

Fueling your life

It takes many different sources of energy, including renewables, to make the electricity that keeps your lights on.

Renewable energy is power generated from sunlight, blowing wind, flowing water, heat inside the earth and biomass. You get about 17 percent of your electricity from renewable resources.

The rest of your energy is fueled by nonrenewable resources, which

include oil, coal and natural gas. These resources are nonrenewable because they exist on the earth in limited quantities, and are not quickly replenished.

It takes both renewable and nonrenewable resources to make the energy you use.



Hi! I'm Randy.

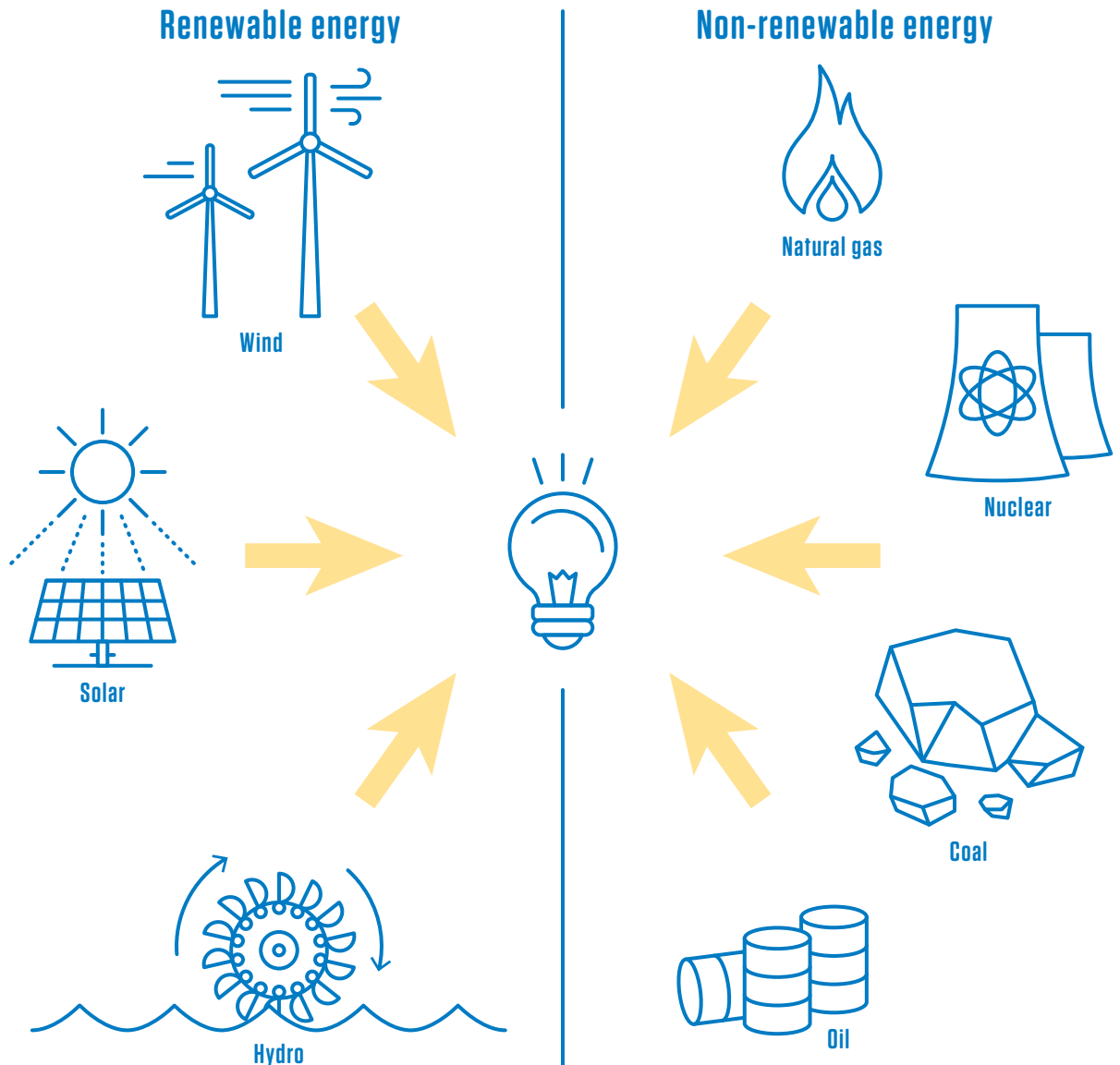
We can make electricity to power your home and school from different resources around you. Some of those resources are un-renew-a-believable like sunlight, wind and water.

