

How To Write a Research Project for LABRats

By Shawn Carlson

LABRats Research Projects (RPs) are open-ended experiments that the senior members do as individuals and the younger members carry out in their Groups. RPs offer everyone the chance to carry out long-term, simple and low-cost experiments at home.

By showing Labrats how to put the science skills they learn at their weekly Synergy meetings into practice, RPs re-enforce the program's basic science content. What's more, since members get to pick which projects they want to do, these experiments get each Labrat immersed in scientific explorations that deeply interest them.

But even more importantly, RPs hone a Labrat's empirical skills and habits of mind. Indeed, they provide a full introduction to real research. For that reason, RPs are arguably the most vital part of the LABRats program.

This monograph explains how to write a Research Project for LABRats.

Background

Your Research Project must meet these criteria:

- 1) **Broad Focus:** RPs must not describe a narrow experiment. They are not like a lab manual that takes students step-by-step through the procedures to do a single experiment with a well-defined outcome. Rather, they should be more like the old "Amateur Scientist" column in Scientific American magazine which provided brief introductions to broad areas and then explained how readers could build the tools to go explore them. Your RP must likewise provide a broad entryway for exploration. You must describe how to build an instrument or carry out a set of procedures that serve as the jumping-off point for a host of explorations that the Labrats can concoct themselves.
- 2) **Cost:** Your RP must be inexpensive to carry out. As much as possible, it should use materials that are easy to obtain for a nominal cost. Keep in mind that in addition to hardware stores and craft shops, this includes science-related materials that can

be purchased through the LABRats Supply Bureau. (Check out Labrats.org for details.)

- 3) **Synergy Support:** Keep in mind that Synergies all have both expertise and equipment that the Labrat can use at the weekly meetings. So Labrats who needs to weigh something on a balance, take digital photographs of something they can transport, use a microscope and so on, will be able to do so at least once each week. For a list of equipment that a typical Synergy is likely to have on hand, please download "How To Start a LABRats Chapter" from the LABRats.org Website.
- 4) **Age Range:** Research Projects must be suitable for Labrats in the age range of 11-14 to do in their Groups, and members 15 and older to do on their own under a mentor's guidance.
- 5) **Presentation Support:** Each Labrat is required to give at least one 5-minute progress report on their RPs to the entire Synergy once each quarter. Your document needs to help the Labrat prepare for these brief talks. For instance, make sure to call out things that the Labrat should mention in his or her next report.
- 6) **Photo Illustration:** You need to provide digital photographs that clearly illustrate every task that the Labrat will need to know in order to carry out the RP.

Permissions Document

A Research Project consists of two documents: The text and, if necessary, a Permissions document. The Permissions document must contain email messages, including the addresses and a FAX number, from the owners of copyrighted images, if any, that you use. These messages must state that the owner is willing to grant SAS permission to use their images in the LABRats educational materials.

We will contact the owner to get their signature on a contract granting SAS non-exclusive rights to use the image. Please understand that we cannot release any monies to you until all permissions have been obtained. We recommend you send the owner of the copyright the following message:

"Hi there,

"I am writing a science lesson for a revolutionary new educational program called LABRats. The program is run by the Society for

Amateur Scientists (SAS), a non-profit organization. (You can see what LABRats is all about by at www.sas.org.)

"I ran across an image on your Web site [WEB ADDRESS] that I'd like to incorporate into my lesson. The image shows [DESCRIBE]. So, I am writing to ask that you allow the Society for Amateur Scientists permission to include this [these] image[s] and distribute it [them] over the Web to all LABRats members.

"Sorry that SAS can't afford to pay you anything for this, they are a non-profit organization after all. But they would be happy to include in this lesson an acknowledgement to you and your Web site thanking you for your generosity.

"Please let me know if this sounds OK to you. If so, please respond with a FAX number so SAS get you the permission slip you'll need to sign.

"Thanks for supporting science education in America!

"Sincerely,

"YOUR NAME"

Titles

All RP documents must begin with the letter 'R', for "Research." The Permissions document that you submit must have the same title as the text document, except with the letters PD appended to the end. For example, "RBloodFlow.doc" and "RBloodFlowPD.doc."

Research Project Template

All RPs have the following sections:

"Acknowledgements"

The Acknowledgement should flow like this:

"This monograph was written by [YOUR NAME]." Thank contributors of copyrighted materials, if any, and cite your

primary sources. Then thank any person or organization that provided assistance to make this monograph possible.

To this the National Office will append credits for donations and other support that helped to make this work possible.

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Science Skill Awards You May Want to Have

List whatever Science Skill Awards are necessary to carry out our project. If your RP describes several different experiments, list what SSAs are required for each separately.

Copyright Notice

The copyright notice must read.

