



The Foodshed
THINKING ECOLOGICALLY Project
...growing our foodshed sustainably

Food Sustainability
Science Fair Project



Partners for Youth Engagement



in Food Sustainability

For help with your grant proposal (science fair project idea) please contact
The Foodshed Project by Phone, or by email (with guardian's permission):

Phone: (705) 675-3894

Email: youth@foodshedproject.ca

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Acknowledgements

Yogurt Maker:

We have 1 yogurt maker. Making yogurt requires heating milk, adding yogurt culture (or plain yogurt), and then allowing to culture for approx. 10hrs. Possible experiments include:

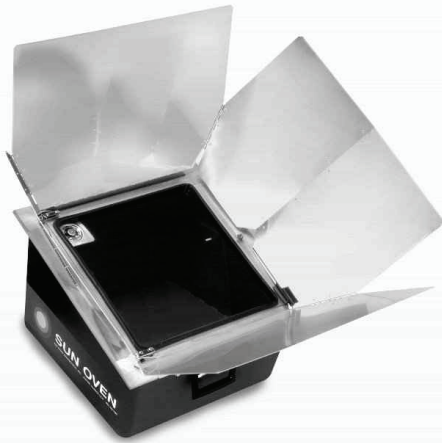
experimenting with yogurt used to start new batch, experiment with culturing time, etc.



Solar Oven:

We have 1 solar oven. The oven is placed in the sun and is capable of reaching temperatures of 400F within the enclosed container. Possible experiments include:

using the solar oven inside by a window, using the solar oven outside in the winter, insulating the outside of the oven for winter use, directing more sunlight into the solar oven, etc.



Other materials we could purchase for you:

- lights for growing plants
- light timers and light meters
- heat mats
- hydroponic nutrients
- hydroponic water pumps
- soil and soil testers
- indoor gardening supplies (trays, pots, covers, etc.)
- food (fruit for dehydrating, local flour for breadmaking, etc.)
- seeds for sprouting
- anything under \$50 that your food sustainability project requires

This guideline was written and produced for the *Partners for Youth Engagement in Food Sustainability* program by

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The Food Sustainability Science Fair Project is a joint project between The Let's Talk Science Partnership Program, The Foodshed Project and The Climate Project Canada, with support from The Social Planning Council of Sudbury and funding from the Ontario Trillium Foundation. This guide was adapted from the Bay Area Science and Engineering Fair (BASEF) student guidebook.



What is Food Sustainability?

Definition of Sustainable:

- 1: capable of being sustained
2 a: of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged <sustainable techniques> <sustainable agriculture> 2 b: of or relating to a lifestyle involving the use of sustainable methods <sustainable society>

Food sustainability is a term used to describe a bunch of issues that deal with making food safe and reliable, for ourselves and for the environment.

Materials available for borrowing



Sprouters and Seeds:

We have 3 sprouters and plenty of seeds. You soak the seeds overnight then put them in the sprouter and rinse them twice a day. Possible experiments include; *different soaking times, different rinse amounts, different water solutions, different light exposure times, different seed types, different recipes with sprouts, etc. etc.*



Food dehydrator:

We have 1 food dehydrator. You slice different foods, place them in the dehydrator and then let the dehydrator run for 1-3 days. Possible experiments include; *dehydrating different foods, different dehydrating times, dehydrating local foods, surveying the taste of dehydrated foods, different recipes with dehydrated foods*



Breadmaker:

We have 1 breadmaker. You add the ingredients (flour, water, sugar, yeast, etc.) from the recipe book (included), and start the machine. Possible experiments include; *coming up with your own recipe, making bread with local food, experimenting with flour to water ratios, experimenting with different types of flours, etc. etc.*

4.4 Making a presentation

When making your poster board presentation keep the following tips in mind:

- use large font (24pt)
- make titles larger than subtitles and subtitles larger than paragraph text
- use graphs, tables and photos to illustrate your results
- remember that people READ reports and LOOK AT posters, so keep the text portion brief
- bring in any materials or subjects of your experiment if they help illustrate (ie., plants, your experimental tools, food, etc.)
- bring your log book (where you wrote your data)



Food safety for the environment: Our current food system relies on shipping food thousands of miles across the world. Shipping that food across the world means we are burning gas and polluting our environment. Modern farming methods also use many chemicals that harm our environment. If we don't have a healthy environment to grow food, that food is not very sustainable.

