STEWARDSHIP

ENERGY, CLIMATE, & YOU

TEACHER'S GUIDE

Inside education

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INTRODUCTION

USING THIS RESOURCE

Stewardship: Energy, Climate and You is designed to help students in grades 3 through 7 make the connection between energy use and climate change with a focus on personal action and becoming stewards of our environment and natural resources.

ABOUT THE POSTER

The illustration depicts both potential and currently used sources of energy as well as images of energy uses and activities occurring in Western Canada and beyond. A number of stewardship activities are also portrayed throughout the poster with a focus on energy conservation and energy efficiency.
Suns  appear next to sources of energy and Hearts  appear next to stewardship activities. The back of the poster contains several short articles discussing climate change, energy and stewardship that inform the reader and encourage personal action.

ABOUT THIS TEACHER'S GUIDE

This Teacher's Guide contains lessons for grades 3-7 plus two supplementary activities. Each of the lessons enhances the Alberta Program of Studies. Through the activities in the teacher's guide, students are encouraged to look at their own lives and examine where they can make changes to reduce their use of energy.

UNDERSTANDING WEATHER, CLIMATE, AND CLIMATE CHANGE

Climate and weather are two terms that are commonly misunderstood. **Weather** describes the current atmospheric conditions. Examples of weather are wind and sunshine, precipitation events such as rain, snow, or sleet and extreme weather events include thunderstorms, tornadoes and hurricanes. Weather changes constantly. It can even change within a single day or even an hour. It can rain in the morning but by afternoon it is clear and sunny.

By contrast, climate changes much more slowly. **Climate** describes general weather patterns over a long period of time. In Canada, for example, we know that during the summer months we can expect warmer temperatures than during the winter months. We do not normally expect snow during the summer months. This is a general pattern of weather that we have seen occur regularly over at least a generation.

Climate change is a large-scale change in average weather over a time period of at least 30 years. Climate change occurs naturally, because of a number of factors such as changes in the Earth's orbit, volcanic eruptions, or changes in energy from the sun. However, climate is also affected by humans. By burning fossil fuels, such as coal, natural gas or oil, humans increase the amount of greenhouse gases in the atmosphere. Most scientists agree human activity is responsible for most temperature increases over the past 250 years. The biggest concern is the speed at which these changes are happening.

Weather events that are not characteristic of a particular season occasionally happen. Sometimes we do experience weather events such as snow in June or spring-like temperatures in December. While a single weather event does not prove or disprove climate change, it is predicted that global warming, and the resulting change in climate, could result in a greater frequency of uncharacteristic weather events — like snow every June.

ALBERTA CURRICULUM CONNECTIONS

GRADE 3 SCIENCE

GUIDING QUESTION:

How can connections among science, technology, and the environment contribute to our conservation efforts? (2018)

GRADE 4 SCIENCE

GUIDING QUESTION:

How can connections among science, society, and the environment contribute to our stewardship efforts? (2018)

TOPIC A: WASTE AND OUR WORLD

Develop and implement a plan to reduce waste, and monitor what happens over a period of time.

GRADE 5 SCIENCE

TOPIC D: WEATHER WATCH

Recognize that human actions can affect climate, and identify human actions that have been linked to the greenhouse effect.

TOPIC A: ELECTRICITY AND MAGNETISM

Interpret and explain the reading on a household electrical meter, efficiency labels on electrical appliances.

GRADE 6 SOCIAL STUDIES

UNIT 6.1: CITIZENS PARTICIPATING IN DECISION MAKING

Analyze how individuals, groups and associations within a community impact decision-making of local and provincial governments by exploring and reflecting upon the following questions and issues: How can individuals, groups and associations within a community participate in the decision- making process regarding current events or issues *(i.e., lobbying, petitioning, organizing and attending local meetings and rallies, contacting elected representatives)*?

GRADE 7 SCIENCE

UNIT A: INTERACTIONS AND ECOSYSTEMS

Investigate and describe relationships between humans and their environments, and identify related issues and scientific questions.

- Identify examples of human impacts on ecosystems, and investigate and analyze the link between these impacts and the human wants and needs that give rise to them.
  (e.g., identify impacts of the use of plants and animals as sources of food, fibre and other materials; identify potential impacts of waste products on environments)

Describe the relationships among knowledge, decisions and actions in maintaining life-supporting environments.

- Identify intended and unintended consequences of human activities within local and global environments
  (e.g., changes resulting from habitat loss, pest control or from introduction of new species; changes leading to species extinction)

HEARTS AND SUNS

DESCRIPTION
This is a fun eye-spy game you can play with students in any grade! Students will identify natural resources and actions they can take to practice environmental stewardship.

