

What goes into the ISEF research plan?

Title

Make it concise and descriptive: "Innies vs. outies: the effect of bellybutton type on lint accumulation." If your study is about a certain area or grouping (species, age group, etc.), name that in the title.

Name

Yours. You'd be surprised how many people forget to add this.

Project question

What is it you are curious about?

Example: "Does bellybutton type affect the amount of lint accumulation over time?"

Introduction

This section summarizes what you found in your background research that relates to your project question - what is known in the field, essentially. Aim for 3-5 paragraphs in this section, maybe a couple more if there's a lot of important background info. Work in references to the articles you read (which will be cited in your bibliography at the end). Use an 'in-line citation' to do this.

Example: if you read an important article by someone named David Smith published in 2004 about the type of lint accumulated in bellybuttons, one of your sentences would read something like this: "Lint from wool sweaters has been found in bellybuttons in significantly higher proportions than any other type (Smith, 2004)."

Hypothesis - OR - Engineering Goal

1. If you're doing an experiment, you will have a hypothesis. The hypothesis is an "If _____, then _____, because _____" statement that shows what you will test and your predicted outcome and reasoning.

Example: If lint is collected from a random sample of 30 "innie" and 30 "outie" bellybuttons, then the innies will have a greater mass of lint because of their concave shape.

2. If you are creating something you have an engineering project. Instead of a hypothesis, it makes more sense for you to state a goal, in the form of a sentence or two that explains what you will do and what problem it will solve.

Example: The goal of this project is to develop a screen that will stay in place in any bellybutton for at least a full week to prevent any lint accumulation.

PLEASE SEE OVER...

Procedure

This is a detailed, numbered list of the steps you will take to set up your experiment and collect and analyze data. Write it so that anyone can pick up your plan and do your experiment. You don't need to include 'gather materials', but spell out all your important steps. Give a lot of detail with steps that are critical to data collection or anything that involves risk to you, other people, animals, or the environment.

Example:

You should NOT just write, "1. Collect bellybutton lint".

You SHOULD write,

- "1. Distribute flyers at school to advertise the study and a website for further information, which students can pick up voluntarily in their science classes (see attached flyer). [and then you'd attach it]
2. Screen potential subjects for personal hygiene habits and bellybutton type through an anonymous online survey (see attached),
3. Select 50 innies and 50 outies who meet the screening criteria (see attached).
4. Post a list of selected subjects' ID codes online and ask them to come to an informational meeting.
5. Obtain informed consent from study participants to collect their bellybutton lint,
6. Establish a private room for bellybutton lint collection,
7. Establish collection times with each participant so that lint is collected every 24 hours,
8. Collect lint by swabbing with a lint-free nylon swab three times in a clockwise direction around the full circumference of the bellybutton...." You get the idea.

Materials

A bulleted list of everything you need to collect data, very specific. An example of a **good** list: "500 ml de-ionized water; stopwatch with 0.1 sec accuracy; AA alkaline battery". An example of a **too-vague** list: "Water; Stopwatch; Battery".

Data List

List all data you'll be collecting during your project. In the example above, you'd be recording the subject number, weight of lint, type of clothing worn, maybe air temperature (affects whether someone wears fuzzy clothing or not)...not just the amount of lint!

Risk assessment

Make a list of the risks you anticipate from your study and explain how you will handle those risks and what regulations, if any, apply (for example, privacy laws, or boating regulations). Include both physical and psychological harm that could potentially happen to people in your study, or to you. Every study has risks - many of them are minimal. Any study that uses human subjects, animals, bacteria or other microorganisms, or involves dangerous chemicals, activities or devices **must** have a very detailed risk assessment section. You can get more information about this from the ISEF rulebook (see Amy or <http://www.societyforscience.org/ISEF/document/respln10.pdf> , page 2).

Bibliography

This goes at the end, formatted in APA style. with at least 5 sources. HOWEVER, this section contains information you probably *started* with - the results of your background research. Once you have the topic of your project in mind, you have to hit the library & web to find out what is already known about it, what isn't known, and how other researchers did their studies. Students often rush through this step - big mistake. It's worth it to your project, and to you when presenting your project, to take a little time to dig into this. The teacher-librarian at your school can be a big help in getting you the full text of articles that look useful to you.