Roadmap to Excellent Climate Education

March 2021

Marie Tremblay
Alberta Council for Environmental Education





ACEE Alberta Council for Environmental Education

ADVANCING ENVIRONMENTAL EDUCATION IN ALBERTA

Barriers to teaching about climate change: Do any of these resonate with you?

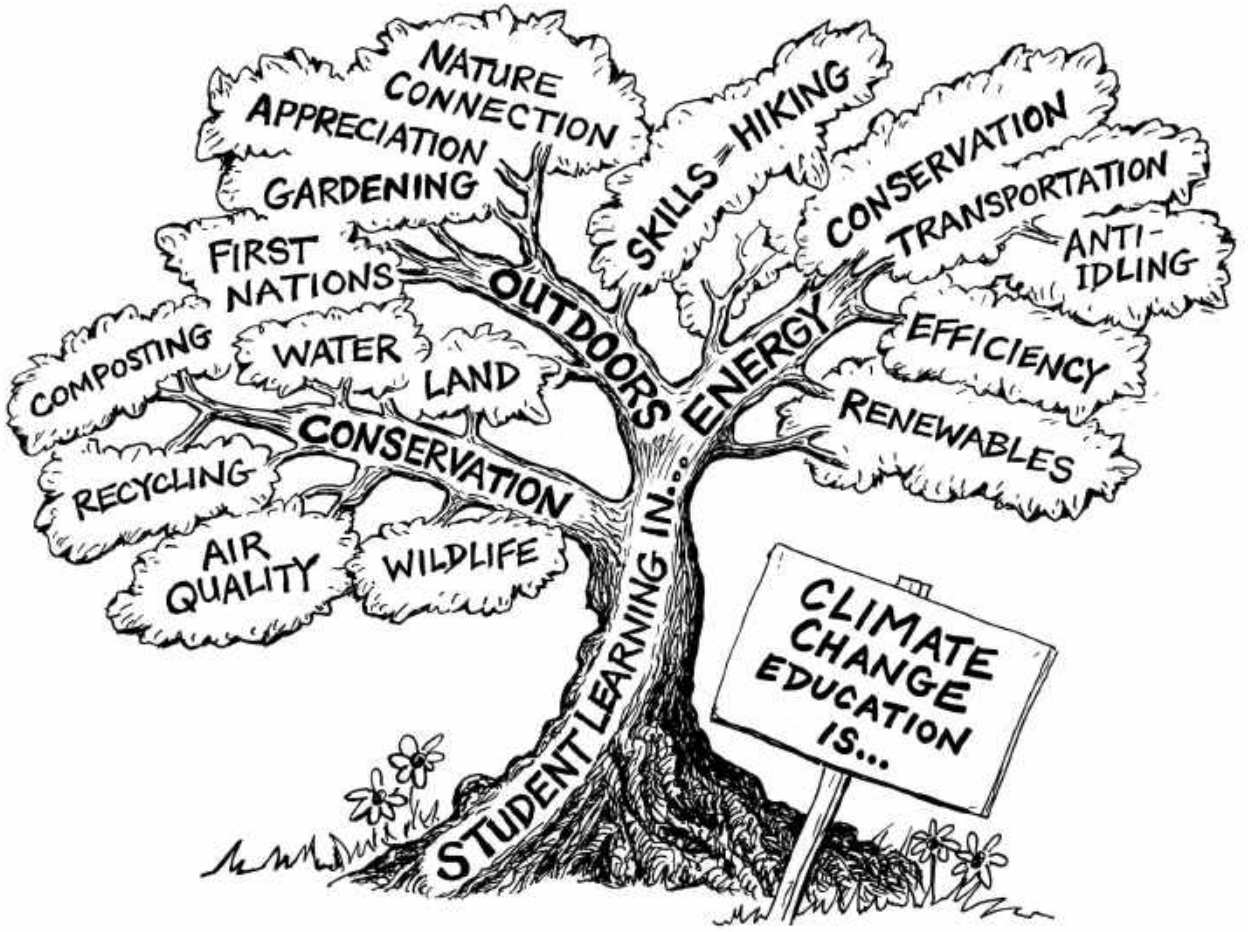
1. Low emphasis in the curriculum
2. Lack of confidence
3. Fear of pushback (students, parents, administrators)
4. Topic is depressing - causes anxiety
5. Lack of time
6. Lack of student engagement

Curriculum links

- Science
- Social studies
- Language arts
- Math

"It's not climate change, it's **everything** change"

Margaret Atwood



ACEE Alberta Council for Environmental Education

Grade 2 Science Curriculum Links to Sustainability Education and Action

Topic D: Hot and Cold Temperature

Recognize the effects of heating and cooling, and identify methods for heating and cooling.

Links to Place and Nature

- How do we use thermometers to measure ambient temperature?
- How does temperature affect how we dress to go outside?
- How does temperature vary throughout the course of the day?
- What places in the schoolyard and warmer or cooler?
- How does the human body maintain an even temperature?
- What do local animals do to keep warm or stay cool?

Links to Indigenous Perspectives

- How did Indigenous peoples in my area traditionally stay warm or cool throughout the seasons?
- How do these methods compare to modern methods of staying warm or cool?

Links to Climate Change

- How does ambient temperature affect me?
- How does extreme heat affect me?
- How does it affect plants and animals?

Links to City of Calgary Environmental and Climate Strategies

- **Climate Resilience Strategy (2):** Calgary's average annual temperature is increasing due to climate change. The amount of very hot days is increasing in Calgary due to climate change (p. 65-72).
- The **Climate Adaptation Action Plan (2)** includes many actions to manage our very hot days in Calgary. For example, The City of Calgary is continuing to expand naturalization programs for City parks and green space to reduce the Urban Heat Island Effect in Calgary (p.86).

Calgary

https://www.abcee.org/curriculum-links

Curriculum links

Kindergarten - Grade 3

Environmental education needs to be age appropriate. *The focus for younger students should be on connecting with nature, and understanding the interconnections among plants, animals, ecosystems - and themselves.* Where does the water I drink everyday come from? Where does the food I eat come from? How does my own health depend on healthy ecosystems? This is also a great time to instill good environmental and climate 'habits', like turning lights and electronics off when not in use, and reducing waste. It's never too early to help students understand that the energy and resources we use to help make our lives better are precious and should not be wasted.

Kindergarten Social Studies | Grade 1 Social Studies | Grade 1 Science | Grade 2 Social Studies | Grade 2 Science | Grade 3 Social Studies | Grade 3 Science

Grade 4 - Grade 6

As students get older, they can progressively learn more about the underlying causes and complexities of our most pressing environmental issues including climate change.

Grade 4 Social Studies | Grade 4 Science | Grade 5 Social Studies | Grade 5 Science | Grade 6 Social Studies | Grade 6 Science

Grade 7 - Grade 9

Grade 7 Social Studies | Grade 7 Science | Grade 8 Social Studies | Grade 8 Science | Grade 9 Social Studies | Grade 9 Science

https://www.abcee.org/curriculum-links

Today's roadmap

Confusion, Anxiety, Apathy

1. Approach with empathy and curiosity
2. Connect to nature and place
3. Build literacy (scientific and social)
4. Develop critical thinking and problem-solving skills
5. Help students be part of the solution
6. Inspire others to action

Informed, Prepared, Optimistic

https://www.abcee.org/sites/default/files/ACEE%20Road%20map%20to%20excellent%20climate%20change%20education_0.pdf

Today's roadmap

Confusion, Anxiety, Apathy

1. Approach with empathy and curiosity
2. Connect to nature and place
3. Build literacy (scientific and social)
4. Develop critical thinking and problem-solving skills
5. **Help students be part of the solution**
6. Inspire others to action

Informed, Prepared, Optimistic

https://www.abcee.org/sites/default/files/ACEE%20Road%20map%20to%20excellent%20climate%20change%20education_0.pdf

Stop #1

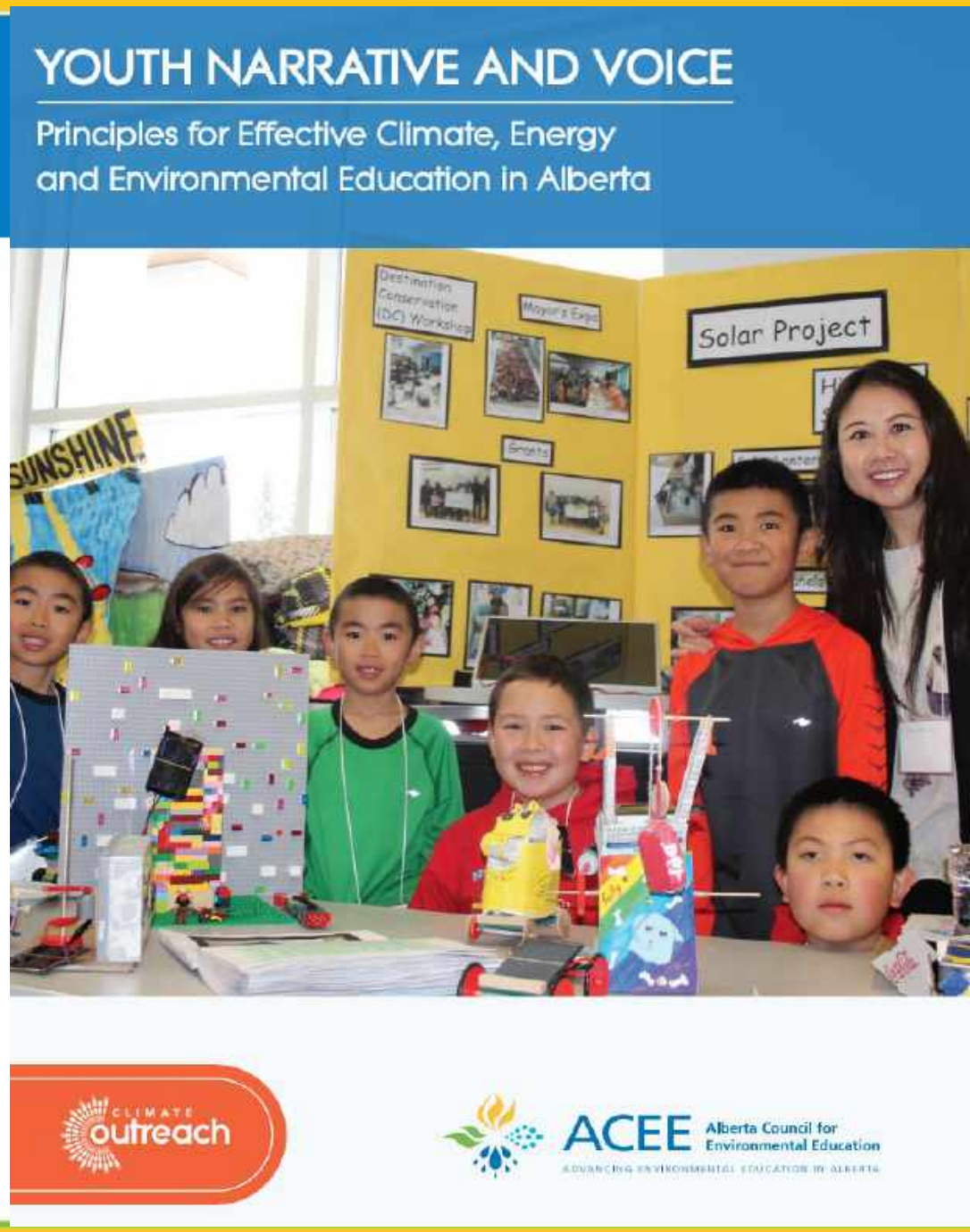
Approach with empathy and curiosity

https://www.abcee.org/sites/default/files/ACEE%20Road%20map%20to%20excellent%20climate%20change%20education_0.pdf

