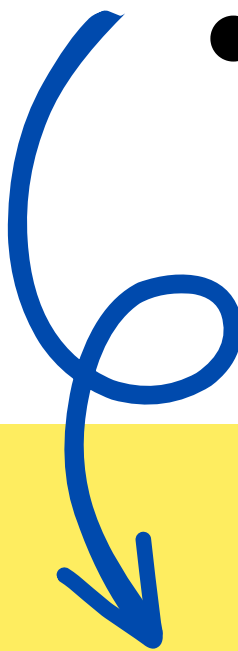


Complete Renewable Energy Bundle

- **Lab**
- **Activities**
- **Readings**



SCROLL
to take a look inside!

Renewable Energy Bundle

Grade 7-9

No PREP

Fully Editable

Lesson, Labs,
Readings, etc.

7-Day Teaching Timeline



NO PREP TEACHING TIMELINE

+ CULMINATING ACTIVITY

Renewable Energy Bundle

This 7/8-day teaching plan is designed for 60-minute class periods and progresses from foundational renewable energy concepts to analysis, application, and evaluation.

Day 1 – Introduction to Renewable Energy

- Warm-Up Brainstorm (5 min): What is energy? Renewable vs. nonrenewable brainstorm.
- Direct Instruction (50 min): Renewable Energy Lesson (biomass, solar, wind, hydro, tidal, fusion).
- Exit Ticket (5 min): Which renewable source is most promising in your opinion and why?

Day 2 – Renewable Energy Lab Stations (Part 1)

- Introduction to stations and expectations (5 min).
- Lab Station Rotations (45 min): First half of stations.
- Debrief Discussion (10 min): Key takeaways from stations.

Day 3 – Renewable Energy Lab Stations (Part 2)

- Quick Review (5 min).
- Lab Station Rotations (50 min): Remaining stations.
- Submit papers (5 min)

Day 4 – Wind & Solar Energy

- Reading: Wind Energy Production – Complete reading and questions
- Reading: Solar Energy Production – If done early, start. Reading is to be done for homework.

Day 5 – Renewable Energy Scavenger Hunt

- Device-Based Renewable Energy Scavenger Hunt

Day 6 – Energy Storage & Real-World Challenges

- Crash Course Worksheet: Energy Storage (30 min).
- Small Group Discussion: Why energy storage matters (15 min).
- CER Writing: In your opinion, which Renewable Energy source should the government use? (15 min).

Day 7/8 – Culminating Activity

Powering Our Community – Renewable Energy Proposal Challenge

- Complete over 1-2 days

For students who finish early or as an alternative activity: Reading: Hydroelectric Energy Production (20 min).

Powering Our Community – Renewable Energy Proposal Challenge

Overview

Students act as energy consultants hired to design a renewable energy plan for a small community. Using evidence from everything they’ve learned (solar, wind, hydro, biomass, storage, advantages/limitations), they must create a short, evidence-based proposal defending their energy choices.

This activity reinforces:

- Energy transformation concepts
- Advantages and limitations of each energy source
- Storage and intermittency challenges
- Real-world application and trade-offs
- Claim–Evidence–Reasoning writing

Task Breakdown

1. Scenario Introduction (10 minutes)

Tell students: “Your town wants to reduce fossil fuel use and switch to renewable energy. You have been hired as renewable energy consultants. Your job is to design a realistic, evidence-based energy plan.”

Community profile:

- Population: 50,000
- Located near a river
- Moderate wind speeds
- Receives good sunlight
- Limited budget
- Wants reliable electricity year-round

Students may choose **2–3 renewable sources** (not just one).

2. Planning & Evidence Gathering (20 minutes)

Students work in pairs or small groups.

They must complete:

1. **Energy Mix Decision**
 - What renewable sources will you use?
 - Why did you choose them?
2. **Energy Storage Plan**
 - How will you handle cloudy days, calm wind, or seasonal changes?
3. **Advantages**
 - Environmental benefits
 - Long-term cost benefits
4. **Limitations & Solutions**
 - What problems might occur?
 - How will you address them?

Encourage them to reference:

- Lab station insights
- Reading articles
- Scavenger hunt findings
- Crash Course storage worksheet

3. Final Product (20 minutes)

Students create ONE of the following:

Option A: **One-Page Energy Proposal**

- Title
- Energy sources selected
- 3 pieces of evidence
- Storage solution
- Diagram or simple energy flow sketch
- Final justification paragraph (CER format)

Option B: **Mini Presentation (3 minutes per group)**

- Energy mix explanation
- Why it works for this community
- Biggest challenge and solution

4. Quick Share & Reflection (10 minutes)

Have groups present.

