

Jurupa Mountains Cultural Center – 7621 Granite Hill Drive – Riverside, CA. 92509

Phone: (951) 685-5818 Fax: (951) 685-1240

Email: jmccmail@hotmail.com Website: www.jmcc.us



NUCLEAR SCIENCE

Scout Name: _____
Troop Number _____
Date: _____

Requirement #1:

a. Describe the biological effects and hazards of radiation to:

In your explanation discuss the nature and magnitude of radiation risks to humans from nuclear power, medical radiation and background radiation. Explain the measures required by law to minimize this risk.

Human Kind: _____

The Environment: _____

And Wild Life: _____

Explain the difference between acute and chronic effects:

Requirement #2: Tell the meaning of the following (match the term with its definition).

- | | |
|---------------------------------------|--|
| 1. ALARA ____ | A. A radioactive gas |
| 2. Alpha particle ____ | B. Similar to light but much higher energy |
| 3. Atom ____ | C. As low as reasonably achievable |
| 4. Background radiation ____ | D. Radiation you can not avoid. |
| 5. Beta particle ____ | E. A factory for making things radioactive |
| 6. Contamination ____ | F. Free flying electrons |
| 7. Curie and becquerel ____ | G. Element gives off charged particles or rays. |
| 8. Gamma ray ____ | H. Particle in the nucleus with no electric charge. |
| 9. Half-life ____ | I. Units of radioactivity |
| 10. Ionization ____ | J. Building blocks of protons and neutrons |
| 11. Quark ____ | K. Any process that gives atoms an electric charge |
| 12. Isotope ____ | L. The amount of time it takes an element to lose one-half of its radioactivity. |
| 13. Neutron ____ | M. Two protons and two neutrons. |
| 14. Nuclear energy ____ | N. A harmful substance where it doesn't belong. |
| 15. Nuclear reactor ____ | O. Alike but different. |
| 16. Particle accelerator ____ | P. Machine to study nuclear structure. |
| 17. Rad and grey/rem and sievert ____ | Q. Smallest piece of an element. |
| 18. Radiation ____ | R. Energy stored in the nucleus. |
| 19. Radioactivity ____ | S. Energetic photon used to see bones. |
| 20. Radon ____ | T. Units of exposure. |
| 21. X-Ray ____ | U. Generic term for energy moving through space. |

Requirement #3: Choose five individuals important to the field of atomic energy and nuclear science and explain each persons contribution.

1. _____

2. _____

3. _____

4. _____

5. _____

Requirement #4: Choose an element from the periodic table. Construct 3-D models for the atoms of three isotopes of this element, showing neutrons, protons and electrons. Use the three models to explain the difference between atomic number and mass number. Then do the following:

A. Make a drawing showing how nuclear fission happens, labeling all details.

Draw another picture showing how a chain reaction could be started and how it could be stopped.

B. Explain what is meant by a "critical mass". _____

Requirement #5: Do any three of the following:

A. Build an electroscope. Show how it works. Place a radiation source inside and explain any difference seen.

E. Describe how radon is detected in homes. Discuss the steps taken for the Long-term and short term tests methods, how to interpret the results, and explain when each type of test should be used.

Explain the health concerns related to radon gas and tell what steps can be taken to reduce radon in buildings.

G. Make a cloud chamber. Show how it can be used to see the tracks caused by radiation.

Explain what is happening:

Requirement #6: Do one of the following:

- B. Find out how many nuclear power plants exist in the United States. Locate the one nearest your home. Find out what percentage of electricity in the United States is generated by nuclear power plants by coal and by gas.

****This is a Pre-requisite** – Bring your research to class!**

Requirement #7: Find out about three career opportunities in Nuclear Science that are interesting.

1. _____
2. _____
3. _____

Pick one and find out the education training and experience required for this profession and discuss this with your counselor.

Tell why this profession interests you:
