

Mid-Term Report of the Andrew Johnson Amateur Radio Club to the ARRL Foundation Club Grant Program

March 1, 2023

The following is the 180-day report by the Andrew Johnson Amateur Radio Club (AJARC), located in Greeneville, Greene County, Tennessee, on the progress of executing the ARRL Foundation Club Grant Program.

Executive Summary

- July and August 2022 – Completed 8-week class session (pilot class) with five children, ages 8 to 12 years, including parents. One adult passed Technician license and is now a member of AJARC. A second family (husband and wife) has joined AJARC and are continuing to pursue a Technician class license.
- September 1, 2022 – Received ARRL Foundation Club Grant Program grant
- September 24, 2022 – Conducted a fox hunt with the class. Event was covered in the local newspaper.
- January to present – Currently conducting second class session with eleven children, ages 8 to 14 years, including parents.
- January 11, 2023 – Held the first monthly Electronics and Computer Club Meetup at the Greene Co. Makers. Thirty-two in attendance.
- February 2, 2023 – Held Introduction to Electronics and Programming for four teens
- February 8, 2023 – Held second monthly Electronics and Computer Club Meetup. Twenty-four in attendance.
- March 8, 2023 – (scheduled) Third monthly Electronics and Computer Club Meetup
- April 15, 2023 – (scheduled) AJARC Hamfest at the Greene Co. Tennessee Fairgrounds. A VE session is planned.

Project Summary

The Andrew Johnson Amateur Radio Club (AJARC.org) (501(c)(3)), in partnership with the Greene County Makers (GCM) (501(c)(3)), is creating STEM classes for Greene County youth (ages 8-18) to grow their interests in amateur radio and support gaining a technician class license. AJARC is also planning to provide an electronics workbench and amateur radio station, that will reside at the Greene County Makers space, for youth to utilize for classes, exploration, fun (GOTA), and create a positive community impact.

Project Goal

Our goal is to enrich the lives of Greene County Tennessee youth, their families, and the community by providing STEM classes that lead to a technician class license, a space to explore and experience electronics (electronics workbench) and get on the air (amateur radio station).

Accomplishments

June 2022

We began our project by introducing the families of the Free Wildlings Homeschool Playgroup to amateur radio at the 2022 ARRL Field Day hosted by AJARC at Kinser Park located in Greene County, TN.



July – August 2022

We began our first series of STEM classes leading to a Technician Class license with five children, ages 8 to 12 years old, including parents. Classes were held on Thursday afternoon at the Greene County Makers and lasted for eight weeks. Topics taught were electrical, electronics, magnetism, radio, antennas, and propagation.

In the class session on antennas the children built tape measure beam antennas for an upcoming fox hunt sponsored by AJARC.

At the end of class, a practice exam was given in the same style as a VE session. Children and their parents took the exam. No one passed the practice exam. We used the exam as a teaching session by discussing each question and it was a good learning experience.

September 2022

One adult from the class passed their Technician class license while attending the Shelby Hamfest in Shelby, North Carolina on Sep. 3, 2022. He is now an AJARC member.

September 1, 2022 AJARC received word that we received a grant from the ARRL Foundation Club Grant Program. The award is chronicled in the local newspaper October 12, 2022 (see October timeline below).



AJARC hosted a tailgate swap meet and fox hunt on Saturday September 24, 2022. The children from the class used the tape measure antennas they built to hunt for two foxes in Hardin Park, located in Greeneville, TN. The event was chronicled in the local newspaper.

[Club Holds Ham Radio Swap Meet and Scavenger Hunt, The Greeneville Sun, Sep. 26, 2022](#)

NEWS:
Club Holds Ham Radio Swap Meet And Scavenger Hunt. 3A

SPORTS:
Vols Chomp Gators, Crack AP Top 10. 1B

The Greeneville Sun

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Searching For The Signal

SUN PHOTOS BY MARIO MCALLEE

A group of ham radio enthusiasts went on the "fox hunt" scavenger hunt to search for a hidden radio in the trail next to Hal Henard Elementary.