Then students answer individually:

- Which renewable source do you think will dominate the future? Why?
- What is the biggest challenge with renewable energy?

Quick Grade Rubric

Criteria	4	3	2	1
Scientific Accuracy	Accurate and detailed	Mostly accurate	Some errors	Major misunderstandings
Evidence Use	Strong evidence from multiple activities	Some evidence	Limited evidence	No evidence
Storage Understanding	Clear, realistic plan	Basic plan	Vague plan	No storage plan
Reasoning	Logical and well explained	Mostly logical	Limited explanation	Weak reasoning

Lesson

Renewable Energy Lesson

- Lesson
- Hydroelectric Energy Reading + Video Worksheet
- NO PREP - Just download and Go!

8th - 10th Grade



RENEWABLE RESOURCES TEACHER & STUDENT VERSION

Student Notes

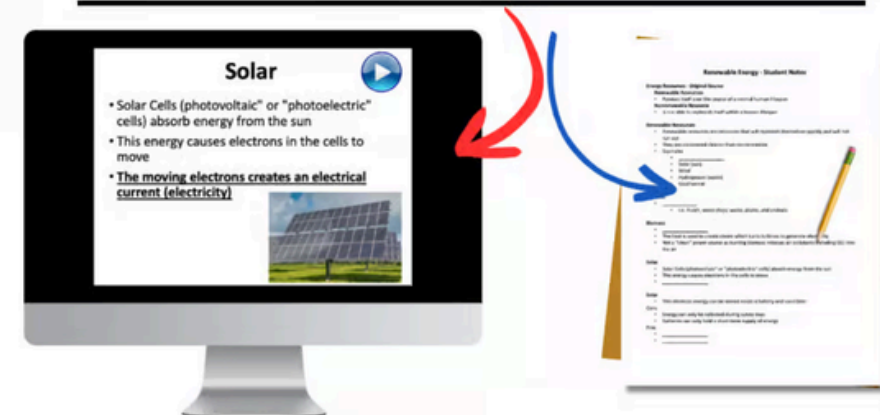
Hydroelectric Reading

Renewable Resources

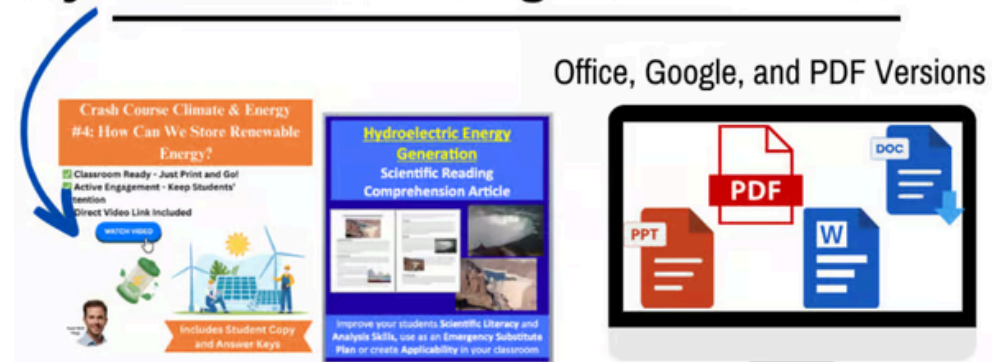
- Renewable resources are resources that will replenish themselves quickly and will not run out
- They are considered cleaner than nonrenewable
- Examples
 - Solar (sun)
 - Wind
 - Hydropower (water)
 - Geothermal

Student version of the lesson includes blanks to fill in.

Videos Embedded & Student Notes



Hydroelectric Reading + Video Worksheet



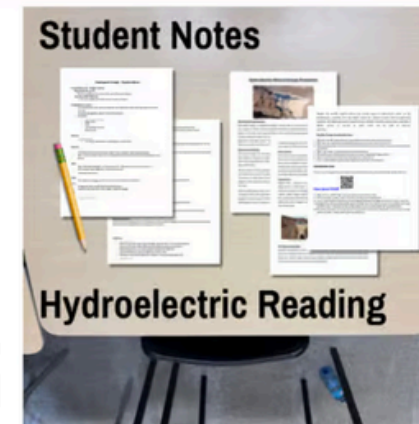
NO PREP

✓ Simply Download and Teach/Upload to your class site.

