David Bettinson, 6th grade teacher at Midvalley Elementary School in Midvale, Utah attended ARRL's Teachers Institute on Wireless Technology in 2008 and developed the educational plan for the school's contact with Astronaut Jeffrey Williams on December 2, 2009. Here he shares the thinking that went into developing the educational proposal and his vision beyond the ARISS contact event.

Background. As I developed the educational plan for our ARISS application, I reviewed the curriculum of all the grade levels (K-6) in our school. There were many direct connections the ARISS experience would provide for the school, and a multitude of indirect connections. For all except the 6th grade students, we decided to primarily focus on the space-related aspect of the contact.

I gathered educational materials for all grade levels about the ISS, along with biographical information on the crew, and provided the materials to the teachers for use in their classes. We had a school-wide "design a mission patch" activity that created a lot of interest in our ARISS contact. WE also requested, and received, from the IMAX Corporation, special permission to show the DVD version of *IMAX Space Station 3-D* throughout the school.

Because I have all of the 6th grade students rotation to me for physical science and space-related aspects of the curriculum, I was able to incorporate many of the activities and lessons I learned at TI-2008 into my lesson plans. While our state curriculum focuses on the a narrow visible light portion of the electromagnetic spectrum I expanded into the entire spectrum with particular emphasis on the radio, microwave and infrared portions as they relate to the wireless communication devices that are so common to the students. We demonstrated some of that technology, including the Boe-Bot, and I connected some of the basic principles of electricity they learning in 5th grade to the technology we would be using for the ARISS contact.

By expanding our discussion of the electromagnetic spectrum I was able to integrate wireless technology into our curriculum on light. The Boe-Bot created a great interest generator, and was a perfect bridge to other forms of wireless technology that are familiar, but not understood. Providing a simplified technical background of wireless technology for the students gave much more meaning to the space topics we cover in our curriculum, particularly space communication and satellite systems.

The future includes plans to expand on what was done with the 6th grade students to include actual hands-on experiences with satellite communication and amateur radio. I would also like to

establish a weather satellite downlink capability to enrich the weather curriculum taught by the 4th grade.

The ARISS educational proposal should include answers to these questions:

How will you:

- integrate this activity into the school curriculum?
- involve as many grade levels as you can?

Midvalley Elementary School ARISS Educational Proposal

The opportunity for an ARISS contact provides for many areas of integration into the school curriculum. There are several direct connections to the State of Utah Science Core Curriculum at multiple grade levels, and many opportunities for extension and enrichment activities. The "Wow!" factor of things related to space, and the natural curiosity of students of all ages provide an ideal environment to make this event a community-wide learning experience.

Science Core Curriculum connections include:

3rd Grade	• Earth rotation and apparent motion of objects in the sky • Forces and motion • Gravity and its effects
4th Grade	• Weather observation from space • Earth observation satellites • ISS Earth observation missions
5th Grade	• ISS Microgravity experiments dealing with physical and chemical changes in matter • Space—based monitoring of forces that reshape Earth's surface • Earth's magnetic field: space-based research • Effects of Earth's magnetic field on communications • Generation of electrical power for spacecraft • Relationship between electricity, circuit boards, and radio communications

6th Grade	• Properties and behaviors of light expanded to other elements of the electromagnetic spectrum (radio, microwave, etc.) • Microgravity research with microorganisms • Use of technology to observe and explore in space • Earth's rotation and apparent movement of objects in the night sky • Gravity, microgravity, and "free-fall" • Challenges to human space travel and exploration
Cross-curricular connections for all grade levels include	• Study and research skills • Reading of non-fiction and fiction books related to space travel and radio communications • Writing reports and articles related to the event • Oral reports and presentations • Upper grade introduction to simplified math of electricity, radio, and other elements of physics related to space

Activities to involve all grade levels:

- Depending on the date assigned for the ARISS contact, incorporate the event into our World Space Week (October) or Utah Space Week (April) celebrations
- School-wide contest to design a "mission patch" and/or poster for event publicity
- Use World Space Week Teacher Guide and Utah Space Week Teacher Guide as suggested activities for all grade levels
- Use of NASA and Civil Air Patrol/Aerospace Education Foundation materials and lesson plan resources that focus on the International Space Station.
- Track ISS flybys for oru location before, during and after contact date. Plan pre and post event "star parties" for the school and community.
- Bookmark NASA ISS web site on computer lab browsers for use of all students during assigned lab periods prior to the event.
- Download tracking software to computer lab computers for students use or teacher demonstration