Students are anxious about their future

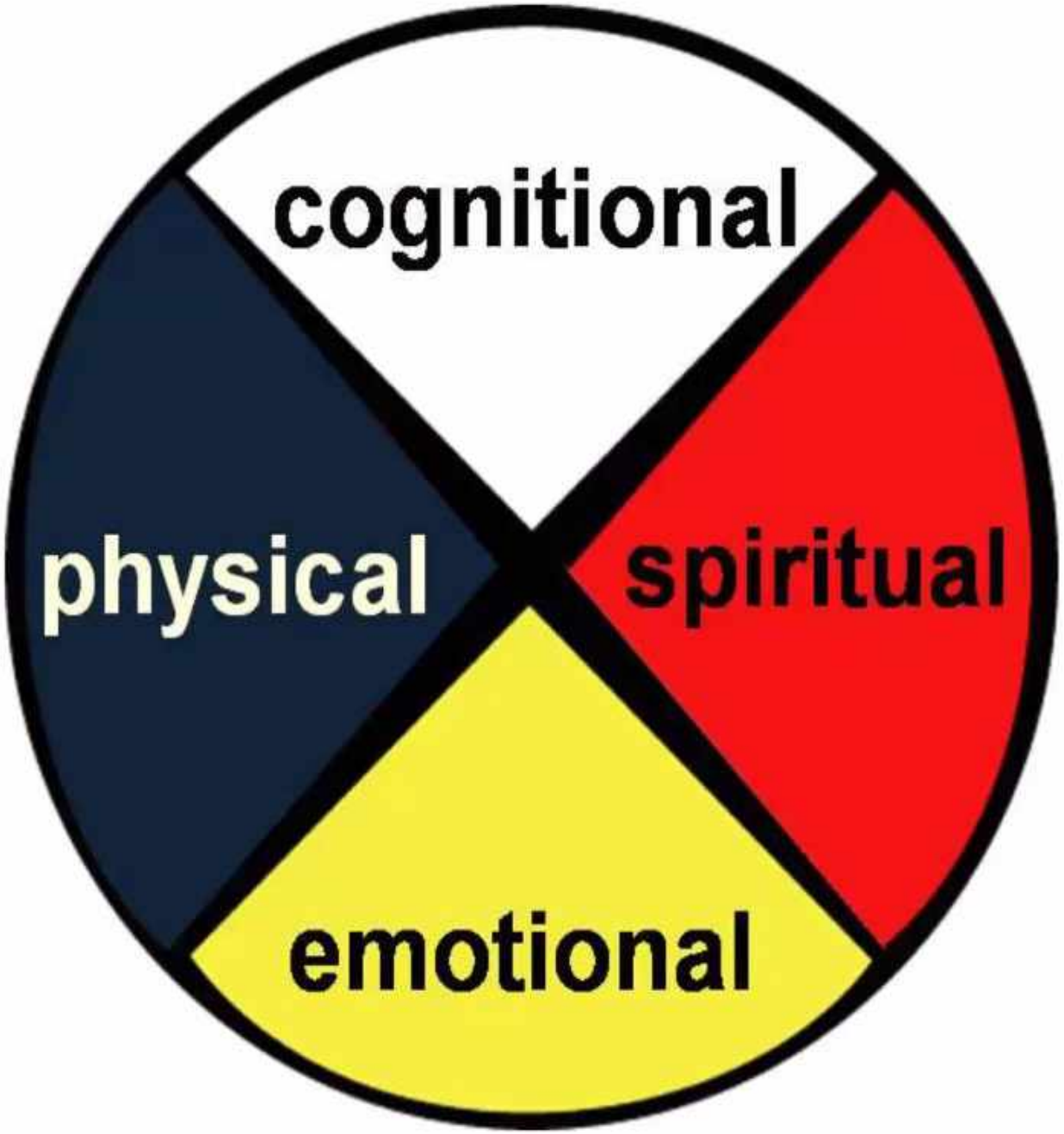
"I would feel sick because I would realize exactly how many things we're doing to destroy our planet."
- Grade 7 student

https://www.abcee.org/sites/default/files/ACEE-v4%20%281%29.pdf



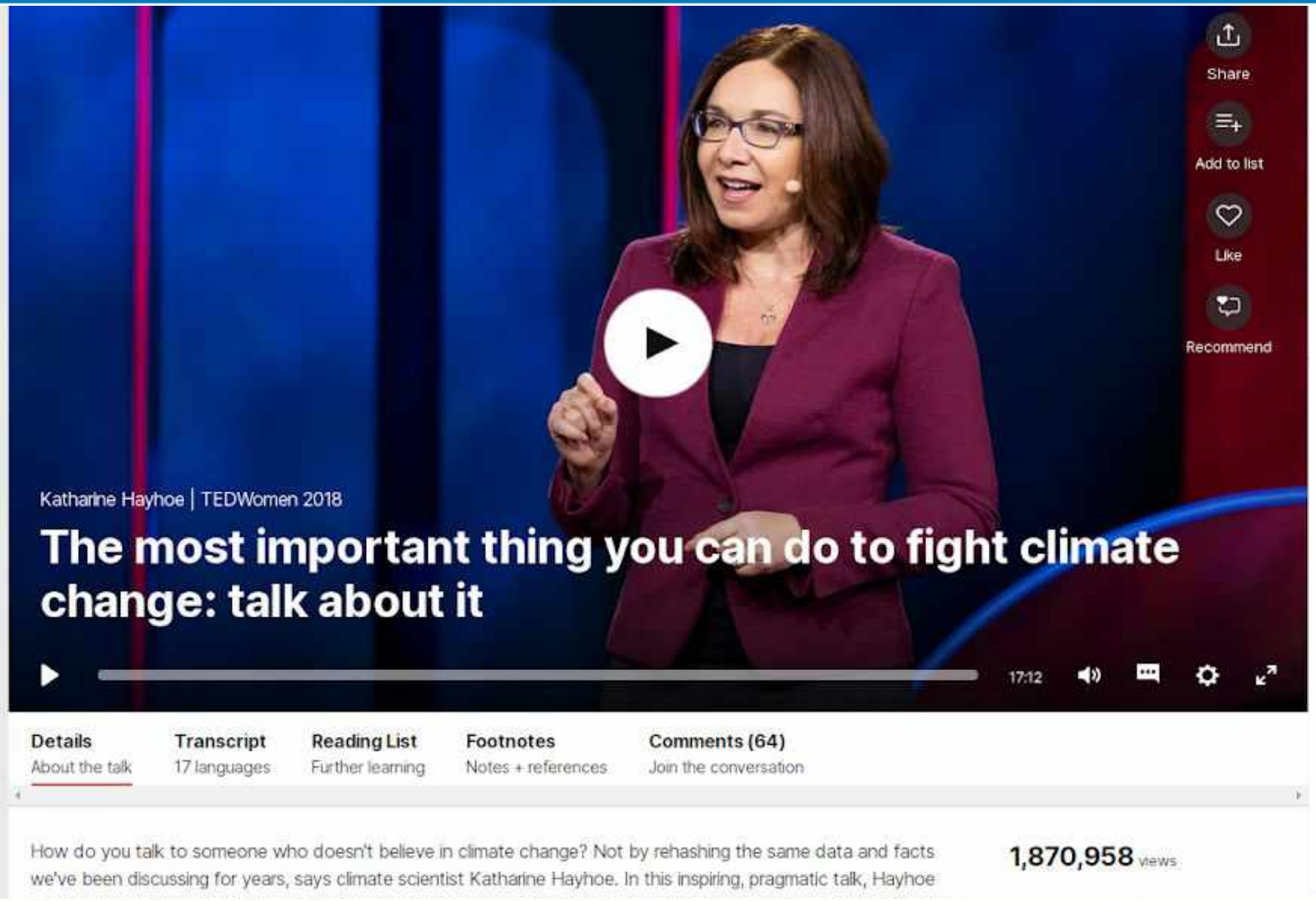
"No tragedies before grade 4."

- Dr. David Orr



Mind
Body
Heart
Spirit

How to talk about climate change



Katharine Hayhoe,
Climate Scientist, Texas Tech University

https://www.ted.com/talks/katharine_hayhoe_the_most_important_thing_you_can_do_to_fight_climate_change_talk_about_it?language=en

Think conversation, NOT debate!

Environmental Education

Think conversation, NOT debate!

Stop #2

Connect with nature and place

https://www.abcee.org/sites/default/files/ACEE%20Road%20map%20to%20excellent%20climate%20change%20education_0.pdf

Our relationship with the Earth is broken

How is climate change affecting Alberta, here and now?

- Wildfires
- Floods
- Pine beetle
- Droughts
- Extreme weather events


Fort McMurray 2016


Edmonton 2019

Calgary 2013


Alberta wheat field

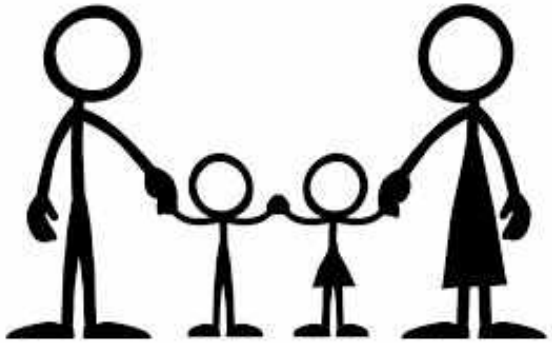

Jasper (ongoing)

Seeking guidance from Indigenous perspectives

- People as part of nature, rather than separate from it

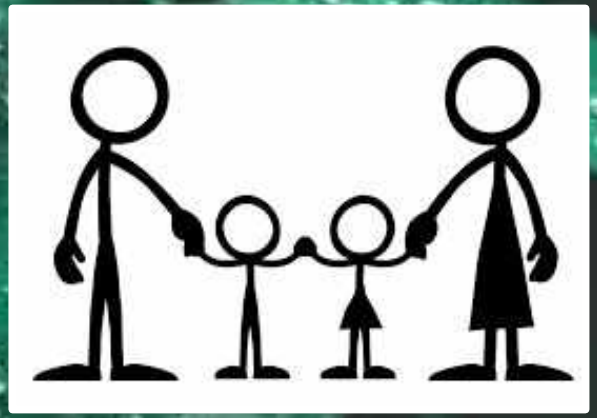
- Healing our relationship with Mother Earth
  - connectedness
  - reciprocity
  - responsibility

Western perspective



Relationship

Responsibility



Respect

Reciprocity

Upcoming Workshops:

Exploring Sustainability Through an Indigenous Lens - Getting Started with Elementary Students (April 20 & 27)

Exploring Sustainability Through an Indigenous Lens - Getting Started with Secondary Students (May 4 & 11)

Donna Ross & Marie Tremblay

Outdoor learning: connecting to nature and place

- Fosters love and respect for nature
- Makes learning local and relevant
- Provides a fun and engaging learning environment
- Contributes to student wellness

Stop #3

Build scientific AND social literacy

https://www.abcee.org/sites/default/files/ACEE%20Road%20map%20to%20excellent%20climate%20change%20education_0.pdf

Welcome to an *exploration*

- Forget being an expert!
- Demonstrate commitment to lifelong learning
- Use your students' questions as a starting point, and grow from there…

Let’s start with the basics - time for a quiz!

HOME › CLIMATE CHANGE QUIZ

SHARE

How much do you know about the world’s greatest threat? We’re talking, of course, about climate change.

https://www.earthday.org/the-climate-change-quiz/

What are your most ‘burning” questions when it comes to climate change?

Five essentials of climate change

1. The earth is warming
2. It's bad
3. It's because of humans
4. Experts agree
5. We can fix it

Seth Wynes, Green Teacher Magazine 2019

Five essentials of climate change

1. The earth is warming
2. It's bad
3. It's because of humans
4. Experts agree
5. We can fix it

Seth Wynes, Green Teacher Magazine 2019

Five essentials of climate change

1. The earth is warming
2. It's bad
3. It's because of humans
4. Experts agree
5. We can fix it

99% agree:

- climate change is happening and is caused by human activity
- urgent action is needed

https://www.theguardian.com/science/2019/jul/24/scientific-consensus-on-humans-causing-global-warming-passes-99

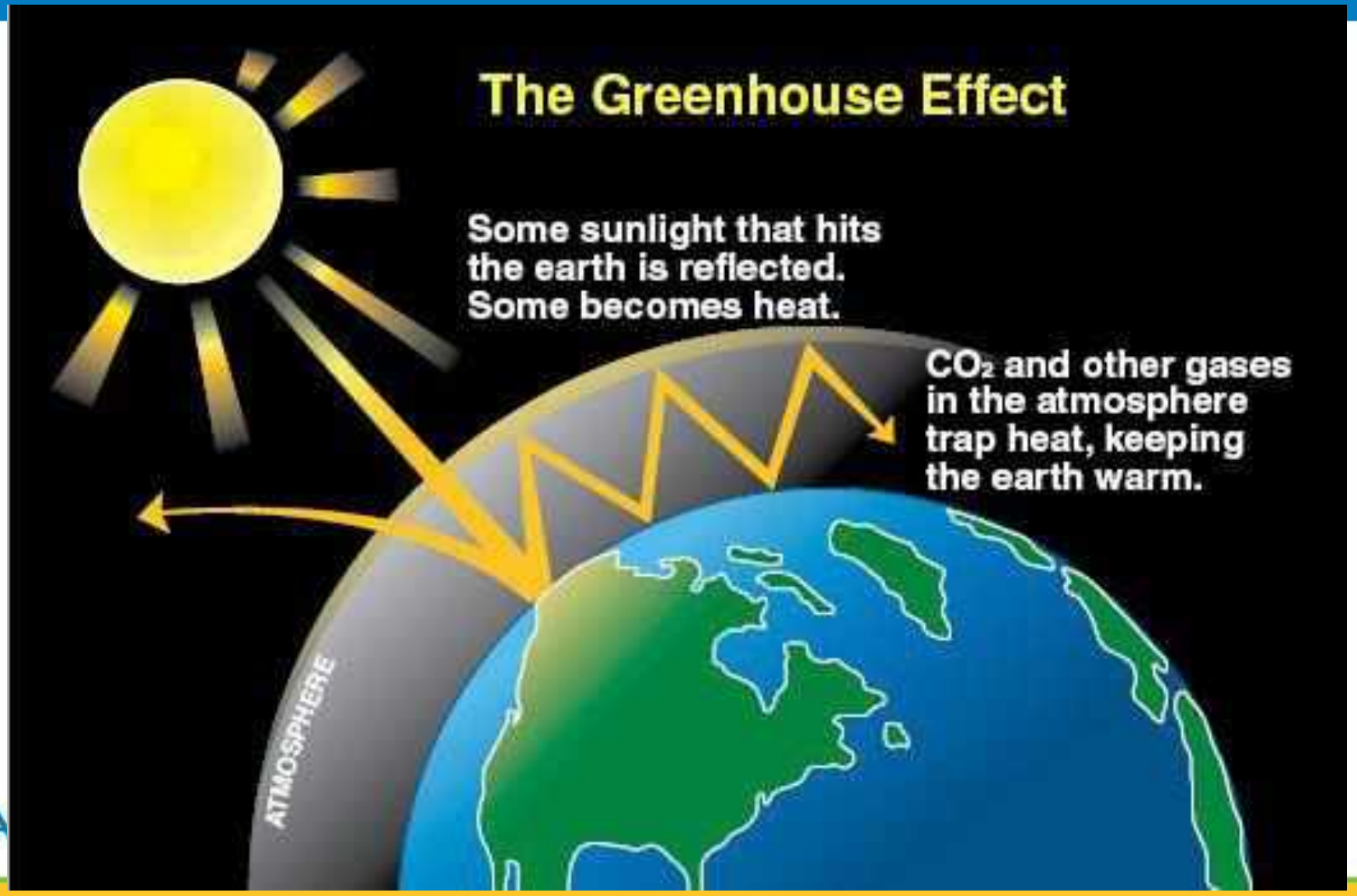
Seth Wynes, Green Teacher Magazine 2019

Five essentials of climate change

1. The earth is warming
2. It's bad
3. It's because of humans
4. Experts agree
5. We can fix it

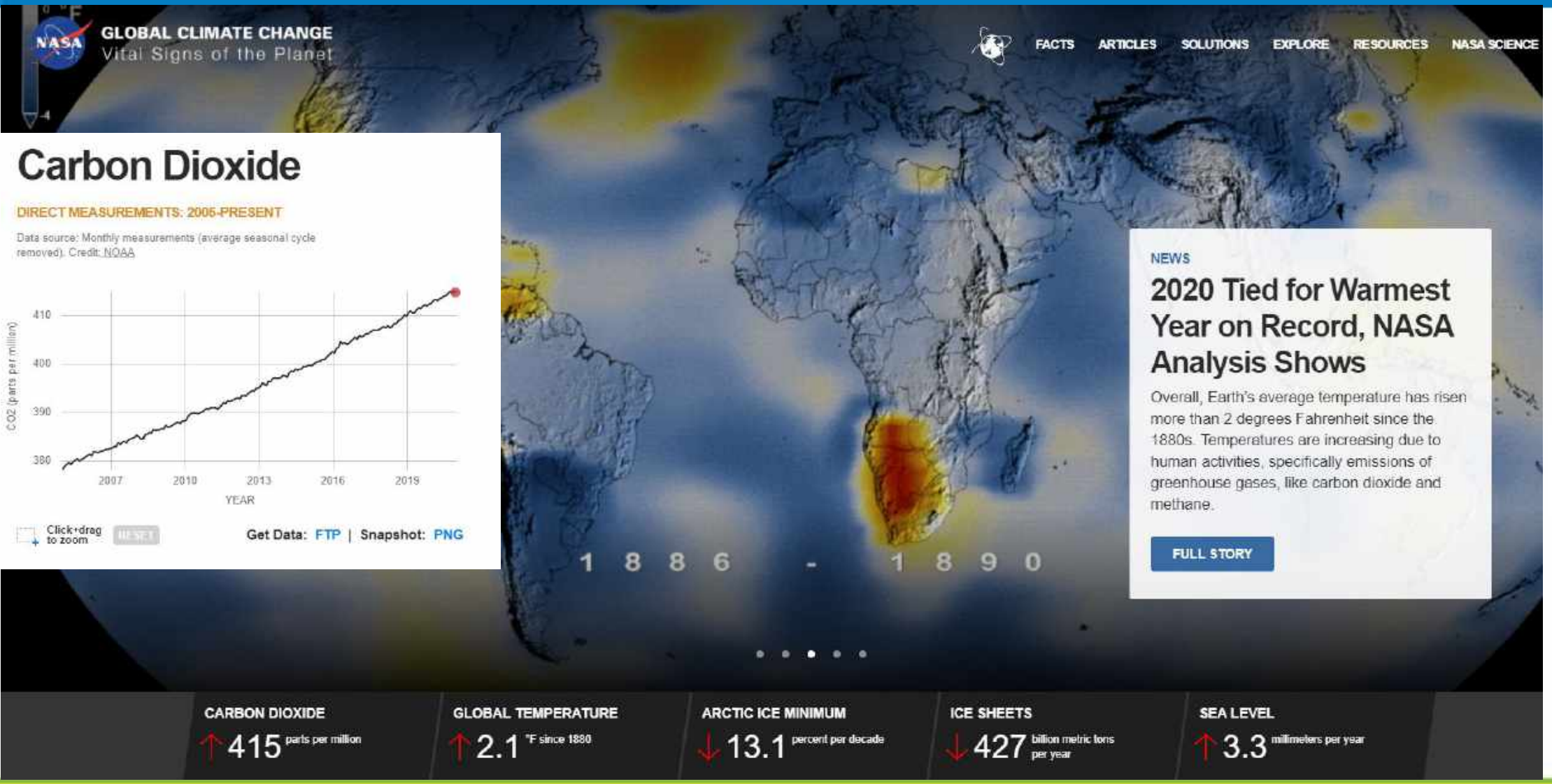
Seth Wynes, Green Teacher Magazine 2019

What is the mechanism?



https://www.google.com/search?q=greenhouse+effect+diagram&rlz=1C1CHBF_enCA883CA883&tbm=isch&source=iu&ictx=1&fir=WW9ttjbmGE8bcM%253A%252Cg_Ex_9iAsYTaCM%252C_&vet=1&usg=AI4_-kSu6EMbQMtpqDS3BGY4lCAOtbVLWw&sa=X&ved=2ahUKEwjvrqeQ-f7nAhXoHzQIHTQ3Bj0Q9QEwAHoECAoQLg#imgrc=OULYdM_BwIrvfM

What is the evidence?
NASA Global Climate Change - REAL data in REAL time



https://climate.nasa.gov/

Climate Kids

SEARCH CLIMATE KIDS

Big Questions | Weather & Climate | Atmosphere | Water | Energy | Plants & Animals

What Is Climate Change?

The Short Answer:

Climate change describes a change in the average conditions — such as temperature and rainfall — in a region over a long period of time. NASA scientists have observed Earth's surface is warming, and many of the warmest years on record have happened in the past 20 years.

