacy/tools/enewsletter.html>

## CLEAN STEM Flash Wildfires and Climate Change

First in a series of timely climate & energy e-blasts to use and share. Sign-up [here](#) to be sure you're on the list. Browse the [CLEAN Collection](#) for NGSS-aligned resources.

CLEAN supports teaching and learning about climate and energy with 600+ free peer-reviewed, scientifically accurate, and classroom-ready resources.

### CLEAN Resource Spotlight:

#### Wildfires Out West video

Watch this video for a quick overview about the causes and effects of wildfires.

Audience: Middle and high school classes

Video length: 3:13 min

Find more resources on [wildfires](#) in the CLEAN Collection.



This video from Climate Central looks at the way climate conditions can affect vegetation in the West and what influence this has on wildfires.



### Wildfires

Wildfires and the Clin



### Stronger Storms

Climate Change and Stronger storms.



### Drought and Crops

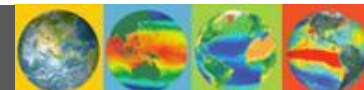
Crop Challenges in a Changi



### Arctic Change

Sea Change for Arctic Ice and Pola  
arctic ice and ecosystems.

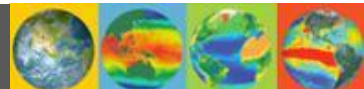
CLEAN STEM Flashes:  
View and sign up for this  
topical newsletter »



# Explore One Aspect of Teacher Guidance in CLEAN

- Explore one piece of teacher guidance in CLEAN.
- Put the URL for the piece you explored into the chat window with a note about what you thought about the information.

<https://cleanet.org/clean/literacy/index.html>



# Continued Learning Through CLEAN Resources

**CLEAN**  
CLIMATE LITERACY & ENERGY AWARENESS NETWORK

Collection of Climate and Energy Educational Resources  
A collection of ~700 free, ready-to-use resources rigorously reviewed by educators and scientists.  
Suitable for secondary through higher education classrooms.

Search the Collection > Browse by NGSS >

Guidance in Teaching Climate and Energy Science  
Background information, pedagogic approaches, links to relevant educational resources in the CLEAN collection.

**CLEAN Network**  
A community of professionals committed to improving climate and energy literacy.

About the CLEAN Project CLEAN Review Process

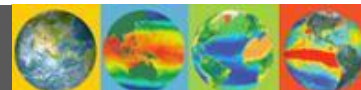
**CLEAN**  
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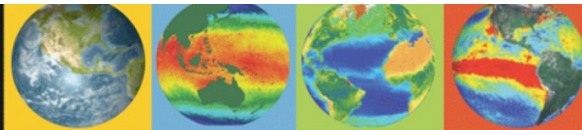
**News**

- Register for one or more webinars in the [CLEAN Webinar Series!](#)
- Teachers, check out the create-your-own [CLEAN-NGSS unit resources!](#)
- CLEAN was awarded the [2017 Friend of the Planet award](#) by the NCSE!
- The CLEAN Collection is now aligned with NGSS!

**CLEAN STEM Flashes:**  
View and sign up for this topical newsletter >

CLEAN Network





## CLEAN Network

The CLEAN Network is a professionally diverse community of over 570 members committed to improving climate and energy literacy locally, regionally, nationally, and globally, to enable responsible decisions and actions. The CLEAN Network has been a dynamic group since 2008 and is now led by the [CLEAN Leadership Board](#) established in 2016.

[Join the CLEAN Network »](#)

[Email list archive »](#)

Tuesdays at 1pm Eastern time CLEAN Network members meet in a teleconference to collaborate and share information about their literacy work, upcoming events, opportunities for collaboration or funding. Frequently guest speakers present on the topic of climate and energy literacy.

[Recent and upcoming telecon topics and speakers »](#)



### [Educators](#)

Search or browse the Collection of Climate and Energy Educational Resources and learn more about teaching climate and energy science. [CLEAN Collection »](#)