***Possible project:** How much pollution does shipping bananas from Costa Rica cause? How much pollution does shipping Apples from Niagara Falls cause? How much pollution does shipping potatoes from Azilda cause?*

***Possible project:** What are the common chemicals that farms use? Are those bad for the environment? Are there any alternatives? How do they compare in cost?*

Food reliability: As mentioned, much of our food is shipped from other countries. What happens if there is a drought in that country? What happens if the cost of gas becomes too much and we cannot afford to ship food from other countries? In order for our food to be considered "reliable," we have to know that it will be there tomorrow, in 5 years and in 50 years. Food that is not entirely reliable is not very sustainable.

***Possible project:** What food do we get from other countries? How did our grandparents get food before mass transport?*

A food sustainability science fair project could involve research on what makes reliable and safe food, or how to make food safe and reliable. You could also choose a project that examines the methods that make safe and reliable food (ie., what soil types grow the best potatoes, what flour makes the best bread, what is the best way to compost, or what is the best length of soaking time to sprout mung beans). What makes food safer for yourself? Growing food yourself (backyard gardening, indoor gardening, hydroponic gardening, window sill gardening, sprouting seeds). Making food yourself (baking your own bread, making your own yogurt). Knowing where your food came from. Knowing how your food was made

What makes food safer for the environment? Buying locally grown food (less transportation pollution). Buying organic food (less chemicals used on the farm). What makes your food more reliable: Growing your own food ("self-reliance"). Making your own food. Buying local food.

How would you like \$50 dollars to put towards your science fair project?

The Foodshed Project is running a food sustainability grant program which can win you \$50 to use towards your science fair project. The rules are;

- The science project must be about a food sustainability issue or topic
- You must submit a "grant proposal" which explains your project idea
- The money can only be used on materials for your science project and will be purchased and delivered by The Foodshed Project staff
- Only 5 grants will be awarded
- Due date for grant is on the grant application

The Foodshed Project also has materials you can borrow (for free) for use in your project. Please see page 16 and 17 for descriptions and pictures of Materials you can borrow.

Ideas for food sustainable projects are projects involving;

- sprouting seeds, beans or nuts
- bread making
- yogurt making
- growing vegetables or plants
- growing plants in water (hydroponics)
- examining soil
- research people's opinions about local food
- researching agriculture in Northern Ontario and/or Sudbury
- composting
- dehydrating food
- design a presentation on food sustainability and assess people's knowledge before and after
- examine Canada's food regulation agencies
- compare food safety in Canada to other countries
- biodiversity
- examine other diets (ie, raw food, Harvard school of medicine diet, Canadian Food Guide, vegan, vegetarian, etc.)

4. REPORTING YOUR RESULTS

4.1 Organize and analyze your results

Now is the time to look at all your results and organize them in a way that will make sense to other people. This may require making a graph, making a table or labeling your experiment results. Remember, people like neat and tidy.

4.2 Come up with a conclusion

What do your results show? Is there a trend? Remember to use the right scientific language. It is pretty rare in science to "prove" something or to say "this *causes* that." Scientists prefer to use words like "may" "might" and "the results suggest that" because what we think is "truth" and "fact" is constantly changing in science and its important to keep an open mind.

4.3 Organizing your material for presentation

If you are organizing your material for a poster presentation it is useful to organize your material in the following manner;

Introduction: This is where you summarize some of the background research you did for your project. It is used to justify **why** you asked the experimental question that you did, and what other people have found about the subject. You are sort of brining the reader "up to speed" with an introduction.

Methods and Materials: You should be able to take most of this from your grant proposal.

Results: Your quantitative results can be displayed in graphs, tables and charts. Your qualitative results can be written out in paragraph form. **IMPORTANT:** You should not make any statement about what the results suggest or mean. That is for the conclusion section.

