

STEP 3: DATA COLLECTION

Data collection is, for most students, the most enjoyable part of the project. Most scientists agree that work in the lab is fun. Here you will develop procedures, revise ideas, and collect data. You will have fun in experimentation; however you must document all work by recording everything that was done. Data is anything that we can measure or observe. Data can be placed into two different categories, quantitative and qualitative.

Quantitative data is any observation that is numerical in nature. This data is easily replicable as it is a number measurement. This type of data can be analyzed using a variety of statistical tests. Good quantitative data is something that can be replicated by other research scientists. It is critical that accurate data be recorded for future use and reference. Because quantitative data has a specific measurement, it must have a specific unit of measurement that was used. Be sure to label all quantitative data with the proper unit.

Qualitative data is any written observations that you notice during experimentation. These may include possible problems that you encountered. They may be outside forces that you feel may help explain the quantitative results that are being recorded. Qualitative data are your interpretations of what you are observing. Due to this fact, qualitative data may not be replicable by other research scientists. Most judges will focus their attention on the quantitative data, however good qualitative notes can help you explain this data more clearly. All researchers should keep a good journal documenting both quantitative and qualitative data.

It is imperative that all data is taken and recorded as accurately as possible. A good journal/logbook will help you verify your work and adds validity to your study. The data collection sheet is one way to record your data. You may keep this information in a bound journal or on separate sheets compiled together. A well-prepared data collection sheet will help you to identify exactly what you plan to collect. It also forces you to predict other possible data or problems that you may encounter. A well-designed data collection sheet will replace the journal entry during data collection. ISEF strongly suggests a well-documented journal as part of the final display. Record keeping can be tedious, but it is critical for developing conclusions about the data collected.

Assignment 10: DATA COLLECTION SHEET

The data collection sheet is one way that you can keep track of all quantitative and qualitative data. Most students find it will save them time in the long run. The data collection sheet is one piece of paper that will include all of the major experimental information needed for a good journal. If you prepare a place to record your data, then when you are collecting the data it will be much faster. You will eliminate a lot of repetitive record keeping if you use the data collection sheet. It is very important that you record the data as you collect it. Don't rely on your memory to recall critical data.

The data collection sheet should include, but is not limited to, the following

information:

1. Date of data collection
2. Trial number (both control and experimental)
3. Brief procedure with independent variable(s) identified
4. Quantitative data (dependent variable)
5. Qualitative data (observations and notes – these may be very helpful later during conclusion writing and/or data analysis)
6. Constants (include items such as environmental conditions, location, set up, etc. that will stay the same in all testing)
7. Title
8. Your name and/or signature
9. LABEL EVERYTHING WITH UNITS MEASURED!!!!!!!!!!!!
10. It is a great idea to record any other information that could affect your experiment - atmospheric conditions, lot numbers of chemicals, serial and model number of equipment used, etc.

You do not need to rewrite published procedures. Simply document the published work and you do not need to copy any lengthy procedures. You must describe any modifications that were made to the published procedure. It is a good idea to have a copy of the published procedure and reference in your files to refer to, however.

A poor example of a data collection sheet is shown below. Try to determine why this is a poor example. What is missing? What would make this data easier to understand?

DATA COLLECTION SHEET

Sunday

Green

5	4	4	3	2
5	6	6	7	8

Yellow

5	5	4	5	6
5	5	6	5	4

Data worked perfectly!

A better example may look more like this example:

EFFECTS OF DENERVATION ON TRANSPORT MAXIMUM OF PHOSPHATES

Group 2: Saline Control
Trial # _____

Ken Mann
Date: _____

Initial Mass of Rat: _____ grams

Constants: Inulin: 3% at 4.5 ml/hr
Saline: 0.9% at 2.0 ml/hr
Phosphate: 30 mmol at 2 ml/hr
60 mmol at 2 ml/hr
90 mmol at 2 ml/hr

Procedure:

	Inulin	_____	_____	_____	_____	_____	_____	_____	_____	_____
	Saline	_____	30mmol Pi	_____	60mmol Pi	_____	90mmol Pi	_____	_____	_____
	!		!		!		!			
TPTX	!		!		!		!			
Minute	0	60	120	150	165	185	200	220	235	255
			P1		P2		P3		P4	
			U1R	_____	U2R	_____	U3R	_____	U4R	_____
			U2L	_____	U2L	_____	U3L	_____	U4L	_____
Blood Pressure			_____ mmHg		_____ mmHg		_____ mmHg		_____ mmHg	

Measured Data:

Period	Vu ml/min	In mg%	PO4 mM	Ca++ mM	Na mEq	K mEq	PAH mg%
P1							
P2							
P3							
P4							
U1R							
U1L							
U2R							
U2L							
U3R							
U3L							
U4R							
U4L							

Qualitative Notes:

ASSIGNMENT 10

1. Develop a data collection sheet for record keeping.

Assignment 11: JOURNAL

The journal is an essential part of your science fair project. The journal will document each step in your progress to project completion. The data is very important and should be accurately recorded. A data collection sheet will help you accomplish this. All other aspects of your project can be recorded and documented. You can use a spiral notebook, a bound notebook, or a three-ring binder. You may use the sample journal sheets as described in the introduction to this book. The journal will provide verification of when you did your project. It should also document that this is your work. Two items that are important for your journal entries are the date and the signature. This should provide adequate documentation that this is your work. You may also prepare a cover page for your journal. This will help to identify your project. Your teacher can laminate the cover and bind your journal into a final product if you like. You will find sample journals in the classroom.

ASSIGNMENT 11

1. Develop a sample journal to use throughout your project.
2. Develop a cover page to identify your journal.

STEP 3 GRADE CRITERIA

E=Excellent

S=Satisfactory

N=Needs Work

The following grade criteria will be used to assign points for this task:

_____ data collection sheet shows key experimental plan aspects (title, variables, control, constants)

_____ brief procedure given to help understand how data is being collected

_____ quantitative and qualitative data shown on the data collection sheet

_____ journal cover page

_____ journal entries show date and signature

_____ adequate number of journal entries show project progress

Format (Grammar, Spelling, Typed, Style) _____

Content (Information, Documented, Reliable, Journal) _____

Creativity/Originality (Ownership of Project, Ingenuity) _____

EXCELLENT WORK: 28 - 30

SATISFACTORY WORK: 24 - 27

NEEDS IMPROVEMENT: 21 - 23

Total Points _____/30 points

Suggestions for Improvement: