

BSSP PHYSICS SUMMER INSTITUTE SCHEDULE

JUNE 8-12 AND JUNE 15-19, 2009

June 8-12: Hardin

June 8: Matter

- 8:00-8:45 am Welcome and introduction to the BSSP Program.
- 8:45-9:15 am Teachers' Pre-test and Cultural Survey.
- 9:15-10:00 am Inquiry Pedagogy
- 10:00-10:15 am BREAK
- 10:15-10:45 am Presentation of the Summer institute Curriculum and Schedule.
Presentation of properties of matter.
- 10:45-11:45 am Hands-on activity on physical properties of matter: exploring mass, volume, and density
- 12:00-12:45 pm LUNCH
- 12:45-1:30 pm Hands-on activity: Physical changes: phases of matter: solid, liquid and gas; melting and boiling points
- 1:30-2:30 pm Speaker on phase changes of matter.
- 2:30-3:15 pm Online activity: learn all about solids, liquids, or gases and their applicability to the real world.
- 3:15-3:45pm Teachers' poster session on phases of matter
- 3:45-4:00 pm Muddiest points.

June 9: Motion, or the change in position. Constant velocity motion

8:00-8:30 am Review of the muddiest points from the day before (matter)

8:30-9:15 am Hands on activity: Vector's scavenger hunt.

9:15-9:45 am Online activity on vectors and motion (SciObject).

9:45-10:00 am BREAK

10:00-11:15 Hands-on activity. Constant and accelerated motion: position, speed and velocity.

11:15-12:00 pm Online Activity: position versus time graphs to determine position and constant velocity.
Math connection.

12:00-12:45 pm LUNCH

12:45-1:30 pm Inquiry Pedagogy

1:30-2:30 pm Online activity: velocity versus time graphs to determine velocity and acceleration of uniform accelerated motion. Brief summary presentation.

2:30-3:30 pm Runner demonstration of accelerated motion. Storytelling about running.

3:30-4:00 pm Muddiest points.



June 10: Motion, or the change in position. Accelerated velocity motion

8:00-8:30 am Review of the muddiest points from the day before (constant motion)

8:30-9:30 am Hands on activity: different types of accelerated motion: falling objects, circular motion, and parabolic motion.

9:30-10:00 am Online activity on accelerated motions: falling objects and circular motion.

10:00-10:15 am BREAK

10:15-11:30 am Speaker and demonstration of basketball player and arrow throwing

11:30-12:15 pm LUNCH

12:15-1:15 pm Demonstration and hands-on activity: using motion detectors: Exploring position versus time graphs for uniform and accelerated motions

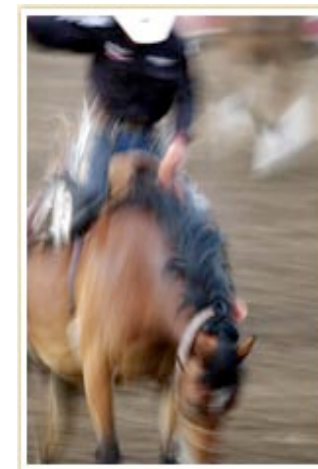
1:15-2:15pm Online activity: Parabolic motion .

2:15-3:00 pm Brief summary of the accelerated motions

3:00-4:00 pm Inquiry Pedagogy .

June 11: Force as a cause for change

- 8:00-8:30 am Review of the muddiest points from the day before (accelerated motion)
- 8:30-9:15 am Hands-on activity on forces. First Law of motion, or the effect of the absence of forces.
- 9:15-10:00 am Online activity: graphical description of all the forces applied to an object. Vector addition and the concept of net force and equilibrium of moving and non-moving things.
- 10:00-10:15 am BREAK
- 10:15- 10:45 am Presentation and demonstration of the First Newton's Law of motion, and the concepts of force, force addition or net force, and equilibrium. Teachers will be able to associate NO change in motion (constant velocity or rest) with the absence of a net applied force.
- 10:45-11:45 am Hands-on activity Second Law, demonstrating that the acceleration of an object is proportional to the applied force (when the mass of the object is constant). Math connection.
- 11:45-12:30 pm LUNCH
- 12:30-1:30 pm Inquiry Pedagogy
- 1:30-2:00 pm Online activity on Newton's Second law of motion, focusing on changes in motion and its association to a net applied force.
- 2:00-2:30 pm Closure presentation on Newton's Second Law and muddiest points.
- 2:30-4:00 pm Roping and rodeo demonstration on the application of net forces and the change in motion.



June 12: Newton's Third Law and Different types of forces

- 8:00-8:30 am Review of the muddiest points from the day before (forces: 1st and 2nd Newton's Laws)
- 8:30-9:30 am Hands-on activity on Third Newton's Law of motion.
- 9:30-10:15 am Online activity: identification of the forces applied to an object.
Identification of pairs of action and reaction forces, and the fact that they are applied on DIFFERENT objects.
- 10:15-10:30 am BREAK
- 10:30- 11:00 am Presentation on different types of forces: Contact (friction, tension, and normal) and non-contact forces (gravity, magnetic, and electric) and action-reaction pairs
- 11:15-12:00 pm Inquiry Pedagogy
- 12:00-12:45 pm LUNCH
- 12:45-2:00 pm Online activity on Newton's Laws of Motion. Pick your favorite Law and elaborate a poster. Teachers' posters presentation.
- 2:00-3:30 pm Setting a tipi, identification of the forces that hold a tipi.
- 3:30-4:00 pm Muddiest points.