✓ Hydroelectric Generation Reading + Video Worksheet

✓ Interactive & Video-Enhanced Lesson

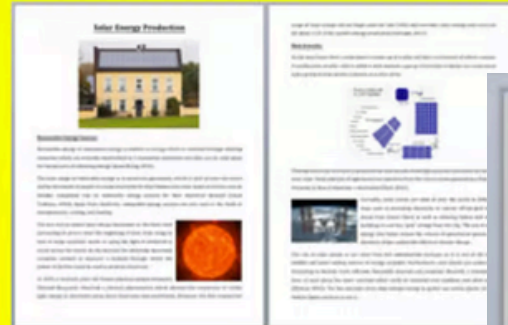
✓ Google, Office, & PDF



3 Readings

Solar Energy Production

Scientific Reading Comprehension Article



Improve your students **Scientific Analysis Skills**, use as an **Emergency Substitute Plan** or create **Applicability** in your classroom

Wind Energy Production

Scientific Reading Comprehension Article



Improve your students **Scientific Literacy and Analysis Skills**, use as an **Emergency Substitute Plan** or create **Applicability** in your classroom

Hydroelectric Energy Generation

Scientific Reading Comprehension Article



Improve your students **Scientific Literacy and Analysis Skills**, use as an **Emergency Substitute Plan** or create **Applicability** in your classroom

Hydroelectric (Water) Energy Production



Renewable Energy Sources:

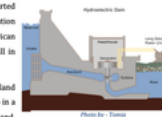
Renewable energy or alternative energy is energy that we can obtain over and over again like solar, wind, etc. These resources replenish themselves automatically over a short period of time (think of the wind, water and the Sun, we are constantly being exposed to them). Renewable energy is generally cleaner and more environmentally friendly than fossil fuels and doesn't leave hazardous waste like nuclear. Today, people use renewable energy to power their homes, run their industry and everything in-between.

Hydroelectric Energy:

The power of water has been appreciated and used by humans for thousands of years with the first evidence of human use found in China during the Han dynasty somewhere between 202 BC and 9 AD. During this time, water wheels were used by people to hull grain, break ore and make paper (SHA, 2016).

The use of water in the production of electricity started in the later years of the 19th century with the invention of turbines. In 1849, James Francis, a British-American engineer, developed the modern turbine that is still in use today.

The first hydroelectric plant was developed in England in the year 1878. It was used to power a single lamp in a Cragside Country house in Northumberland, England. Following its success, countries from all over the globe started using hydroelectric plants for



producing energy. In 1893, the world's largest hydroelectric plant was built at I was named the Edward Dean Adams Power Plant (SHA, 2016).

How it works:

Hydroelectric power harnesses the kinetic energy (energy of motion) present in flowing water. This energy can be captured by placing a turbine in the way of the water flow. Water flows from the higher to lower level, it is sent through a narrow channel called penstock. The penstock turns a turbine that rotates the shaft of it produces electricity (OWG, 2014). Power plants utilize multiple turbines and go to increase efficiency and maximize power output.

Present Day:

Niagara Falls - Electricity was first generated from the Niagara River in 1893 when a 2,200 kilowatt power plant was built just above the Horseshoe Falls to power a nearby railway. Today, Niagara Falls generates power from both the Canadian and American side, producing more than 2.4 million kilowatts, enough to continuously power 24 million 100 W light bulbs!



The Hoover Dam - Located just outside of Las Vegas, Nevada, the Hoover dam produces 2,000 megawatts yearly and an average kilowatt hour, enough to serve 8 million homes.

The Good and the Bad:

Although hydroelectric power is one of the most environmentally-friendly ways of generating electricity, building dams and reservoirs to store water for generating electricity diverts water which can severely impact nearby towns, villages, wildlife habitats, etc. Furthermore, if the dam were to ever break, the nearby area would be flooded.

Despite the possible negative effects, the overall impact of hydroelectric power on the environment is positive, as it has helped reduce our reliance on fossil fuels for generating electricity. The significant upside is that the power of water is limitless as more than 70 percent of Earth's surface is covered in water which can be used to generate electricity.

Reading Comprehension Questions

1. What are two differences between renewable and non-renewable energy sources?
2. Who were the first humans to utilize the power of water and when did this occur?
3. What invention allowed us to produce electricity from the power of water, when did it occur and who invented it?
4. When and where was the first hydroelectric plant built?
5. What is the name of the largest hydroelectric power plant built in Niagara Falls?
6. How is electricity generated using hydroelectric power plants?
7. How can hydroelectric power plants negatively impact the environment?

