



ARISS Education

Ada Lace and Ham Radio Exploration Chapter 7

Objectives:

Students will:

- Analyze character development in literature through discussion and written reflection.
- Explore radio communication and its role in space exploration.
- Collaborate to develop an ARISS proposal and associated educational activities.
- Engage in a hands-on direction-finding (Fox Hunt) activity to understand radio signals.

Suggested Grade Levels:

3rd-8th Grade

Subject Areas:

- Science (Earth & Space Science, Engineering & Technology)
- Language Arts (Reading Comprehension, Writing)
- Math (Measurement, Data Interpretation)

Time Allotment:

- Reading and discussion: 1 class period
- ARISS proposal development: Ongoing over several weeks
- Fox Hunt activity: 2 class periods (first day for teaching the expectations, second for actual “hunt”)

Next Generation Science Standards:

- **3-PS2-4:** Define a simple design problem that can be solved by applying scientific ideas about magnets.
- **3-5-ETS1-1:** Define a simple design problem reflecting a need or a want that includes criteria for success and constraints on materials, time, or cost.
- **MS-PS4-3:** Integrate qualitative scientific and technical information to support the claim that digitized signals (e.g., radio) are a more reliable way to encode and transmit information than analog signals.

Background Information:

- ARISS (Amateur Radio on the International Space Station) provides students with opportunities to connect with astronauts via amateur radio.
- Radio communication plays a critical role in space exploration, allowing astronauts to communicate with Earth.
- The Fox Hunt (radio direction finding) is an engaging way for students to understand radio signals and tracking techniques.
- Additional information:
 - [ARISS website](#)
 - [ARRL Fox Hunt guide](#)



ARISS Education

Vocabulary:

- **Amateur Radio (Ham Radio):** A radio communication system used by individuals for non-commercial purposes.
- **ARISS:** Amateur Radio on the International Space Station, which allows students to communicate with astronauts.
- **Direction-Finding (Fox Hunt):** A technique used to locate a hidden radio transmitter.
- **Signal Strength:** The power level of a radio signal as received by an antenna.
- **Transmitter:** A device that sends out radio waves.

Materials:

- Copies of *Ada Lace, Take Me to Your Leader*
- [Ada Lace, Take Me to Your Leader Part 3 of 3](#) (0:00-5:11)
- ARISS proposal guidelines [ARISS website](#)
- Materials for Fox Hunt (see extensions section below)
 - It is strongly recommended that you seek the support of a local expert for this.
- Handheld radios (if available)
- Paper maps for Fox Hunt tracking (optional)
- Writing materials for proposal drafting. A shared Google Doc is recommended.

Lesson Procedures:

1. **Before Reading Discussion:**
 - Review Chapter 6
2. **Reading Chapter 7:**
 - Who did Ada's prank on Elliott remind Ada/you of? (Milton)
 - Explain page 68: "...he was almost a different person over the radio." (They can cooperate)
 - Inference: Why might Milton's actions have changed?
 - What makes Ada change her mind? (Her own prank/guilty conscience)
 - Can you think of a time when you shared a similar experience with one of these two characters? Please share.
 - What special plans have Mr. Peebles and the kids worked out? (Talk to the Space Station)
3. **Hands-on Activities:**
 - **Introduction to ARISS & Proposal Development:**
 - i. Introduce students to ARISS and its mission. [ARISS website](#)
 - ii. If not already done, form a team to write an ARISS proposal.
 - iii. Seek student input on what educational activities to pair with the event.
 - **Fox Hunt Activity:**
 - i. Explain how radio direction-finding works.
 - ii. Conduct a hands-on Fox Hunt where students use receivers to locate a hidden transmitter.

Differentiated Instruction:

- a. **Visual Learners:** Design potential posters and flyers for an ARISS event.
- b. **Auditory Learners:** Compose questions and interview fellow students to seek input for the event.
- c. **Kinesthetic Learners:** Hands-on Fox Hunt activity (see extension) and/or, role-playing.



ARISS Education

- d. **ESL Students:** Provide ARISS contact sample video with translations.
- e. **At-risk Students:** Encourage oral participation. Make intentional role assignments aligned to student strengths.
- f. **Advanced Learners:** Research and present on past ARISS contacts and their impact on education. Letter writing campaign to seek guest speakers and/or event sponsors.

Extensions:

- Research and discuss how astronauts communicate with Earth.
- Organize a simulated ham radio conversation where students role-play as astronauts and ground control.
- Fox Hunt Radio Direction-Finding: Introduce students to radio direction-finding by hosting a small-scale Fox Hunt activity. ([Fox Hunt Information](#)). Depending on your level of expertise, you may wish to Invite a local ham radio operator or club to offer technical assistance.