OBJECTIVE
To familiarize students to the *Stewardship* poster and to set groundwork for future discussions of stewardship, climate change, energy use and conservation.

DURATION
15 minutes (or longer if you can come up with your own riddles!)

MATERIALS
Stewardship: Energy, Climate and You *posters;* Hearts and Suns Riddles

PROCEDURE
Divide students into small groups, providing each group with a copy of the *Stewardship, Energy, Climate and You poster.*

Have each group come up with a sound they might hear if they were out in nature. It might be the sound of the wind *(whsssssh)* or an animal call *(caw of a crow).* This will be their "buzzer" sound when they have a correct answer.

Read the clues aloud and award points to the team with the correct answer.

PART 2
Have the students in their groups try to make their own riddles for two hearts and two suns. Have students submit their clues to you and play the same game again, using their clues!

If you would like to share the creative clues that your students have come up with, feel free to send them to ***info@insideeducation.ca***

Have fun!

HEARTS AND SUNS RIDDLE

Hearts - *Actions to reduce greenhouse gases*	*Answer*
This gadget makes showering the easiest yet, by using less water while still getting wet! — What am I?	18. Low-flow shower head
Take in your paper, metal and plastic; you can compost your apple core, that is fantastic! — Where am I?	7. Recycling Centre
You might find your old toys here at bargain prices. Buying cool used stuff is sometimes the nicest! — Where am I?	2. Yard Sale *(bonus for Thrift Store)*
When you come to school on me, you'll often wear a pack. But make sure when you park, you put me in the rack! — What am I?	17. Bicycle
An easy way to save, and an important one too. Sure it's cold outside, but grab a sweater and turn me down, It's a stewardship thing to do! — What am I?	6. Thermostat
I spend my summers where tree stumps abound, when I'm done my stewardship, there'll be seedlings in the ground! — Who am I?	8. Tree Planter
Suns - *Energy sources*	*Answer*
It's breezy, it's easy! I use the wind to spin, spin, spin and for many people this green power is a stewardship win! — What am I?	h) Wind Turbine
The oil found here is mixed in with sand, at room temperature it's as hard as a hockey puck in your hand. — Where am I?	c) Oil sands
I am a strong source of energy all through the day, I keep the Earth warm while you run and play. — What am I?	a) The Sun
I can be burned to create electricity to power cities and towns, by the year 2030 you might not see as much of me around. — What am I?	k) Coal
Look for a big reservoir that stores a powerful flow that can be turned into electricity, didn't you know? — What am I?	g) Hydroelectric power
Thousands of kilometers of these are criss crossing below our feet, they move oil and gas around, isn't that neat! — What am I?	e) Pipelines

REDUCING WASTE = REDUCING ENERGY USE

OBJECTIVE
Students will identify personal goals for environmental stewardship and engage in a school-wide initiative to reduce waste and energy consumption.

DURATION
1.5 hours

MATERIALS
Paper, coloured pencils

BACKGROUND
Almost everything we have, use or do requires energy. Reducing the amount we consume, and ultimately, the waste we produce, can reduce the amount of energy we consume. When we use less energy in all parts of our lives, fewer greenhouse gases are emitted into the atmosphere.

Reducing waste = Reducing energy use.

Discuss with students in the activity below, energy resources are being conserved.

- By reducing, reusing and recycling the products we use, fewer new products are required, meaning less energy resources are needed to produce and transport these new products.
- By reducing, reusing and recycling products, less waste needs to be transported and treated at waste faclities, and there may be less need for landfills.
- By limiting the amount of water we use every day, the amount of energy needed to heat hot water (using natural gas) and to treat dirty water is reduced.

PROCEDURE
1. Distribute poster paper to students. Have students divide their paper in half and draw two separate images of themselves, one half entitled "***Today***" the other ***"Tomorrow."***

- On the ***Today*** side, students will draw a picture of a stewardship activity they already do, and have them caption the drawing *(ie: I always recycle my paper)*
- On the ***Tomorrow*** side, students will draw an action that they commit to trying to do in the future, and have them caption the drawing with "I am a going to ....."

You may want to brainstorm some ideas prior to engaging students in the activity. However, the poster depicts many good ideas you can draw from. Samples:

- ***Today*** – Turning off the water when I brush my teeth
- ***Tomorrow*** – Turning off the water when I wash my hands.
- ***Today*** – Carry a reusable water bottle.
- ***Tomorrow*** – Try to go plastic free for a day.

ONE SIMPLE ACT!