Weather vs. Climate

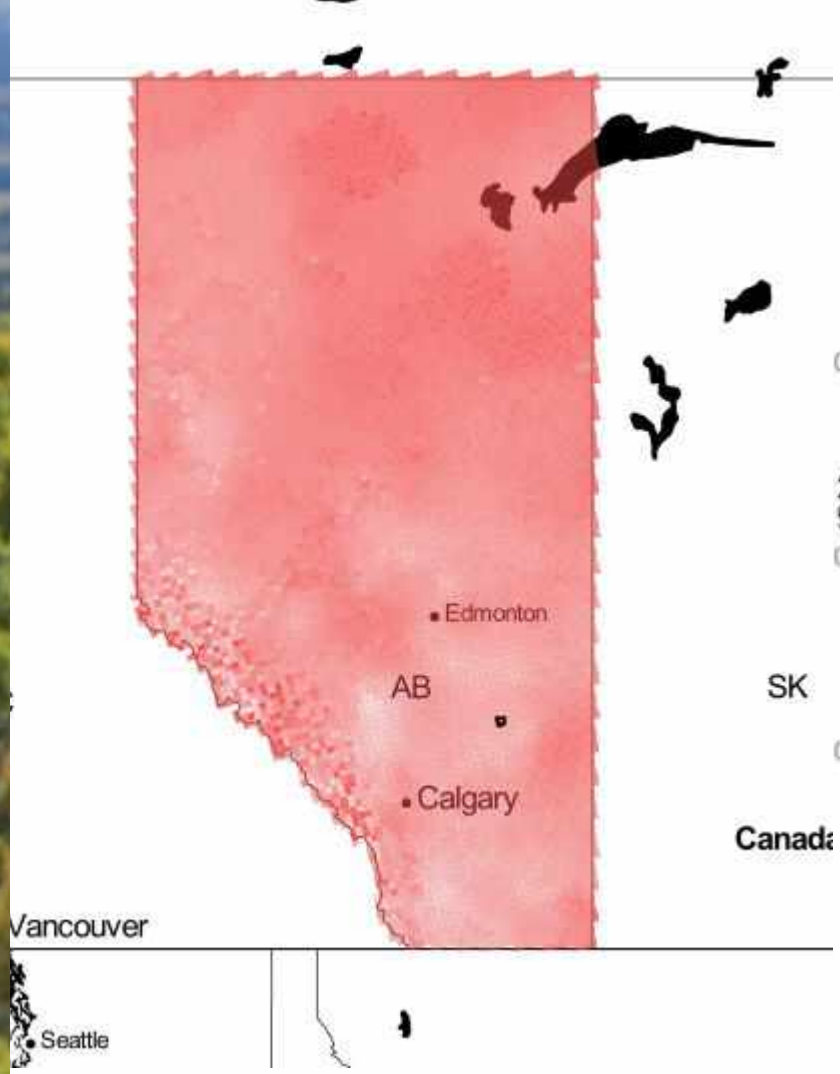
https://climatekids.nasa.gov/

ALBERTA CLIMATE RECORDS

Visualizing Climate Change Past & Present

START →

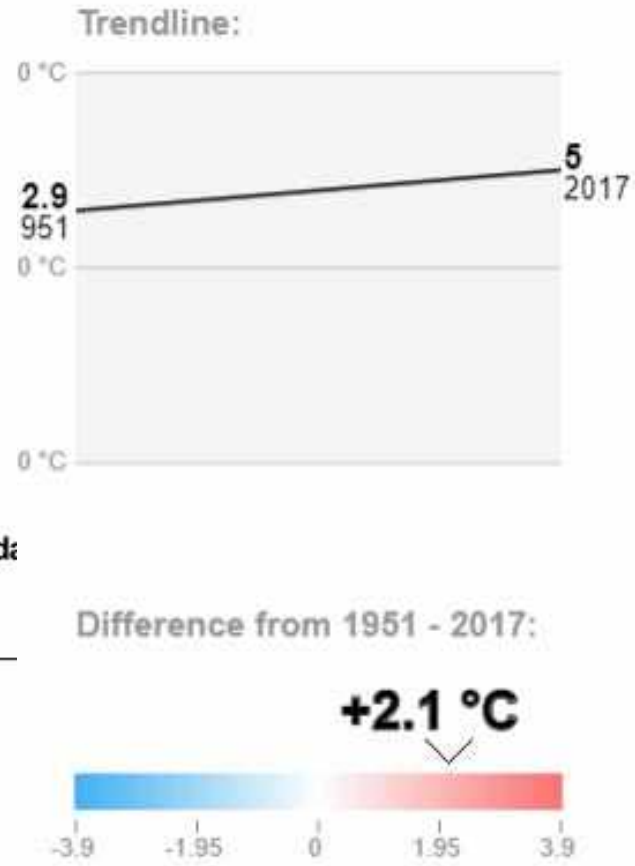
Not your first time? Get right into the data
or Review the 2019 updates



+VARIABILITY)

INDEX CHANGE

Calgary



http://albertaclimaterecords.com/

How is climate change affecting Alberta, here and now?

- Wildfires
- Floods
- Pine beetle
- Droughts
- Extreme weather events


Fort McMurray 2016


Edmonton 2019

Calgary 2013


Alberta wheat field


Jasper (ongoing)

Social dimensions to explore...

- Social justice
- Global citizenship
- Sustainable Development Goals

2015 Pope's Encyclical on the Environment - *Caring for Our Common Home*

Climate change: the moral issue of our time.

We must look after the earth and the poor.

https://www.abcee.org/sites/default/files/papa-francesco_20150524_enciclica-laudato-si.pdf

Global climate risk: some nations are more vulnerable than others...

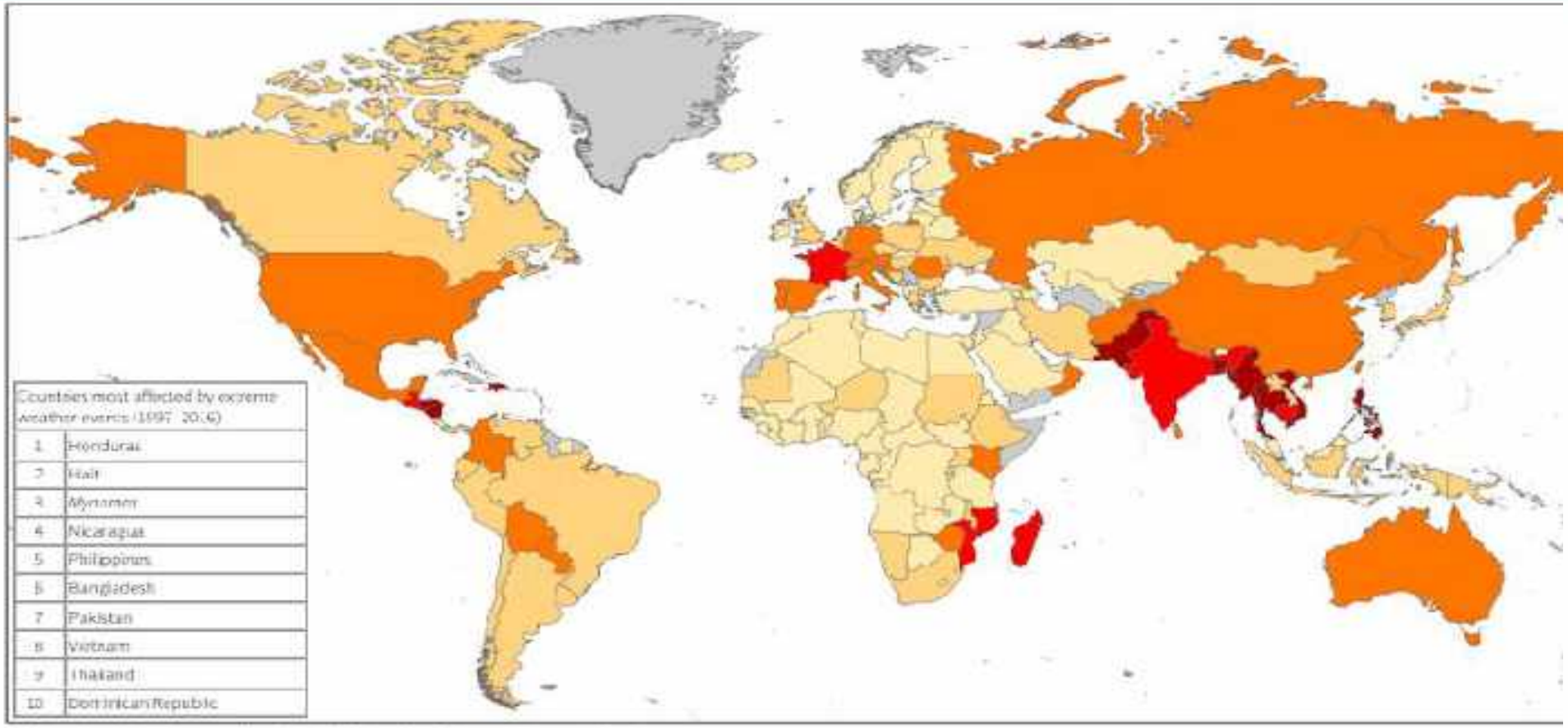


Figure 1: World Map of the Global Climate Risk Index for 1997–2016

Source: https://germanwatch.org/de/14638

United Nations' Agenda 2030: Fostering global citizenship

Stop #4

Develop critical thinking skills

https://www.abcee.org/sites/default/files/ACEE%20Road%20map%20to%20excellent%20climate%20change%20education_0.pdf

