

Science Project: Instruction Booklet

A science project is an experiment or a model that **can** be presented in a science fair.

You may work **alone**, or with a **partner**.

You may do one of two types of projects: an experiment or a model.

- ◆ **Experiment:** use the steps of the scientific method to answer a question.
- ◆ **Model:** construct a **working** model to explain a scientific concept. The model must be accompanied by a clear and complete written explanation.

Timeline

Step	Due date	Completed
Project idea (p.2) Each partner must have their own copy of the work, and a copy of any internet or book pages from which you took your idea, if applicable.		
Experiment plan (p.3-4) OR model plan (p.5-6). Conference with the teacher. (Each partner must have their own copy of the work)		
Complete the experiment or the model. Show your complete results table to the teacher.		
In-class presentation : <ul style="list-style-type: none"> • Backboard • Oral presentation • Folder with this completed booklet and copies of any pages that you use. 		

Participation in the science fair is optional, with a 5% bonus mark for participation.

Science Project Idea

Student(s): _____

Project idea : _____

Note on projects involving human participants:

Your teacher will look closely at your project to make sure that it is safe for everyone taking part. Only projects where the risks of harm are not greater or more likely than those encountered in everyday life will be allowed.

If your project involves human participants, and if you are selected to go the Regional Science Fair, you will need to bring proof of Informed Consent from each of your participants to present at the Regional. This means you need to write a short letter explaining your experiment to your participants, and then ask them and their parents/guardians to sign a form to show they agree to participate. These forms are not required for going to the school science fair, but it will be required if your project is selected to go to the Regional Science Fair. Your teacher has more information and handouts to help you with this.

Where did you find your idea?

Check all the boxes that apply and give the required additional information

<input type="checkbox"/> Website (give website in bibliography)	<input type="checkbox"/> Book (give reference in bibliography)	<input type="checkbox"/> Suggestion from a parent or other adult	<input type="checkbox"/> Your imagination
Why did you choose this idea?			
Bibliography:			

Discussion with your teacher: Date: _____

Teacher's initials: _____

Experiment Plan

Question:

(Model: What is the effect of « X » on « Y ».

Example: What is the effect of the quantity of acid in rainwater on the growth of plants?)

Hypothesis (with a reason):

Model: I think that when « X » is larger, « Y » will be larger (or smaller), because ...

Example: I think that when rain is more acidic, plants will grow less well, because I think that acid is bad for the health of the plants.

Variables:

Independent variable:	Dependant variable:
Control variables:	

Procedure:

Tips: Make a list of **steps**.

In a logical order.

Use **drawings** to be more clear, if necessary.

Show how you will **control the variables**.

Use **groups** of test subjects, or **repeat each measurement** numerous times (say how many) and calculate the average.

Model Plan

Purpose of the model: *(What is the scientific concept that the model will explain?)*

Material:

Things that are necessary to do the experiment	Where to find them?

Diagram(s) of the model

- *Make **your own** drawing, not a photocopy from a book or printed from the internet.*
- ***Label** your diagram with the **scientific name** of each part, and the **material** used.*
- *Neat and organized.*
- *Some models will require more than one diagram to show all the parts.*

Procedure

Tips: *Make a list of **steps**.*
 *In a **logical order**.*
 *Use **drawings** to be more clear, if necessary.*

Explanation of the model: On separate paper.

Explain the scientific concept that your model demonstrates, and how the model functions.

Example: if you make a model of an automobile motor you must explain how real motors work and how your model shows this.

Length: At least two (2) pages.

Tips for the backboard:



The **information** that is necessary for the backboard is listed in the following table:

For an experiment	For a model
<ul style="list-style-type: none"> <input type="checkbox"/> The title of the project, and your name <input type="checkbox"/> The purpose <input type="checkbox"/> The hypothesis <input type="checkbox"/> The variables <input type="checkbox"/> The procedure (a list of steps, add drawings or photos if possible.) <input type="checkbox"/> The results, with a table and graphs if appropriate. <input type="checkbox"/> The conclusion 	<ul style="list-style-type: none"> <input type="checkbox"/> The title of the project, and your name <input type="checkbox"/> The purpose of the model (It's a model of what?) <input type="checkbox"/> A diagram of the model (your own drawing) with the names of all the parts <input type="checkbox"/> Your building procedure <input type="checkbox"/> A scientific explanation of the model with a diagram of the "real thing" that your model represents, if applicable.
<p>In both cases you must...</p> <ul style="list-style-type: none"> <input type="checkbox"/> Name and give credit to all the people that helped you <input type="checkbox"/> Explain the connection between your research and "real life" 	



Organise your information in a **logical** fashion!!!!