Steven Bible (center, wearing the hat) of the Andrew Johnson Amateur Radio Club, stands with children who participated in the scavenger hunt at Hal Henard Elementary. They hold tools that were used to search for the hidden piece of ham radio equipment.

Club Holds Ham Radio Swap Meet And Scavenger Hunt

The Andrew Johnson Amateur Radio Club and the Greeneville Hamfest hosted the Ham Radio Swapmeet Tailgate Party at Hal Henard Elementary School on Vann Road from 8 a.m. to about 11 a.m. Saturday. In addition to the swap meet, those in attendance were invited to participate in a transmitter fox hunt. A piece of radio equipment was hidden within the brush on a nature trail adjacent to the school. For more information about the radio club, go online to www.ajarc.org. The club is also on Facebook at Andrew Johnson Amateur Radio Club. The Greeneville Hamfest website is www.greenevillehamfest.com.

Josh and Kim Fox hold the found ham radio equipment that was hidden for the scavenger hunt.

October – December 2022

During this time, we performed development of the curriculum with plans to start a second class in January 2023, right after the holidays.

[Grant Will Create STEM Class For Amateur Radio Outreach, The Greeneville Sun, Oct. 12, 2022](#)

Grant Will Create STEM Class For Amateur Radio Outreach

BY AMY ROSE
STAFF WRITER

A new STEM class is being created for Greene County youth ages 8-18 through a grant recently awarded to the Andrew Johnson Amateur Radio Club Inc. (AJARC).

The "Youth STEM through Amateur Radio Outreach" project is designed for students to grow their interests in amateur radio and gain their technician class amateur radio license, according to a press release from AJARC.

STEM is a common education acronym that stands for Science, Technology, Engineering and Math

The Andrew Johnson Amateur Radio Club STEM project will be conducted in partnership with the Greene County Makers and Free Wildlings Homeschool Playgroup.

The project will be developing a STEM curriculum in support of gaining a technician class amateur radio license.

Steven Bible, the club's volunteer project coordinator, who will be working to create the curriculum, said, "We are excited to provide the amateur radio experience to help children learn about science and technology in Greeneville and Greene County. We hope to grow this program so others can take advantage of it and learn from the curriculum we develop."

AJARC club members will assist Bible with the classes.

The program also will provide classroom materials, an electronics workbench, and an



PHOTO SPECIAL TO THE SUN

From left, front row: Mae Peters, Anna Fox, and Maverick Cooper; and back row: Larry Whiteside, secretary-treasurer of the Andrew Johnson Amateur Radio Club (AJARC); Ian Bible, AJARC president; Steven Bible, AJARC volunteer; Peter Higgins, president of Greene County Makers; and Kim Fox, Free Wildlings Homeschool Playgroup.

amateur radio station that will reside at the Greene County Makers space.

The electronics workbench and amateur radio station will be utilized by the students during classes for exploration, fun, operating a Get On The Air (GOTA) station, and creating a positive community impact, the press release stated.

Peter Higgins, president of the Greene County Makers, said, "Technology is a vital part of the future of our community, and this is an amazing opportunity to further our mission of promoting STEM to the children of Greene County."

The grant is in the amount of \$5,750, and the

grant period covers Sept. 1, 2022, through Sept. 1, 2023.

Ian Bible, Andrew Johnson Amateur Radio Club president, said, "The AJARC is honored to receive this grant and help us further our community outreach programs and promote amateur radio."

The Free Wildlings Homeschool Playgroup, of Greeneville and the Tri-Cities, has 336 Members.

"The Free Wildlings homeschool group is excited to partner with the AJARC and GCM to provide STEM opportunities to our children and parents," Group Leader Janina Geary said.

AJARC is just one of twenty-four organiza-

tions nationally that were awarded funding which was announced from a new American Radio Relay League (ARRL) Foundation Club Grant Program funded from Amateur Radio Digital Communications (ARDC). The ARRLF awarded \$270,000 to 24 radio clubs during their first round of applications. The ARRL Foundation received 128 applications in the first round, with requests totaling \$1.74 million.

