

### Middle School 2023-2024

Energy Efficiency & Conservation STEAM Activity: 6<sup>th</sup> – 8<sup>th</sup> Grade



Title: Where Does Our Electricity Come from?

**Objective**: Students will research renewable and non-renewable energy and compare energy alternatives to create an infographic of one energy source.

### Materials:

- computer with access to internet
- pencil

- coloring pencils
- <u>infographic rubric sheet</u>

**Estimated Time Needed:** 120 minutes (60 minutes for procedures, 90 minutes for research & assignment, 30 min for presentations)

### **Background Information & Vocabulary:**

**Renewable** - Renewable energy is energy produced from sources like the sun and wind that are naturally replenished and do not run out.

Non-Renewable - Non-renewable energy comes from sources that will run out or will not be replenished in our lifetimes—or even in many, many lifetimes. Most non-renewable energy sources are fossil fuels: coal, petroleum, and natural gas

#### Procedures:

- 1. Lead a class discussion using Guiding Questions about various types of energy sources.
- 2. Watch the film <u>Our Beautiful Planet: A Carbon Free Future</u>.
- 3. Share what you noticed in small groups for 5–7 minutes.
- 4. Choose either a renewable or non-renewable energy source and create a poster/infographic that includes the following:
  - a. Description of energy source chosen
  - b. Pros & Cons
  - c. Statistics (ex. Carbon emission emitted in its extraction, popularity of use, etc.)
- 5. Self-Evaluate poster/infographic by Infographic Rubric sheet.
- 6. Present to classroom.

#### **Guiding Questions:**

- Where does the energy to generate electricity come from?
- Just how much carbon emissions are produced when we do various activities?
- How could changing our energy usage help reduce carbon emissions?

Evaluation: Using the Infographic Rubric sheet, share a top grade infographic.

\* Lesson taken in part from <u>Our Beautiful Planet</u> series created by NSTA, The Climate Imitative, and Kikim Media.



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## **Community Action (optional):** Students use one of the following websites to calculate their individual and/or household carbon footprint.

- a. Monitor Your Carbon Footprint
- b. ZeroFootprint Youth Calculator

- c. Ecological Footprint Calculator
- d. CoolClimate Calculator

### **Additional Resources:**

- <u>What is Renewable Energy?</u> UN.org
- <u>Non-Renewable Energy</u> Solar Schools
- How to Make an Infographic for Class

**Special Opportunity:** Request a presentation to your class by a Solar United Neighbors representative to learn more about how the power of the sun is harnessed into energy we use. Presentations will be available on a first come first serve basis. <u>Complete this form to set up a presentation</u>.

### Benchmarks:

### General

- G.K12.4.3.3d Advocate convincingly to diverse audiences using sophisticated techniques (oral, written, technological) appropriate to the field and audience.
- SP.PK12.US.1.3c Apply skills and strategies in written communication

### 6th grade

- SC.68.CS-PC.2.4 Describe how the unequal net-neutrality and distribution of computing resources in a global economy raises issues of equity, access, and power.
- ELA.6.C.1.5 Improve writing by planning, revising, and editing, considering feedback from peers.
- ELA.6.V.1.1 Integrate academic vocabulary appropriate to grade level in speaking and writing.
- ELA.6.C.4.1 Conduct research to answer a question
- ELA.6.C.5.1 Integrate diverse digital media to enhance audience engagement in tasks.

### 7th grade

- SC.7.P.10.2 Observe and explain that light can be reflected, refracted, and/or absorbed.
- SC.7.E.6.6 Identify the impact that humans have had on Earth
- SS.7.E.1.3 Review the concepts of supply and demand, choice, scarcity, and opportunity cost as they relate to the development of the mixed market economy in the United States.
- SS.7.E.1.5 Assess how profits, incentives, and competition motivate individuals, households, and businesses in a free market economy.
- SS.7.E.2.5 Explain how economic institutions impact the national economy.
- ELA.7.V.1.1 Integrate academic vocabulary appropriate to grade level in speaking and writing.
- ELA.7.C.4.1 Conduct research to answer a question
- ELA.7.C.5.1 Integrate diverse digital media to build cohesion in oral or written tasks.

