Summer Institute Schedule: Group 1

Week 1:

Day 1: Morning: Introduction to Space Physics and applications in the K-12 classroom. Overview of current research activities, space weather and society, historical development of our current understanding. E.g. Solar system: Earth centered view, Ptolemy, Galileo, Kepler, modern view ([5]SD4.1, [6]SD4.1, [7]SD4.1). Material and chemistry: Greek ideas of four elements, alchemy (transforming of elements, especially gold), periodic table ([9]SB1.1, [10]SB1.1, [11]SB1.1). Aurora: mythology, harbinger of good or bad news, ice crystal reflection of sunlight, current understanding.
Afternoon: ASC

Day 2: Morning: Earth, and the Sun: atmosphere (clouds, temperature, vertical structure), atmospheric chemistry (ozone layer), magnetosphere (basic ideas of plasma), solar wind, internal structure of the sun, and nuclear reaction as the energy source of the sun. Demonstration of electricity and magnetic field experiments ([8]SB3.2, [9]SB3.2, [10]SB3.2, [11]SB3.2, [3]SB4.2, [7]SB4.2, [8]SB4.2, [10]SB4.2, [11]SB4.2).
Afternoon: ASC

Day 3: Morning: Understanding the Aurora I: Morphology (local and global view, substorm), altitude, the auroral processes within the upper atmosphere, particle collision, aurora colors, atoms and molecules, light emission, light spectrum. Demonstration of prism experiments ([9]SB1.1, [9]SB3.2], [3]SB4.2). Assignment: Begin working on Space Physics Lesson Plans #1 and #2 (due Day 9).
Afternoon: ASC

Day 4: Morning: Solar system: Dynamics of Earth and the moon, modeling the motion of Earth and the moon, understanding the seasonal and day/night cycles, understanding tides ([3]SB4.2, [5]SD3.1, [8]SD3.1, [8]SD4.1).
Afternoon: ASC

Day 5: Morning: The universe: Structure: galaxies, black holes, stars, planets, moons, asteroids, comets, interstellar medium. Time: speed of light, Big Bang, and Hubble expansion (red shift) ([5]SD4.1, [6]SD4.1, [7]SD4.1]).
Afternoon: ASC

Week 2:

Day 6: Morning: Understanding the Aurora II: Solar wind interaction with magnetosphere, electrical energy of the aurora and its impact on the magnetic field, predicting the aurora. Demonstration of data interpretation for aurora prediction. Use and understand web based data sources (ACE satellite, SOHO Lasco images, GOES magnetic field).
Afternoon: ASC

Day 7: Morning: Guest lecture Neal Brown will lead students through the creation of "chirpers," radio transmitters used to collect atmospheric data. (Dirk will present Understanding the Aurora II to Group 2.)
Afternoon: ASC

Day 8: All Day (both groups together): Modern Aurora Research: Class held at Poker Flat Research Range (lecture at Davies Science Center, tour of Lidar Observatory, launch pads, Payload Assembly facilities, Launch Operations, Blockhouse). Demonstration of optical instruments and magnetometer data at the Davies Science Center. Several "chirpers" will be launched for data collection.

Day 9: All Day: Class will be with Alaska Science Consortium all day to review and revise lesson plans. Dirk Lummerzheim will be available to assist part of the day.

Day 10: All Day: Participants present Space Physics Lesson Plans they have written for K-12 classrooms during this course. Science instructor ensures scientific integrity of Lesson Plans. ASC instructors evaluate based on adherence to the learning cycle model and other educational merits.