Science fair

Name: Elise Cook
Partner-No
Idea: My idea for the scienc fair is that when a wildfire gets put out all or that orea is useless because of the artifical substence. I wonder if I can make a nptural substenee that will equa Sticate the fire and in the same time, but the ground will be able to grow things.
I dd get my idea from a documentery But I dont know what it is called,

Learning Outcomes!

- ❑ I will discuss technologies that provide scientists with evidence that cannot be directly observed by using the human senses.
- ❑ I will identify biases that could influence an investigation.
- ❑ I will plan and conduct a controlled experiment.
- ❑ I will identify the variables in a controlled experiment.
- ❑ I will apply the correct vocabulary for variables in scientific contexts.
- ❑ I will evaluate the effect of the manipulated variable on the responding variable in a controlled experiment.
- ❑ I will defend a conclusion regarding cause and effect based on evidence from a controlled experiment.
- ❑ I will discuss the use of diverse data representations in communicating evidence.
- ❑ I will compare the clarity and accuracy of evidence communicated through diverse data representations.
- ❑ Discuss potential impacts of evidence that is not communicated clearly and accurately.
- ❑ Examine the importance of scientific ethics in investigations.
- ❑ Demonstrate scientific ethics during investigations.

Important Dates

Deadline for applications for the Calgary Youth Science Fair

January 30th, 2026

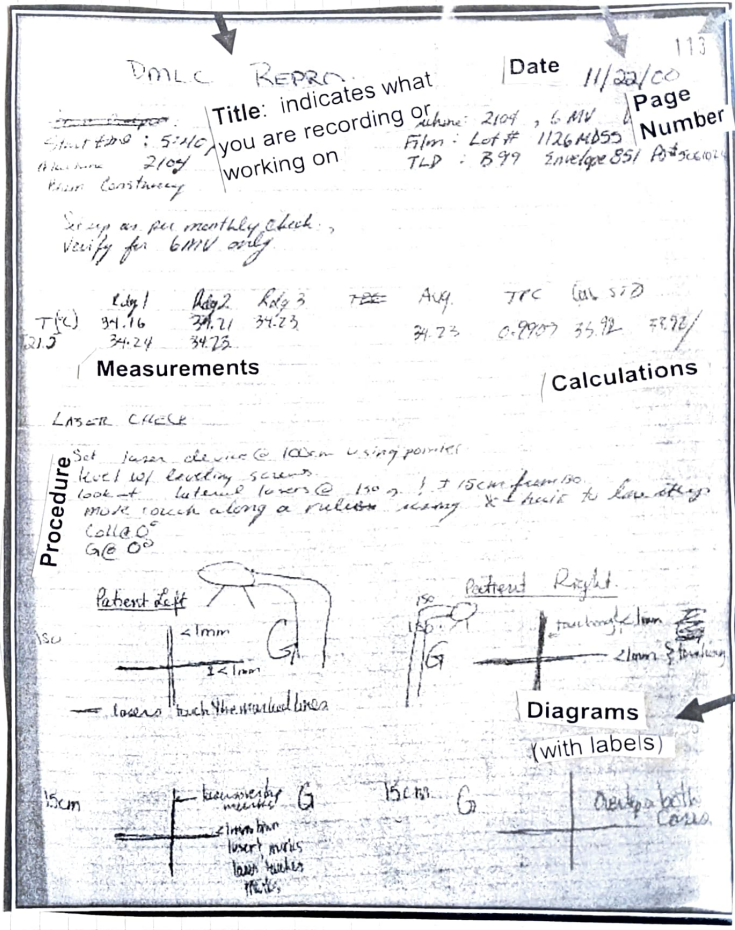
Glenmeadows Science Fair project due

March 13th, 2026

EGS Science Fair Showcase (Gr. 5/6)

March 16th, 2026

Example of a page from a Scientist's Log Book



TIPS! 7 15, 2026

- No animals expierment
- Name all cites
- It simple - no
- Most of the work myself
- Teacher 3 Parent - approval
- Follow rules
- Safe to do
- Easily access data
- No dangerous stuff

Ideas: 21, enero. 2026

What I want my science fair idea to be about is fire because I think it is a big all across Canada and that it threatand families and animals with life. If that topic might not work I would want to do something to do with mold.

How is thing a World Problem?

- If Canada there are many fire (wildfires).
- I think this can help our econemy in many ways: Help grow more trees, put out fires in organic ways. non-harmful

Websites

- I want to find websites that can help me know more about fires.
- Website - Canadas wild life - tress, animals e.c.t.
- the website sras styles showed us about the quality and range of fire.
- Canada Govorment?