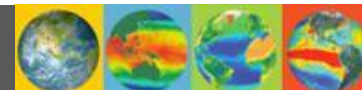
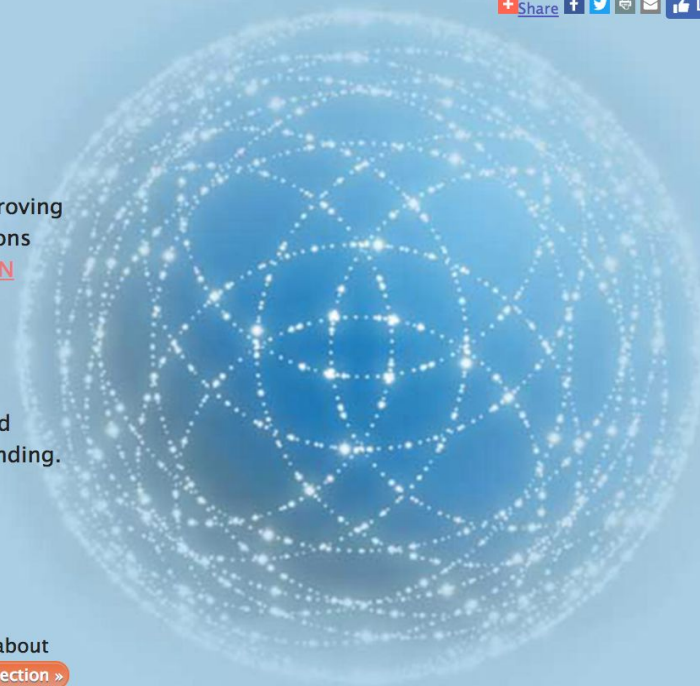
### [Resource Developers](#)

See the multiple ways in which developers can participate in strengthening the collection of educational resources.



### [Partners](#)

Learn about the variety of organizations that partner with CLEAN.



# CLEAN Get Started Guide Homepage

## Create Your Own CLEAN-NGSS Unit Overview

How to Get Started

Phenology Unit

History of Oceans and Atmosphere Unit

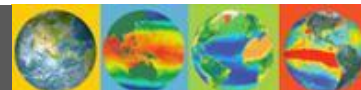
Debating the Grid Unit

1. Get Started guide, resources, and [video](#) to create climate & energy units
2. Three ready-to-use unit exemplars

Using CLEAN to Build NGSS Units



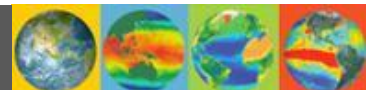
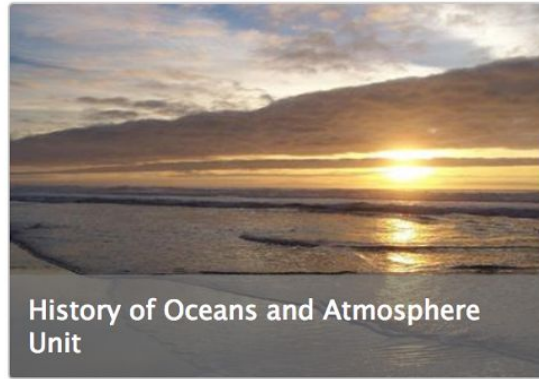
To access the *Get Started Guide*: Click the “CLEAN-NGSS unit resources” tab in the left sidebar of the CLEAN homepage



# Unit Exemplars

Classroom-ready units are available to download and use:

Explore Examples of CLEAN-NGSS Units



# Become involved!

- Use CLEAN resources & teaching guidance
- Sign up for CLEAN STEM Flash
- Watch the CLEAN webinars
- Submit a resource to CLEAN
- Join CLEAN Network

[cleanet.org](http://cleanet.org)

## Hurricanes

Howling Hurricanes! V



## Wildfires

Wildfires and the C



## Drought and Crops

Crop Challenges in a Changi



## Stronger Storms

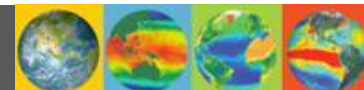
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# Questions?

## Contacts:

katie.boyd@colorado.edu

anne.u.gold@colorado.edu

**CLEAN Website: [cleanet.org](http://cleanet.org)**

The screenshot shows the homepage of the CLEAN website. At the top, the word "CLEAN" is written in large green letters, followed by four circular icons of Earth showing different climate data. Below this is the text "CLIMATE LITERACY & ENERGY AWARENESS NETWORK". The main content area has a background image of wind turbines. On the left, a text box describes the "The CLEAN Collection of Climate and Energy Educational Resources" as a collection of 700+ free, ready-to-use learning resources. Below this text are three orange buttons: "Ways to Search >", "Browse the Collection >", and "Browse by NGSS >". On the right, there is a quote: "CLEAN materials were extremely helpful, primarily guiding my approach for my school students." attributed to "-Environmental scie". Above the quote are social media sharing icons (Share, Facebook, Twitter, Email) and a "Like 299" button. At the bottom right of the quote area are navigation dots and a play/pause icon.

**CLEAN** CLIMATE LITERACY & ENERGY AWARENESS NETWORK

**The CLEAN Collection of Climate and Energy Educational Resources**

A collection of 700+ free, ready-to-use learning resources rigorously reviewed by educators and scientists suitable for secondary through higher education classrooms.

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