

Amateur Radio

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School Amateur Radio Clubs

Forward

It is interesting that in this day and age of mobile broadband networks and social media that Amateur Radio, the pioneering radio hobby of the last century, would be an excellent way of introducing science and technology to young children today. Amateur Radio enthusiasts are an amazing, untapped resource for educators. They are hidden away in every community, and can provide their own equipment and expertise. They also have a zeal to pass on this technology to the next generation. And, I would say, their aging ranks could do with some new recruits from us. So this largely free and enriching collaboration between the schools and the Amateur Radio fraternity is a classic win-win situation.

When I first introduced the school Amateur Radio club at St. Kevin's Primary School in Ormond Victoria, I had no idea what a success it would be. We were lucky to have an Amateur Radio enthusiast within our ranks, so the introduction was initially driven by this staff member. The teachers, parents and students are now raving about it. To see the children confidently building electronic kits or talking to other schools over shortwave radio is quite incredible. I am now exploring ways to expand this program. The following article, by Julie and Joe Gonzales, (our staff member and her husband) introduces the modern world of Amateur Radio. It explains how they set up Amateur Radio clubs at three primary schools in Melbourne and it provides all the information needed for other schools to get involved.



Michael Day, Principal St. Kevin's Primary School, Ormond, Victoria and the St. Kevin's SARC Group.

Since some of you reading this article will be unfamiliar with Amateur Radio we will start with a short introduction: Modern Amateur Radio is a community-aware, technology-based and rewarding hobby. The purpose of Amateur Radio is largely self-education and technical experimentation, but through the medium of radio communications, many operators around the world form long-term friendships thereby fostering international good will.

Amateur Radio is challenging. There are many popular Australian and international contests for operators to hone their skills. For example: By making as many contacts as they can over a day or a weekend or by trying to contact certain countries or states. Amateur Radio has become an outdoor sport of sorts for many enthusiasts engaged in portable radio operation from mountain summits, national parks, museums, lighthouses and many more places.

Amateur Radio clubs actively support local community activities and provide free communications for public events. Through club meetings and organised events they provide an enriching environment for experimentation, construction, technical advancement and social activities. On a more serious level, Amateur Radio civil emergency networks are always ready to provide emergency communications in case of natural disaster.

Recently, there has been a resurgence in Amateur Radio participation due to simplified licencing conditions, the availability of low-cost radio equipment and no minimum age requirement. This has provided a new opportunity for primary school students, even as young as nine, who have successfully obtained their own Amateur Radio foundation licence.



Photo1: School Amateur Radio clubs cater for a select group of students.

Unlike “Citizens Band”, all Amateur Radio operators are licenced and must identify themselves using their individual call signs. Just like TV broadcasters, Amateur Radio communications is subject to the Radio Communications Act and is regulated by the Australian Communications and Media Authority thereby providing an open, safe and friendly environment for adults and children.

Now it is a fact that school Amateur Radio clubs used to be far more common than they are today. They were once a refuge for some students who didn’t quite fit in to the often-competitive, sports-orientated, mayhem of school lunchtimes. They were indeed a haven for all those with an interest in “pulling things apart to see how they work”, “just tinkering around with stuff” and “seeing what will happen if I do this”. Of course the students didn’t know it then, but they were developing all the skills needed for a career in science and technology. How many of you reading this article today will remember being just like that when you were at school?

In those days the idea of a primary school Amateur Radio club was completely out of the question; when there was a minimum age requirement and difficult operator qualifications needed just to obtain an Amateur Radio licence. Amateur Radio was clearly

not for kids! But times have changed with the introduction of the Amateur Radio foundation licence and so there are many new opportunities for young people today.

Some will still say that primary school students (and we are talking ages six to twelve here) are too young for Amateur Radio. Many operators with young children, grandchildren or having experience with the Scout's annual Jamboree On The Air will tell you that young people often have mixed feelings when it comes to using a radio. They can be shy; don't know what to say on air and are intimidated by all the adults pressuring them to "just press this button and speak into the microphone".

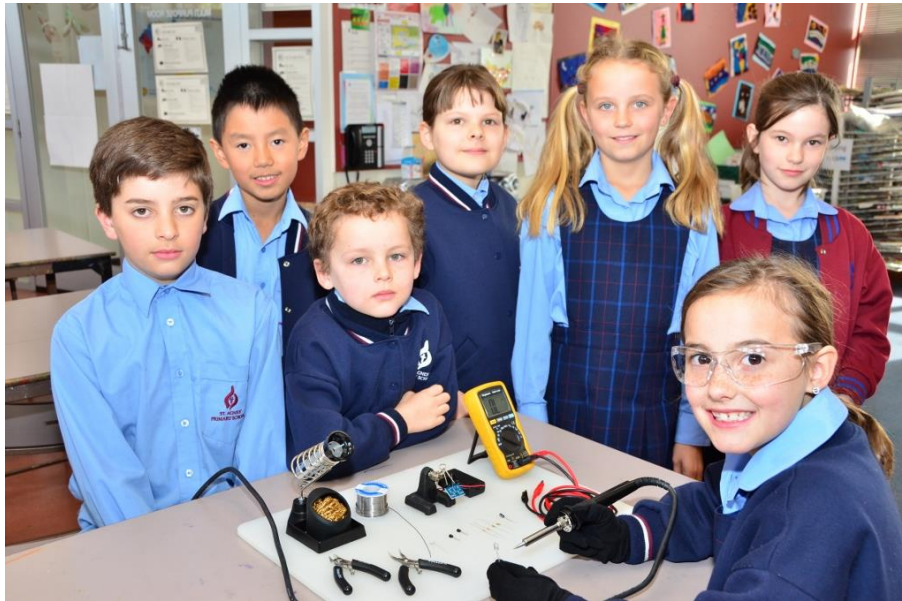


Photo 2: Young mad scientists at work on their electronics project.

It seems that Amateur Radio just doesn't come naturally to youngsters. Or so you might think. But if you put the same children into a familiar, non-threatening environment, give them some practice, praise and confidence with what they are doing; especially let them learn from their slightly-older mentors and you will be very surprised indeed. Sure, they are not going to be skilled operators overnight, but you will see them having a lot of fun, learning so much and wanting to do it all again next week. Perhaps one day, not too far into the future, some of them will remember their first experience of Amateur Radio and it might just change their lives for the better. As one famous Nobel Laureate, Albert Einstein medal winner and Amateur Radio operator recalls:

"Ten years of fascination with Amateur Radio in the 1950s led me to a professional life in basic research and university teaching. Over the next forty years, my research in radio astronomy taught me a great deal about extracting extremely weak signals from noise, and analyzing their content. In 2001, back on the air as an active radio amateur, I began thinking about ways to apply techniques, learned and developed in the research world, to the problems of weak-signal communication on our VHF and UHF bands." - Dr. Joe Taylor, K1JT.



Photo 3: Everyone in the group is equal; has a job to do and you have to be polite!

So what does it take to interest primary school students in Amateur Radio these days? Well, for a typical group with enquiring minds and not much else to do at lunch time, surprisingly very little. For a start they are way smart enough to realise this is a whole different thing from mobile phones, social media and the Internet.

When they first hear the voices of far-off stations through the crackling sounds of shortwave radio they instantly realise they are very privileged to be listening to a larger world. You can tell when they tentatively ask you the question: “Can we talk to them too?” And they are always simultaneously amazed, excited and a little terrified at the response: “OK, why don’t you try.” But without exception the look on their faces, when a station first acknowledges their name over the air, has to be seen to be believed.



Photo 4: Morse code, the all-time, absolute favourite radio club activity. Believe it or not!

From that point on they are hooked. Next, their parents tell us that their children can’t wait for radio club and they won’t stop talking about it at home. Of course it is not everyone’s cup of tea, but for the few that return week after week an amazing transformation occurs, as we shall see.

Now there are some important rules for primary school Amateur Radio clubs: The first is that everyone in the group, no matter what their age, is equal. The second is that everyone must help each other out. So far so good, but the third rule will probably surprise you: Everyone must be polite!



Photo 5: It is important to keep the conversation going... “What’s your dog’s name?”

As all Amateur Radio operators know, when you are on the air you must be respectful and courteous to others at all times. You are an ambassador to your school, to your state and to your country. You have to say “good morning” or “good afternoon”, remember to give your name and to properly introduce the other members of your group. This is probably the most unexpected part of Amateur Radio for the students and it often requires a little practice. It is true that with great privilege comes great responsibility.

The next lesson is also fundamental. Most people think that Amateur Radio is just a licence to communicate: Things like call signs, signal strength reports, details of your station etc. But instead, Amateur Radio is actually a licence to have a conversation, with anyone, anywhere, any age, regardless of gender, position or status, using your Amateur Radio of course. You have to remember that when you pick up the microphone you are having a conversation with a real person, who in time may even become a good friend.

So you need to make a good impression by talking about mutually interesting subjects. The most important skill of course is listening and then remembering to answer any questions. And to keep the conversation going it is always a good idea to ask your own question at the end of your transmission. Having a good conversation on the air is a real skill and it too requires some practice to gain confidence.



Photo 6. Beep, beep, beep: “Look what we found in the bushes!”

There is technically a lot to know about having a two-way Amateur Radio contact. The students learn about station call signs, when and how to use them and what each part of a call sign signifies. Making a call, answering a call, giving signal strength reports and calling CQ to all other stations, are all drills that the students practice before getting on the air for the first time.



Photo 7: “Can we have radio club every day?”

When the shortwave band conditions are poor the students have to know how to spell their names using the international radio alphabet (Alpha, Bravo, Charlie, etc.) Then there are numerous other codes and abbreviations used instead of common expressions, which may otherwise be lost in the noise. When conditions really get tough there is Morse code. And without exception the one session all the students like best, and you won’t believe this, is Morse code practice. Sending their name using a real telegraph key is a buzz (excuse the pun).

It is not all hard work, though. There are also games, videos and activities to make each session more exciting. And to be fair, all this learning is just for fun and it does not substitute for a real Amateur Radio foundation licence course delivered by a trained examiner. But that is really the whole point: School Amateur Radio clubs are just a fun experience to get the students started.



Photo 8. Crazy antenna building project.

So how do the on-air sessions work? Since only one student can talk on the radio at a time, and some groups have as many as a dozen students, the on air sessions are structured and everyone gets a job to do.

The first task is to make sure that the equipment is connected correctly and working. The antenna, microphone and power supply plugs into the radio. Check! Then it is time to tune around the band listening very carefully for any activity. Students write down the frequency of any stations heard as well as frequencies where there is annoying interference from nearby electrical or electronic devices.

Next, several on-line databases are checked for the frequencies of any scheduled activity from portable stations activating summits or parks. There are also regularly scheduled nets to listen to. Any stations heard are immediately looked up on an on-line directory to check their names, locations and even to see photographs of the operator and their station equipment. Sometimes stations are called at pre-arranged times or the students join in on a net. Sometimes they call CQ to see who else is listening.

When a two-way contact begins there is always a lot to do: All the operator and station details are entered into the station log book. Students record the time in UTC, call signs, frequency, mode, signal strength, name, location and any questions asked. Students take it in turns to answer and ask questions and they use the operating procedures that they have been practicing. After the session they talk excitedly about who they contacted and how they did on the air.

By now you are probably wondering all about security and other issues with children getting on the air. Well, there really isn't a problem. Here's why: The same precautions that apply to primary school student Internet use also apply on the air. The students are very familiar with the drill: "Don't give your full name or location.", "Don't provide any private information." etc. The difference is that all radio contacts must be fully supervised by the licenced school Amateur Radio club operator.

Of course the airwaves are completely open to anyone and both sides of the conversation can be monitored by others, and they often are. This sort of transparency helps keep all on-air conversations above board. In addition, all operators are licenced by the Australian Communications and Media Authority. They are bound by the codes of conduct stated in their licence conditions and the Radio Communications Act regulations. Operators can easily be identified by their call sign, much like a car can by its number plate. Nevertheless, security is vital and requires vigilance.