How we make electricity!

Electricity makes the way you live possible. It keeps your home warm, lights on, video games working, computers and cell phones charged, ice cream frozen—it touches your life in almost every way!

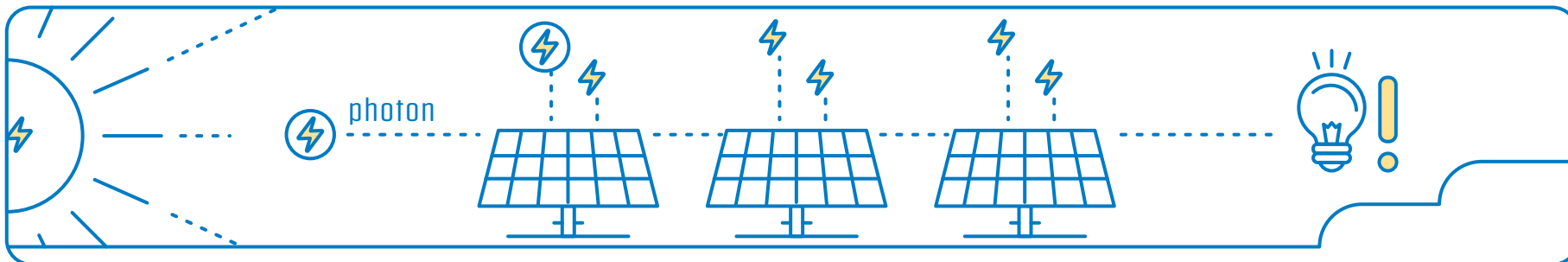
We make electricity from both nonrenewable and renewable resources and it takes many skilled men and women in hundreds of different jobs working together.

We use many resources to create electricity. Right now, we use mostly coal and natural gas, and each year we use more and more wind, solar and hydropower.



Q: How did Benjamin Franklin feel when he discovered electricity?

A: _____



Randy says:

The sun is like a huge battery in the sky. Solar panels convert the sun's tiny particles of light, called photons, into electricity.

Solar power

Solar panels capture energy from the sun and convert it into electricity. The main benefit of solar energy is that it is clean. The sun's energy can only be gathered when it is shining. Night time, clouds and stormy weather interrupt the sun's rays so we rely on other options to power our homes when we can't collect solar power.

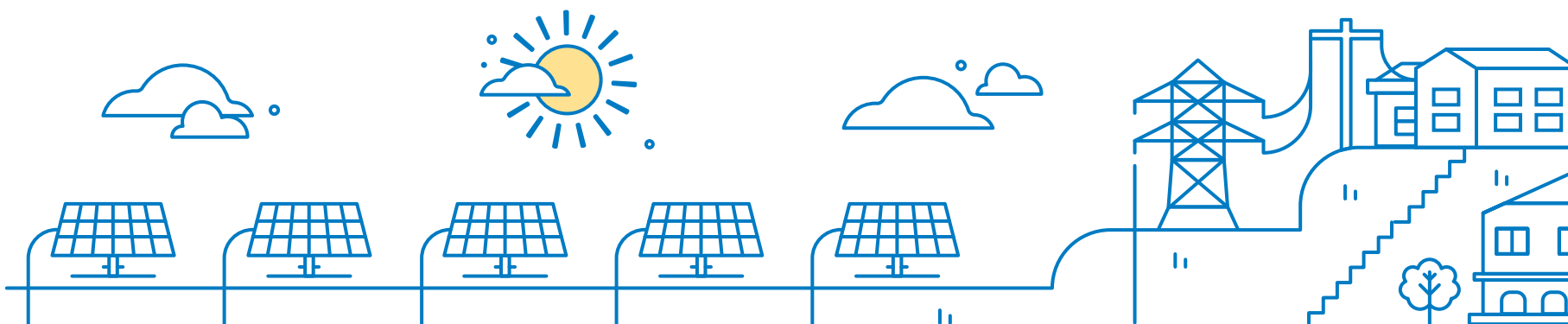
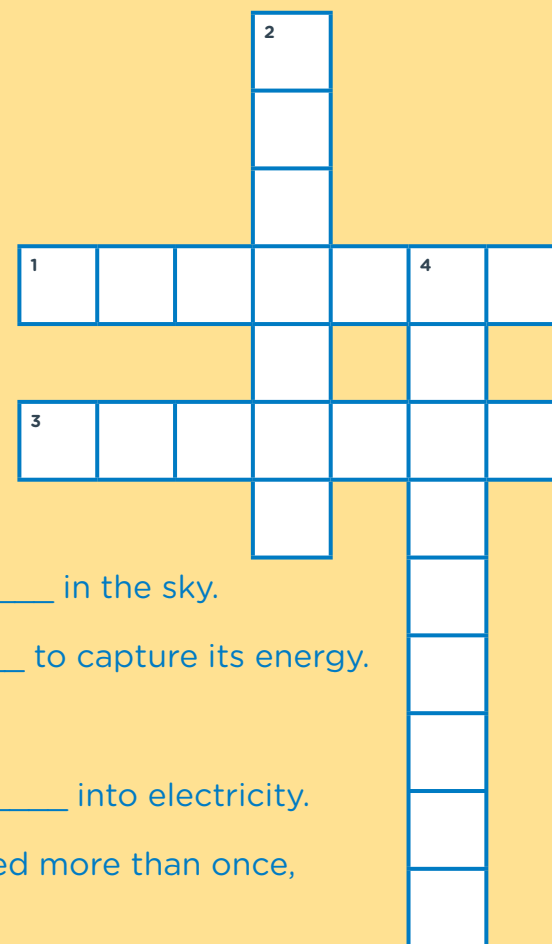
Crossword puzzle