Questions

- Can I get a sample of the substence that they to put out fires in the present?
- Does it fit they coureulum?
- Is it at high?

Site: Natural Resources Canada — Forest Regions of Canada, — 27/1/2026

Forest regions & Acadian	Location: Maritimes	Predominate tree species red spruce, balsm fir, yellow birch
Boreal	Northen Canada	white spruce, balsam fir, black spruce, Jack pine, white birch, trembling aspen, tamarack willow
Carolinjan (Deciduous)	southwestern Ontario	beech, maple, black walnut, hickory, oak
Coast	British Columbia	Western redcedar, western hemlock Sitka spruce, Douglas-fir.
Columbia	British Columbia	western redcedar, western hemlock, Douglas fir.
Great Lakes St. Lawrence	Central Canada	Red pine, eastern white pine, eastern hemlock, yellow birch, maple oak
Motane	British Columbia & Alberthat	Douglas fir, lodepole, pondersa pine, trembling aspen.
Subalpine	British Columbia & Alberthd	Engelmann spruce, subalpine fir, lodgepole pine.

Jan/22/26

POPULAR TREES IN CANADA!

- Martin's-tree service INC, Britannica, Goverment of Canada, the morton Arboretum, Ontario. Ca

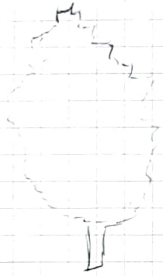
Spruce:
- 40 species-world wide
- Conifer family Pinacea
- Paper Industry
- Body of Vidlin & Piano
- Needle like leaves
- thin scaly bark

Sugar maple
- Canadian flag
- Acer saccharum
- fall colour
- 60 - 70 feet tall
- the bark is gray brown and deeply furrowed.

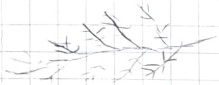
Red oak
- offical tree of PEI
- Family: Fagaceae
- 300 years old
- type: Decidous, Fall colour
- Size large (greater than 50 feet)

- Eastern White Cedar
- Shelter to animals-bugs
- 45 feet tall
- Scientific Name: thuja occeidentalis
- Small, 15 meters high, 30 cientmeters
- Needles - yellow-green, small
- Bark, thin and shiny when young

Eastern White Cedar.



Full tree

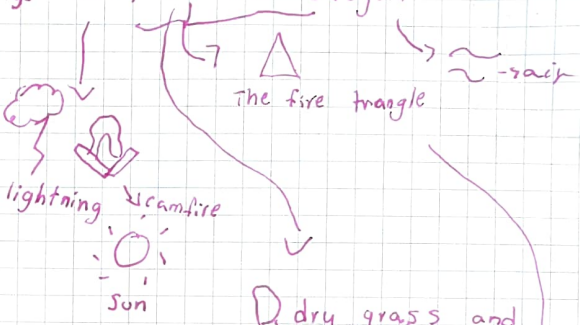


Leaf

↳ fruit

Fire:

- 3 things heat, fuel and oxogen



- Unplanned, uncontrolled
- lightning most common ignicion in Canada
- Sparks, fireworks, ciggarettes
- Weather, landscape, fuel
- No wind on a hill in a circle
- Fires are good for environment.
- Fire put out - more dangerous fire later
- Wild services, 911

↳ CBC kids.

Primary Forest Fire Fighting Substances

Aerial Retardants

Foams
- Allergy risks
- Heating produces harmful fumes?

Which natural substances are likely to work by each mechanism? (cooling: gels smothering: coating: clay, salts/minerals Maybe a hybrid? foams

What are they? Does it increase Nutrient loading?

How do they work?

Ingredients - Biodegradation rates.

→ What happens to soil chemistry after application? (PH, salinity, nutrients) levels, Nitrogen, etc)

How well does the substance "stick" to vegetation/surfaces? (adhesion)

Does it form a protective coating or char layer that slows ignition and reignition?

- Behavior at different types of heat exposure.

What type of droplet size pattern is more effective when sprayed or dropped?

How wind drift and/or evaporation affects a substance?

✓ retardant fire performance

Is the mixture stable over time?

Check or Viscosity range needed to spray in a reliable way?

How does temperature affect it?

Questions: 23, Jan. 2026

- Can I get some of that substence?
- What Is the substence made out of?
- What does it wieght (substence)?
- What is the substence?

Aerial Fire
- aerial fire retardants are substances that is dropped from the aircraft to perimeter the fire - to stop or slow down the fires.

- How does fire affet the forest?
- How does water compare to aerial fire?
- How is water related to aerial fire?
- Under what condition does fire cause risks?

