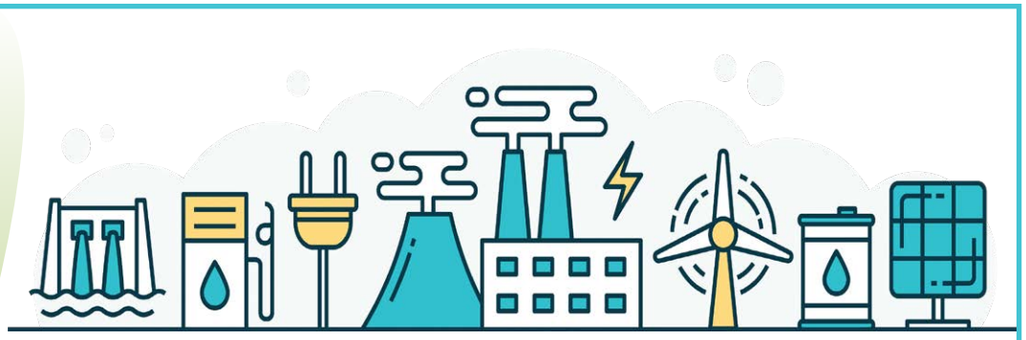
Nebraska
Agriculture in the Classroom



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 and flowing water. You get a growing amount of your electricity from renewable resources. The rest of your energy is fueled by resources including oil, coal and natural gas.

Power is generated either at large power plants, wind farms or solar fields, or locally from smaller projects in the community. Some people have solar panels on their homes to provide power.

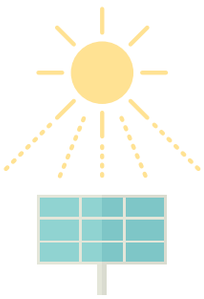
These sources of electricity are all connected by power lines to homes, schools and communities.

Hi! I'm Randy.

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

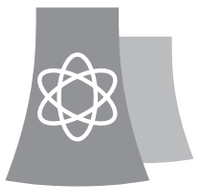
How we make electricity!

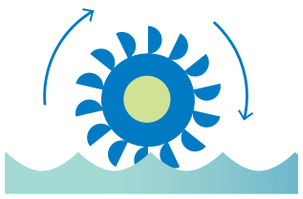
Types of generation


Solar

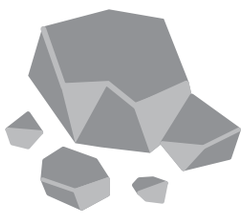

Wind


Oil


Nuclear


Hydro


Natural gas


Coal

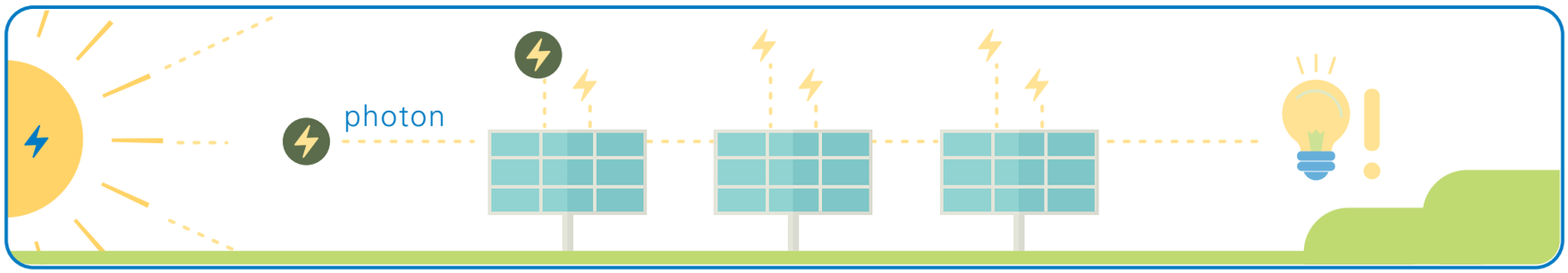
Electricity makes the way you live possible. It keeps your home warm, lights on, video games working, computers and cell phones charged, ice cream frozen—it touches your life in almost every way!

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

Q: What did the baby light bulb say to the mommy light bulb?

A: _____

"I love you watts and watts!"