Photo 9: "Which is better, voice or Morse code?"

Although operating procedures and on-air sessions are the main part of each lunchtime gathering other activities are also provided. For example there are simple sessions on: How radios work; how radio waves travel all around the world; the different parts of a radio station and the history of radio communication. For example: Did you know that shortwave radio communications is powered by the sun? It is very convenient that the school Amateur Radio clubs operate from the school library as there are many books and on-line resources for these subjects.



Photo 10: "It's those radio club kids again. What are they doing now? How do you join?"

There are also some practical exercises to do like: Building and testing your own radio antenna; building your first electronic project kit, tracking down sources of local radio interference and finding hidden transmitters in the playground. These activities are intended to provide the students with a taste for scientific enquiry, observation, research, experimentation, analysis and testing. Through Amateur Radio they realise they are part of a larger world and who knows where it will take them from there?

Now the main reason for this article is actually to encourage and help other Amateur Radio operators to set up and run their own school radio clubs. The primary school Amateur Radio club program presented here can easily be adapted for secondary schools. It would be suitable for any operators associated in some way with a school, for example a teacher, parent or relative.

But first there are a few important practicalities: You will, of course, need to obtain permission from the school principal: We have prepared a school radio club proposal letter, which you may copy and modify, that sets out the purpose, format, requirements, setup and operation of the club. The principal may need to show this letter to the school board to get approval. You will have to meet with the principal to go over the fine details of the operation and to provide assurances.

To access the school you will need a current Working With Children card. You will have to check that the school's insurance will completely cover your operation. You will most likely be supervised by a teacher. You will also need to safely install an antenna and dedicate some of your own radio equipment to the school station. If you are a foundation licensee you will need to use a footswitch to maintain control of the transmitter at all times. Finally you will need to devote lots of time to prepare and present an activity session each week during the school terms. And why would you go to all this trouble, again? Simple: Just to see the look on the students faces when they get on the air!

So what happens next? Well, news of the school Amateur Radio club quickly spreads throughout the school community. At assembly, the principal explains the reason for the mysterious antenna that has appeared above the school building. Posters are put up around the school and newsletters are sent home. Parents visit the Amateur Radio station before or after school to investigate the strange sounds and curious activity.

A small group of enthusiastic students is selected and asked to take home the school radio club booklet to read and a permission slip to sign. Our free radio club booklet contains information on all the theory and practical sessions. It is also laced with imaginative, real-world scenarios to whet their appetites for Amateur Radio adventures and exciting activities. You can copy our booklet and modify it as you like.

Soon there is a waiting list of students eager to get started! After completing the six-week program students organise a presentation of their new skills at school assemblies: They say what they have done; who they have contacted on the air; they read out their name using the international radio alphabet or send it using Morse code; they show with pride the antenna they have made out of sticks and wire. Each of the students completing the program gets a certificate. Of course they are always welcome to return to the club as mentors. And most do.

If you are an Amateur Radio operator and are interested in taking this idea further please get in touch with us, we would love to help. Or if you are part of a school community and think this program would work in your area we can help you get in contact with local Amateur Radio enthusiasts.

Our motivation for establishing school Amateur Radio clubs has always been to provide an enriching experience for the children. In doing so we have already been rewarded beyond all our expectations.

Our vision is that one day school Amateur Radio clubs will enjoy many of the benefits that other Amateur Radio clubs take for granted like having their own regular on-air net (SARCNET), contests, hamfests, field days, conferences, newsletters; even a regular column in Amateur Radio magazine. And we firmly believe that their young, wondrous, smiling faces will change the face of Amateur Radio. Please help us if you can. The children are our future. For more free information and assistance please contact the authors at www.sarcnet.org. Note: An abridged version of this article was printed in the Term 1 2016 edition of Education Today, "The school principal's magazine", with an estimated circulation of some 8000 school principals.