The **Visual appeal** of the project is important:

- ✓ Neatness
- ✓ Use of space
- ✓ Use of color
- ✓ Illustrations
- ✓ Writing

Tips for the oral presentation:



Prepare the text of your oral presentation in advance, and **practice it** at home!!!



It would be ideal to just **speak** directly to the class and explain your project without looking at your notes.

- If this is not realistic for you, you can prepare **notes on index cards** to remind yourself of what you want to say and refer to them occasionally during your presentation.
- If you think you will need to keep the complete text in front of you to read in front of the class, write **it out on paper** that you can hold in your hand to read without turning your back to the class. **Do not** just read your text off your backboard, because it would be difficult for the class to hear you if your back were turned.



Pay attention to the following points:

- ✓ Speak in a clear voice
- ✓ Make eye contact with the audience
- ✓ Use appropriate vocabulary
- ✓ Communicate effectively (you should understand the subject about which you are speaking)

Material to bring for your presentation:



The backboard must be completely finished at home before coming to class. There will not **be any class time given** to finish off the backboard on the due date!



If you make a model, **bring it!!!**, and be ready to show how it works.



If you did an experiment and your **material** is not too cumbersome, bring it with you to show the class. If this is not realistic, try to take numerous photos while doing the experiment to include on your backboard.



If there is not enough time in class to really *do* the experiment during your presentation you must have done the experiment at home and you may simply present your **results** in class.



If you have a video camera at home you can take a video of your experiment. **BUT**, it probably won't be possible to present a video during the science fair due to a lack of equipment or even plugs.

Experiment Project

Experimental Aspect		
Purpose and hypothesis		/2
Procedure <ul style="list-style-type: none"> Clearly and completely explained in your own words addresses the purpose of the experiment provides for effective control of variables Include repeat measurements as appropriate 		/6
Results <ul style="list-style-type: none"> Tables of result is correctly constructed and complete. Results are graphed appropriately and correctly 		/5
Conclusion <ul style="list-style-type: none"> Correct, justified by the results 		/2
Experimental challenge (hands-on), for grade level <ul style="list-style-type: none"> Requires high degree of skill and/or time –5 pts Requires average skill and/or time – 3-4 pts Requires little skill and/or time – 1-2 pt 		/5
Scientific Understanding		
Identification of variables		/5
Demonstrates personal understanding of scientific concepts. <ul style="list-style-type: none"> above grade level – 5 pts at grade level – 3-4 pts below grade level – 1-2 pt 		/5
Originality <ul style="list-style-type: none"> Own idea, own procedure – 3 pts A modification of an idea taken elsewhere – 2 pts A re-doing of an idea taken elsewhere – 1 pt. 		/3
Presentation		
Visual Display <ul style="list-style-type: none"> Logically organized, neat, good use of colour, good use of space, good use of pictures, legible. 		/3
Oral Presentation <ul style="list-style-type: none"> Can present speak directly to audience with only occasional reference to notes, pointing out elements of board as relevant to guide audience attention, with excellent voice, eye contact and fluency – 4 pts. Reads presentation from prepared notes, with good voice, eye contact, fluency – 2-3 pts. Reads presentation from board, with little or no eye contact, voice difficult to understand – 1-2 pts. 		/4
Total		/40

Model Project

Experimental Aspect		
Materials list - Provided and complete		/2
Diagram <ul style="list-style-type: none"> Your own diagram (not copy-and-pasted from web!) Neatly and clearly drawn Fully labelled Shows all aspects of model (using more than one drawing if necessary) 		/5
Building procedure <ul style="list-style-type: none"> Clearly and completely explained In your own words 		/3
Model <ul style="list-style-type: none"> Well built Works as intended 		/5
Experimental challenge, for grade level <ul style="list-style-type: none"> Requires high degree of skill and/or time –5 pts Requires average skill and/or time – 3-4 pts Requires little skill and/or time – 1-2 pts 		/5
Scientific understanding		
Purpose of model is clear		/2
Explanation of model demonstrates your understanding of scientific concepts. <ul style="list-style-type: none"> above grade level – 7-8 pts at grade level 5-6 pts below grade level – 1-4 pts 		/8
Originality <ul style="list-style-type: none"> Own idea, own procedure – 3 pts A modification of an idea taken elsewhere – 2 pts A re-doing of an idea taken elsewhere – 1 pt. 		/3
Presentation		
Visual Display <ul style="list-style-type: none"> Logically organized, neat, good use of colour, good use of space, good use of pictures, legible. 		/3
Oral Presentation <ul style="list-style-type: none"> Can present speak directly to audience with only occasional reference to notes, pointing out elements of board as relevant to guide audience attention, with excellent voice, eye contact and fluency – 4 pts. Reads presentation from prepared notes, with good voice, eye contact, fluency – 2-3 pts. Reads presentation from board, with little or no eye contact, voice difficult to understand – 1-2 pts. 		/7
Total		/40