PARK SPANISH IMMERSION ELEMENTARY SCHOOL

# 2010 Science and Imagination Fair

*Encouraging a child's journey into the world of science, creativity, invention and imagination.*

## Super Science Challenge
## PSI 10th Annual Science and Imagination Fair
## Thursday, February 11th, 2010

Welcome to the world of science! Science is not a nerdy subject. Some of the brightest minds and some of the best jobs are found in the world of science. So get ready for the Super Science Challenge. Students grades 4-6 are encouraged to participate in the fair's super science challenge by choosing to do their project based on the science curriculum of PSI.

***4th Grade Science topics and sample project ideas are:***

**~Human Body (bones, joints, and muscles)** model of human body, research on special topic of the human body, research a joint disease such as arthritis or bursitis, think about how essential it is for joint mobilization (what if a joint was immobilized), increase disability awareness, learn about artificial joints and artificial limbs, bring in an x-ray and discuss how x-rays work or what the x-ray is an image of, interview a doctor, nurse, x-ray technician, or a physical therapist. Investigate the skeletal system, research gymnasts and muscle development for athletes, display animal skeletons, how is an exoskeleton different from an endo-skeleton?, research muscle and bone atrophy that astronauts experience in space and what they do to prevent it, research strains, sprains, cramps or how a broken bone heals.
**~Electricity and Magnetism** project using electricity, small motors, magnets – testing for strength and metal content, display of insulators and conductors, circuitry, a water compass, magnetic art, a magnetic message board, building a telegraph, building a model motor.
**~Rocks and Minerals** display of rocks and minerals, use in everyday world, in manufacturing, interview and report of geologist, ordering rocks by weight, diameter, circumference, chart of Moh's scale, test rocks for calcite, exploration of the use and properties of limestone, Portland cement, Minnesota's official rock/mineral, provide resources from the Natural Resources Conservation Unit, survey neighborhood for materials used (asphalt driveway, cement, stucco houses), research and report about: caves, forms of calcite, limestone and marble formation, what is a sinkhole?, the properties of petroleum, what is spelunking?, what is a fossil?, where is the most basalt or granite on Earth?, what kind of rocks are found on the moon.

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Yes, I will take the Super Science Challenge!

Student's Name_____

Phone number: _____Grade:_____

Names of partner's (if any) _____

Name of your project and science curriculum theme your project relates to:

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***5th Grade Science topics and sample project ideas are:***

~**Nutrition:**

- Select a food to test for fat, Vit. C or sugar.
- Does the average lunch from home contain more sugar or calories than a school lunch?
- Does a starfruit have as much acid as orange juice?
- Is there acid in meat?
- Do different kinds of baked goods contain different amounts of sugar?
- Do cooked hot dogs have less fat than uncooked hot dogs?
- Are all potato chips equally greasy? Compare chips w/ different oils.
- Does exposure to light affect Vit. C content in orange juice?
- Can milk really turn into plastic?
- Can you make butter from heavy cream?
- Find a test for starch in foods and use it to analyze a product.
- Determine the percentage of sugar in different products.

~**Solar System**, model of the planets, space exploration, planetary info, planetary trivia game. History of trips into outer space, trips to the moon, research space station.

~**Variables**:

- Design controlled experiments to find out how a variable affects the quality of a product. Here are some examples: best sized tire for a race car, most absorbent paper towel, best recipe for lemonade, most effective insulating material, best fabric for a raincoat, best way to heat water with solar energy.
- Double pendulums provide lots of interesting variables to investigate. Find out how changing the release heights, which pendulum is released, adding masses to one pendulum and not the other, or other possibilities affect the outcome.
- Make a double-decker pendulum by attaching a pendulum to another pendulum.
- Hang two equal pendulums next to each other and link them with a soda straw that has been split at each end.
- Investigate stringless pendulums. Compare pendulums that are made from a variety of materials

such as sticks, straws, paper clips or wires.

- Does the kind of water a boat floats in (salt vs. fresh) affect the number of passengers it can support?
- Conduct controlled experiments to investigate the variables that affect the use of toys: a windup car, Frisbee, toy parachute, yo-yo, bicycle, skateboard, paper airplane, cassette player, football or others.
- Make a coin sorter using a flipper system. Position containers so that the coins will land in the containers after they've been sorted.