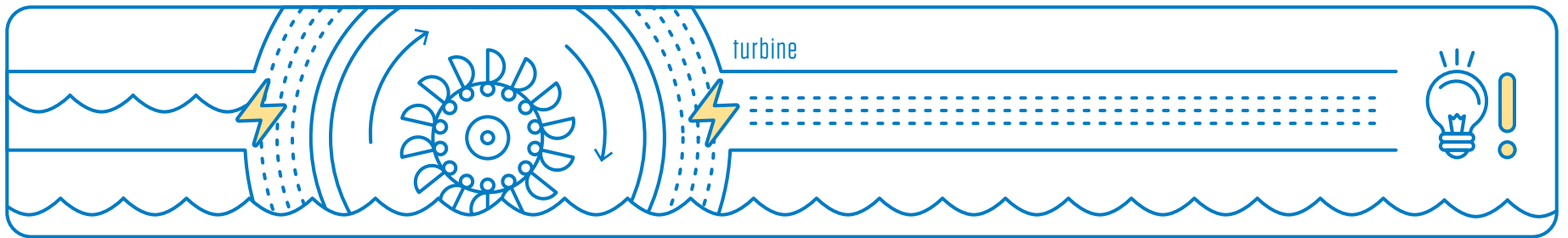
Across

- 1. The sun is like a big _____ in the sky.
- 3. The sun has to be _____ to capture its energy.

Down

- 2. Solar panels convert _____ into electricity.
- 4. The sun's energy can be used more than once, so it is _____.





Hydropower

Hydropower is one of the oldest ways to generate energy. Power is created when water flows through a pipe, then pushes against blades that turn in a turbine to spin a generator to produce electricity. Today, about half of the renewable energy we use comes from hydropower.

