

Elevate your STEM curriculum with amateur radio

Below are just a few examples of lessons that engage students in hands-on learning of STEM concepts. All amateur radio-related activities can be modified or expanded to be more academically appropriate for your students. We believe in relating science concepts to amateur radio through collaboration and inquisition about our position in the global community. Find more resources, lesson plans and success stories at arrl.org.

Elementary (K-Gr.5)

- Use Software-Defined Radios: tracking and studying weather patterns, rounding and estimating numbers, synthesize and draw conclusions with data
- Try Satellite Tracking: gravity and forces, use technology to explore GPS, Earth land features, forces and motion, VHF and GPS to track animals, ecosystems
- Introduce Electronics: build simple circuits, draw and understand diagrams and legends, measure resistors, units of measurement, unit conversions
- Incorporate Morse Code (CW): sight words or content-specific vocabulary, kinesthetic learning, musical beat and rhythm games, movement breaks
- Design and Exchange QSL Cards: card design process to connect with others, research and persuasive writing skills to present card designs for different US regions or countries

Middle (Gr. 6-8)

- Solder a kit: assemble or repair an electronic circuit, understand the construction and function of a device, understand energy and bonds
- Track a Balloon: gather and synthesize data about weather, climate, geography and the atmosphere
- View radio waves with an Oscilloscope: explore and calculate the relationship between elements of a wavelength, observe, measure, graph and discuss data
- Build a Circuit on a Breadboard: explore factors that affect electric and magnetic forces, design and reflect on a procedure using data and information from a variety of sources

Searching for even more ways to elevate your STEM teaching? The **ARRL Teachers Institute on Wireless Technology** is a donor funded, multi-day professional development program for educators like you!

High (Gr. 9-12)

- Understand relationship between electromagnetic concepts
- Construct 2-meter yagi antennas: measure Standing Wave Ratio, gather and interpret data
- Interpret GeoChron data: research social and environmental implications and differences created by real-life tectonic plates, major sea routes, satellites, population, weather information, apply mathematical concepts to find trends in data, calculate time zones, sun rise and sun sets
- Learn the history of wireless technology: research sources, connect historical and social impact and present findings regarding radio and wireless technology through different time periods (ie: wartime, fireside chats, tv dishes, telephones, wireless earbuds)
- Exploring electrical safety: introduce RF, calculate impedance and current, analyze and design efficient equipment set ups

College

- Build and test microwave circuits or components using software
- Build an antenna: Study radiation patterns, gain, interference using data
- Set up a ground station: receive and decode data using software
- Use microcontrollers technology: Raspberry Pi to transmit data to explore wireless communication, track animals in environments to draw conclusions by designing a RFID system