2. Brainstorm stewardship activities everyone in your school can do together. Think about energy and water conservation activities that could be initiated, such as:

- reusing school materials;
- reusing water bottles;
- bringing litter free lunches;
- recycling;
- holding a swap/flea market for clothes, sports equipment or other items; or
- Shutting off classroom lights and just using natural light from the windows.

3. As a class, create an action plan for your school-wide program. Make a list of things that need to be done and materials you will need to do them. Consider what steps it will take to enact your idea.

- Does the class need to have the permission of the principal?
- How will you go about getting permission? Write a letter? Make a presentation?
- How long will the project take?
- What needs to be done first?
- How will you let the rest of the school know about your project?
- Are there creative ways to spread the word that will not create waste?
- How will you know if your plan was successful? *(e.g.,: 30% more students bring litter-less lunches, reduce school-wide use of paper by 25%, and so forth)*

SAMPLE ACTION PLAN FOR SCHOOL STEWARDSHIP

What do we need to do? Brainstorm required tasks. Consider the order in which things need to be done. Post your action plan in the classroom to be updated regularly.

	Task	Assigned to	Completed	Notes
1.				
2.				
3.				

EVALUATE

At different stages of your program, take some time to discuss progress

- How did it go/is it going?
- What resources did you need to implement the action plan?
- Is it easy to make these changes? Why or why not?
- What were some challenges participants faced in participating? How did you overcome these challenges?
- Was it easier to implement the action plan with many people participating?
- Did you have to change your action plan as you went along? What adjustments did you have to make and why?

STEWARDSHIP METER

OBJECTIVE

Students will understand some of the key elements of effective stewardship; Awareness, Attitude, and Action. Students will examine energy use in their home and look for ways to conserve energy and reduce their personal contribution to greenhouse gas emissions.

DURATION

60 minutes plus work at home

MATERIALS

Stewardship posters, "Energy Efficiency Scavenger Hunt" and "Track Your Use of Electricity" worksheets

BACKGROUND

Refer to the article ***What is Stewardship?*** on the back of the poster for a quick summary of the three elements of effective **stewardship**. Students will put these elements into practice in by learning about the relationship between electricity conservation and climate change.

Energy is required to produce, transport, use and dispose of everyday items. Much of our energy use, especially in heating our homes, manufacturing goods, transportation and even developing our energy resources creates atmospheric emissions. Perhaps the most discussed of these is ***carbon dioxide (CO_2)*** which is a greenhouse gas. As our global energy use increases, so too does the volume of atmospheric CO_2 we produce. Energy efficiency and conservation actions, reducing water use and producing less waste all save energy meaning less greenhouse gas emissions.

PROCEDURE

PART 1 - AWARENESS AND ATTITUDE

1. Divide students into small groups. Write the terms "greenhouse effect," "global warming" and "climate change" on the board. As a class, discuss what students think these terms mean.

2. Distribute posters to each group. Direct students to the article "Greenhouse Effect, Global Warming and Climate Change" on the back of the ***Stewardship: Energy, Climate and You poster.*** Are there differences in the students' perceptions of the terms from the definitions in the articles? Discuss these differences as a class and point out that these are terms that are often misunderstood by adults and kids, and that the first step to solving a problem is to learn more about it.

3. Direct students to the front of the poster. Ask them to identify human activities that use energy. Examples include transportation, development of natural resources, electricity and heat in the home, and products we use.

4. Explain to students that many forms of energy create **emissions**, particularly in the form of carbon dioxide *(CO_2)*. Whenever we can reduce the amount of energy we use, we reduce the amount of CO_2 going into the atmosphere. Reducing the amount of CO_2 in the atmosphere can help reduce the enhanced greenhouse effect, which in turn will help reduce global warming and slow climate change.

Note to Teacher:
The three terms are often used interchangeably but they actually mean different things. The ***greenhouse effect*** *is a naturally occuring phenomenon where gases in our atmosphere trap the sun's heat. The* ***enhanced greenhouse effect*** *is caused by humans contributing high concentrations of greenhouse gases to the atmosphere, which leads to an unexpected warming of the Earth. Essentially, we are making the Earth's natural "greenhouse effect" too effective! This unnatural increase in the Earth's temperature is leading to rapidly changing climates all over the world. These changing climates can result in an increased occurance of severe weather such as droughts, violent storms, and abnormal temperatures. It can also lead to shifting seasons and changing precipitation patterns, like snow first falling in September and unexpectedly melting in March.*

PART 2 - ENERGY EFFICIENCY SCAVENGER HUNT

1. Make copies of the "Energy Efficiency Scavenger Hunt" worksheet, one per student – consider copying on already-used paper. Point out to students that you have done this, and describe your motivation for doing so!

2. Have students examine energy use in their home and do a simple energy audit with their family using the"Energy Efficiency Scavenger Hunt" worksheet.

