Grade 8 – 9 Science Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Science Project: Instruction Booklet

A science project is an experiment or a model that **can**be presented in a science fair. This project is worth 10% of your final grade in science!

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 | Date | Grade |
| Project idea sheet (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. |  | /2 |
| Experiment plan sheet (p.3-4) or model plan sheet (p.5-6).  Conference with the teacher. (Each partner must have their own copy of the work) |  | /5 |
| Complete the experiment or the model.    Show your complete results table to the teacher. |  | /2 |
| Final remittance :   * Backboard * Oral presentation * Folder with this completed booklet and copies of any pages that you use. |  | /35 |

Participation in the science fair is optional, but you receive and extra 5% as a bonus just for being there.

Science project Idea

Student(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Project idea : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Where did you find your idea?

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

|  |  |  |  |
| --- | --- | --- | --- |
| * Book | Title:  Author :  Editor : Year of publication : | | |
| *If possible, photocopy the page(s) of the book that you use and include them with your final project.* | | | |
| * Website | | Complete internet address : | |
| *If possible, print the page(s) that you use and include them with your final project.* | | | |
| * Suggestion from a parent or other adult | | | Name of the person : |
| *Explain how you thought of this idea :* | | | |
| * Your imagination : *Explain how you thought of this idea :* | | | |
| * Other: *Explain!* | | | |

Discussion with your teacher: Date: \_\_\_\_\_\_\_\_\_ Teacher’s initials: \_\_\_\_\_\_

# Experiment Plan (draft sheet)

Question**:**

*(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):**

*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: | Dependent 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.*

Material:

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

Results:

1. Specifically, what are you going to measure to obtain the results? Which instrument will you use to make your measurements? Where, when, and how will you make your measurements?

1. Prepare a table for your results. Write the title of each column to show the measurements that you will record, and the **units of measurement**. Leave spaces in the table to record your results when you do the experiment.

# Model Plan (draft sheet)

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.*

Fabrication method

*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.

Science Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Tips for the backboard:**

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

|  |  |
| --- | --- |
| **For an experiment** | **For a model** |
| * The title of the project, and your name * The purpose * The hypothesis * The variables * The procedure (a list of steps, add drawings or photos if possible.) * The results, with a table **and** graphs if appropriate. * The conclusion | * The title of the project, and your name * The purpose of the model (It’s a model of what?) * A diagram of the model (your **own** drawing) with the names of all the parts * Your fabrication procedure * A scientific explanation of the model with a diagram of the “real thing” that your model represents, if applicable. |
| In both cases you must…  * Name and give credit to **all** the people that helped you * 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** | | /20 |
| Purpose and hypothesis | /2 |
| Procedure   * *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   * *Tables of result is correctly constructed and complete.* * *Results are graphed appropriately and correctly* | /5 |
| Conclusion   * *Correct, justified by the results* | /2 |
| Experimental challenge (hands-on), for grade level   * *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** | | /13 |
| Identification of variables | /5 |
| Demonstrates personal understanding of scientific concepts.   * *above grade level – 5 pts* * *at grade level – 3-4 pts* * *below grade level – 1-2 pt* | /5 |
| Originality   * *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** | | /7 |
| Visual Display *Logically organized, neat, good use of colour, good use of space, good use of pictures, legible.* | /3 |
| Oral Presentation   * *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** | | /20 |
|  |  |
| Materials list - Provided and complete | /2 |
| Diagram   * *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   * *Clearly and completely explained* * *In your own words* | /3 |
| Model   * *Well built* * *Works as intended* | /5 |
| Experimental challenge, for grade level   * *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** | | /13 |
| Purpose of model is clear | /2 |
| Explanation of model demonstrates your understanding of scientific concepts.   * *above grade level – 7-8 pts* * *at grade level 5-6 pts* * *below grade level – 1-4 pts* | /8 |
| Originality   * *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** | | /7 |
| Visual Display *Logically organized, neat, good use of colour, good use of space, good use of pictures, legible.* | /3 |
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| Total /40 | | |