SCIENCE FAIR PROJECTS

Mr. Stephenson

Includes original source material by Dr. Gabbott

PROJECT CHECKLIST

Do I have everything?

Is my problem in the form of a **question**?

Have I answered the question with a clearly written **hypothesis** including a **prediction**?

Does my **experiment** test my hypothesis (prediction)?

Does my experiment include appropriate **controls** to eliminate other factors that may explain the observations?

Have I designed my experiment with enough **repeated tests** to reduce chance as a factor?

Do I have a **logbook** to record all my data, my ideas and any other notes?

Have my teacher and parents/guardians **approved** my project?

Is my **display** complete and visually appealing? Have I included all the **supporting materials** I need?

Have I handed in my **Abstract**?

THE LOGBOOK

This is simply a book with a complete record of your project. It contains the "**raw**" data as you collected it, along with the dates of each record. It should also include your ideas, original plans for the procedure and any changes you made as the project progressed. One important page should be the original (and subsequent) Project Proposal. Make sure these have been signed by your teacher.

The logbook should be "**bound**", and not loose leaf, such as a three-ring binder. It doesn't have to be particularly neat but it should be clear and well annotated, with dates for all entries. It might contain the sources of the apparatus and materials you used (what shop did you buy equipment from, how much did it cost? Who did you borrow equipment from?). Pictures can also be included.

THE DISPLAY

-like a formal Lab Report, but in **POSTER FORM.** *You must include the following*:

PROJECT TITLE **Student name and grade**

PROBLEM A clear statement of the problem. Provide background information or a context for the problem – explain why this is an important question.

HYPOTHESIS Your "answer" to the problem and a Prediction (written in "If … then …" format.) You must give the *reason* for your hypothesis. Identify the dependent and independent variables and those you controlled.

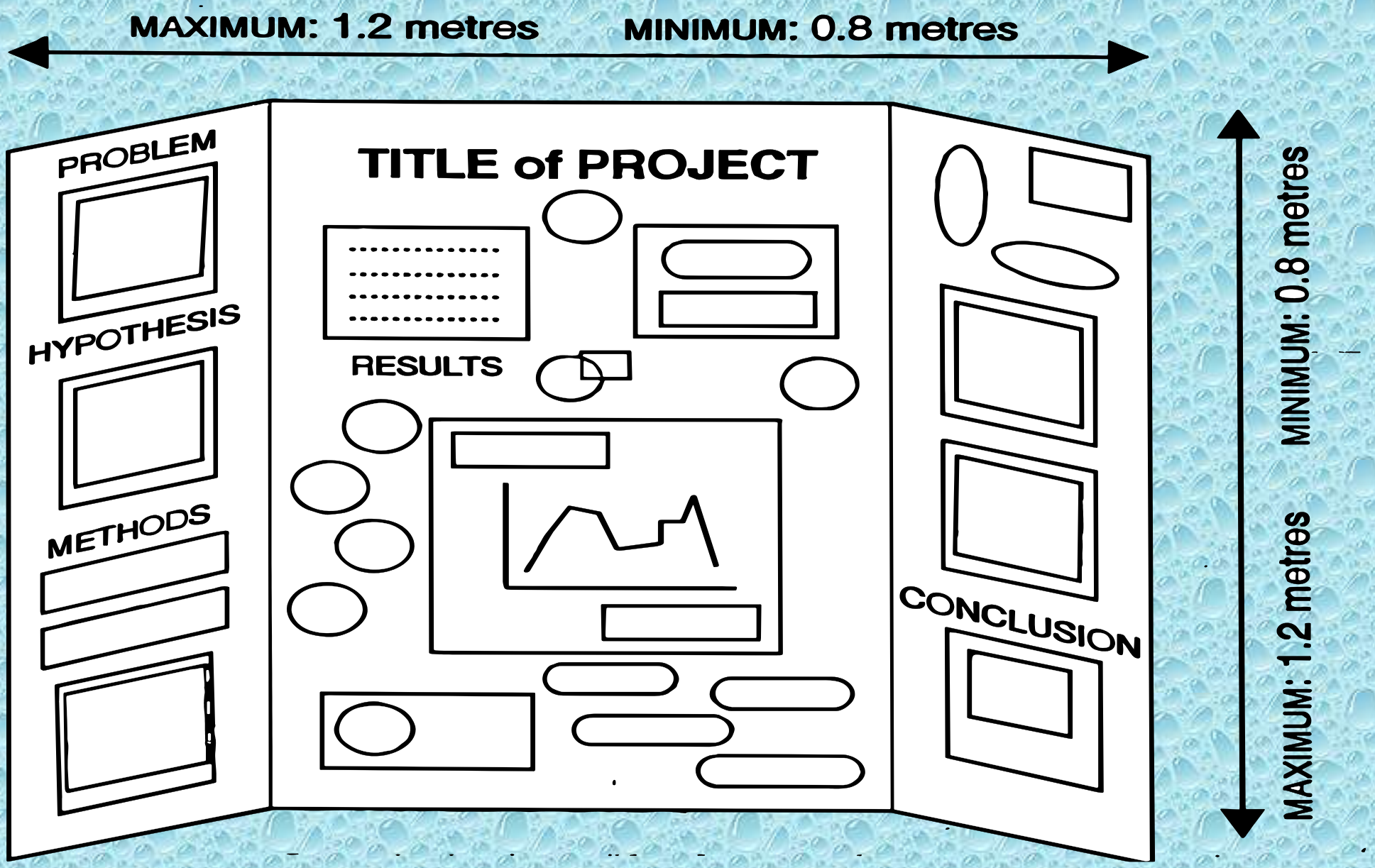
METHODS An explanation of the procedures used in the experiment which *must* be written in the **past tense**. List any unusual or important equipment.