3. As a class, discuss findings. Consider creating a chart for your class, recording what is being done at home, what could be done and track any changes through the unit *(or even throughout the year!)*

Note to Teacher:
It is important students not be made to feel guilty – nor should they 'blame' their parents for activities at home. Instead, it is important for students to understand there are always ways for us to improve our lifestyles and reduce our carbon footprint.
Stewardship is something we practice, like soccer or playing an instrument. The goal is to get better at it every day!

PART 3 - TRACK YOUR USE OF ELECTRICITY

Students can determine the success of behaviour changes with regard to energy use by monitoring their household electrical meter. The worksheet "Track Your Use of Electricity" outlines how they can do this, as well as how to read an electrical meter. Have them practice “reading” meter numbers a few times in class.

Remind students that the readings should be taken on the same day and time each week. By measuring the decrease in electricity use, students are measuring the effectiveness of their stewardship actions, therefore they now can think of this as their stewardship meter!

EVALUATE

As a class, review why it is important for us to be aware of our household and personal energy use. What are some of the challenges we face in reducing our energy use? Are some of these challenges easier to overcome than others? Was it difficult to change your attitude toward energy efficiency, conservation, water use and waste? Are there creative ways to overcome some of these challenges?

ENERGY EFFICIENCY SCAVENGER HUNT

One place we use a lot of energy is our home. Do an energy efficiency scavenger hunt to find the things your family is already doing to reduce energy consumption. There are extra lines for you to add some of your own ideas!

Energy Efficiency Opportunity	Already Do	Could do
Use energy efficient appliances.		
Use LED light bulbs.		
Turn off the lights when we leave a room.		
Unplug electrical devices when not in use.		
Turn off the water while brushing teeth.		
Wash clothes in cold water.		
Keep the thermostat turned down at night and when no one is home, to around 16°-18° Celsius.		
Keep the furnace filter clean.		
Keep your water heater temperature at 55° Celsius *(130° F)*.		
Only run the clothes dryer when it is full.		
Hang clothes to dry.		
Keep showers under 5 minutes.		
Only run the dishwasher when it is full.		
Use a backyard compost or city composting program.		
Collect and recycle recyclables *(paper, plastics, deposit containers)*.		
Only charge electronics when necessary.		

TRACK YOUR USE OF ELECTRICITY

The electrical meter on your house is one way to tell if you have successfully reduced your use of electricity Like the odometer in your car that shows you the total distance your car has traveled, the electric meter displays the total amount of power that has been used since it was set.

To begin, you need to find out how much electricity your family uses in one week. Ask a trusted adult to help you find your household electrical meter. You will need to take a measurement of the amount of electricity used once a week, for three weeks in a row.

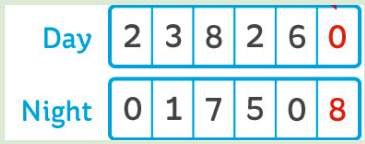
Take your readings exactly one week apart. Also try to take them at the same time of day.

Subtract your first meter reading from your second meter reading. This will tell you how much electricity you used during that week. Talk with your family and decide on some ways to reduce your use of electricity. Take another meter reading at the end of the second week and compare your first week with your second week. How much electricity did you save after you and your family took action?

HOW TO READ YOUR ELECTRICAL METER

- Check to see if your electrical meter is digital or if it has dials.
- Start with the dial on the left. Find the needle.
- Record the number the needle points to.
- If the needle falls between numbers, choose the lower number, except if the needle falls between 0 and 9, then choose 9.

4 6 3 9 2



First meter reading: Date: _____ Time: _____

Meter reading: | | | | | |

Second meter reading: Date: _____ Time: _____

Meter reading: | | | | | |

Third meter reading: Date: _____ Time: _____

Meter reading: | | | | | |

DO THE MATH:

Second meter reading | | | | | |

First meter reading − | | | | | |

The amount of electricity your family used this week = | | | | | | kWh

Third meter reading | | | | | |

Second meter reading − | | | | | |

The amount of electricity your family used this week = | | | | | | kWh

Did you reduce your use of electricity? Was it by a little or by a lot? Was it easy to make changes? Why or Why not?

MAKING A DIFFERENCE

OBJECTIVE
Students will identify a local issue in their community with regards to energy stewardship, form an action plan to influence local community and/or government and execute their action plan.

DURATION
Several class periods, plus time outside of class.

MATERIALS
Internet access, other materials will depend on action chosen.

BACKGROUND
Every voice counts and students do not necessarily need to be 18 to make their opinions known. Encouraging students to think critically and take action on envrionmental topics that matter to them can be an important part of developing citizenship.