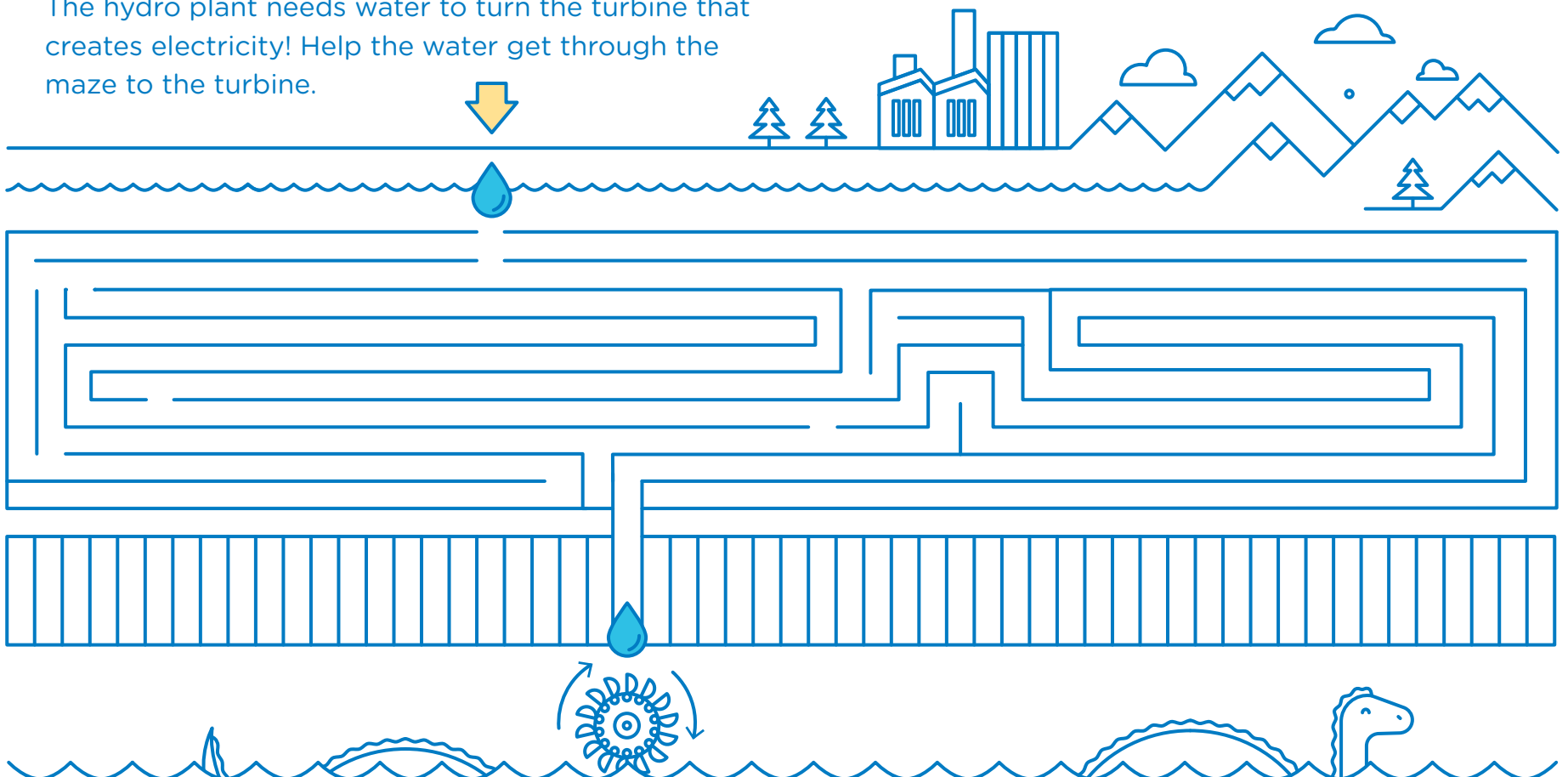


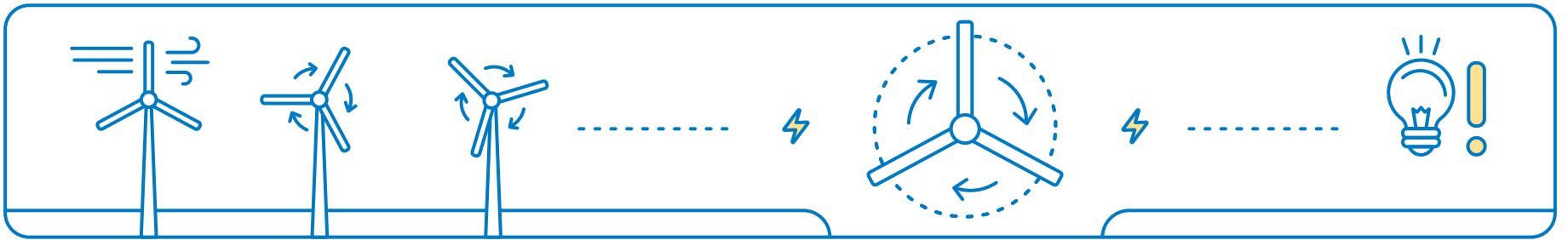
Randy says:

A turbine can weigh as much as 172 tons and turn at a rate of 90 revolutions per minute to make electricity. ZOWIE!

Help the water through the dam!

The hydro plant needs water to turn the turbine that creates electricity! Help the water get through the maze to the turbine.