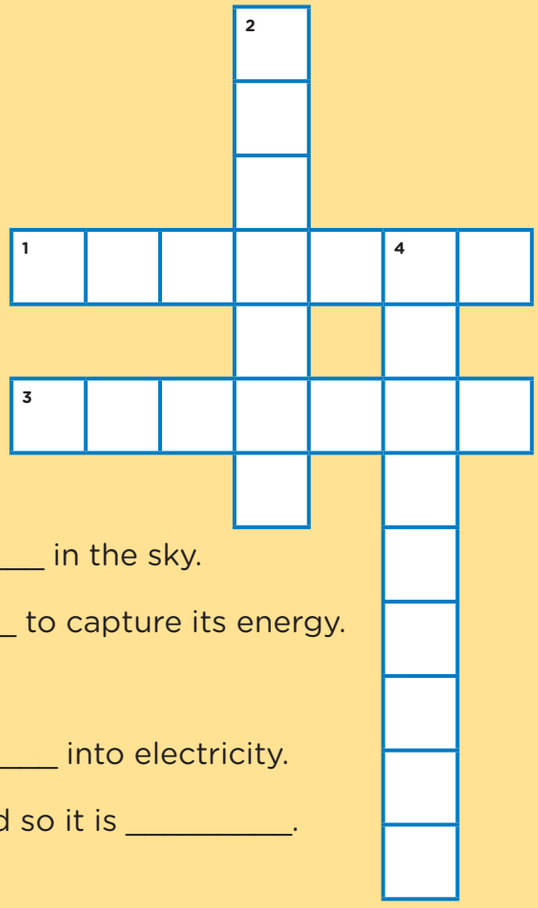
Randy says:

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. Nighttime, 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

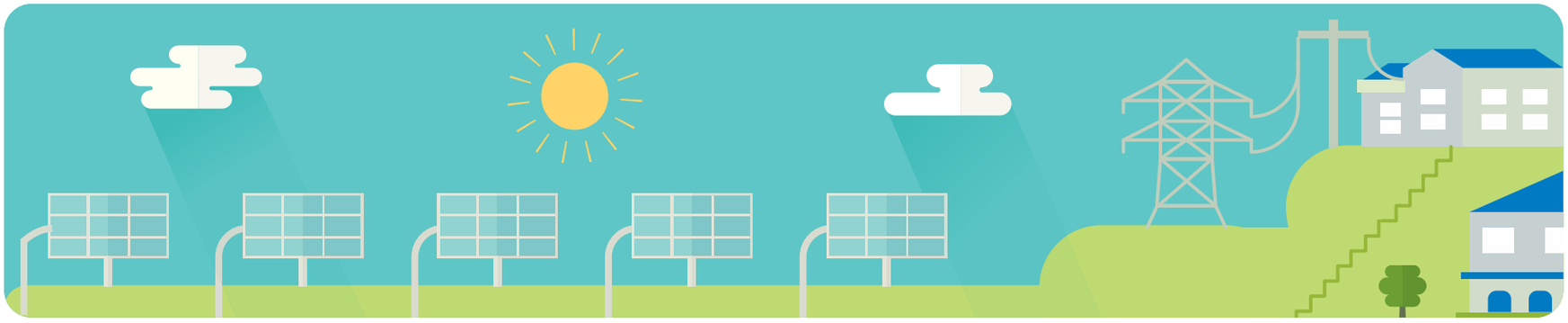
1. The sun is like a big _____ in the sky.

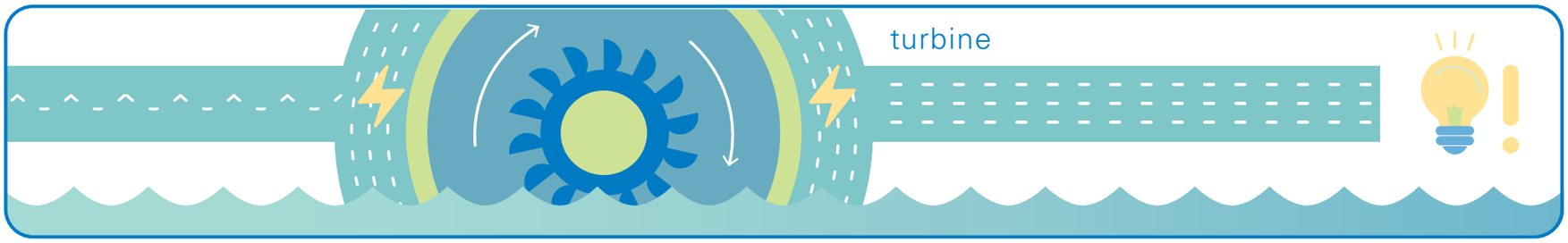
3. The sun has to be _____ to capture its energy.

