

CEA Conference

Theme: Who's Got the Power?

Verse: 1 Chr. 29:11, Eph. 1:15-23, 2 Tim. 1:6-14

1st Quarter: Matter – the Ingredients of Physics - Chemistry

Explore the wonder of God creating the universe/world using the ingredients of the periodic table.

Define atoms, elements, compounds, chemical reactions, physical and chemical changes, chemical equations.

Incorporate ART. Draw atoms of different elements. Illustrate different types of bonds. Make models of different compounds then model a chemical reaction. Identify characteristics of chemical reactions and experience a few: baking soda and vinegar, calcium chloride/baking soda/phenol red experiment, butane fuel... Compare physical and chemical changes and give examples of each.

Other:

2nd Quarter: Motion – the Laws of Physics - Roller Coasters

Explore the wonder of the laws that order our world.

Define Newton's laws of motion [an object in motion stays in motion, an object at rest stays at rest; force = mass X acceleration; for every action there is an = and opposite reaction] and apply them to creating the most thrilling roller coaster experience. Incorporate formulas and apply to coasters.

Design a roller coaster using half pipe foams, masking tape, and a marble. How high did you want to start? Why? How do you keep the speed going? What force is your coaster using? How many loops did you make? Why? How many pieces of foam did you use? Why? Could you have traveled longer? How do you know? Would this be a scary roller coaster ride? Would it be safe? Where was your marble traveling the fastest? What is that called? Where did your coaster have the greatest potential energy? How would you measure the average speed of your marble or coaster assuming the marble weighs 1g? [Speed = distance / time] What force made the marble stop moving? Without that force what would the marble have done?

Could graph speed after testing coaster multiple times.

Other:

3rd Quarter: Force – the Tools of Physics - Simple Machines

Explore the wonder of technology and the power it gives us.

Define simple machines and mechanical advantage and apply that to building big buildings and real life application (stations: lift with inclined plane, pulley, wedge, lever, wheel, gears – apply appropriate tools for specific tasks). Apply formulas to identify mechanical advantage for each simple machine.

Create stations with a task to accomplish using a simple machine. What tool would you use and why?

<u>Task</u>	<u>Simple Machine</u>	<u>Why</u>
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Bring piano up stairs

Pull person out of deep hole

Open jar lid that is stuck

Keep door from falling shut

Cut down a tree

What simple machine do these tools incorporate?

<u>Tool</u>	<u>Simple Machines</u>
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Can opener

Wheel barrow

Bicycle

Clock

Crane

Could create a Powerpoint presentation of useful tools and the simple machines they incorporate.

Other:

4th Quarter: Energy – the Power of Physics – Conserving Resources

Evaluate the energy forms that empower our lifestyles and our responsibility to manage this energy.

Differentiate between light energy, heat, mechanical, magnetic, electrical, wind, solar, kinetic, hydro. Identify which are renewable and which are not. Evaluate where we can conserve and measure energy saved.

Create a heat conserving contraption that will keep an ice cube from melting the longest. Using a paper lunch bag, create a heat repelling environment to keep the ice from absorbing heat energy as long as possible. Measure ice cubes following the activity and compare results with design.

Create a conservation plan and collect data on those impacted and energy conserved. Organize a community wide student led conservation event – service learning project to encourage community wide conservation. Design an energy efficient home/car based on research – model efficiency at every level of your design: floor, roof, windows, appliances, heat, building materials, etc.

Could build a model of an energy efficient home or create an invention to conserve more energy.

Field Trips Suggestions:

- Great America Six Flags – Physics Day (free bus, only school groups, data packs)
- Ice Skating – experience motion with less friction
- Sci-Tech in Aurora – great hands on physics exhibits
- Museum of Science and Industry – Chicago
- Fermilab – nuclear power

Websites:

- www.howstuffworks.com – physics videos – maglev trains
- www.edheads.org – simple machines activities
- www.sixflags.com – field trip info
- www.sixflags.com/greatAmerica/assets/pdf/PhysicsDayStudentManual.pdf student manual
- www.sixflags.com/greatAmerica/assets/pdf/MathTeacherManual.pdf teacher manual
- www.thetech.org – physics of roller coasters curriculum, also magnets and electricity
- homeschooling.gomilpitas.com/explore/physics.htm – kids physics websites
- www.learner.org/interactives/parkphysics/ - roller coaster games

Suggested novels:

Encourage input immediately as well as emailed input that will be distributed back to everyone. Ask about relevant physics based literature.

Incorporate the AWESOME POWER OF GOD through physics that He invites us to explore!