Wind power

We are big fans of the wind!

Wind turbines generate electricity when the wind blows. Like solar energy, wind power is a clean source of energy. One turbine can power hundreds of homes throughout the year, but the turbines can't provide power all the time—only when the wind is blowing.

It can be too windy to use the wind turbines. Wind turbines can only be used to generate electricity when the wind blows just right. If the wind is either too weak or too gusty, wind turbines cannot be used to make electricity.

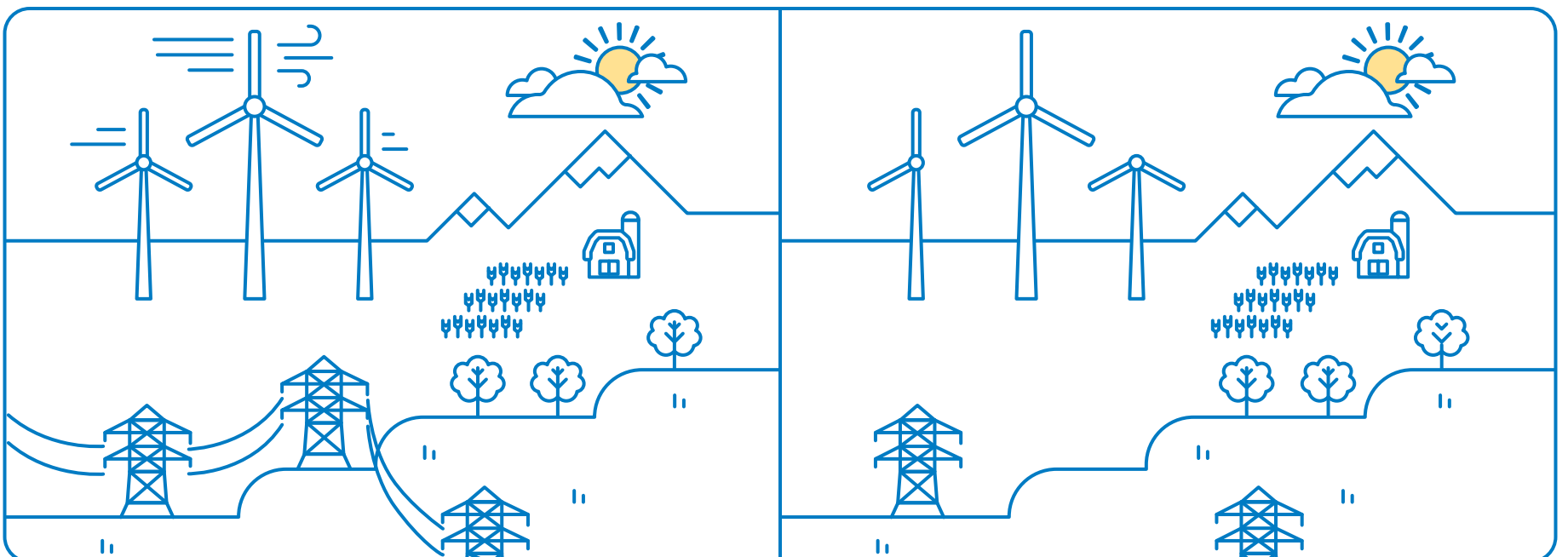


Randy says:

At 300 feet, wind turbines are the same height as the Statue of Liberty and can spin up to 200 miles per hour to create electricity.

Something's not right!

The picture on the right is missing some parts. Turbines need to make power and get it to where it's headed. Draw in the details that are missing so we can get the turbines running again.



Even more un-renew-a-believable energy sources

Solar, wind and hydropower are sources of renewable energy. The earth offers us more ways to generate electricity.



Q: What is a renewable energy source that is used every day at your school?

A: _____

Q: How are renewable power plants like people who enjoy going to the beach?

A: _____

Geothermal energy

Geothermal uses the earth's internal heat to help heat and cool buildings and make electricity. It's the same energy that causes volcanoes and geysers to erupt. Geothermal power plants work by tapping into steam or hot water reservoirs underground to create electricity.

Biomass energy

Biomass uses materials like wood, paper, plants and even garbage to make electricity. Energy is released from biomass as heat when it is burned.

The earth's resources all work together

Because the sun doesn't always shine and the wind doesn't always blow, renewable energy alone can't supply all of our electricity. In order for us to rely on electricity anytime we need it—like turning on a lamp in the middle of the night, turning on our heat on a cold and snowy day, or charging a cell phone early in the morning—we also need coal and natural gas to produce power.

