Learning Activities with Scanners

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What can I wish to the youth of my country who devote themselves to science? ...Thirdly, passion. Remember that science demands from a man all his life. If you had two lives that would not be enough for you. Be passionate in your work and in your searching.
------Ivan Pavlov (1849 - 1936)

Introduction

If your web browser supports CSS2 standards, this document will print in paginated form. Alternatively, this document is also available as a PDF [learningactivities.pdf].

The purpose of this document is to assist self-motivated learners with activities that leverage the world of scanner radio listening and enjoyment. While the degree of difficulty show below is approximately categorized by school age, active learners of all ages (8-80) can benefit. And correspondingly, while the distinction between the various physical and social sciences may be organizationally convenient for parents and teachers, a serious scanner enthusiast soon learns that learning by using a scanner radio is a truly an interdisciplinary activity.

The questions below are intended to be a guide, or rather, a starting point. Additional questions and the quest for answers to those questions should follow naturally and emergently. It should be possible to use these questions for a poster project in a science fair or similar educational opportunity. Of course, it goes without saying that these questions are not tied any State-aligned learning outcomes or standards. Please use the information you glean from your scanner responsibly and in a manner befitting the highest standards of conduct for American citizenry.

Some of the questions are specific to the San Fernando Valley, a large suburb of the City of Los Angeles. This grounds the questions in reality rather than abstraction. But even these specific questions can generalize to other geographic regions with a little creativity.

I suppose the genesis for this guide was that I didn't have one when I started in radio somewhere in middle ("junior high") school. Hopefully, this guide can encourage a few young minds to turn off the television occasionally and turn on a scanner radio. Both the individual and our society will be the better for it.

Thanks, and happy monitoring.

Wayne Smith, N6LHV

Engineering

Antennas are very important in the land-mobile radio environment.

Middle School	High School	College
Count the different types of antennas on a typical LA City Fire Rescue Ambulance.	Classify each antenna with the appropriate frequency range. Using a digital camera, present a photographic essay of each antenna and its use (as best as you can determine).	Write a paper on "active antennas" and the role they might play in the future, especially with "software defined radios".

Bonus #1: Try to identify and classify the various types of antennas on a Electronic News Gathering (news media) truck from a major Los Angeles television station.

Bonus #2: Where is the antenna on a Metro Bus and what does it look it? Why? Which manufacturer sells these types of antennas?

Land-mobile professionals have to understand the concept of "line-of-sight" in some detail.

Middle School	High School	College
At sea level, approximately how far, in miles, can you see?	What is multipath? Define the following acronyms MSL, AGL, and HAAT. Compare and constrast.	Find a city or county in the Southern California area that has had to work hard on overcoming the "line-of-sight" issue. What methods and techniques did that agency use?

Bonus #1: Research the physics of over-the-horizon radar. For what purpose is it used?

Information Technology

The Wireless Telecommunications Bureau (WTB) of the Federal Communications Commission (FCC) publishes many land-mobile frequencies. Knowing how to search this database is extremely useful.

Middle School	High School	College
Use the FCC search engine to find the registrant of callsign "KMA367".	Use the FCC search engine to find all of the registrants of 153.7400 Mhz in California. Which public college system is this--community colleges, CSU, or UC? Document how you go out determining that.	Use the FCC search engine to find at least one known anomaly in the FCC record set. What recommendations would you make to the FCC about making the Universal Licensing System more accurate?

Bonus #1: Why is the KMA367 relatively famous and how has been used in the past?

Knowing how to *search* this database is useful, but knowing how to *leverage* this database is even more useful.

Middle School	High School	College
Download and install a program called "wget". What does this program do? How do you use it? Why is it useful?	Write a simple script or otherwise mirror the major Universal Licensing System datasets onto a personal server. Document the process using non-UML techniques.	Use a pure open-source solution, including either Linux or *BSD. Document the process using only UML techniques.

Management

Often, the communications we hear on our scanners are related to assisting other individuals in some fashion.

Middle School	High School	College
Listen to	How can radio traffic be monitored by supervisors to improve the performance and operations of staff? Do you think this practice is ethical? Why or why not?	What recommendations would you make to the Department of Homeland Defense to improve inter-organizational (i.e., between different organizations) radio communications? Be sure to address technological, organizational, and economic issues.

Bonus #1: What is a socio-technical system (STS)? What characteristics of an STS are present (or not present) in the organizations you monitor with your scanner?