Conclusion: This is where you tie in all your results together and give an explanation as to what it all means or suggests. It is also good practice to compare your results to the background research that you did. In this section you should also include what future experiments can be done to further your experiments.

References: This is where you list all the sources you used in your background research.

2.2 When, where and how to send in your proposal

Your grant proposal due date is listed on the grant application.

Once you have filled out the proposal to the best of your ability you can hand it in to your teacher and they will fax it to us.

We will notify your teacher once we have received your proposal and then we will notify your teacher again once we have decided who has been awarded the grant.

3. DOING YOUR EXPERIMENTS

3.1 How to get your grant money

If you have been awarded a grant for your food sustainability science fair project **The Foodshed Project** staff will buy all your necessary materials and deliver them to your supervising teacher.

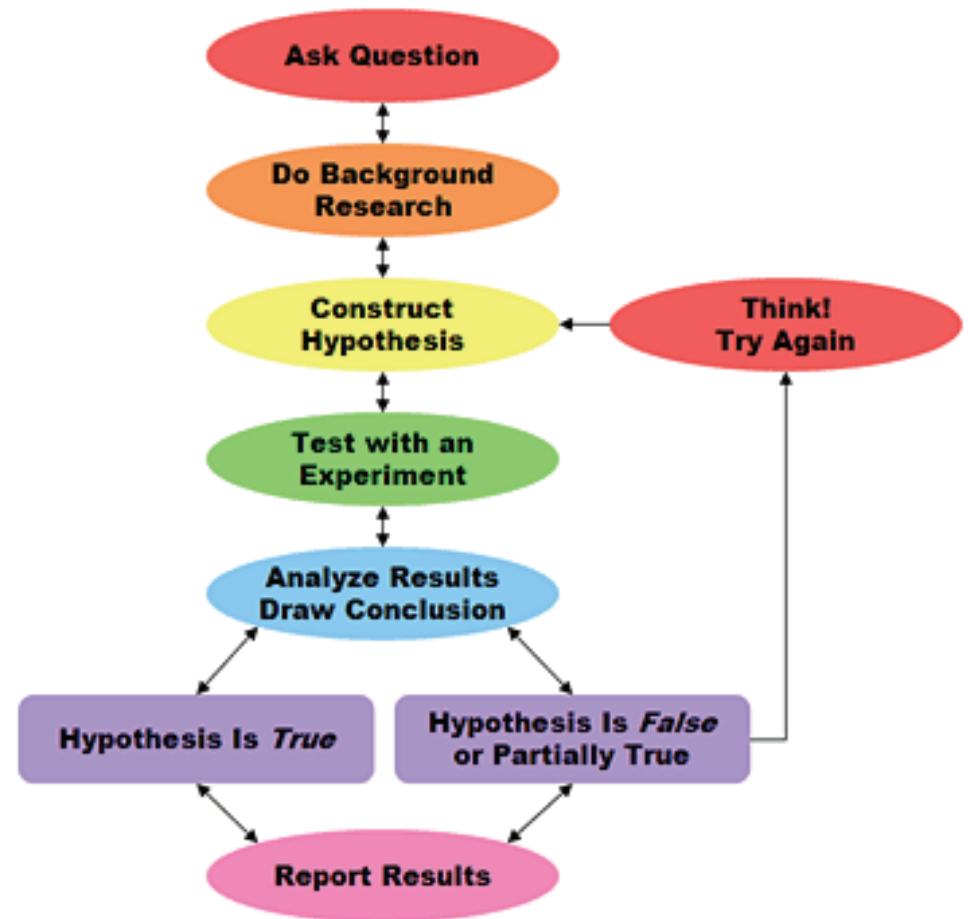
3.2 Conducting your experiment

Make sure you keep track of your results and observations as you go, because you may forget them if you wait. Most scientists have one notebook (a **log book**) that is just for writing down results and data as they go. Be sure to include dates, times, quantities and descriptions.

If your results are thorough and organized, it will also make it much easier to put together your presentation in the end.



Before you can put together a food sustainability science fair project you need to know how to put together an **AWESOME** science fair project, which means you need to use the 'scientific method.'