RENEWABLE ENERGY WORD SCRAMBLE

1. ORSLA NPAEL

2. DIWN TENRBIU

3. ISOSBAM

4. NGRETORAE

5. YODHRWEPOR

6. RHMLETEAOG

7. IECTCELITRY

8. WREPO



Wood



Landfill gas

Types of biomass



Crops



Garbage

Un-Renew-a-Believable WORD SEARCH

E E Y K N W I N D M Q T L D A
 L Z M L M P G D T A A N X M U
 E Q U V N I T E H E L A M A L
 C W F Q V D N N H V X T X A G
 T K V Z T Q E S P T Y U M C R
 R O H Y D R O P O W E R J Q E
 I M K B P L F H M E E A L O N
 C E W N A D I O Y H G L R M E
 I T T R N M N T T S Q G Q Z W
 T H U P E P G O S W M A P F A
 Y A R D L R E N X R X S F I B
 Z N B H J G F S F R G L A W L
 H E I W V R U H J M Z S P R E
 D P N Q S X O P J L G Q M K K
 E S E V R E S O U R C E S M V

- SOLAR
- RENEWABLE
- WIND
- TURBINE
- ELECTRICITY
- NATURAL GAS
- HYDROPOWER
- PHOTONS
- PANEL
- RESOURCES
- METHANE
- HEAT
- GEOTHERMAL



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Educator's Guide - January 2019

The Renewables Issue

Academic Standard Focus

ELA-Literacy Standards

- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate. (CCSS.ELA-Literacy.CCRA.L.4)
- Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression. (CCSS.ELA-Literacy.CCRA.L.6)

Next Generation Science Standards

- Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.] (4-ESS3-1.)

National Agriculture Literacy Outcomes

Science, Grades 3-5 - Plants and Animals for Food, Fiber & Energy Outcomes

- Distinguish between renewable and non-renewable resources used in the production of food, feed, fuel, fiber (fabric or clothing) and shelter.

Additional Resources

Power Up Game: www.myamericanfarm.com/games/power_up/

The Energy Story: www.energyquest.ca.gov/story/

EIA Energy Kids: www.eia.gov/kids/

Science Daily: Matter & Energy: www.sciencedaily.com/news/matter_energy/

The following YouTube videos have more information on energy:

Kinetic Energy: www.youtube.com/watch?v=ASZv3tIK56k

Force and Gravity: www.youtube.com/watch?v=LEs9J2IQIZY

Where does energy come from?: www.youtube.com/watch?v=aUa7I7D_myU

Using Energy: www.youtube.com/watch?v=z1xFrYkQwik

Animated Hydropower Slide: <http://energy.gov/eere/water/how-hydropower-works>

Hydropower video: <http://energy.gov/eere/water/hydropower-basics>

Other Links:

- www.need.org
- www.energyquest.ca.gov/games/index.html (online energy games)
- www.epa.gov/students/teachers.html
- www.myenergygateway.org
- www.partselect.com/JustForFun/Electric-Math-Numbers-Behind-Appliances.aspx/

Additional Resources on Renewable and Non-Renewable Energy:

- www.kids.esdb.bg/basic.html
- www.greenmountain.com/resources/enviro-kids/renewable-energy-101

Additional Resource Sites:

- www.alliantenergykids.com/FunandGames/CoolProjects/
- www.eia.gov/kids/index.cfm
- www.evergreenconservancy.org/environmental-education/hydro-power/

- www.dteenergy.com/kids/
- <http://fwee.org/nw-hydro-tours/walk-through-a-hydroelectric-project/>
- www.blackhillscorp.com
- www.energystar.gov/index.cfm?c=kids.kids_index
- <http://www.eschooltoday.com/energy/kinds-of-energy/all-about-energy.html>
- www.tvakids.com
- www.mineralseducationcoalition.org