"This monograph is copyrighted by Labrats. All rights reserved. © YEAR"

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"Research and Learning Goals"

State the broad goals of the Research Project. Explain what the Labrat will be able to do when they have completed it. An example might be:

"This Research Project will show you how to monitor the health of streams and riparian habitats. If you complete this project you'll not only understand a great deal about the ecology of streams, you'll also be able to test water samples for pollutants, as well as monitor living organisms that live in the water and near it. "

"What You'll Need"

This section contains a bulleted list of equipment necessary to carry out the basic research program. If an item is particularly specialized

or obscure, make sure to append to the entry a parenthetical note identifying a source.

"Background"

The Background section is not intended to be a complete and thorough introduction to the subject. You do need to provide a general overview of the topic, enough to wet their appetites and get them headed in the right direction, but Labrats are expected to look to other sources for more detailed information. Keep this section to about 1500 words.

"Procedures"

Describe exactly what the Labrats need to do in order to carry out research in this area: the protocols to perform the various kinds of measurements, etc. Please be as detailed as necessary to make sure the readers understand the procedure thoroughly. And don't forget to illustrate each procedure with plenty of digital images.

Make sure to remind your readers just how important their science journal is. Tell them that they need to carefully and thoroughly log all their observations in their journal.

"Suggested Explorations"

Propose at least five different experiments that the members could do. Spend just one paragraph on each. Start these paragraphs by proposing an experimental question and then spend the rest of the paragraph pointing the readers in the right direction to go answer it.

"Reading/References"

List published resources that are appropriate for this age group as well as key words to use in a Google search. Don't forget to cite the Websites of any relevant government agencies, like the US Geological Survey (www.usgs.gov), NASA (www.nasa.gov), the National Oceanographic and Atmospheric Administration (NOAA) (www.noaa.gov), etc.

"LABRats Web Support"

Each RP is supported on the labrats.org Website by a discussion board where members can post questions, get answers from experts and share experiences. While you need to include the subject heading "LABRats Web Support", the National Office will insert the appropriate text in this section that will direct the readers to the correct forum.

"Talking Points"

List at least five very general questions about the RP topic that you hope each member will be able to answer by the time the project is complete. These questions will be used by the LABRats program to stimulate discussion.

How to Submit Your Research Project

First, if you haven't already done so you'll need to logon to www.labrats.org/developers and register as a LABRats Developer.

Then, you need to use the Developer's "Propose Research Project" form to send us a proposal. You'll be asked to describe what RP you'd like to write, and explain why you are the right person to write it. Please understand that developers must agree to irrevocably assign all copyrights to their work to the Society for Amateur Scientists.

Before you begin, make sure you check the list of RPs that are either completed or already in progress. You don't want to waste your time writing a Project that already exists.

We will promptly notify you by email as to whether we accept your proposal.

Should we accept it and you are a first-time writer for LABRats, we will ask you to submit just one RP so we can evaluate your work. Do not write anything else until we have approved your first submission. If we feel that your work does not meet the high standards of the program, we will reject your piece and tell you frankly why. Please note that we cannot pay a kill fee.

If we accept your work, then we'll invite you to submit additional material. You'll need to submit the main text, as well as the

Permissions document (if necessary) in Microsoft Word format through the upload feature on the LABRats developers' Web page.

Frequently Asked Questions

Q: Do I keep the copyright if my work is not accepted by LABRats?

A: Absolutely. We only take possession of copyrights for materials that become part of the LABRats program.

Q: Will my name appear on my work when it is published?

A: Yes, but in the Acknowledgements section. Also, we list all developers on the LABRats Developers Webpage along with the titles of all materials they have written for the program. You may claim authorship of all your work on your résumé, and direct people to the Developer's webpage for confirmation.

Q: Do I have to supply all of the images?

A: Yes. You need to supply enough photos to illustrate your text. For sake of consistency and quality of production, we may replace yours with images that we generate. Please keep in mind that if you provide quality images that we can use directly in the text, you are much more likely to receive additional assignments from us.

Q: Can I borrow information from on-line sources?

A: You are completely free to review any material from any source to prepare your work. Just remember, you must make certain that you obey all copyright restrictions in producing your work. Also, make certain to acknowledge the original source in your Acknowledgement section. Developers are required to affirm under penalty of perjury that they hold the copyrights to any written material they submit. Moreover, we routinely search the Web for key phrases in submitted work. Please understand that when we identify someone who is not trustworthy that person is banned from participating in LABRats in any way for life.

Q: Are there any other resources you recommend?

A: Yes! The US Government Printing Office is the most prolific printer in the world and everything they produce is in the public domain. If you're willing to do a little digging, you can find tons of great how-to science resources there that you are free to use. For details, check out <http://www.sas.org/E-Bulletin/2001-10-26/features2/features.html>