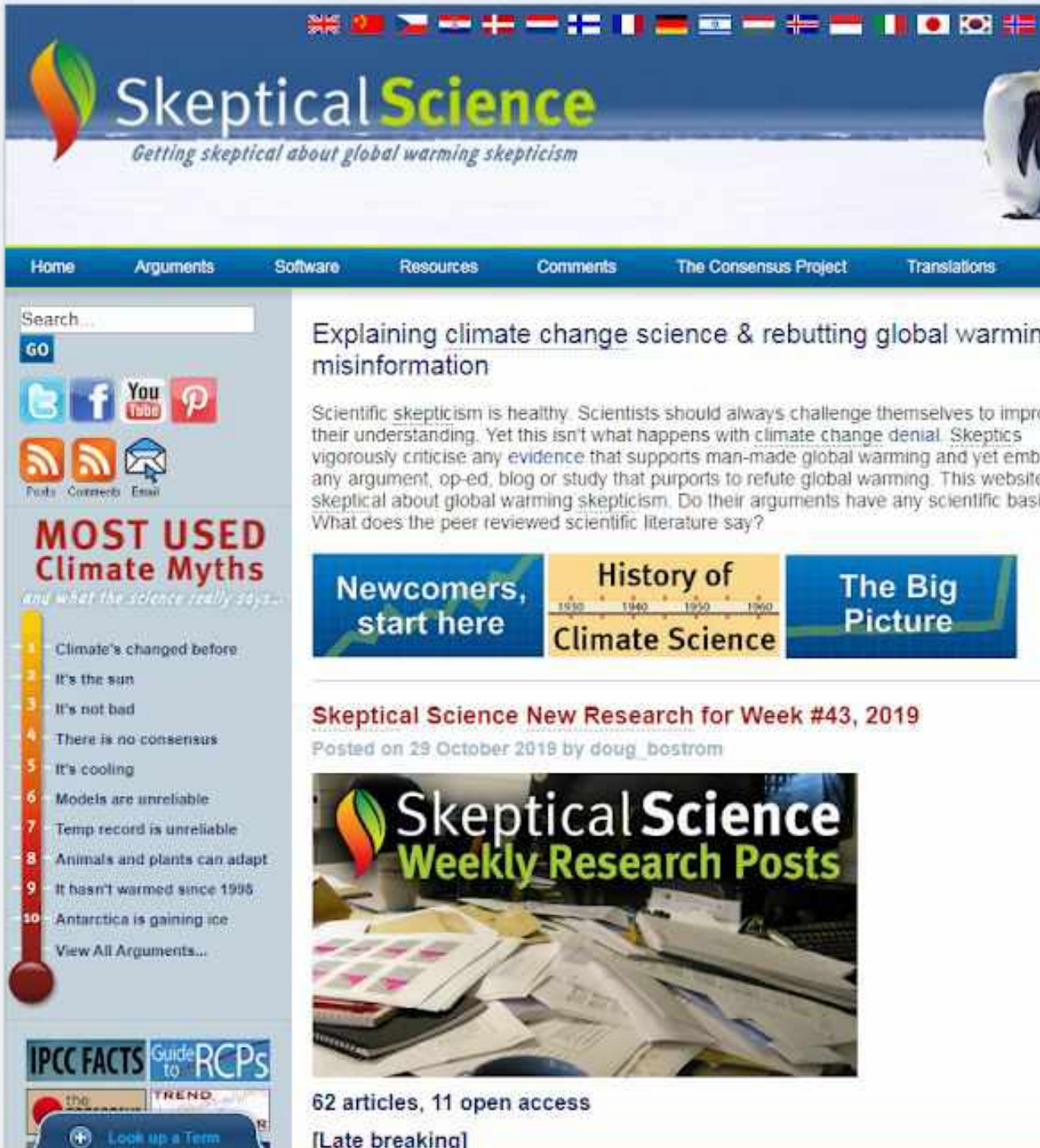
A great opportunity to develop critical thinking skills

- **Ask** good questions
- **Identify** important similarities and differences
- **Judge** the accuracy of statements
- **Rate** the direct and indirect effects
- **Create** an accurate illustration
- **Support** reasons with evidence
- **Develop** an effective hypothesis
- **Assess** proposed solutions
- **Support** or refute conclusions
- **Assess** the adequacy of evidence

Critical Thinking Consortium
https://tc2.ca/

Dispelling climate myths

https://skepticalscience.com/



https://skepticalscience.com/

Stop #5

Help students be part of the solution

https://www.abcee.org/sites/default/files/ACEE%20Road%20map%20to%20excellent%20climate%20change%20education_0.pdf

Problem Space

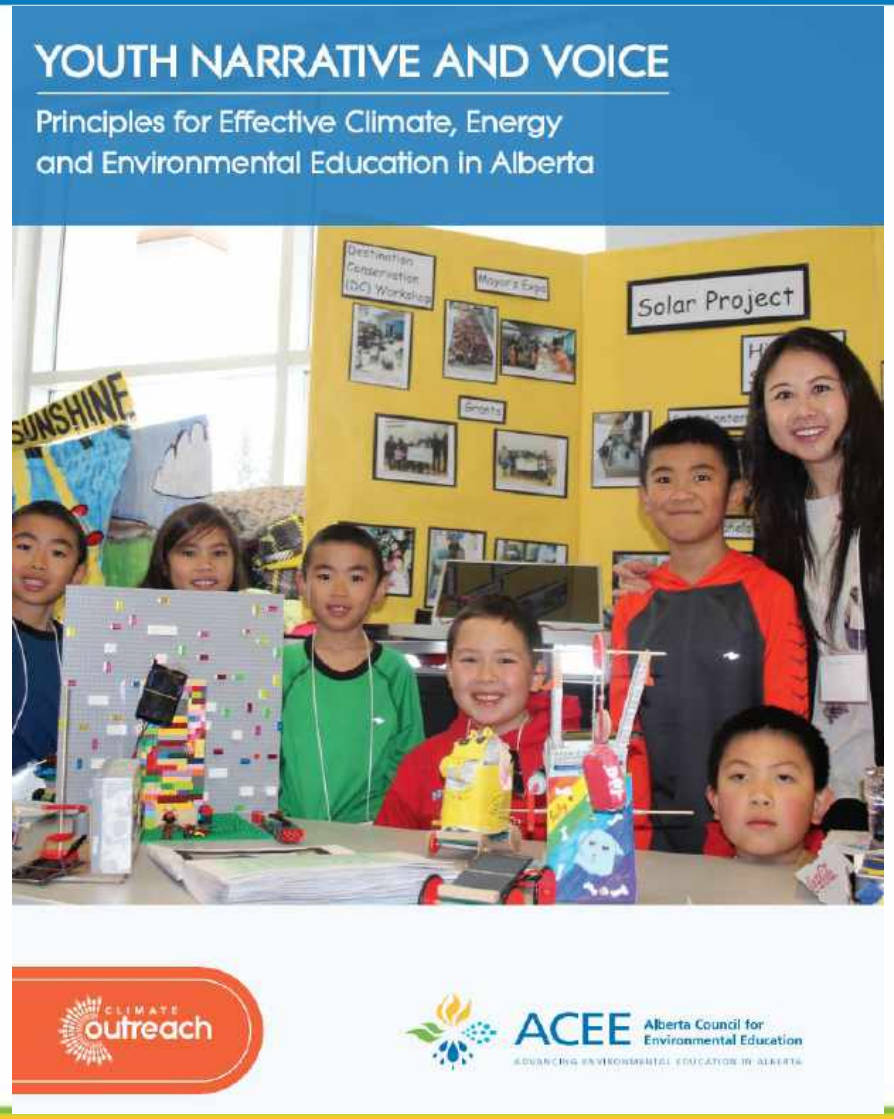
Problem Space

Solution Space

Students are interested in climate **solutions**

Hearing about solutions to environmental problems made students feel more hopeful about the future.

https://www.abcee.org/narratives



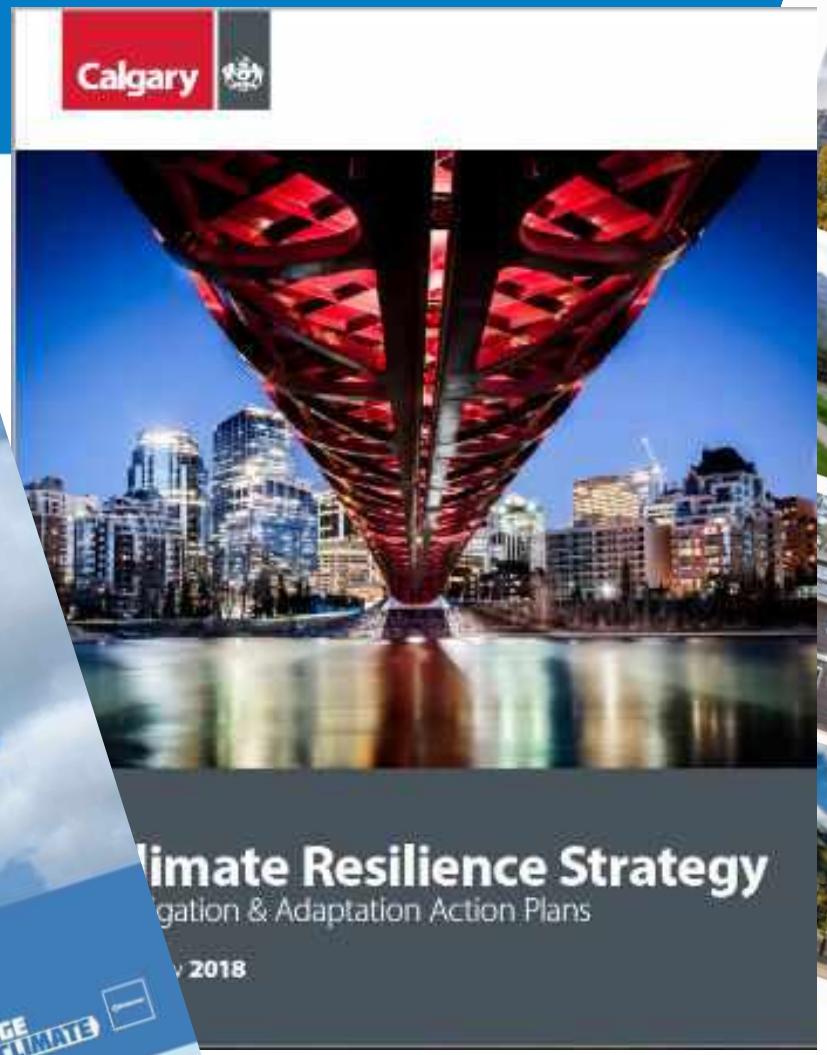
Enough talk then….