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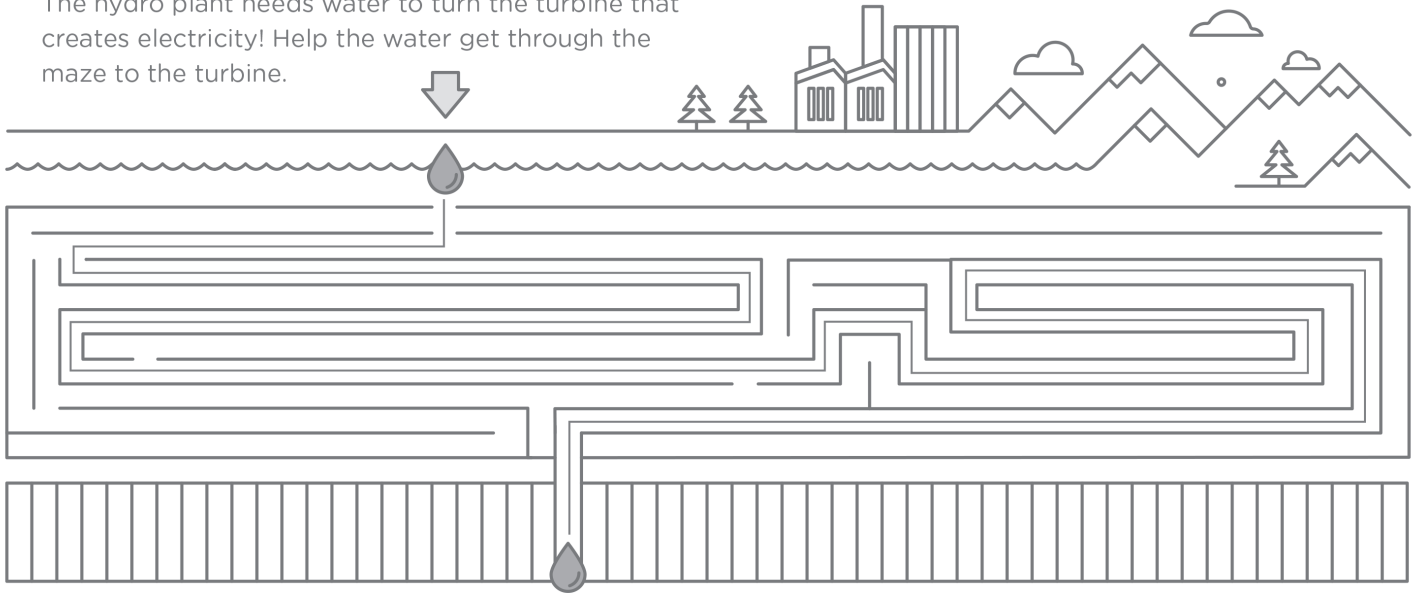
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www.NEFBFoundation.org

Or visit www.AgClassroom.org for more programs, resources, and lesson plans.

Help the water through the dam!

The hydro plant needs water to turn the turbine that creates electricity! Help the water get through the maze to the turbine.



Answers

Page 2

Q. How did Benjamin Franklin feel when he discovered electricity? A: Shocked!

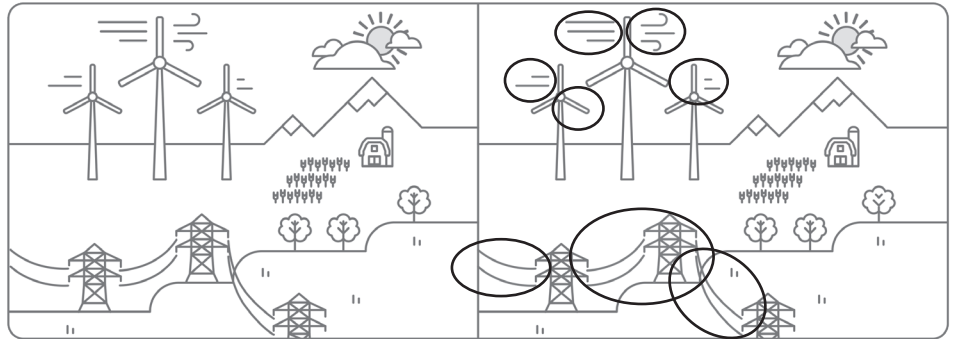
Page 3

Across 1. Battery

Across 3. Shining

Down 2. Photons

Down 4. Renewable



Page 6

Q. What is a renewable energy source that is used every day at your school? A. Brain power!

Q. How are renewable power plants like people who enjoy going to the beach? A. They all like sun, wind and water.

Page 7 - Word Scramble

1. Solar Panel
2. Wind Turbine
3. Biomass
4. Generator
5. Hydropower
6. Geothermal
7. Electricity
8. Power