Extension Questions

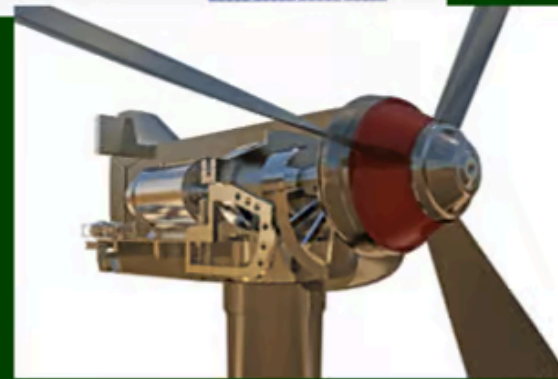
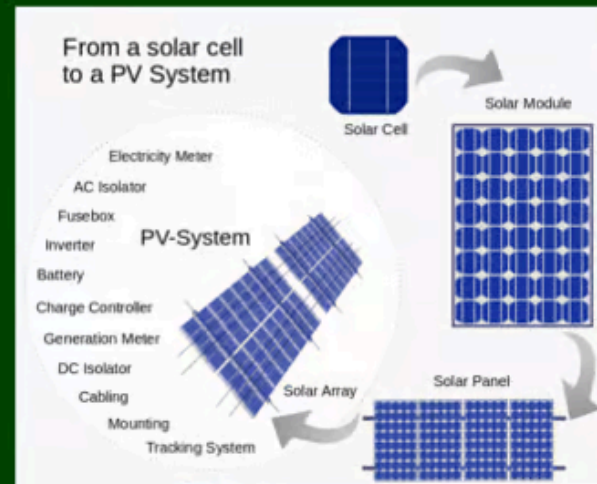
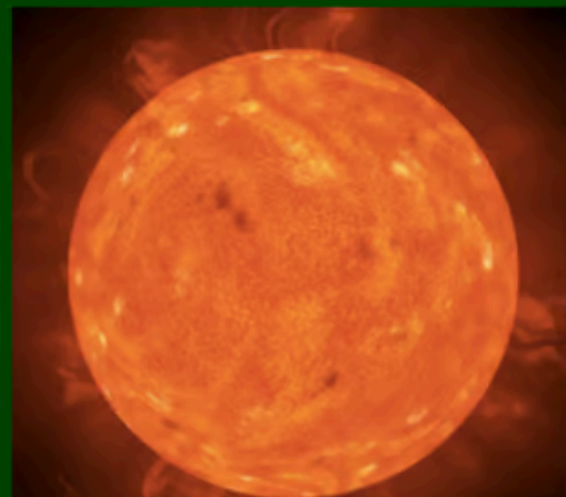
For the next two questions, please go to the following site using the provided URL or the QR code.



- <http://go.gl/5ANW1R>
8. Why are dams used? They create two levels of water for it to flow.
 9. What causes the turbine to spin? The flow of water down the penstock.
 10. Do you think hydroelectric power is the energy producing technology of the future? Why or why not?
 11. Research the nearest hydroelectric plant to where you live. How far away is it located? How much electricity does it produce per day and how many homes does it supply with electricity daily?
 12. The power of water can be harnessed in ways other than a dam. Research one other way that the motion of water is being used to generate electricity.

Lab Station Activity

Renewable Energy Lab Station Activity



7 Lab Station Activities to get your kids out of their seats and engaged in their learning

Interactive Lab Station Activity



Little to no prep, just print and go

7 Engaging Lab Stations

Each station tests your students' knowledge and provides a fantastic learning opportunity for your kids to learn through assessment

1. Get Hands-On
2. Research
3. Explain Yourself
4. Applicability Reading
5. Test Your Knowledge
6. Learn From Expert
7. Become the Question Master

Save your time by utilizing dry labs that are all set to go. Just print and place them around the room



Station 1

Get Hands-On - Draw and label the moon as it would appear from Earth.

Station 2

Research - Using your search engine research: What are some common traits of example provided? Sure you.

Station 3

Explain yourself - Write down an opinion to the following question in paragraph form. You are NOT permitted to use your device.

Station 9

Become The Question Master - You must create 2 multiple-choice questions, 2 true/false questions and 1 short answer question. You must also supply the answers and you may not re-use any of the questions you have seen in this lab.

Station 4 Rest Station

Use this time wisely. Complete any station work not yet finalized.

Station 5

Applicability Reading - Read the following answer to find the reading.

Station 6

Test Your Knowledge - Answer the following 5 multiple choice questions.

Station 7

Learn from the expert - Using a classroom computer or your own device, watch the following video clip and answer the associated questions. You may do this as often as you.

Station 8 Rest Station

Use this time wisely. Complete any station work not yet finalized.