Down

2. Solar panels convert _____ into electricity.

4. The sun's energy is unlimited so it is _____.





Hydropower

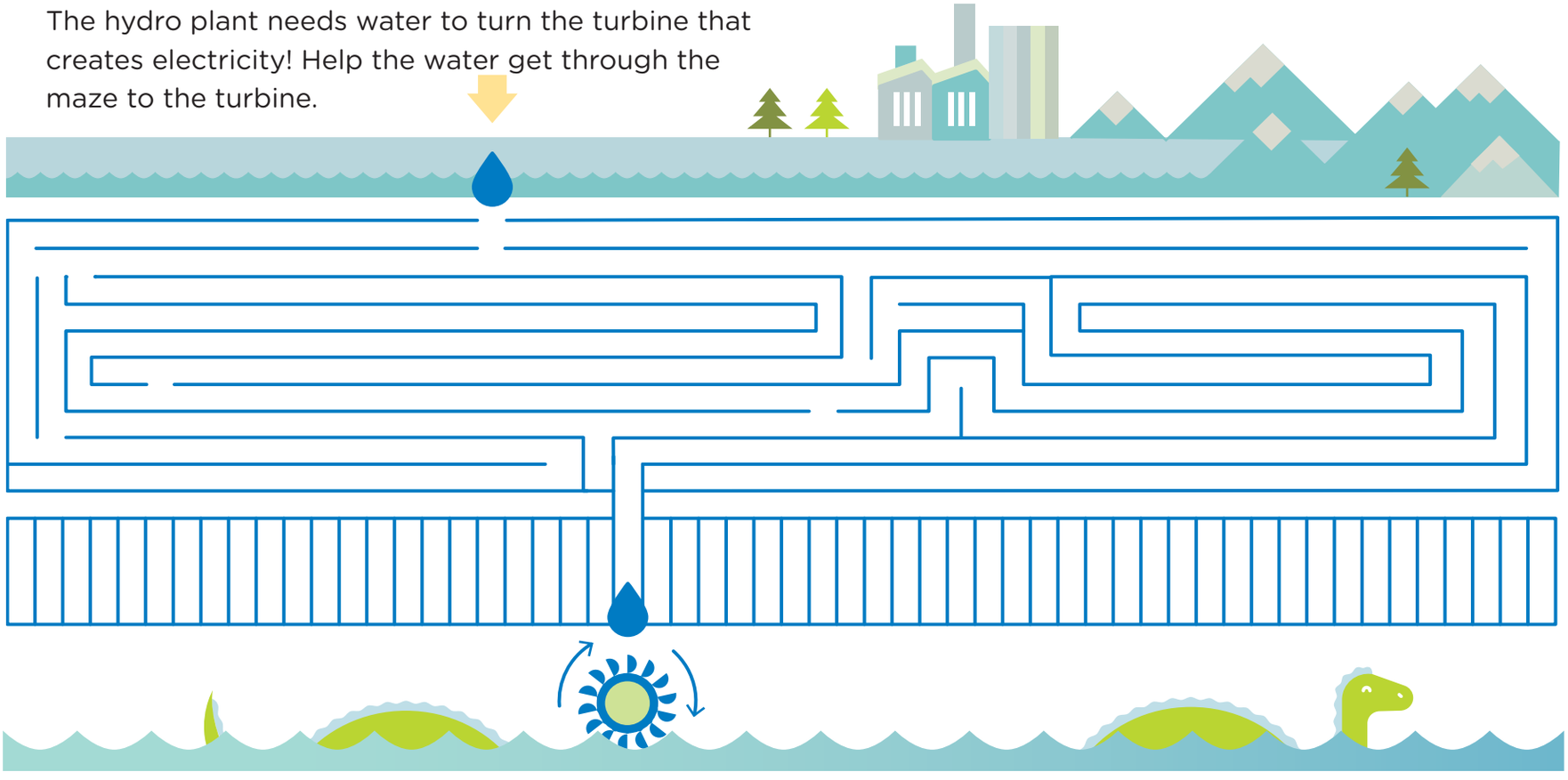
Hydropower is one of the oldest ways to generate energy. Power is created when water flows through a pipe, then pushes against blades that turn in a turbine to spin a generator to produce electricity. Today, about half of the renewable energy we use comes from hydropower.