~**Pulleys and Levers Examples:**

- Put a scale at the end of a class 2 lever (50 cm from the fulcrum). Find out how much effort is required to life a load as it moves from the fulcrum to the effort at 5 cm intervals. Then try 10 cm from the fulcrum w/ a class 3 lever.
- Create a diagram of a make-believe lever system. Write an imaginative description of its use, name it and draw it. Make a model of your lever system.
- Use ½ meter sticks and other materials to build a multiple lever system where one lever acts on another to provide a double advantage. Compare the effort and load in such a system.
- Assemble pulley systems that use a single and double pulley (two wheels), two single pulleys, and two double pulleys. (You will need an extra long rope). Record how many different systems you discover.
- Research 4 simple machines – the wheel and axle, inclined plane, wedge and screw and give a report. Use diagrams, objects, and show use of each item.
- Research a compound machine such as a backhoe, drilling rig, hoist, exercise equipment, crane, elevator, or a drawbridge.
- Set up a lever and pulley system. You may wish to research the Spanish- Barton system.

**Adaptation –** Design an organism uniquely adapted to the environment of your choosing. Designing both internal and external body parts consider: body design, symmetry, diet/acquiring food, shelter/protection/skeleton/, mobility, sensory ability, communication, reproduction, life cycle, temperature regulation, respiration, metabolism, digestion, waste removal, water regulation, other unique adaptation behaviors. Make a model or sketch of your organism. Discuss how your organism has adapted to its environment. If you wish, enter an environmental stressor to your environment and show how your organism will respond.

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### ***6th Grade Science topics and sample project ideas are:***

~**Cells** – basic structure/ parts of the cell, mitosis, Punnett squares

~**Environment** – Biomes, the Energy Cycle, Photosynthesis

~**Solutions** – Show Concentrations, Saturation, Chemical Reactions

- Use FOSS Science stories to find a project.
- Find out if each mixture makes a solution with water: flour, baking soda, alum, cooking oil, rubbing alcohol, etc.
- Research diatomaceous Earth and create a project on it.
- Research sodium chloride, where it comes from, and its vital uses.
- Research citric acid, what fruits and food products contain it, what does it do?
- What affect does temperature have on saturation? Try experimenting w/ different temperatures.
- Dissolve a material in a salt solution. Describe what is happening.
- Investigate baking powder, its ingredients, its use in cooking, reacting w/ water, salt, and how it differs from baking soda.
- Investigate drinks. Many are made of several materials dissolved in water. The order in which they are listed as ingredients corresponds to the relative amount in the product. Bring the product and report on its contents.
- Investigate limiting chemicals using baking soda and calcium chloride. Which is the limiting agent?
- Create crystals w/ table salt, rock salt, sugar, Epsom salts or borax. Create a work of art or describe your experiment.
- How do they get the fizz in soda?
- Create a solution that results in a new precipitate.

~**Models and Designs** - model of atom, solar system, model of animals in food chain, design something to scale (house, space ship, etc.).

- Research the Ptolemaic system of the universe and how it differs from today's model of the solar system.
- Produce a blueprint of your fantasy house, build a three dimensional model from your drawings.
- Make a model to show how a door lock, a camera, a toy or a toaster work.
- Choose a household device to study and improve upon. What would make the device better, more appealing, or easier to use?
- Research one of the many types of engineering. Interview an engineer if possible or simply give a report on the field and examples of what the engineer type of your choosing would create. Examples: a mechanical engineer, electrical, civil, mining, genetic, chemical, locomotive, biomedical, software or environmental engineer.~**Earth, Sun and Moon** – solstice, equinox, leap years, tides, and lunar phases
- Create a terrarium and describe how you would care for it.
- Bring in your bug collection. Describe your bugs and their natural habitats.
- Bring in plants you've grown and describe its optimal growing conditions. Create an instruction booklet on how to grow your plant.
- Create a design of a native plant garden. What plants would you include and why? What are the benefits of native plants? How would insects and other animals respond to a native plant garden?
- Research what the Department of Agriculture does. Learn about US farms.
- What is an organic farming? What do sustainability and permaculture mean?
- What agricultural, natural resources, and land management state organizations care for the environment? Research and create a project using photos and information.
- Think about the environment of your neighborhood, including gardens, parks, woods, and other spaces. Describe the environment; bring illustrations, photos or diagrams. How is your environment beneficial to you and other living things?
- Research another environment from another part of the world.
- Research your favorite living organism, including its ideal habitat.
- Learn about saltwater environments or geothermal environments? Who lives there, what are the conditions like?
- Find out how pollution affects our land, air and water. What can be done?
- How does extracting natural resources affect our environment?
- Create a project as an environmental advocate. What would you advertise or encourage?
- Think of a product or create a new one that is good for the environment? How so? How does it differ from something we already use?

~**Health** – Infectious diseases. Research and report on a type of disease. Feel free to include information, photos, the history of the disease, possible cures, etc.

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