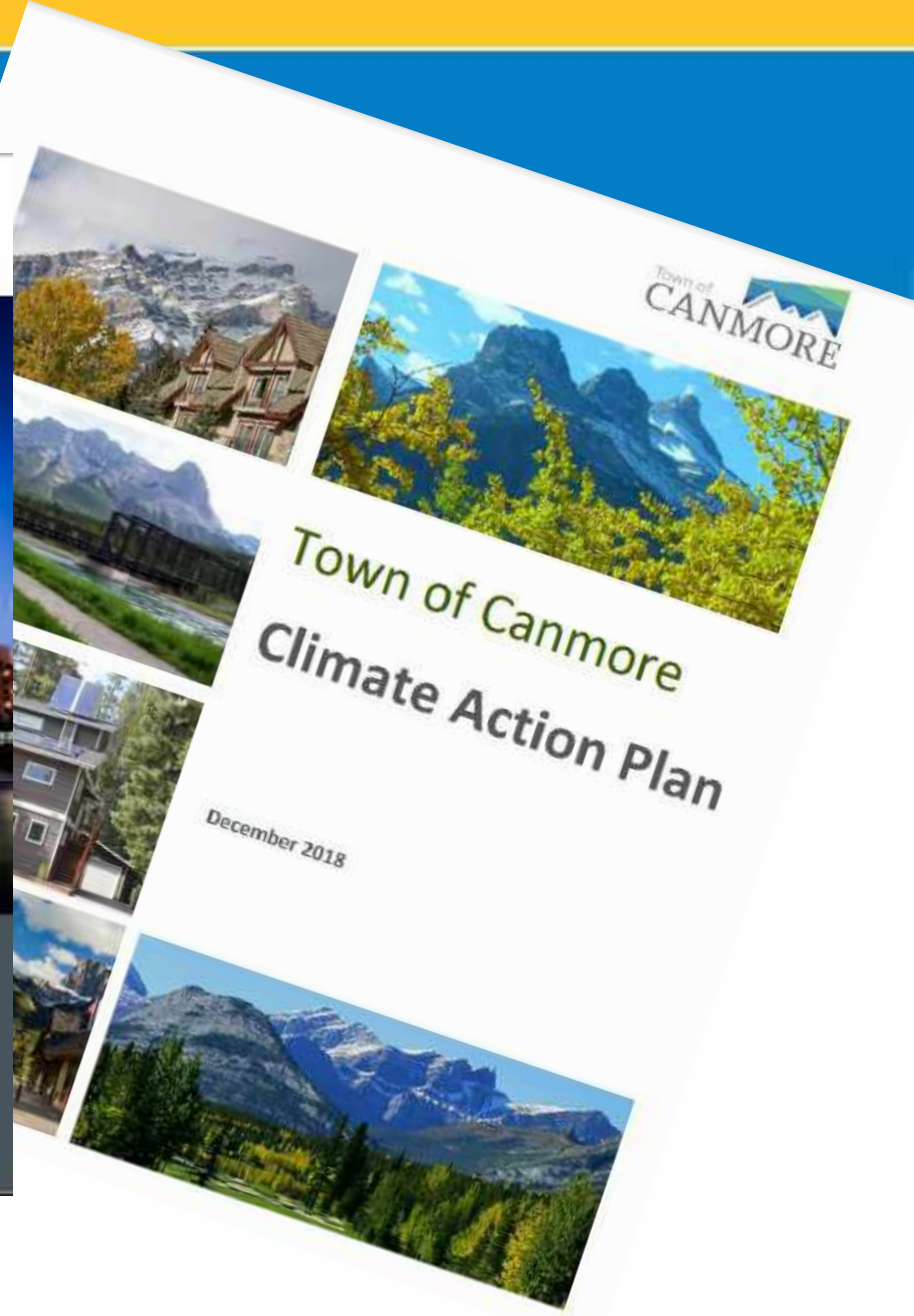
ACEE Alberta Council for Environmental Education

Enough talk then….

Let's get after it!


CLIMATE RESILIENT EDMONTON
ADAPTATION STRATEGY AND ACTION PLAN
CHANGE FOR CLIMATE


Calgary
limate Resilience Strategy
gation & Adaptation Action Plans
2018


Town of CANMORE
Town of Canmore
Climate Action Plan
December 2018

Municipal Climate Change Action Centre

Municipalities planning for climate change in Alberta

https://mccac.ca/alberta-municipalities-planning-for-climate-change/

Cities

- City of Airdrie
- City of Calgary
- City of Edmonton*
- City of Leduc
- City of Red Deer
- City of Spruce Grove
- City of St. Albert

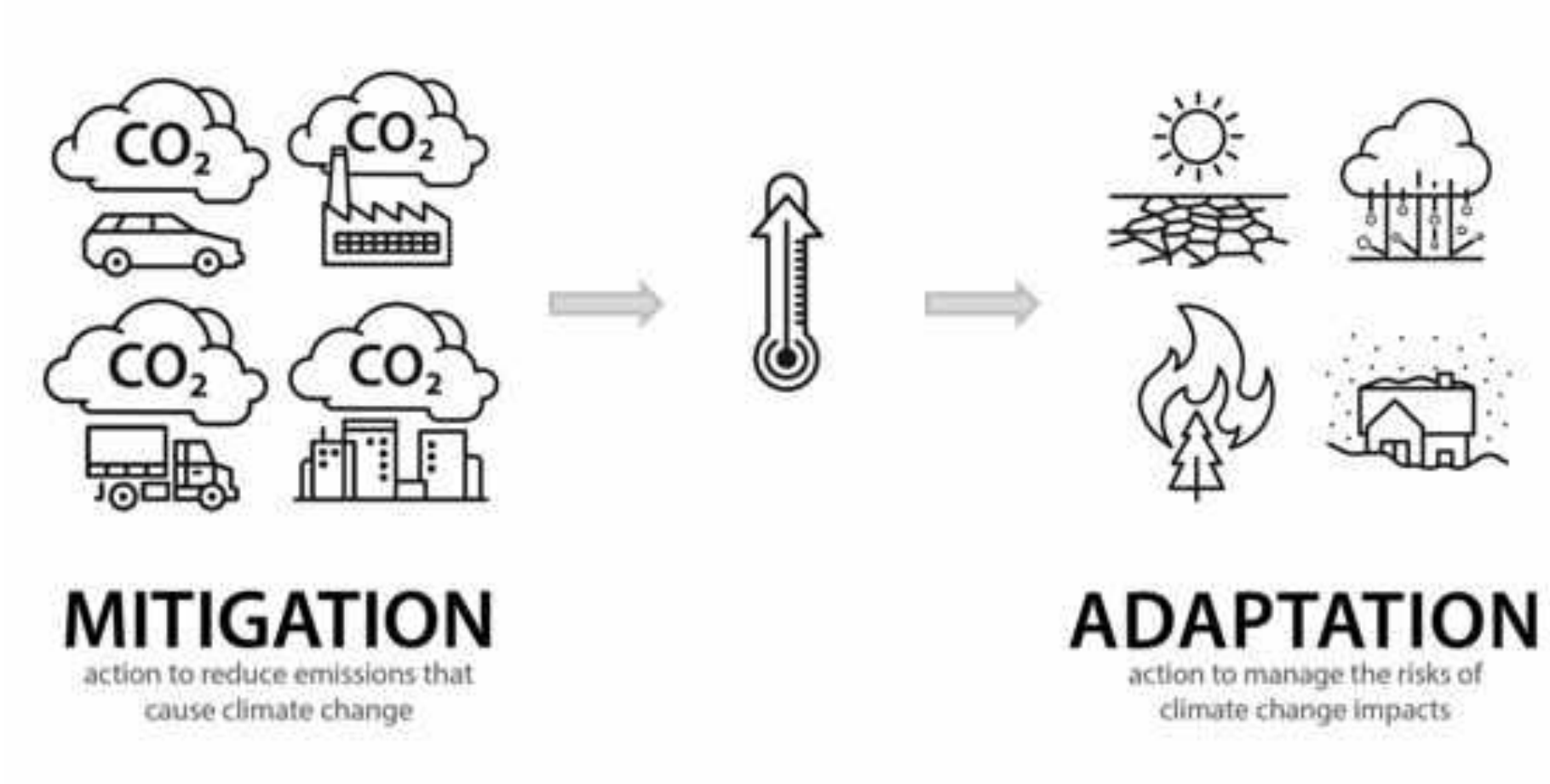
Towns

- Town of Banff
- Town of Canmore*
- Town of Cochrane
- Town of Devon
- Town of Black Diamond
- Town of Drayton Valley
- Town of Okotoks
- Town of Stony Plain
- Town of Sylvan Lake

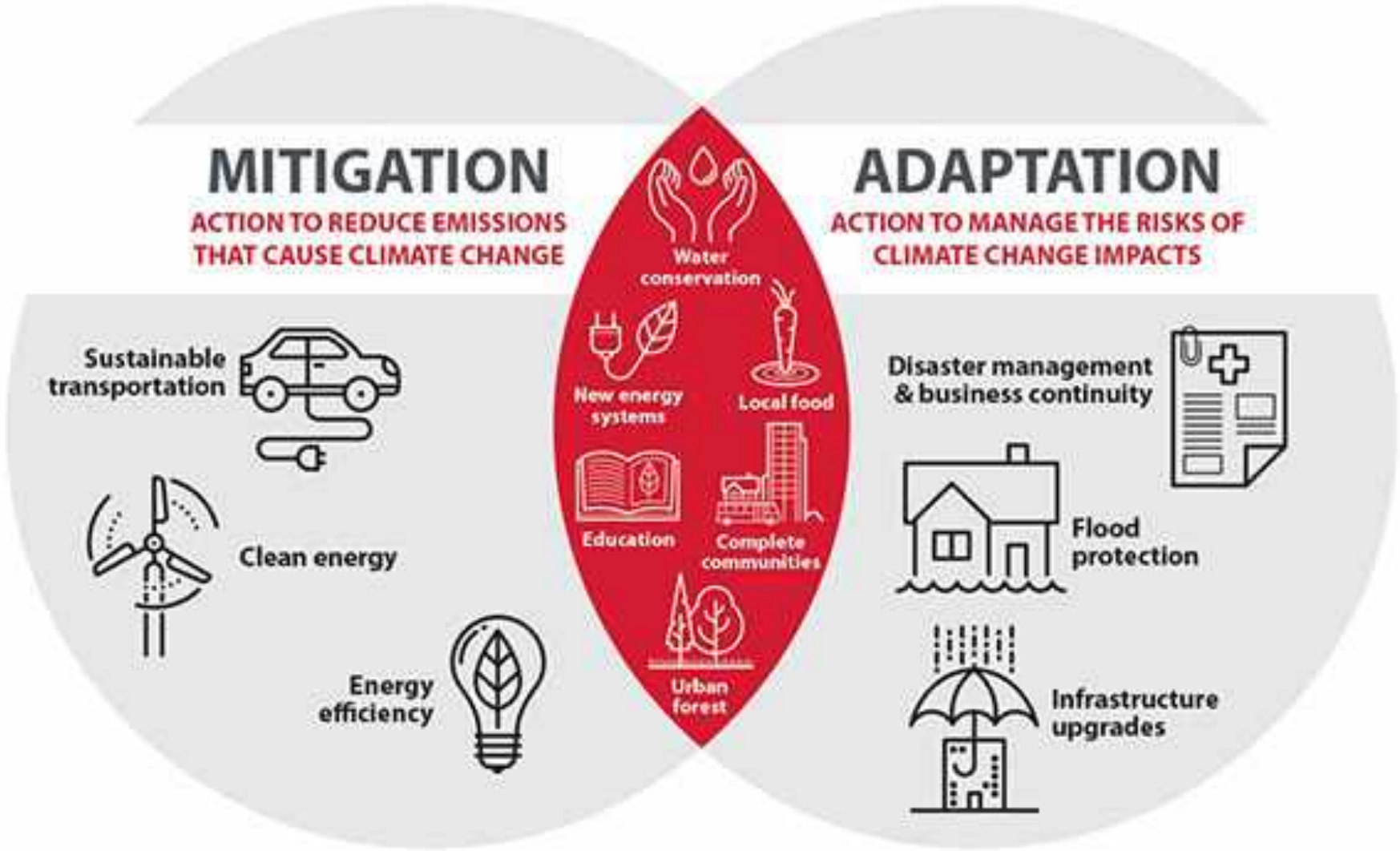
Counties

- Brazeau County

Two categories for climate change action



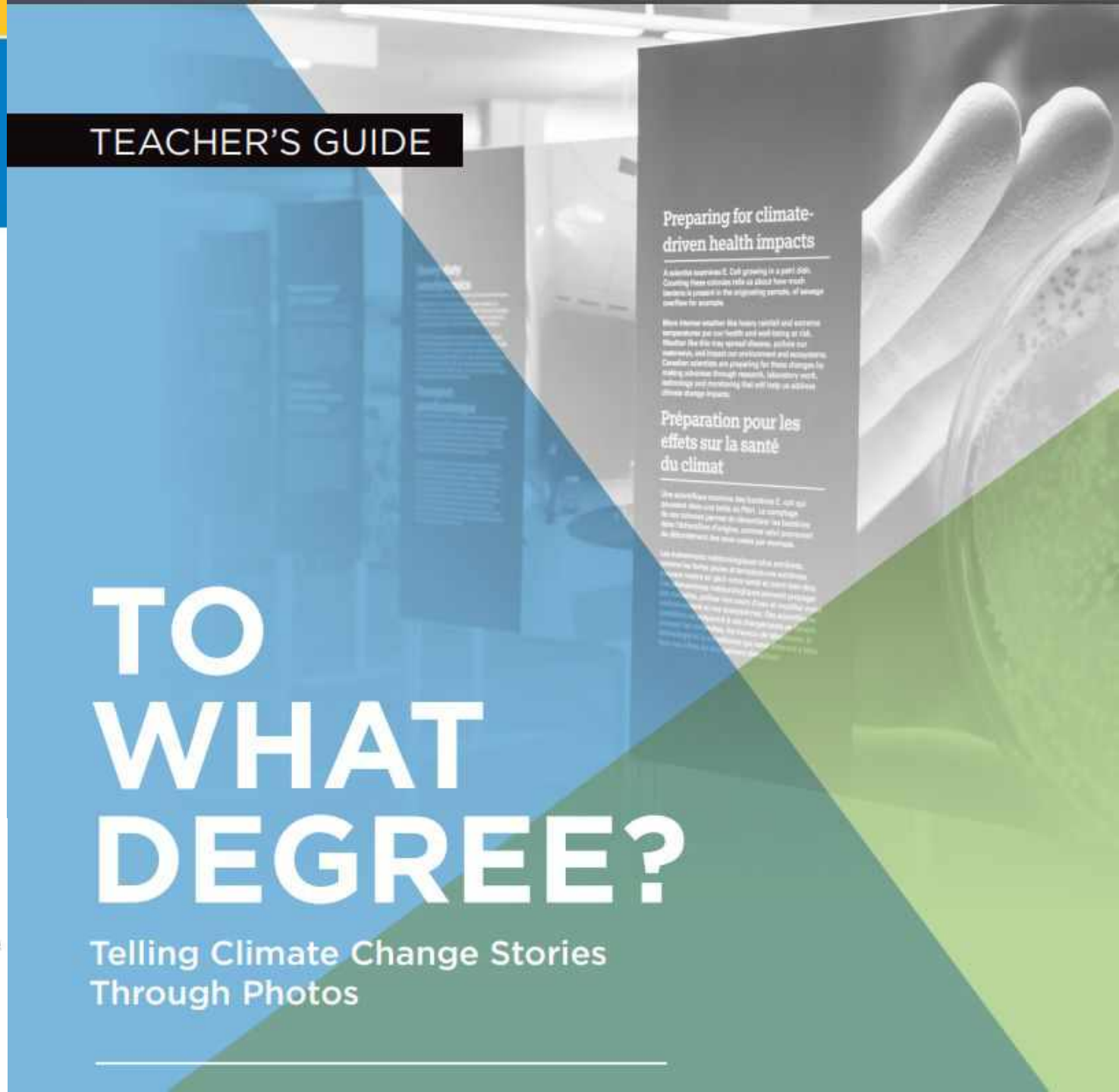
Building Climate Resilience



Activity: Mitigation vs Adaptation

Can be downloaded for free at:

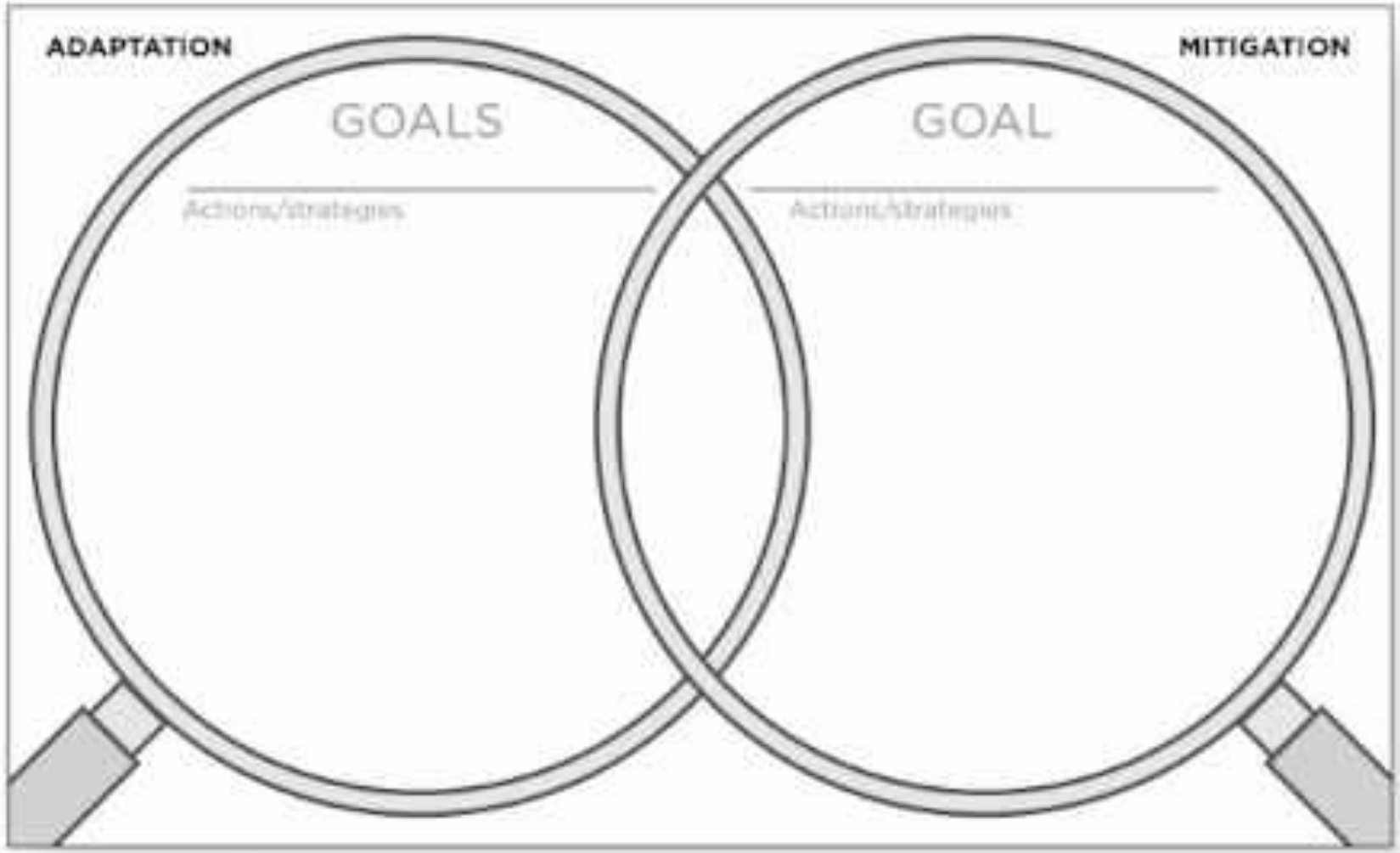
https://energy.techno-science.ca/doc/resources/TWD_English.pdf

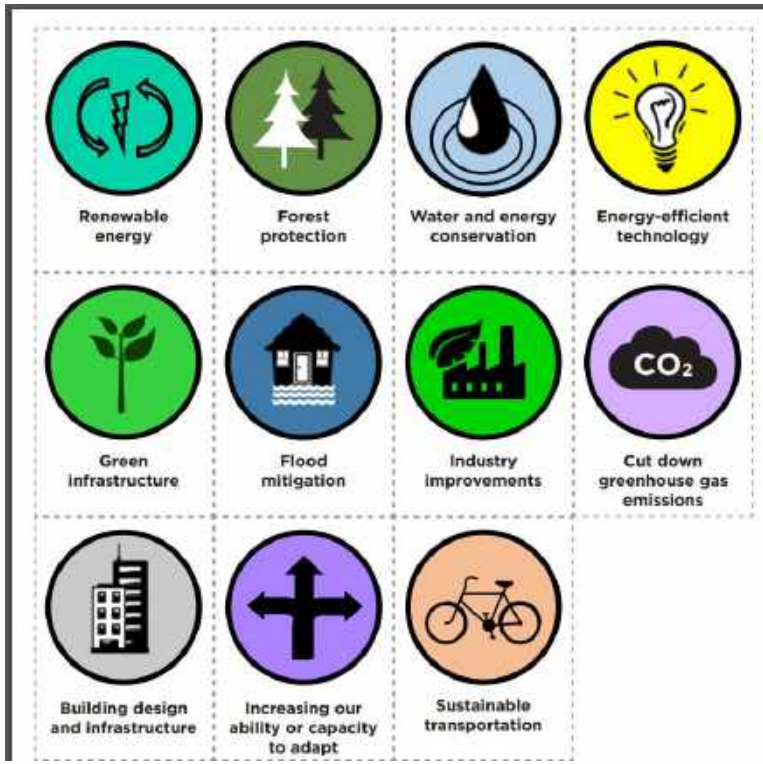


Ingenium

Let's Talk Energy
Engaging ideas for Canada's future
Parlons énergie
Idées d'avenir pour le Canada

