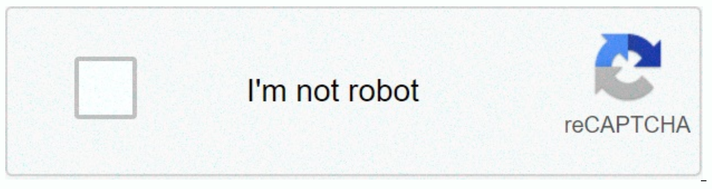

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Nuclear science merit badge worksheet

This merit badge has been replaced by the nuclear sciences merit badge Saying the meaning of the following: alpha particle, atom, background radiation, beta particle, curie, fallout, half-life, ionization, isotope, neutrons, neutron activation, nuclear energy, nuclear reactor, particle accelerator, radiation, radioactivity, roentgen and X-rays. Make three-dimensional models of the atoms of the three isotopes. Display neutrons, protons, and electrons. Use these models to explain the difference between atomic weight and number. Draw a picture showing how nuclear fission occurs. Label all details. Draw a second image that shows how a chain reaction might be initiated. Also show how it can be stopped. Show what a 'critical mass' means. Say who five of the following people were. Explain what each of the five discovered in the field of atomic energy: Henri Becquerel, Niels Bohr, Marie Curie, Albert Einstein, Enrico Fermi, Otto Hahn, Ernest Lawrence, Lise Meitner, William Roentgen, and Sir Ernest Rutherford. Explain how a person's discovery related to someone else's work. Draw and color the radiation hazard symbol. Explain where it should and should not be used. Tell why and how people should carefully use radiation or radioactive materials. Perform THREE of the following actions: Build an electroscope. Show how it works. Put a radiation source inside. Explain any differences seen. Make a simple Geiger counter. Tell the parties. Say what types of radiation the counter can detect. Say how many counts per minute of the radiation you've found in your home. Build a model of a reactor. Display fuel, control bars, shielding, moderator, and any cooling material. Explain how a reactor could be used to change nuclear power into electrical energy or make things radioactive. Use a Geiger counter and a radiation source. Show how counts change per minute as the source approaches. Place three different types of material between the source and the detector. Explain any differences in counts per minute. Say which is best to protect people from radiation and why. Use a fast-speed film and a radiation source. Display the principles of self-adography and x-ray. Explain what happened to the movies. Tell how someone could use this in medicine, research, or industry. Using a Geiger counter (which you have built or borrowed), find a radiation source that has been hidden under a cover. Find him in at least three other places under the deck. Explain how someone might use this in medicine, agriculture or industry. Visit a place where X-rays are used. Draw a floor plan of the room in which it is used. Show where the unit is used, the person directing it, and the patient when used. Describe the radiation hazards of X-rays. Make a cloud chamber. Show how it can be used to view tracks caused by radiation. Explain Explain it's happening. Visit a place where radiostopes are being used. Explain by drawing how and why it is used. Obtain samples of irradiated seeds. Planted. Plant a group of unsrabate seeds of the same type. Grow both groups. List the differences. Discuss what irradiation does to seeds. Atomic Energy Worksheet Follow Me, Scouts January, 2017 (this merit badge replaces the atomic energy merit badge) Do as follows: Say what radiation is. Describe the dangers of radiation to humans, the environment, and wildlife. Explain the difference between radiation exposure and pollution. In your explanation, discuss the nature and magnitude of radiation risks to humans due to nuclear energy, medical radiation (e.g. chest or dental x-rays) and background radiation, including radon. Explain the principle of ALARA and the measures required by law to minimize these risks. Describe the radiation hazard symbol and explain where it should be used. Tell why and how people should carefully use radiation or radioactive materials. Compare the amount of radiation exposure from a worker at a nuclear power plant with that of someone receiving a chest and dental x-ray. Do the following: Indicate the meaning of the following: atom, nucleus, proton, neutron, electron, quark, isotope; alpha particle, beta particle, gamma rays, x-rays; ionization, radioactivity, radiostope and stability. Choose an item from the recurring table. Build 3D models for the atoms of three isotopes of this element, showing neutrons, protons and electrons. Use all three models to explain the difference between the atomic number and the number of mass and the difference between the atom and the nuclear and quark structures of the isotopes. Do ONE of the following; Then discuss modern particle physics with your counselor: Visit an accelerator (research lab) or university where people study the properties of the nucleus or nucleons. Name three particle accelerators and describe several experiments performed by each accelerator. DO TWO of the following; then discuss with your counselor the different types of radiation and how they can be used: Build an electroscope. Show how it works. Place a radiation source inside and explain the effect it causes. Make a cloud camera. Show how it can be used to view tracks caused by radiation. Explain what's going on. Obtain a sample of irradiated and non-irradiated foods. Prepare the two foods and compare their taste and texture. Store leftovers in separate containers and under the same conditions. Over a 14-day period, decomposition or deterioration rate, and describe the differences you see on days 5, 10, and 14. Visit a place where radiostopes are being used. Using a drawing, explain how and why they are used. Do ONE of the following; then discuss with your counselor the principles of radiation safety: Using a radiation meter and a radioactive, radioactive source, how counts change per minute as the source approaches or moves away from the radiation detector. Place three different materials between the source and the detector, and then explain the differences in measurements per minute. Explain how time, distance, and shielding can reduce an individual's radiation dose. Describe how radon is detected in homes. Discuss the steps taken for long- and short-term test methods, indicate how to interpret the results, and explain when each type of test should be used. Explain the health problem related to radon gas and say what steps can be taken to reduce radon in buildings. Visit a place where X-rays are used. Draw a floor plan of this room. Show where the unit, unit operator, and patient would be when operating the x-ray unit. Explain the precautions taken and the importance of these precautions. Do ONE of the following; Then discuss with your counselor how nuclear energy is used to produce electricity: Draw a picture showing how nuclear fission occurs, tagging all the details. Draw another image that shows how a chain reaction might start and how it might stop. Explain what a critical mass means. Build a nuclear reactor model. Display fuel, control bars, shielding, moderator, and cooling material. Explain how a reactor could be used to change nuclear power into electrical energy or make things radioactive. Find out how many nuclear power plants exist in the United States. Locate the one closest to your home. Find out what percentage of electricity in the United States generates nuclear power plants, coal, and gas. Give an example of each of the following in relation to how the energy of an atom can be used: nuclear medicine, environmental applications, industrial applications, space exploration and radiation therapy. For each example, explain the application and its importance to nuclear science. Learn about three professional nuclear science opportunities that interest you. Choose one and discover the education, training, and experience required for this profession and discuss this with your counselor. Say why you're interested in this profession. Nuclear Sciences Worksheet Follow Me, Scouts Date: Saturday, March 7, 2020 | Time: 8:30 AM - 2:30 PM | Check-in: 8:00 The Nuclear Science Merit Badge is an exciting way to learn about physics. Whether you're a troop leader, Merit Badge counselor, or scout looking for resources to earn this badge, you've come to the right place! This website contains information and links to help you meet all requirements. Scouts can complete the merit badge in the workshop. There's no charge. (This workshop is supported by Creighton's Department of Physics, the Contemporary Physics Education Project, and the U.S. Department of Energy's Office of Science.) Requirements 1, 2, 3a, 4a, 4b, 5a, 5c, 6a, 7 and 8 shall be met. this one workshop will be held on Saturday, March 7, 2020, in the Department of Physics at Creighton University. Check-in for Scouts will be located in front of room G59 in the Hixson-Lied building and will begin at 8:00AM. (Be sure to register in advance. We're overbooked, so unfortunately you can't accept it this year. The workshop will start on time at 8:30AM. Please arrive no later than 8:00AM to ensure that browsers have completed registration by 8:30AM. A Creighton University campus can be found here. Parking is available in the student parking lot on the north side of Burt Street, opposite the Hixson-Lied building. Lunch is available at no cost. Although not a requirement, parents and leaders are welcome to accompany their scouts through the workshop. There will be a room with coffee and doughnuts for those adults who decide to stay and wait in Creighton while their scouts complete the workshop. Please note that the telephone number for this room is 402-280-2846. Parents and leaders are not required to stay and wait for their scouts, as we will have a full guard staff. The worksheets for the merit badge are available for download here. Scouts are encouraged to complete as many worksheets as they can before Saturday and bring them in. Additional information about the merit badge can be found at the links below. Each year Creighton University puts in a one-day nuclear science merit badge workshop for area explorers. If you are interested in participating in the workshop, please contact Jolene Buckingham for space availability. Images from previous workshops of the Nuclear Sciences Merit Badge

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