FOAMS:

Questions: what are they? (ingredients)
- why do fire fighters use them?
- What do they do to the fire?
- How do they work?

1. Pairs with water to extinguish fire quickly
   ↳ Done faster & more efficiently
- Water, air and foam concentrate

Foam Blanket
- Removing Oxegen, Reduce Heat
- Invented in 1902 → porpouse. oil and flamable fires.

FOAMS - continuing

january 23, 2026

23, January 26

Why firepeople us it/What does it do:
- reduces spreading ability
- Reduces dispersing and dangerous oxygen
- Extracts heat from liquid and surronding surfaces.

Class A foam:
- Used to fight Class A Fires
- Wood, paper, cloth and some plastics.
- Wildland and structural firefighting opperacion
- Wetting agents, surfactants and stabilizers
- Eco friendly and Biodegradable.

Class B foam:
- Oil, gasoline, grease and alcohol. fires
- Used in milatary, commercial and industrial firefighting opperacions.
- to floot on the surface of the burning liquid.

FACTS

Firefighting foam is used because of it ability to interfere with the three elements. (page 10).

- Important to Conside the health and environmental risks = Chemicals in the foarm of foam.

Site: Fenton Fire: What is Firefighting FOams and how does it work.

ARIEI RETARDANTS

24, January 2026

Site:

Chemical Dusts that are Flammable

27/1/26

27, 1/2026

- Adipic acid
- Anthraquinone
- Ascorbic acid
- Calcium acetate
- Calcium stearate
- Carboxy-methylcellulose
- Dextrin
- Lactose
- Lead stearate
- Methyl-cellulose
- Paraformaldehyde
- Sodium ascorbate
- Sodium stearate

Metal Dusts:

- Aluminium
- Titanium
- Bronze
- Iron carbonyl
- Magnesium
- Magnese
- Zinc
- Zireonium

Mycalsas.com

27/1/26

- Water cannot put out oil or grease fires
- Dont swat flames → can cause air flow

- Natural items that can put out fires • Sand • Salt, Baking soda
- flour cannot put out fire

- ordinary fires = Water

Class C fire

- Involving eletrical fires

VARIABLES:

29/1/26

Example: Coke & mentos
- Independent pop, mentos (type)
- Dependent. the reaction
- Controlled: amount of brand, of pop mentos brand

Hypothesis Plan

2/2/2026

My hypothesis for my project is that I will make a substance that's base will be sand. I think my project will be successful because sand is useful for extinguishing fires, and I think it will be eco-friendly because sand comes from the ocean.

Week three at Home

Are you designing a new solution or improving something?

- Im improving the wildfire extinguisher, so that it is eco friendly.
- Im creating a solution for: ~~Families~~, communities and animals that have lost there land because of fires.

My soluation will help because it will grow more trees and restore the land.

Week 3 21/2/2026

1. **Engineering/Innovation Project**

Define and state the problem

If you are doing an engineering/innovation project your project will involve designing, building and testing. Your project might be improving something that already exists or designing something new to solve an unsolved problem. Instead of asking a science question, your first task will be to define the goal of your project and the problem that you are solving. The problem provides direction for your project.

The problem for your project can be a stated like

"To design and build…"

"To improve the function/usabilty of …."

You can combine these with the sentence "***Who*** needs ***what*** because ***why***."*

Example:

After you do some research, you might discover that *marine biologists* (who) need an *underwater robot* (what) to *study starfish* (why).

So your project problem statement could be:

To design and build an underwater robot that can move on a rocky sea bed

Specify Requirements & Constraints

Instead of formulating a hypothesis you will **specify the requirements** to solve the problem in your project. For student projects three to five requirements will be plenty! Your requirements should be needed and possible. Requirements might include things like:*

- physical characteristics (eg. Weight, size, strength)
- performance characteristics – accuracy of motion, speed, speed of stopping, strength)
- inputs (power sources)
- outputs (power, speed, or undesireable side effects)
- storage, size, how something looks, and quality or reliability.

*https://www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-problem-statement#definingtheproblem

2. **Example**:

In the robot project above requirements could be:

- The robot must be able to sink and rise without being manually lifted
- The robot must be able to walk through rocks at a minimum speed of 1 meter/minute
- In the robot project above requirements could be
- Be able to be used on five missions

Week 3 ..example

3. With an infinite amount of time, money and resources, we can probably solve any problem perfectly! But there are always things that constrain projects. **Constraints** are those things that force us to use only certain things to solve the problem and meet the requirements. Sometimes, constraints placed on a problem mean that a solution cannot be achieved. But often, constraints contribute to efficiency and improved design in problem solving and still allow the designer to achieve all the requirements of a project. **You will need to specify the constraints that apply to your project.**

Constraints could include the amount of time you have to meet the requirements, the cost of a project, the size of the design, limitations on the materials you can use, etc.