#### 8th grade

- ELA.8.V.1.1 Integrate academic vocabulary appropriate to grade level in speaking and writing
- ELA.8.C.4.1 Conduct research to answer a question
- ELA.8.C.5.1 Integrate diverse digital media to emphasize the relevance of a topic or idea in oral or written tasks.





## DEFINITION

NUCLEAR ENERGY: ENERGY DISCHARGED DURING NUCLEAR FISSION ALSO KNOW AS FUSION

## **RENEWABLE/NON**

NUCLEAR ENERGY IS NON-RENEWABLE RESOURCE, BECAUSE IT USES RADIOACTIVE-FUEL

## PROS

 ITS CONSIDERED AS ONE OF THE MOST LOW-CARBON ENERGY SOURCES.
 IT HAS THE LEAST CARBON FOOTPRINT
 ITIS NECESSARY TO SOLVE CLIMATE CHANGE AND GREEN HOUSE GAS EMISSIONS



## CONS

+NUCLEAR POWER BRINGS AN IMPORTANT PROBLEM TO THE TABLE, BECAUSE

ITS A NON RENEWABLE RESOURCE , SO IF WE OVER USE IT THE SUPPLY WILL RUN OUT

•THERE ARE MANY LONGTERM EFFECTS THAT COME WHIT IT, SUCH AS AN IMPACT TO THE ENVIRONMENT, BECAUSE NUCLEAR WASTE MAY POLLUTE NEARBY WATER SOURCES

•NUCLEAR POWER PLANTS MAY BE CHEAP TO USE, BUT THEY ARE EXTREMELY EXSPENSIVE TO BUILD, THE ESTIMATES FOR AND THE PRICE OFTEN ARE INACCURATE AND THE PRICE EXCEEDS MID-BUILD



## **FUN FACTS**



•NUCLEAR ENERGY ASSISTS IN POWERING 28 UNITED STATE. •NUCLEAR ENERGY IS ONE OF THE MOST USEFULL SOURCES IN AMERICA .NUCLEAR ENERGY PROVIDES ALMOST HALF OF AMERICA SAFE,CLEAN,ENERGY. •THERE ARE CURRENTIT 439 FUNCTIONING POWER PLANTS



Hydroelectric Power

Renewable energy!



## It's RENEWABLE! CLEAN Energy! Affordable! QUICKLY Generated!

## Can cause Drought Obstructs fish Migration

50.07

CONS

Energy made by the flow of water 1,308<sub>GW</sub> total hydropower installed capacity in 2019

> Vietnam 16.76 Vietnam 16.76 Venezuele 15.39 Vistria 1 Iran 12.17 Mexico 11.11 Colombia 11.92

Rest of world 274.43

CHEAPER THEN ANY OTHER SOURCE OF ELECTRICITY!! MASSIVE AMOUNT OF ENERGY UP TO 100 KILOWATS!!!



# **SOLAR POWER :**

coverts sun energy into electricity and heat utilizing solar panels ranging from residential rooftops to large rural farms.



### **PROS**:

- reduces power bill
- long-term saving
- energy independence

**44%** of total global energy came from solar power in 2021

The world has a cumulative solar energy capacity of **850.2** gigawatts.

China generates more solar energy than any other country, with a current capacity of





### **CONS:**

- high upfront costs
- sunlight dependent
- space constraints



(USD BILLION) \$368.63 \$320.52 \$260.1





**Miami Beach Nautilus Middle School** 

windmills

### How could we use renewable energy

to save the planet?



## PROS

0

 Wind is a renewable energy source meaning it wont deplete with use.
 Clean energy. Wind power produces electricity without emitting greenhouse gases.



### Description

- CONS
  1. Wind turbines can be dangerous to some wildlife. Wind turbines can be fatal to wildlife.
  2. Wind turbines can be noisey
- Windmills are structures designed to harness the kinetic energy
- The wind converts it into mechanical or electrical

energy.

## **STATISTICS**



1.The global wind energy capacity had surpassed 700 gigawatts with continued growth.

2. China was the worlds leading wind energy producer.

A study respond live not

### POPULARITY OF USE

A study finds that **90 percent** of respondents would prefer to live near a wind farm over any type of centralized power plant, whether coal, natural gas or nuclear.