Campaign: to work in an organized and active way toward a particular goal, typically a social, political or environmental one. Education campaigns are a great way to raise awareness and knowledge about a topic.

Lobbying: the act of expressing your point of view directly to a government official to influence public policy. Lobbying is regulated in Canada and lobbyists are often professionals hired by companies or organizations to work on their behalf.

Petition: a petition can be a document signed by many people to express their support for the point of view expressed in the document. Different levels of government often have rules regarding who can sign a petition and what information about them needs to be collected. For example you may need to be over 18 years old and you may need to provide a phone number or address.

Rally: an event where large numbers of people gather to express their support for a point of view.

PROCEDURE

1. Begin with a class discussion identifying ways that community members can participate in decision-making processes other than elections. Your list might include lobbying, petitioning, rallies and letter-writing campaigns. Discuss the pros and cons of different methods, with attention given to resources (time, money, effort) required, organization, number of people involved, and effectiveness of the activity.

2. As a class, brainstorm local issues regarding energy stewardship. Use the ***Stewardship, Energy, Climate and You poster*** for some ideas. Decide on an issue – *local in your school or local in your community* - on which your class will take action. Possible approaches include:

Encouraging your school to:

- reducing the furnace's temperature at night, while no one is in the school;
- retrofitting water fountains so water bottles can be easily refilled; or
- placing signs up outside the school, asking drivers not to idle their engines while picking up and dropping off students.
- participating in a citizen science activity
- starting a walk/bike/carpool to school initative

Encouraging your city or town to:

- support greater use of carpooling, public transit, walking or bicycles;
- begin a curb-side recycling program or compost program; or
- pass a bylaw restricting idling vehicles.

3. Based on the opening discussion, decide which form of action will be most effective for your local issue. If your idea requires money, are you able to do fundraising? Do you have enough people to organize it? Will your class need more help? Can you ask other classes or students to help you?

4. Have the students thoroughly research the issue. Who's affected? How much energy could be conserved? Students should understand all the perspectives and demonstrate they have considered all sides of an issue. A well-researched and presented case is more likely to be successful.

5. As a class, create a list of everything that needs to be done and a timeline for when they will be completed. Determine the list of supplies. What do you need to carry out your action plan? Assign tasks to individuals or small groups. Make sure to have regular check-ins to be sure everyone is on track.

EVALUATE

When you have completed your campaign have a debriefing session to discuss how it went. Were you successful? Why or why not? Were there things that could have been done differently?

TIPS FOR SUCCESS

When deciding upon a local issue, maximize the chances of success of the campaign by directing students toward very specific actions, like promoting an idle-free campaign rather than large general ideas that are very complex, such as trying to stop global warming.

If students decide to embark on a letter writing campaign, remind them that personal letters are the most effective. Brainstorm some ideas for content as a class but discourage students from taking a form letter approach.

DOES IT MATTER IF THE CLIMATE CHANGES?

OBJECTIVES

Students will understand how with complex issues such as climate change there are no absolute answers and there are multiple perspectives that must be considered.

DURATION

60 minutes

MATERIALS

Stewardship poster; *"Climate Change Impacts"* worksheet; Internet connection; projector and/or SMART Board™

BACKGROUND

Humans, plants and animals have adapted to live in most of the climates of the world. Climate is reflected in our customs, shelter, clothing, food preferences, agriculture, transportation, recreation and settlements. If Canada's climate changes it will have an impact on all areas of Canadian life.

The weather determines much about our way of life. The way we live, the food we can grow and how we get other foods, and what we do for work are all affected by Canada's unique mix of climates. Canada's ecozones, such as the Prairies, the Boreal Shield, or the Northern Arctic, have climates that support a variety of different plants, animals, weather patterns, and water bodies. Each region has industries, such as agriculture, fisheries, tourism, and energy extraction, that are directly affected by climate.

Scientists have predicted a large number of impacts that may occur as our climate changes.

They include:

- Hotter summers which will increase stress on wildlife, plants and human beings;
- Warmer winters which may reduce demand for energy to heat our homes;
- Early break up of arctic ice affecting wildlife and Inuit hunters;
- Changes in precipitation patterns, leading to drought, flooding, or severe storms;
- Reduced snow in the mountains which could affect the flow of rivers;
- Rising sea levels, affecting coastal regions and communities;
- Increase in growing seasons, allowing for different crops to be grown;
- Invasion of pest species;
- Increased frequency of severe weather events, such as tornados, ice storms and hurricanes;
- Reduced ice on rivers and lakes in winter, which reduces winter road access to resources and remote communities;
- Drier summers that increase risk of wildfires and affect the growth of food crops (like wheat) and feed crops (like hay).