Constraints

4. **Example**

In the robot project constraints could be

- The robot can only have upto 4 legs
- The robot can only be of upcycled materials
- The robot can weigh a maximum of 2.5kilograms

Week 3 example 2/2/2025

In designing a paper airplane you could design it for landing spot accuracy. The problem can be stated as: To design and test a paper airplane that can land accurately. Your requirements could include that it is made of paper, travels at least 5 meters and lands within 5cm of the target location. You'll want to be able to test the plane more than once, so you should require some kind of durability - for example the plane should be strong enough to last a minimum of 10 test flights. Constraints might include that the plane be made of a single sheet of printer paper, use no more than 5 cm of clear tape to hold it together, and that all your design and testing has to be completed within two hours.

Hypothesis 5/2/26

My hypothesis for my project is that I will successfully create an eco-friendly wildfire extinguisher, that will put out the fire and not harm the land. I predict that my extinguishers base will be made of sand because sand is an all natural substance that is a common fire extinguisher. I hypothesize that my eco-friendly extinguisher will not harm the land while still reducing and extinguishing the fire.

Hypothesis

answer your question

9/2/2026

Hypothesis

The hypothesis for my project is that I will be able to create an eco- friendly wildfire that will extinguish the fire but not harm the environment. The reason why I think I will be able to create an eco-friendly wildfire is because I will create the extinguisher with a sand base. Sand is a very eco-friendly material that can be used for extinguishing a fire. I also predict that my extinguisher will include sand, salt or water base. I think these materials will be a positive choice because there are from the land and they can extinguish fires. I think sand will be the best choice because it will respond well to the land and mix nicely with the soil.

I predic

If . . then . . because

same - or close to the levels

- prediction will have less impact on the soil

MATERIALS

9/2/2026

- Soil
- Non-flammable container
- Baby pine
- Fire
- Non-flammable space
- Red fire extinguisher bottle.
- Lighter / matches

Which natural substances work with each mecenisum? 10/12/26

- Clay-Natural substance that is usally found in the bank or bed of a river, or in a creek.
- Sand. Sand is a finely mix of rock and minerals, that is usally round on a beach and on the bottom of the ocean.
- Salt, Salt is a finely grion edible substance that is found in, oceans, saltwater lakes and salt rocks. Salt can be used to extinguish fires because it cuts off the oxegen supply and smothers the flames, and absorbing heat. The reason why salt can cut off oxegen is because it creates a barrier over the burning material.
- Absorbs thermal energy.
- Cooling and disrupt the fire triangle.

Biodegradation 10/2/2026
Rates

Biodegradation rates:

Definition

Biodegradation: Capable of being broken down especially into innocous products by the action of living things (such as microorganism).

Biodegradation Rates:

Biodegradation Rates are how much or little (Rates) of biodegradation is.

I think the level/Rate of biodegration of my project should be low, because I will use natural items for testing.

Materials

Matierals:

16/2/26

- 3 lemon cypress pine trees.
- Bone meal
- Sand
- Zolite
- Dry mix of leaves
- grass seeds.
- Soil
- Non-flammable container
- Ph tester.
- lighter for the fire

Variables:

16/2/2026

# of habitats

Controlled	Dependent	Independent
• amount of extinguisher applied. • Amount of dirt • type of tree • Amount of time on fire • Amount of time to regenerate seed. Size of tree • Metal pot • location.	• levels of ph • soil quality • tree quality ↓ Quantitative observations ↓ what is the criteria to determine this? what are the characteristics of an unhealthy and a healthy tree?	• Ph levels. • the seed growth depending on how the soil seed reacts to the extinguisher

16/2/2026 lemon cypress:

- California native
- grow in room tempeture
- lime yellow color
- Small or Smaller

What to observe? 18/2/2026

- Tree
- is the wood crunchy or soft?
- how is quality of the pine needles?
- Is the trunk still in one piece?
- Is the wood deteriorating
- Is the tree regenerating sprouting

18/2/2026 Healthy and unhealthy trees

Site: Gouvernment of Canada

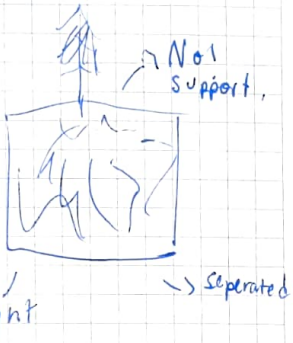
Healthy	Unhealthy
• crown tall and sturdy • tree trunk is thick and sturdy • Vibrant colours (Depending on the type of tree). • Able to sway with the wind • Dirt is moist	• Crown and leaves or pines very dry and crinkled • No sign of fruit or flowers • No colour, (Brown, gray colour • Dirt is dry and unhealthy • mold or fungus

Healthy soil

- dark
- crumbly
- moist.