June 15-19: Northern Cheyenne Reservation

June 15: Energy as a source of motion and force

- 8:00-8:30 am Review of the muddiest points from the day before (forces: 3rd Newton's Law)
- 8:30-9:30 am Hands-on activity about Work (force x distance). Operational definition of Work and Power.
- 9:30-10:00 am Online activity on simple machines: their function, identification and description of simple machines
- 10:00-10:15 am BREAK
- 10:15-10:30 Brief presentation on Work, and Power.
- 10:30-12:00 am Hands-on activity Identification of kinetic and potential energy, exchange between potential and kinetic energy. Introduction of energy conservation.
- 12:00-12:45 pm LUNCH
- 12:45-1:30 pm Inquiry Pedagogy
- 1:30-2:30 pm Demonstration of the use of traditional tools. Introduction to simple machines
- 2:30-3:15 pm Online activity on PE and KE (SciObject)
- 3:15-3:45 pm Closure presentation on PE, KE, and energy conservation
- 3:45-4:00 pm Muddiest points.

June 16: Other types of energy

- 8:00-8:30 am Review of the muddiest points from the day before (PE and KE and energy conservation)
- 8:30-10:00 am Hands-on activity on temperature and heat.
- 10:00-10:15 am BREAK
- 10:30-11:15 am Online activity on energy transformation and the law of energy conservation. (SCiObjects)
- 11:15-12:00 pm Hands-on activity on Temperature measurement in different scales. Math connection.
- 12:00-12:15 pm Closure presentation on heat, thermal energy, temperature, and heat capacity.
- 12:15-1:00 pm LUNCH
- 1:00-2:00 pm Speaker on Forest fires, firefighters.
- 2:00-3:00 pm Online activity on temperature and heat as thermo-energy and Thermal energy transfer: conduction, convection, and radiation (SCiObjects)
- 3:00-4:00 pm Inquiry Pedagogy and muddiest points.



June 17: Electromagnetism

- 8:00-8:30 am Review of the muddiest points from the day before (heat and temperature)
- 8:30-9:15 am Hands-on activity Exploring electromagnetic interactions. *Engage* step of the 5-E's
- 9:15-9:10:00 am Inquiry Pedagogy
- 10:00-10:15 am BREAK
- 10:15-11:15 am Hands-on activity: properties of permanent magnets, magnetic interactions (magnetic fields, distance, poles, like poles repel, opposites attract). *Explore and Explain* steps of the 5E's
- 11:15-12:00 pm Online activity on electromagnets, magnetic force can affect an electric current, changing magnetic field can exert a force on an electric current – generators and motors. Production of Posters
- 12:00-12:45 pm LUNCH.
- 12:45-1:30 pm Teachers' posters presentations on electromagnetism.
- 1:30-2:00 pm Brief presentation on the history of the discovery of electromagnetism *Elaborate & Evaluate* steps of the 5-E's.
- 2:00-3:00 pm Magnetism and Earth Science connection.
- 3:00-4:00 pm Inquiry Pedagogy and muddiest points.

June 18: Electricity

- 8:00 -8:30 am Review of the muddiest points from the day before topic (electromagnetism)
- 8:30-9:30 am Hands-on Activity on static electricity: exploring electric charges
- 9:30-10:00 am Online activity: electric force
- 10:00 -10:20 am BREAK
- 10:20-12:00 pm Hands-on activity on circuits: essential characteristics of a circuit – complete path, source, load; involving series and parallel circuits. Good and bad conductors. Building alarm systems.
- 12:00-1:00 pm LUNCH
- 1:00-1:45 pm Online activity: electric circuits
- 1:45 -2:00 pm Presentation that summarizes the concepts learned about circuits and Ohm's law. Muddiest points.
- 2:00-4:00 pm Field trip to a wind farm in the Northern Cheyenne reservation.



June 19: Sound and Light

- 8:00 -8:30 am Review of the muddiest points from the day before topic (electricity)
- 8:30-9:15 am Introduction to sound: Native American Drumming demonstration
- 9:15-10:00 am Inquiry Pedagogy
- 10:00-10:15 am BREAK
- 10:15-11:15 am Hands-on activity on sound –waves, propagation, reflection and and refraction.
- 11:15-12:00 pm Online activity: Application of sound.
- 12:00-12:45 pm LUNCH
- 1:00-1: 45 pm Hands-on activity on prisms
- 1:45-2:15 pm Online activity: electromagnetic spectra, and prisms
- 2:15-3:30 pm The use of colors in the Native American tradition. N. Cheyenne and Crow speakers.
- 3:30-4:30 pm Post-test. Graduation ceremony and farewell.