RESULTS Present data as clearly as possible, preferably graphically, so that it is easily understood. Graphs must have labelled axes (including units) and title.

DISCUSSION Interpret your results, what do they show? How convincing is your data? Was the prediction correct? Consider any **SOURCES OF UNCERTAINTY OR ERROR**.

CONCLUSION What are the conclusions you can draw from the experiments? Have you answered your original problem? What else could be done next?

Above all, the display should capture the interest of the viewer. Remember that an appropriate photo or drawing can be more effective than many words. Careful use of colour can make a real difference. Make the title large, clear and neat, and be sure that all your lettering is large enough to be read without difficulty from about 1-2 metres.



NOTE: Your name and grade must be printed clearly in a small (approx. 6cm x 12cm) box in the top right hand corner of the poster.

Here are a few examples of displays from 2009….

SALTY ICE

Problem

Hypothesis

Materials

Melting Time of Ice with Different Salts

Types of Salt	Time
Calcium Chloride	17m 50s
Iron (II) Chloride	27m 20s
Zinc Chloride	20m 40s
Potassium Chloride	21m 50s
Ammonium Chloride	21m 30s
Silver Chloride	25m 13s
Cobalt Chloride	21m 19s
Pure Ice (control)	28m 13s

Results

Methods

Conclusion

Some comments:

In this project the student was looking at the ability of different salts to melt ice.

Visually - very eye catching
- bright colours, diagrams, charts, pictures, etc.

Content - well displayed
- amount of material is appropriate to deal with the topic but overall a bit basic.

Skin Cancer Prevention With SUN SCREENS

HYPOTHESIS

RIABLES

METHODS

ATERIALS

PROCEDURE

DISCUSSION

SOURCES OF ERR

RESULTS

CONCLUSION

BIBLIOGRAPHY

Some comments:

This was a very good project in which the student investigated the effectiveness of various types of sunscreen.

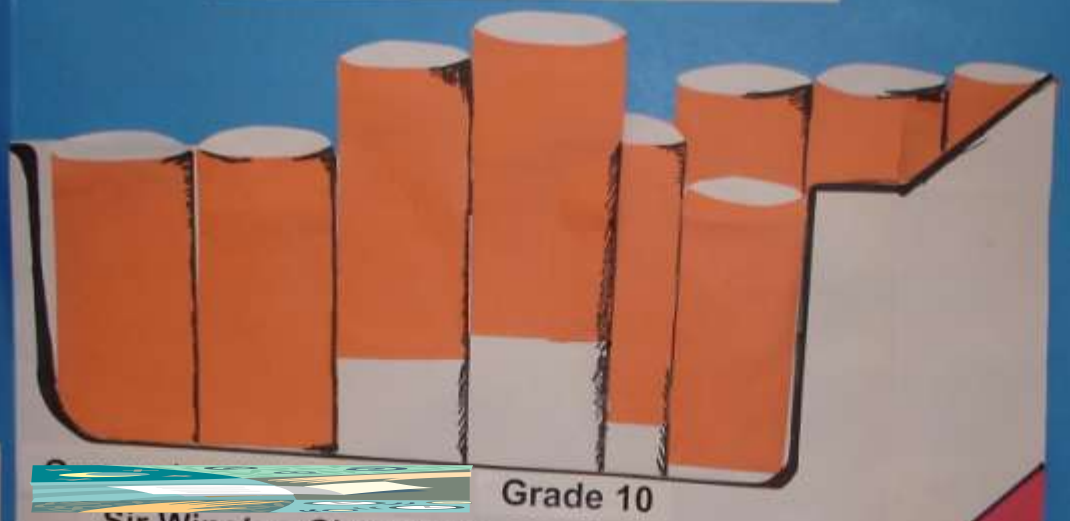
- The experiment was well thought out and executed.