Unhealthy soil

- light.
- Very crumbly
- Moist



University of Calgary ! 2012/26

- kathleen-Biology-honey bee experimental design, planning project
Spencer: PHD, the immunion system of nicro bio, perfect bacteria

~~Aggre~~ Annegre BI ?

- Use the same volume.
- Variable of the fire
- What happens if you dont put it on ?
  - ↳ Compare
- Size of flame
- Branches
- What measure with fire?
  - ↳ smoke
  - How are going to measure
- fast growth of grass seeds
  - ↳ short time to grow
- Organic matter - what can grow
- Mositure ? PH
- Heat to seeds ?
  - ↳ cook seeds ? pay attencion

grass seeds ?

Measure 1/23/2026

- Measure the fire hieght
- What the fire do to the soil
- Heat to the retardant.
- Heat to seed, tree and leaves
- Volume of soil and retardand.
- What the fire do to the branches.
- Soil Before, After the extinguisher is applied, 5-7 days after.

Same 1 2/23/2026

things that change and dont change?

- PH
- tree quality
- soil Mostiure
- habbitat
- Soil tempeture
- Seeds
- Branches

Siol Quality:

I have chosen to use PH because I would like to understand if my extinguisher is reducing the root growth or the availability to hold nutrients.

Annegret

2/23/26

Affect of fire and retardant

- trees react diffeint
- diffeint tress diffeint results
  - 7 mencion the lemon cypress
- Wensday no
- Monday
- Deatils steps.
  As deatiled as ya can.

Method

What is the question Im answering.

PROCEDURE 2/24/26

PRE-Fire

SRING: PH: 8.0
Moisture: 8.1
temputure: 19°

AUTUMN: PH: 8.3
moisture: 39-1.
temputure: 18°

SUMMER: PH: 7.8
Moisture 50
temputure: 18°

After fire:

AUTUMN. PH 6.7
Moisture 30-1.
temp. 19°

spring: PH. 7.5
Moisture 72
temp. 19

Summer: PH: 7.7
Moisture: 48
temp. 20°

Next day with grow light.

~~25/2/26~~ 26/2/26

AUTUMN 7.6
PH 7.6
Moist 561
temp. 19°c

Spring:
PH: 7.0
Moist. 751.
temp. 17°c

Summer
PH 8.3
moist 671
temp. 17°c

Observations.

Autumn:
the autumn tree and habitat burned quite well. The dry grass mix also caught on fire.
The extinguisher extinguish very well. It smothered the smoke and cold the ground.

Trunk. Burnt, dark brown, delicate
Branches. White ash on the tips.
Very dark and burnt

Spring:

Summer

Process

25/2/26

1. First I all of my materials
2. I laid out all of my ingredients for the extinguisher.
- Zeolite,

Day 2 of measuring the saplings.

27/2/26

Autumn:
PH. 8.2
Moist. 82.1.
Temp. 18

Spring.
PH. 8.4
Moist. 8 61.
Temp. 17 c

Summer.
PH. 8.3
Moist 76.1.
temp. 16 c

Today I noticed that the sand has starting to sink into the soil.

Day 3 28/2/2026

Autumn
PH. 8.4
moist. 7.5
temp. 18°c

Spring.
PH. 7.8
Moist 80%.
temp 17°c

summer
PH. 7.2
moist: 75%.
temp. 17°c

Tinder: Dry leaves

Day 4 1/3/26

Autumn
PH. 8.2
moist 76%.
temp. 18

Spring
PH 7.4
moist 81%.
temp. 18°c

Summer
Ph. 8.1
moist. 77%.
temp. 18°c

Today I watered each sapling with corasponding amount. Trees are in healthy state.

Day 5: 2/3/26

Autumn
Ph 6.0
moist 84%
temp - 8°c

Spring
Ph: 7.5
moist 55%
temp 8°c

Summer
Ph: 7.5
moist 74%
temp 17

4/3/26 Annegret

- Add something about the fire.
  ↳ Method
- Plan out first try fold
  ↳ that for your first there!
- tips: - Know exactly what you want to say
- DONT READ the tryfold
- Point to headings
- What would you do next to!
- Patience
- You, no the most
- DONT BE SHY!
- picture
- Whats on the table!
- graphs are done: