

## Activity 3.1.2 Resources

### Purpose

If you are changing the oil in a car, a sledge hammer will not help you. Having the right tool for the job is critical in research. Likewise, when the most appropriate tool for the job is not available, alternatives are sometimes used. Each tool and material has a special set of instructions for care, disposal, and safe use.

In previous courses, you learned to read and write instructions such as Standard Operating Procedure (SOP) or standard tool operation, Good Laboratory Practices (GLP), Good Manufacturing Practices (GMP), chemical hygiene plans, and other safety protocol. You may need to revisit your notes on those protocol to ensure that your research meets professional criteria.

What items and materials will you need to complete the instructions you developed in *Activity 3.1.1 Step-by-Step*? How are those items used in a safe way?

### Materials

#### Per pair of students:

- Computer with Internet access and word processing software

#### Per student:

- *Agriscience Notebook*
- *Laboratory Notebooks*
- Pencil

### Procedure

You and your partner will review the materials you have identified as needed for your project. Note that you have worked on materials lists in both *Project 2.2.4 Solution Proposal* and *Activity 3.1.1 Step-by-Step*. Research is a process with continuous revisions and improvements. You may adjust your materials and procedures numerous times throughout your project as you learn more about each item.

1. Record Table 1 in your *Laboratory Notebook*.

**Table 1. Materials Notes**

Material, Tool, Chemical, or Equipment	Safe Operation (or SOP)	Hazards and Precautions (or GLP / GMP)	Clean-up, Disposal, and Storage Notes	Limitations	Possible Substitutions
Computer	Make sure plugged in safely and working properly.	Electrical Shock when plugging in to outlet. Overheating of computer.	Make sure to close down all programs, sign off, and turn computer off when finished.	Only use programs available on your computer.	Paper/Pencil
Internet	Make sure to only use secure/reliable sites for research and data collection.	Spam sites and computer virus.	Make sure to save and log off all sites signed into and close out.	Some sites may be blocked or restricted.	Library

2. List the equipment, materials, chemicals, and tools that you expect to use in your research and development process.
3. Research each item for safe and proper operation, hazards, clean-up, disposal, storage, and limitations.
4. Adjust the electronic copy of your step-by-step instructions for your research or design project according to the materials and safety precautions.
5. Work with your teacher to locate, order, acquire, and borrow equipment and materials you need to conduct your research.

## **Conclusion**

1. How do researchers respond when resources are scarce?
  - a. Researchers will either find funding to obtain resources or find a good alternative and adjust research procedures.
2. How do substitutions affect the step-by-step instructions?
  - a. The substitution may not have the same use instructions as the original tool so you would need to modify them.
3. Why is it important to record safe use and operation for all materials and equipment in step-by-step instructions?
  - a. To avoid injury or misuse of equipment.