- The display is neat and well organized, although the title is a bit large – some of that room could have been used for a larger font for the rest of the display.

Note the use of photos and the logbook in the lower right corner.

The Skin Killer:

The Effects of Cigarette Smoke Extract on Human Dermal Fibroblast



Grade 10
Sir Winston Churchill Secondary

Problem

Hypothesis

Equipment and Apparatus

- Peristaltic pump and Mechanical Pipette
- Inverted Microscope
- Cell Incubator
- Hemacytometer Cell Counter

- 'Peter Jackson' Cigarette, made in Canada
- Human Dermal Fibroblasts
- Dulbecco's Modified Eagle's Medium (DMEM)
- Fetal Bovine Serum (FBS)
- Penicillin G Sodium
- Streptomycin
- Trypsin/ EDTA
- Trypan Blue
- 24 Well Plate
- Petri Dish
- Vacuum Pump

Methods

Results

1. Analysis of Data

1. Observation of morphology of human dermal fibroblasts

2. Inhibition of human dermal fibroblasts proliferation by CSE

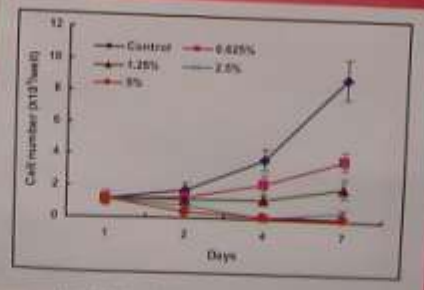


Figure 2. Effect of CSE on fibroblast proliferation

II. Reliability of Data

1. The concentration of CSE

2. Accuracy of cell counting and preparing of cell suspension

3. Manipulations of bacteria

Conclusion

Post-Project Discussion

Comments:

This was an excellent project! Here the student was investigating the effect of cigarette smoke on actual skin cells.

The presentation board is very neat, well organized and the use of the cigarette package is very creative and eye catching.

Font size could have been a bit larger. A large portion of the board is used for the title and visuals.

The experiment was well designed and executed and the analysis of the results was excellent.

Note again the use of photos and graphs.

Some reminders:

Make sure you check the criteria for displays before any fair you attend!

Usually there is some allowance for things like display size, etc.

If you have other items you would like to display with your poster MAKE SURE THEY ARE ALLOWED. Things like chemicals, live specimens (including plants and bacteria), etc. are usually not permitted.

You can modify your display between fairs. If you plan to continue with your project or participate in other fairs, use any feedback you receive CONSTRUCTIVELY.

THE PROJECT SUMMARY

In addition to the Project Display, you must submit a Project Summary (or Abstract). The Summary is part of the evaluation of your project.

The Summary is a brief account of the essential parts of your project. It is NOT a Lab Report. The Summary should point out the key features of the project, including the problem, your hypothesis, the experiment you did and your overall conclusions.

The Summary is limited to a maximum of ONE page (8.5" x 11") and must be printed on white paper, one side only. Summaries longer than one page will not be marked. The minimum font size is 10 pts. Don't include any graphs or illustrations.

The Summary must have the following:

- **Project title**
- **Student's name**
- **Grade**
- **School name**
- **A clear statement of the problem and your hypothesis**
- **A brief description of the experiments carried out**
- **A brief account of the results. Do NOT include graphs, tables or illustrations**
- **Your overall conclusions**

CRITERIA for EVALUATING PROJECTS

SCIENTIFIC THOUGHT

Is there a clear problem or question?

How well does the hypothesis “answer” the question?

Has an effective experiment been designed to test the hypothesis?

Have the dependent and independent variables been identified?

Are there adequate and appropriate controls for other variables?

Are there sufficient replicates or trial numbers?

Has the data been suitably and effectively analysed?

Is the data displayed neatly and in a way that is easy to understand?

Are the results (graphs, charts, tables) neat, clear and understandable?

Is there adequate consideration of the reliability of the data?

Is there a suitable conclusion that answers the question?

CREATIVE ABILITY

Does some part of the project strike you as being creative or original?

DRAMATIC VALUE: PRESENTATION

Does the overall presentation provoke interest?

Ask your teacher for a copy of the marking rubric.

You will also likely be asked to complete a peer evaluation of other student's projects and receive peer evaluations of your project.

HAVE FUN AND GOOD LUCK!!