Science Fair Project Guidelines

1. PLANNING YOUR PROJECT

- 1.1 - What type of project do you have?
- 1.2 - What is your hypothesis?
- 1.3 - Do some background research
- 1.4 - Keep track of your research
- 1.5 - Plan out your methods (your 'recipe')
- 1.6 - Know what materials you are going to need
- 1.6 - Manage your time
- 1.7 - Safety and Ethics

2. WRITING YOUR GRANT PROPOSAL

- 2.1 - Things to include in your proposal
- 2.2 - Where and how to send in your proposal

3. DOING YOUR EXPERIMENTS

- 3.1 - How to get your grant money
- 3.2 - Follow your recipe
- 3.3 - Keep track of your results
- 3.4 - Organize and analyze your results
- 3.5 - Come up with a conclusion

4. REPORTING YOUR RESULTS

- 4.1 - Use the right scientific language
- 4.2 - Coming up with a conclusion
- 4.3 - Organizing your material for presentation
- 4.4 - Making a presentation



2. WRITING YOUR GRANT PROPOSAL

2.1 Things to include in your proposal

- Your name(s)
- School name or name of organization
- Is your project an Innovation, Experiment or a Study? (circle one)
- What is the research question for your project?
- What is the hypothesis for your science fair project?

For your project what will be the

- Subject (s)
- Independent Variable(s)
- Dependent Variable(s)
- Controls
- Control group(s)
- Quantitative observations
- Qualitative observations

- Describe your procedure or prototype:
- What materials will you need?
- What can you borrow from us and what are the projected costs?
- What do you think the practical application(s) of your science fair project will be?
- How much time will your project take?
- Please give us a brief description on how you will manage the time requirements for your project.
- What safety precautions will you take?
- Finally, why are you interested in food sustainability and the project you have chosen?

- your signature
- and your parents
- signature



1.6 Manage your time

It's important to sit down, look at a calendar, decide how much time you have for the project and then draw out a timeline of what you will do and when. So if you have 8 weeks to put together your project, you might want to do something like:

- week 1 - research topic and write/send in grant proposal
- weeks 2 to 5 - start running experiments
- week 6 - organize and analyze results
- weeks 7 to 8 - put together poster presentation

Remember: You want to leave yourself enough time to put together a really good report, because if your results are disorganized and not presented well, your experiment may not look very good.

1.7 Safety and Ethics

The safety and ethics is the number one concern of your experiment. If you cannot prove how your experiment is safe and ethical, you will not receive money for it, nor will anyone let you do your experiment in their lab.

Safety: Make sure you and everyone involved is safe. You should be thinking about all the equipment and materials you are using and asking yourself "Do I know how to use this?" and "Could this potential hurt me or someone else?" If you are not sure about something, ASK!

Ethical: All research involving humans and animals needs approval from official research committees and is heavily regulated and policed, so it is best not to use animals or humans in your research at this level in your career. If you would like to incorporate animals or other people into your experiments in a way that you think is totally harmless, ASK YOUR TEACHER FIRST!



1. PLANNING YOUR PROJECT

1.1 What type of project do you have?

In research there are three types of projects. An experiment, a study and a study. You should know if your project will be an experiment or a study.

Experiment: question → hypothesis → test things that you have control over → record and analyze

example: testing how much beans sprout under different soaking times

example: testing how bean sprouts grow under different rinse times per day

Study: question → hypothesis → test things that are naturally occurring → record and analyze

example: testing people's taste preference for different sprouts

example: surveying how many farms there are in Sudbury and in Northern Ontario

Innovation: develop a product or process that may solve a problem → test your product or process → record and analyze

1.2 What is your hypothesis?

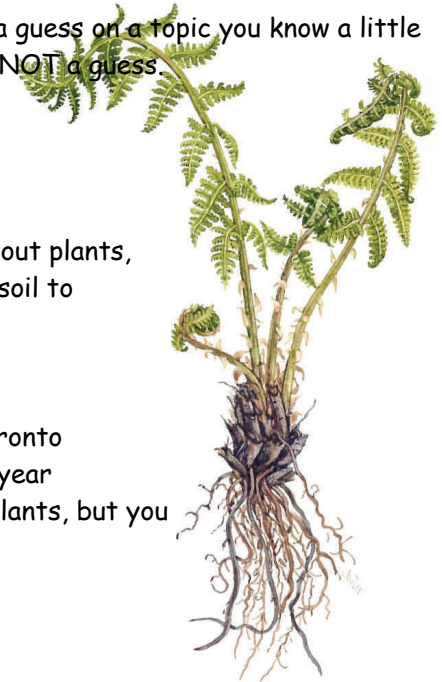
A hypothesis is basically a guess, but it's a guess on a topic you know a little bit about. You want to have a hypothesis, NOT a guess.

hypothesis example: Based on her past performances, you think Kelly will be Canada's Next Top Model **hypothesis**

example: Based on what you have read about plants, you think tomato seeds need really moist soil to germinate

guess example: You know nothing about professional hockey, yet you think the Toronto Maple Leafs will win the Stanley Cup this year

guess example: You know nothing about plants, but you think they will grow in Blueberry Kool-aid



1.3 Do some background research

It is important that you know about the subject you are going to be doing your project in. You don't need to know everything about the subject, but it helps to know a little. It helps in the following ways:

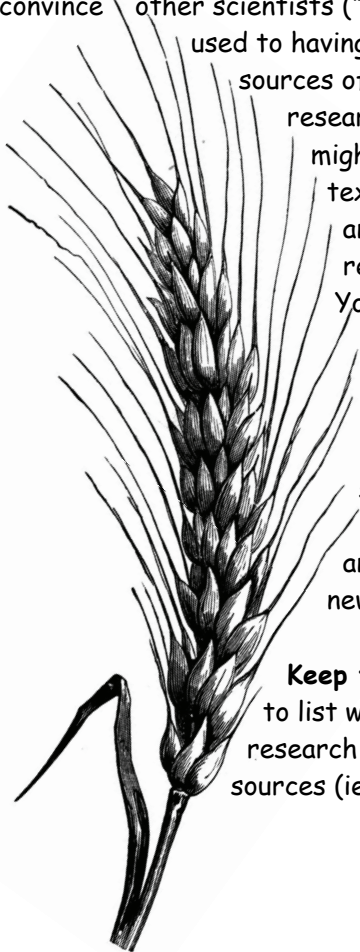
- helps you write a proposal to someone asking for money for your project
- gives you direction with your project
- helps you understand your results

It is also important to question where your research came from. For instance, you might read on a facebook group that 'local food has more nutrients.' Although that may be enough to convince you, it will not be enough to convince other scientists ("the scientific community"), so you should get

used to having to use good sources of research. Good sources of research include books, other scientists research papers and reliable internet sites. You might find it useful to use a big, thick, heavy textbook as a resource to look up a few words and concepts and then use other scientists research papers to find the latest findings. You can find other scientists research papers at <http://scholar.google.com> AND they are often summarized into only a few sentences!

Science has been around for about 500yrs, so a lot of the questions out there have been answered, BUT it is sometimes good to ask an old scientific question again, OR to put a new spin on an old scientific question.

Keep track of your research: You are going to have to list where you got your background information or research from so it's a good idea to keep track of which sources (ie., books, websites, newspapers, etc.) you used.



1.4 Plan your methods and materials (your 'recipe')

You should write out all the steps you will be taking and all the materials you will be using to conduct your experiment. You should write them out so that someone else can conduct the same experiment in their 'lab,' much like one person writes a recipe in their kitchen so that another person could make the exact same recipe in their kitchen.

You are also going to need your materials list for your grant proposal. You will only get money for a science experiment if the people know what it is you are going to be buying with their money.

1.5 What are your conditions?

You should describe your science project, in your grant proposal and report/presentation, using the following terms:

Subject: what/who is being studied

Independent Variable: what you change in order to measure the results

Dependent Variable: what changes as a result of the changes you impose on the independent variable

Controls: conditions that do not change

Control group: subjects not exposed to the independent variable (if you have one)

Quantitative observations: what things you will measure (ie., length, time, frequency, etc.)

Qualitative observations: what things you will describe (colour, taste, smell, behaviour, etc.)

- feel free to take pictures and videos if need be!