Activity: Mitigation vs. Adaptation

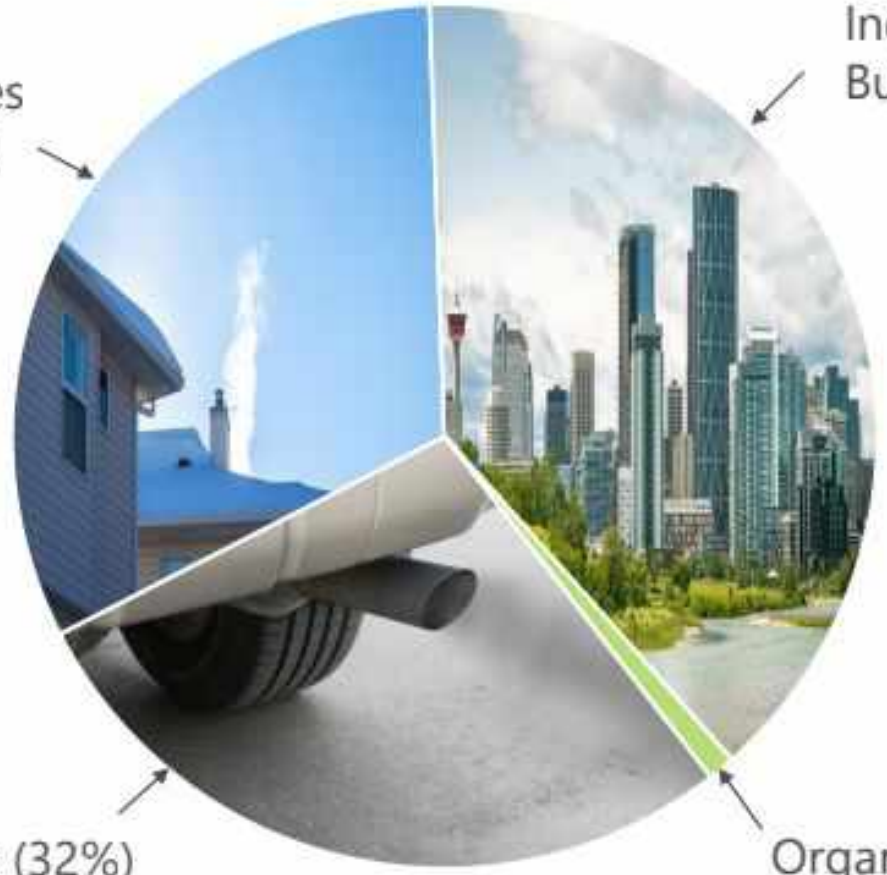


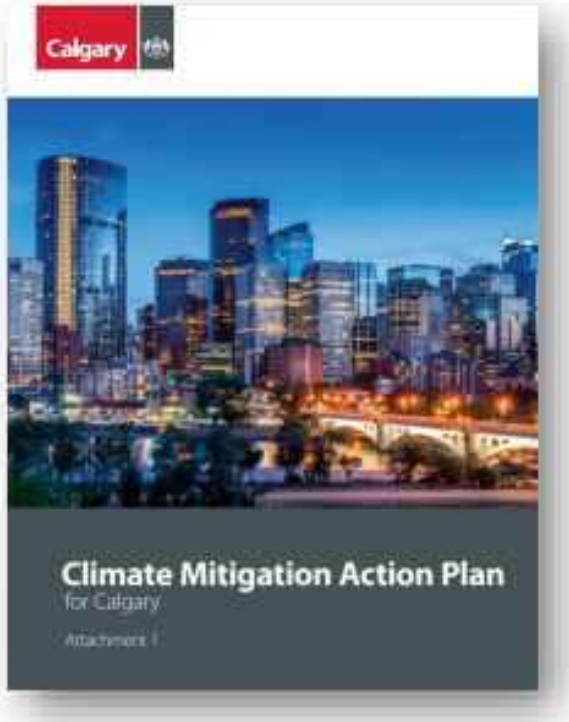


Let’s take a closer look at mitigation…

ACEE Alberta Council for Environmental Education

Reducing Calgary's Contribution to Climate Change





Calgary

Calgary.ca/ClimateAction

Actions you can take **in your home** to help limit climate change.

- [1] Open/close window coverings seasonally
- [1] Draft-proof home
- [1] Program thermostat 17° C (night/away), 21° C (day)
- [1] Use fan instead of air conditioning
- [1] Install drain water heat recovery system
- [1] Install tankless on-demand water heater
- [1] Wash clothes in cold water
- [1] Hang clothes to dry
- [1] Use toaster oven for small meals
- [1] Install induction stove
- [1] Install low flow shower head
- [1] Install faucet aerators on taps
- [1] Leave grass clippings on lawn
- [1] Use a solar or push lawn mower
- [2] Use a French press instead of coffee maker
- [2] Change lightbulbs to LEDs
- [2] Upgrade to ENERGY STAR appliances
- [2] Install high efficiency furnace
- [2] Install geothermal exchange system
- [2] Install energy efficient windows
- [3] Insulate home
- [4] Install solar energy and photovoltaic system
- [4] Retrofit building envelope
- [5] Buy green power

Calgary

Actions you can take **on the go** to help combat climate change.

- 1 Do not idle vehicle
- 1 Carpool or carshare
- 1 Keep vehicle maintained, drive smart
- 3 Drive an electric vehicle
- 3 Take public transit to work/school
- 3 Bike or walk to work/school
- 3 Telecommute

Calgary.ca/ClimateAction

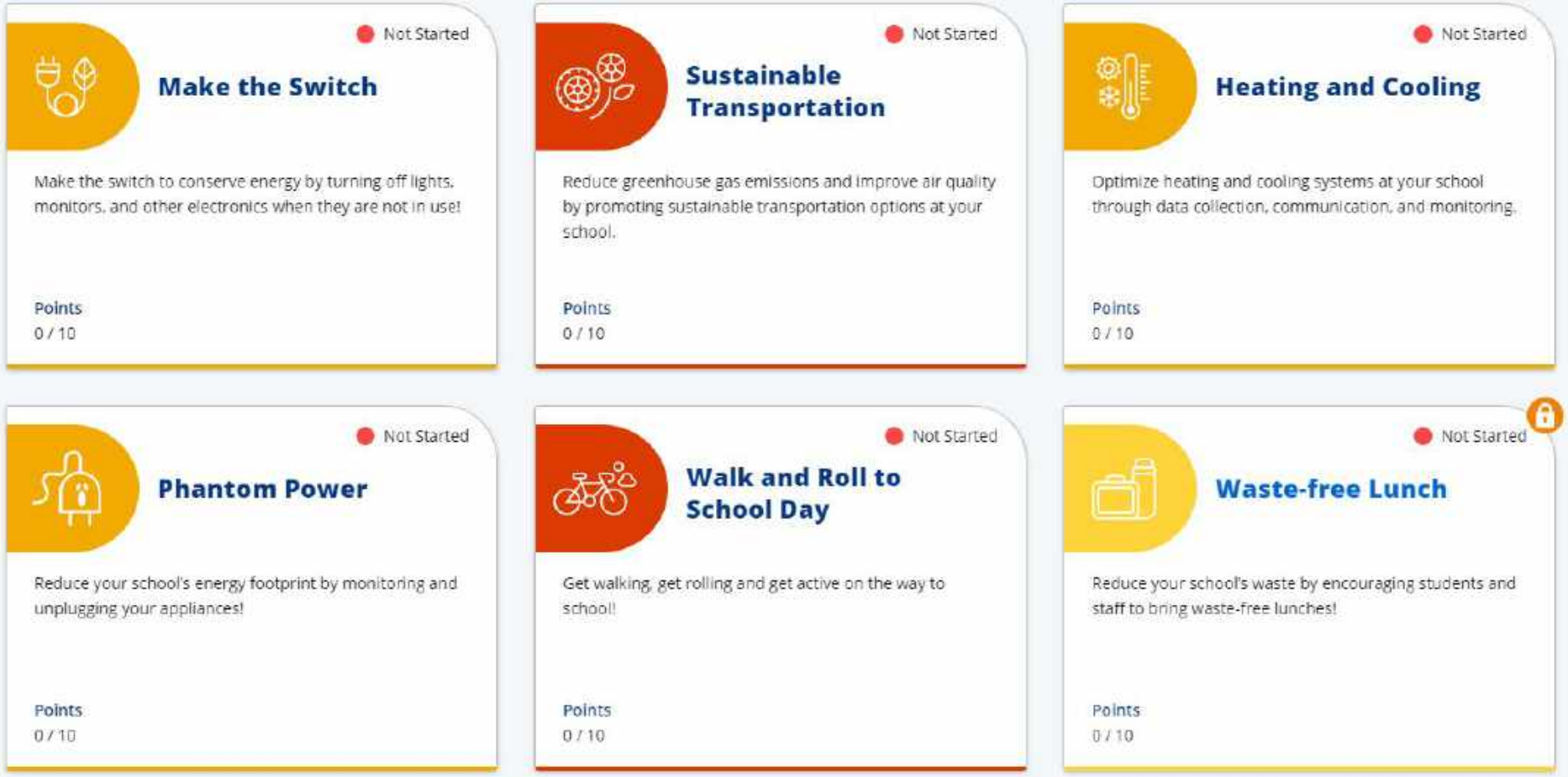
Calgary

Actions you can take **in your daily life** to help limit climate change.

- 1 Grow own food, participate in community garden
- 1 Buy local
- 1 Turn off computer and monitor each day
- 1 Use reusable water bottle and coffee mug
- 3 Switch to vegetarian or vegan diet
- 3 Vacation locally (instead of international flight)
- 4 Work and play close to where you live

Calgary.ca/ClimateAction

EcoSchools actions and resources



[EcoSchools Canada in Calgary website]

[Local Resources to Support EcoSchools Actions]

ecoschools
écoécoles
CANADA

en

Welcome to the EcoSchools Canada Certification Application

Please log in or register to continue

Email or Username

Password

Log in

Register

Forgot your password?

Independent/Private Schools: Contact us to register.


DRAWDOWN
2020
THE WORLD'S LEADING RESOURCE
FOR CLIMATE SOLUTIONS
https://drawdown.org/
Ocean Power

SOLUTIONS

Project Drawdown conducts an ongoing review and analysis of climate solutions—the practices and technologies that can stem and begin to reduce the excess of greenhouse gases in our atmosphere. Our work shows the world can reach Drawdown by mid-century, if we make the best use of all existing climate solutions. Certainly, more solutions are needed and emerging, but there is no reason—or

Each solution reduces greenhouse gases by avoiding emissions and/or by

ABANDONED FARMLAND RESTORATION

ALTERNATIVE CEMENT

ALTERNATIVE REFRIGERANTS

BAMBOO PRODUCTION

BICYCLE INFRASTRUCTURE

BIOCHAR PRODUCTION

BIOGAS FOR COOKING

BIOMASS POWER

BIOPLASTICS

BUILDING AUTOMATION SYSTEMS

BUILDING RETROFITTING

CARPOOLING

COASTAL WETLAND PROTECTION

COASTAL WETLAND RESTORATION

COMPOSTING

ELECTRIC CARS

REDUCE SOURCES › ■ Transportation › *Electrify Vehicles*

11.87–15.68
GIGATONS
CO2 EQUIVALENT

$4.48–5.79
TRILLION $US
NET FIRST COST

$15.30–21.82
TRILLION $US
LIFETIME NET

Quick recap

Confusion, Anxiety, Apathy

1. Approach with empathy and curiosity
2. Connect to nature and place
3. Build literacy (scientific and social)
4. Develop critical thinking and problem-solving skills
5. Help students be part of the solution
6. Inspire others to action

Informed, Prepared, Optimistic

https://www.abcee.org/sites/default/files/ACEE%20Road%20map%20to%20excellent%20climate%20change%20education_0.pdf

Overcoming barriers to teaching about climate change

Barrier	Strategies for Overcoming
Low emphasis in the curriculum	Climate change is EVERYTHING change Links across the curriculum
Lack of confidence	Don't try to be an expert Learn alongside your students
Fear of pushback	Use credible sources of information Focus on the solution space
Topic is depressing; causes anxiety	Listen to your students Acknowledge their anxiety Focus on the solution space Careers of the future
Lack of time	Integrate across the curriculum
Student apathy	Focus on here, now (place) Focus on the solution space, careers of the future

Thank you to our funders!

Thank you for listening!

Contact Information and Presentation:

- **Marie Tremblay**, Senior Education Advisor, Alberta Council for Environmental Education - marie@abcee.org

Website:

www.abcee.org