PROCEDURE

1. Working in small groups, have students use the Climate Change Impacts worksheet to work through the list of potential effects climate change may have on plants, wildlife, human health, jobs, settlements, recreation and transportation, and decide whether or not the changes might have a negative, postive, or unknown effect.

EVALUATE

When students have completed the chart, review it as a class and discuss their responses.

DISCUSS:

- Did everyone come to the same conclusions?
- Did group members agree on whether the effects were negative or positive? Why or why not?
- Did any impacts have both potentially positive and negative effects?
- Did any impacts have only positive or negative effects? Why?

CLIMATE CHANGE IMPACTS

Read the following list of possible impacts of climate change and decide for each category whether or not the possible change to the climate would have a positive effect, a negative effect, or an unknown effect. Write a + for positive, - for negative and a ? for unknown.

	Possible Impacts of Climate Change	Positive, Negative or Unknown Effects of Climate Change								
		Plants	Wildlife	Human	Health	Jobs	Towns/Cities	Recreation	Transportation	Agriculture
1.	Hotter temperatures during the summer months.									
2.	Reduced rainfall and/or snowfall.									
3.	Rise in sea levels in coastal regions.									
4.	More severe weather events (tornadoes, blizzards, ice storms, etc.).									
5.	Less extreme cold weather in the winter and reduced ice on northern lakes, rivers and oceans.									
6	Increase in the temperature of rivers, lakes, oceans.									
7.	Infestations of insect and/or other pest populations not normally expected in Alberta.									
8.	Reduced ice on northern lakes, rivers and oceans.									
9.	Warmer temperatures in northern Canada.									
10.	Changes to growing seasons.									
11.	Increase in the amount of land that can be farmed and crops grown in a season.									

STEWARDSHIP CROSSWORD PUZZLE

ACROSS

3. Taking responsibility for something put in your care (ie: the environment)

5. Increasing temperatures all over the Earth (2 words).

7. keeping the Earth warm (2 words).