Digital Scavenger Hunt Activity

Device-Based Scavenger Hunt Renewable Energy Production

Includes

- 5 Unique Locations
- Online form submission
- Answer Key



Works on all smartphones, tablets, Chromebooks, and laptops

- **100% Digital**
- Simulations
- Quizzes
- Videos
- Games
- and more



So Easy To Use

1. Print out the QR codes and put them around the room
2. Put your students into groups
3. Let them move from Location to Location as they complete the tasks
 - **All tasks are accessed via the QR Codes**
 - **5 Tasks Total per activity**
4. Have them submit their answers directly to your email via the online form

That's it!

Example Location Screenshots

Scavenger Hunt – Renewable Energy Production – Location 1

Watch a Video:

Watch the video below and answer the following questions:



1. What is renewable energy?
2. What are the most common renewable energy sources?
3. What type of energy is not considered renewable, but rather considered alternative?
4. What does it mean to be sustainable?
5. What are the benefits of renewable energy?

Scavenger Hunt – Renewable Energy Production – Location 3

Application Research:

Research the dangers posed to birds and bats by wind turbines. How serious is this danger? What are some ways to reduce it? Discuss two for bats and two for birds. Do you think they would be successful? Your answer should be 4-5 sentences long.

Video Worksheet

Crash Course Climate & Energy #4: How Can We Store Renewable Energy?

- ✓ Classroom Ready - Just Print and Go!
- ✓ Active Engagement - Keep Students' Attention
- ✓ Direct Video Link Included

WATCH VIDEO



Includes Student Copy
and Answer Keys

Crash Course CLIMATE AND ENERGY #4: How Can We Store Renewable Energy?

Name: _____ Date: _____

You can access the video here → <https://youtu.be/0kaZWu5ME5si>

1. Photovoltaic panels are used to generate electricity from _____ energy.
2. One major challenge with solar and wind power is the lack of _____ when the sun isn't shining or the wind isn't blowing.
3. Electricity is carried through conductive materials by the movement of _____.
4. The electric _____ connects homes and industries to their electricity supply.
5. When renewable energy produces more electricity than needed, utilities may use a process called _____.
6. The pattern of midday sag and steep evening demand is referred to as the _____ Curve.
7. Shifting energy use to times when electricity is more abundant is called _____.
8. Excess electricity can be stored chemically by creating _____ fuel.
9. A _____ fuel cell generates electricity by allowing protons to pass through a membrane while electrons take another path.
10. The process of splitting water into hydrogen and oxygen using electricity is called _____.
11. Mechanical energy storage often uses _____ to hold water until electricity is needed.
12. _____ energy storage involves using heat-retaining materials like molten salt.
13. All storage options tend to have a high _____ compared to fossil fuels.
14. Connecting electrical grids over large distances improves energy _____ and equity.
15. There is no single solution to decarbonizing electricity, but it will require global _____ and innovation.

Crash Course CLIMATE AND ENERGY #4: How Can We Store Renewable Energy? KEY

1. Photovoltaic panels are used to generate electricity from **solar** energy.
2. One major challenge with solar and wind power is the lack of **reliability** when the sun isn't shining or the wind isn't blowing.
3. Electricity is carried through conductive materials by the movement of **electrons**.
4. The electric **grid** connects homes and industries to their electricity supply.
5. When renewable energy produces more electricity than needed, utilities may use a process called **curtailment**.
6. The pattern of midday sag and steep evening demand is referred to as the **Duck Curve**.
7. Shifting energy use to times when electricity is more abundant is called **load shifting**.
8. Excess electricity can be stored chemically by creating **hydrogen** fuel.
9. A **hydrogen** fuel cell generates electricity by allowing protons to pass through a membrane while electrons take another path.
10. The process of splitting water into hydrogen and oxygen using electricity is called **electrolysis**.
11. Mechanical energy storage often uses **pumped storage**.
12. **Thermal** energy storage involves using heat-retaining materials like molten salt.
13. All storage options tend to have a high **cost** compared to fossil fuels.
14. Connecting electrical grids over large distances improves energy **security** and equity.
15. There is no single solution to decarbonizing electricity, but it will require global **cooperation** and innovation.

How It Will Benefit Your Classroom

- ✓ **Classroom Ready** - These structured worksheets provide a ready-to-use resource. Just print and go or upload them to your class site.
- ✓ **Active Engagement** - Encourage students to actively process the information instead of passively watching the video, leading to better retention and understanding.
- ✓ **Reinforcement of Key Concepts** - By answering questions, students reinforce important scientific ideas and terminology, improving comprehension.
- ✓ **Enhances Retention of Fast-Paced Content** - Crash Course videos are packed with information. Worksheets help students slow down and process key concepts, ensuring they don't miss important details.
- ✓ **Supports Note-Taking and Study Skills** - Worksheets act as guided notes, helping students organize key points effectively for future reference.



Teach With
Fergy