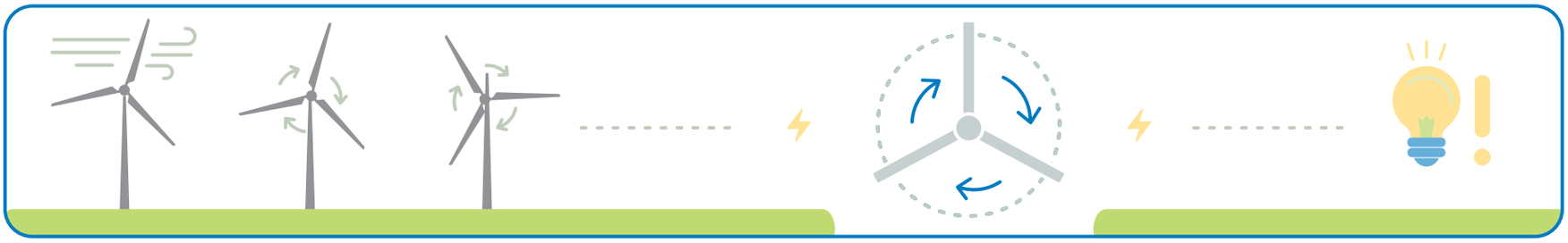
Randy says:

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.

Wise ways we use electricity

Research on new and exciting opportunities to save money and reduce emissions with electricity is important. Here are some cleaner, greener ways electricity is used.

Energy storage

Although sunlight and wind are clean and renewable sources of electricity, they don't produce any power when it gets dark or the wind stops blowing. By keeping that energy in different types of batteries, we can release this stored energy later, when we need it most.

Pumped hydropower is a system that uses excess electricity to pump water uphill to a reservoir that acts like a battery. When electricity is needed, the water is released from the reservoir to flow downhill through turbines which generates electricity.

Electric cars

We have the option to drive cars that use electricity instead of a car that uses gas. We can charge those vehicles when the wind blows and the sun shines and store that electricity until we need to drive the car.

Heat pumps help heat and cool your home by moving heat energy to and from the air rather than using natural gas or other fuels to keep your home comfortable. Heat pumps can deliver 1 to 4 times more heat energy to a home than they consume.

LED bulbs

Energy efficient bulbs reduce the amount of electricity it takes to light our homes. That's because LED (light emitting diodes) bulbs transfer much more of the electricity they use into light than other bulbs. They use 90% less energy than incandescent bulbs for the same amount of light, and half as much as compact fluorescents. On top of that, an LED bulb will last much longer than the other bulbs.

What else can we do to use electricity wisely?

Wise use of Electricity

Draw lines from the question to the correct answer

1. Electric cars use electricity for power instead of this.

2. When the wind blows and the sun shines we can store the energy in these until we need it.

3. These act as batteries when water is pumped uphill into them.

4. These help keep your home comfortable.

5. These bulbs last much longer than other types of bulbs.

A. LED

B. Batteries

C. Heat pumps

D. Gas

E. Reservoirs

Renewable Energy Word Scramble

1. ETAH UMPP

_ _ _ _ _ _ _ _ _

2. DIWN TENRBIU

_ _ _ _ _ _ _ _ _ _ _

3. NGRETORAE

_ _ _ _ _ _ _ _ _

4. YODHRWEPOR

_ _ _ _ _ _ _ _ _ _ _

5. IECTCELITRY

_ _ _ _ _ _ _ _ _ _ _

6. EIREBSTAT

_ _ _ _ _ _ _ _ _

7. LOARS ENPAL

_ _ _ _ _ _ _ _ _ _

8. THLGI IGIEMTNT DEDSOI

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Q: What instrument never fails to energize a crowd?

A: _____

An electric guitar

A wind turbine saw a solar panel at an energy convention. He leaned in and shouted, “Hey, I’m a big fan!”

Un-Renew-a-Believable WORD SEARCH

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

POWER
RESOURCES
LED BULBS
ELECTRICITY
PHOTONS
BATTERIES
HEAT PUMP
ELECTRIC CAR
WIND TURBINE
HYDROPOWER
RENEWABLE
SUNLIGHT

This publication is a project of the Nebraska Agriculture in the Classroom program. Educational projects are produced in cooperation with state and federal agencies, commodity groups, agricultural associations, state universities and colleges and interested individuals. This publication is provided free to educators requesting them. For more information contact: Ms. Courtney Schaardt, Nebraska Farm Bureau Foundation, 5225 South 16th Street, Lincoln, NE 68501, P: 402.421.4461 or E: courtneys@nefb.org. Content and financial support for this project has been provided by: Tri-State Generation and Transmission Association, www.tristategt.org.

Financial support for this Agriculture Reader provided by:

TRI-STATE
A Touchstone Energy® Cooperative