8. This is released into the atmosphere as waste when we burn fossil fuels.

9. Weather patterns measured over a long period of time.

12. A collection of facts that proves an idea.

14. The current atmospheric conditions are commonly referred to as the _____.

16. Scientists can "read" these to find out about growing conditions hundreds of years ago (2 words).

17. All the air that surrounds our planet.

18. This cool stuff can tell scientists what the atmosphere was like thousands of years ago (2 words).

20. Energy from the sun.

21. Everything we have and do requires this in one form or another.

22. This "hard" evidence can tell scientists what life was like millions of years ago.

DOWN

1. The process where some of the sun's energy is trapped in the atmosphere keeping the Earth warm (2 words).

2. An emission-free energy source that gets a lot of "air" play.

4. We can use wind, water, sunshine, coal or natural gas to make this "shocking" stuff.

6. Water "power."

7. Using something carefully to make it last.

10. Alberta is famous for this stuff that we use to make gasoline for our cars.

11. Carbon capture and storage is a way to store a greenhouse gas underground (acronym)

13. This fuel is used to make much of the electricity we use in Alberta. (2 words).

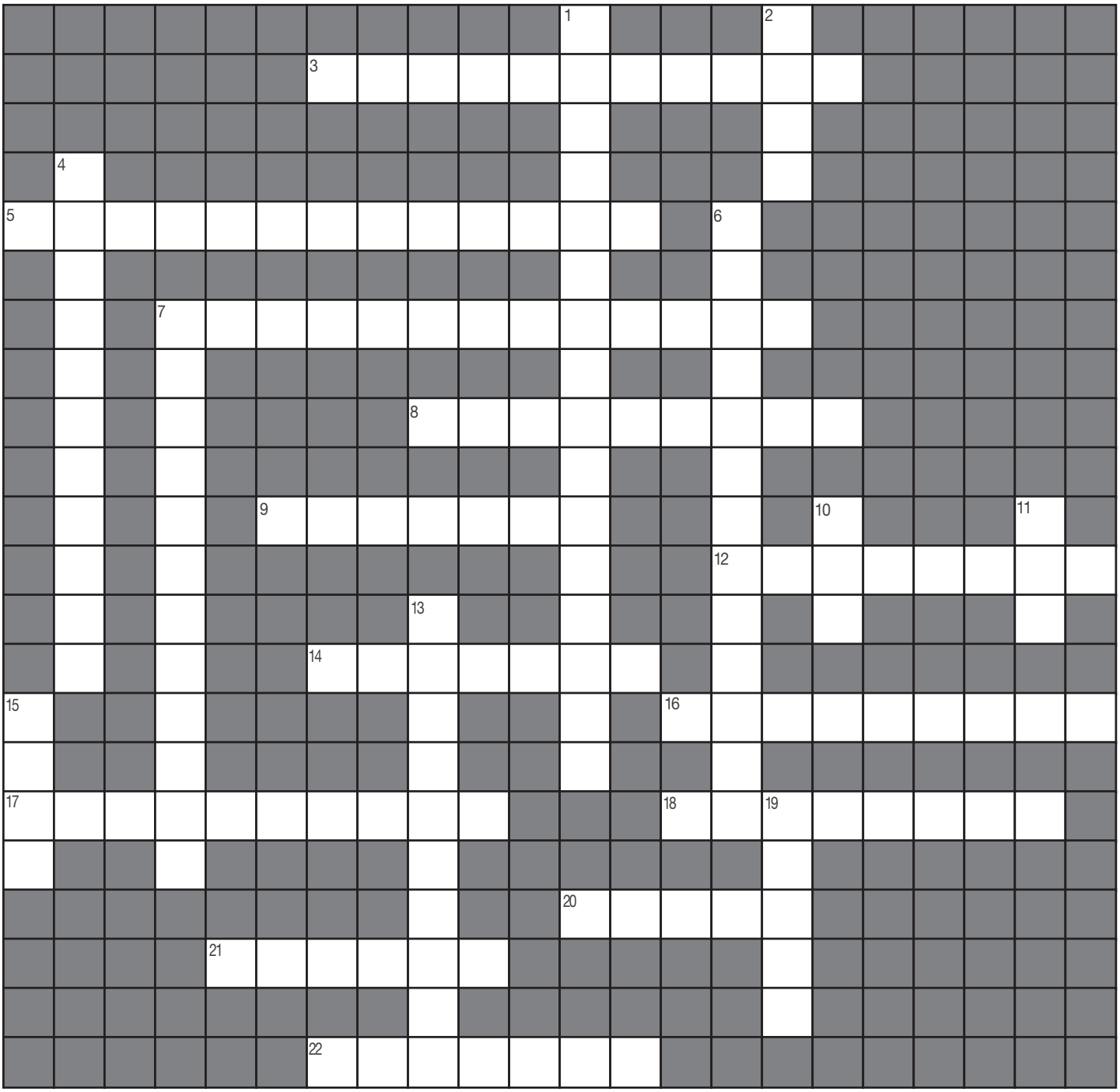
15. By the year 2030 power plants using this resource to generate electricity are scheduled to be shut-down.

