

SCIENCE CAREER ACHIEVEMENT AWARD

Science Achievements

Name: _____

(Certification: Adult leaders must initial and date each completed achievement.)

Do nine of the following:

1. Make three-dimensional models of the atoms of the three isotopes of hydrogen. Show neutrons, protons, and electrons. Make a presentation at a post meeting, community youth group, school class, or other group meeting using these models to explain the difference between atomic weight and number.

Completed _____

2. Write a 500-word essay telling who any five of the following people were and explain what each of the five discovered in the field of atomic energy. Also, explain how any one person's discovery was related to another person's work. Henri Becquerel, Niels Bohr, Marie Curie, Albert Einstein, Enrico Fermi, Otto Hahn, Ernest Lawrence, Lise Meitner, Wilhelm Roentgen, and Ernest Rutherford.

Completed _____

- 3a. Build an electroscope. Put a radiation source on or near the terminal.

- 3b. Demonstrate at your post meeting or another youth group meeting how it works. Explain any difference seen. Explain how you made the electroscope.

Completed _____

- 4a. Build a model of a reactor.

- 4b. Make a presentation to your post or another youth group explaining how the reactor works. Explain the function of the fuel, the control rods, the shielding, the moderator, and any cooling material. Explain how a reactor could be used to change nuclear energy into electrical energy or make things radioactive.

Completed _____

- 5a. Make and use a simple electromagnet.

- 5b. Show magnetic attraction and repulsion.

- 5c. Make a presentation to your post, your class, or another youth group explaining how to use the knowledge you have acquired about magnetic attraction and repulsion.

OR

- 5d. Create a tabletop display using the knowledge you have acquired about magnetic attraction and repulsion and display it at a post meeting, in your classroom, or in other public area.

Completed _____

6. With your post, another community youth group, or your school class, define *chemistry* and tell what chemicals are. Cover the following topics:

- (a) Explain the difference between atoms and molecules and between compounds and mixtures.
- (b) Prepare and present a list of 10 chemicals found in your home and explain their uses.
- (c) Tell the difference between a chemical reaction and a physical change.
- (d) Tell how chemicals in your home are safely stored and how to dispose of them safely.

Completed _____

7a. Learn about and be able to define *inorganic chemistry*.

7b. Carry out an experiment to show three different ways of protecting iron or steel from rusting.

7c. Tell why aluminum doesn't rust the way iron does.

7d. Do an experiment in which one metal makes another metal deposit from solution.

7e. Explain what takes place in terms of the activity series of metals.

Completed _____

8a. Make a presentation to your post or another group on ONE of the following:

- (a) The formula for ozone. Tell where ozone is found. Tell how it is a pollutant but also necessary for a healthy environment.
- (b) The formula for carbon dioxide. Tell how it can cause the greenhouse effect.
- (c) The formula for sulfur dioxide. Explain what acid rain is. What does pH measure? Measure the pH of rain or a body of water near your home. Tell how acid rain can be prevented.

OR

8b. Make a tabletop display using (a), (b), and (c) above. Display at your post meeting or in another public place.

Completed _____

9. Demonstrate the flow of heat energy. Use your demonstration with your post or another group to explain in your own words the ideas of heat, temperature, kinetic energy, calorie, and the laws of thermodynamics.

Completed _____

10. Make presentations to your post or another group giving an example of each of the following forms of energy: heat, light, mechanical, electrical, chemical, and atomic. Prepare a table showing devices for each of the forms of energy that will convert each into another form of energy. Describe the idea of trade-offs in energy use.

Completed _____

11a. Write a 500-word essay listing the main salts, gases, and nutrients in seawater. Describe some important properties of water. Tell how the animals and plants of the ocean affect the chemical composition of seawater. Explain how differences in evaporation and precipitation affect the salt content of the oceans.

OR

11b. Make a presentation of the topics above to your post or another group.

Completed _____

12. Do materials science experiments to show the differences in strength and heat conductivity of wood, plastic, and metal. Explain how this affects building design. Discuss what you have learned with your post, your class, or another group.

Completed _____

13. Develop a project that would help solve an environmental problem, reduce a negative environmental effect, or increase environmental awareness in your community. Include plans for a specific project that your Explorer post, your school class, or another community group could do.

Completed _____

14. Attend a regional or national science career conference as either a staff member or a participant.

Completed _____

Resources

Explorer Leader Handbook (No. 34637A) and Learning for Life Web site (www.learning-for-life.org)

Qualifying Achievements

Because of the design and flexible nature of the program, Advisors and adult leaders are permitted a reasonable degree of latitude in substituting appropriate achievements that serve to meet the qualifying requirements for the Learning for Life Career Achievement Award.

Requirements

Explorers or Learning for Life participants can earn any Career Achievement Award in one or all of the 12 career clusters. To earn a Career Achievement Award, the candidate must provide *50 hours of community service and complete any nine career achievements*. The Explorer post Advisor or adult high school Learning for Life group leader certifies that each Explorer or Learning for Life participant has satisfactorily performed 50 hours of community service and verifies that each candidate has completed at least nine achievements within the career cluster.