19. The home we all share.

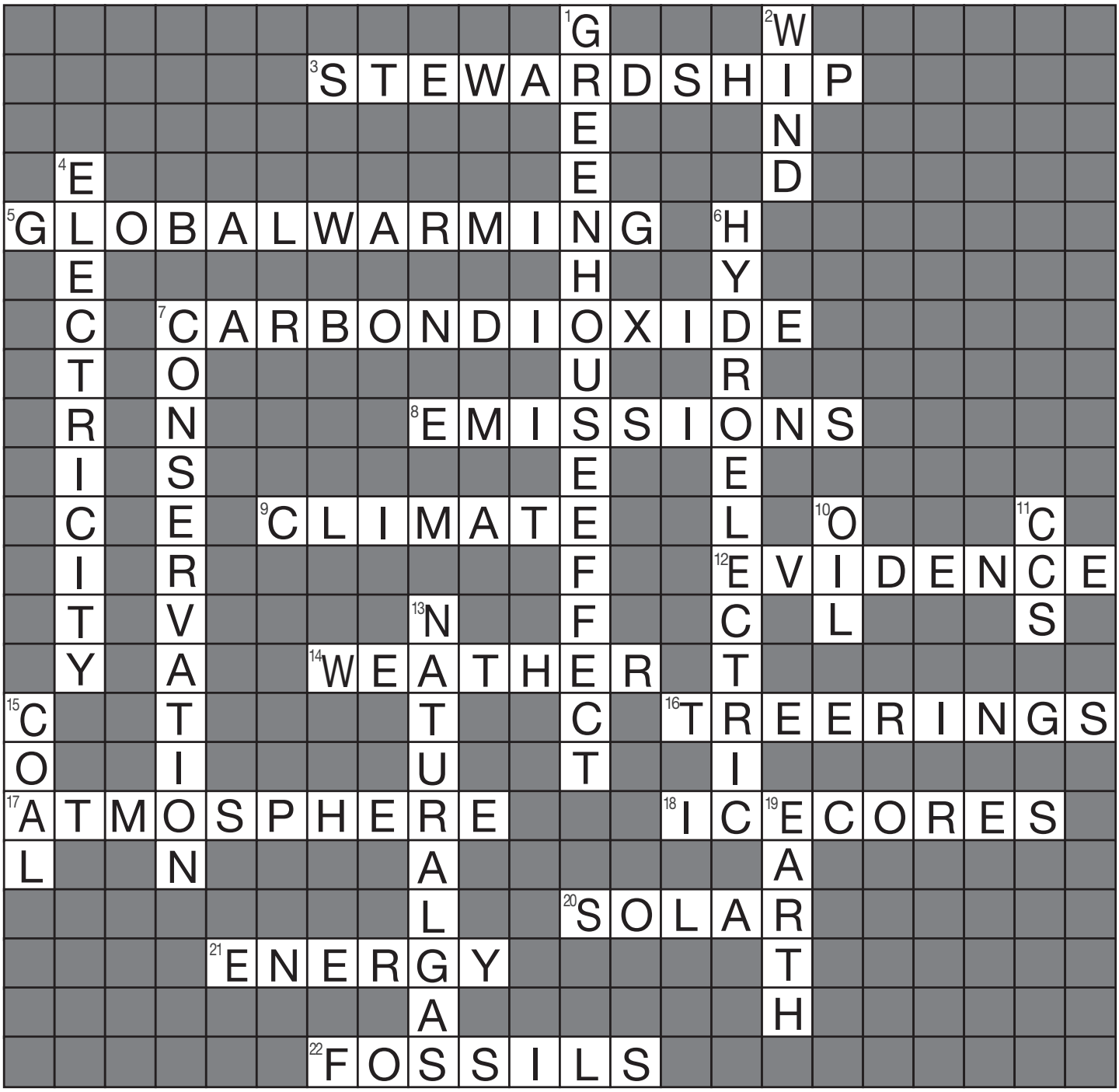
WORD LIST

- Greenhouse Effect
- Wind
- Stewardship
- Electricity
- Global Warming
- Hydroelectric
- Carbon dioxide
- Conservation
- Emissions
- Climate
- Oil
- CCS
- Evidence
- Natural Gas
- Weather
- Coal
- Tree Rings
- Atmosphere
- Ice Cores
- Earth
- Solar
- Energy
- Fossils

STEWARDSHIP CROSSWORD PUZZLE



STEWARDSHIP CROSSWORD PUZZLE - KEY



GLOSSARY

Adapt • to become used to a new environment by changing what you do or how you do it

Atmosphere • the envelope of gases that surround Earth

Carbon Dioxide (CO2) • a chemical compound made up of carbon and oxygen most commonly found as a gas

Climate • general weather patterns observed over long periods of time

Climate Change • a large-scale change in average weather over a time period of at least 30 years

Conservation • protecting something from change, loss or damage

Ecosystem • a group of interdependent organisms and their habitat

Enhanced Greenhouse Effect • an increase in the natural greenhouse effect resulting from an excess in greenhouse gas concentration likely caused by human activities

Environment • the natural world which all living things depend upon

Emission • substances, like invisible gases or small particles, that are released from human activities on natural sources.

Global Warming • the rise of the average temperature of Earth's atmosphere

Greenhouse Effect • the natural warming of Earth's atmosphere where the sun's warmth is trapped by gases in the atmosphere

Greenhouse Gas • a gas that helps trap the sun's warmth in the atmosphere

Solar Energy • heat and light energy from the sun

Stewardship • to look after something that is important to you

Weather • the state of the atmosphere in a place at any given time, eg. rain, wind, sunny, overcast

ADDITIONAL RESOURCES

Inside Education

Canada's largest natural resources and environment education society, with over 33 years of experience supporting teachers and inspiring students. Inside Education has programs and resources related to energy, water, land and stewardship. We also provide ***NO-COST*** school programs, teacher professional development workshops and youth summits related to climate change, energy and other topics.
www.InsideEducation.ca

A+ for Energy

Grants to Alberta teachers who develop and deliver innovative energy education programs in their classrooms and schools. Teachers select an energy topic and design education programs for their students – grants of $5000 are available for these innovative projects. Teachers also receive tuition towards an energy education conference.
www.InsideEducation.ca/grants/a-for-energy-grant/

CARE Package

The newly expanded and updated CARE Package is the ultimate show and tell package designed to be used in a variety of classrooms, school situations and grade levels where the instructor would like to explore topics related to environmental stewardship. Over 28 items will help you and your students explore simple yet effective ways to conserve energy and water and reduce waste. All of the items in the CARE kit are listed in the accompanying Teacher's Guide guide, along with refreshing ideas for promoting stewardship in your school!
www.InsideEducation.ca/learning-resources/

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Edited 2018