The local grant will be managed by the Andrew Johnson Amateur Radio Club.

For more information on the grant, visit <http://www.arrl.org/club-grant-program>.

January – February 2023

We started the next ham radio class beginning Monday January 9, 2023 with six children and parents. Four adults are also taking the class to earn their Technician class license. This class has grown to eleven children in two weeks. We held makeup classes to bring the new families up to date in the curriculum.

The amateur radio class will continue through the month of March with the goal of the students (children and adults) to take the exam on April 15th at the Greeneville TN Hamfest sponsored by AJARC.

TUNE IN TO OUR WEEKLY NET
MONDAY EVENINGS 9:00 PM
W4WC REPEATER SYSTEM

ANDREW JOHNSON AMATEUR RADIO CLUB
GREENEVILLE, TN

GREENEVILLE TN HAMFEST
AMATEUR RADIO AND ELECTRONICS SWAPMEET

Saturday, April 15th, 2023
Outdoor Flea Market and Inside Vendors
Sponsored by Andrew Johnson Amateur Radio Club
Greene County Fairgrounds, 123 Fairgrounds Rd
Greeneville, TN 37745

Talk In:
146.390 -600 KHz- 88.5 Tone
443.575 +5 MHz 100.0 Tone

Backup Talk In:
147.060 +600 88.5 Tone

GENERAL ADMISSION: \$10 PER PERSON, CHILDREN UNDER 12 FREE
OUTSIDE FLEA MARKET SPACES \$5 EACH
INSIDE BOOTHS/TABLES \$10 EACH
LIMITED NUMBER. EMAIL TO RESERVE

ARRL SANCTIONED EVENT

GATES OPEN TO GENERAL PUBLIC AT 6 AM
VETESTING SESSION AT 10 AM
COMMERCIAL BUILDING OPENS AT 7:30 AM
SETUP ON FRIDAY AFTERNOON 3 PM-10 PM
AND SATURDAY MORNING 6 AM

GRAND PRIZE DRAWING AT 12 PM

Please visit our website for more information:
Greenevillehamfest.com

Inside Vendor Information and table reservations:
W2BRN@greenevillehamfest.com

Outside Flea Market Information:
N4DWH@greenevillehamfest.com

Hamfest Chairperson:
K4AEZ@greenevillehamfest.com

WWW.AJARC.ORG

We also started an Electronics and Computer Club Meetup on the second Wednesday of the month in the evening and invited the public. We setup several displays of electronics kits (Arduino based activities), Snap Circuits, and an operating HF station.

At the January meetup we had 32 attended. We held a discussion and a roundtable to learn what everyone was interested in so that we may plan for future activities.

At the February meetup we had 24 attend. We demonstrated various test equipment (oscilloscope, arbitrary waveform generator, antenna analyzers, spectrum analyzers, vector

network analyzers, and multimeters). Mentors helped children to learn Arduino programming and digital logic.

On February 2, 2023, we held an Electronics and Programming for four teens. For this session we used SparkFun Inventor's Kits that are Arduino based programming with a breadboard for creating electronic circuits. The goal here is to introduce electronics to youngsters and get them interested in future classes of their choosing.

Robotics is a hot topic with youngsters. We are working with ARISS to become a beta tester of their curriculum developments (ARISS is an ARDC grant recipient).



Curriculum Development Philosophy

The philosophy for the curriculum development for the amateur radio class is to create a STEM learning experience using the Technician class license as a guide. The goal is to create a cohesive set of topics that build on one another by grouping the questions from the pool.

We are striving to create as many hands on exercises as possible, in addition to demonstrations. For example, we start by explaining electricity using batteries. We explain the many battery sizes (AAA, AA, C, D, etc.), have them read the labels (alkaline, carbon, etc.), and measure their voltages with a multimeter. This simple exercise is performed by the students and it reinforces the test questions on battery chemistry, rechargeable, voltage, current, and the use of test equipment.

Another example is we give each child a small white box and colored markers. The children then draw on the box the front and rear panels of a transceiver. This teaches them about the controls (test questions on frequency display, entering operating frequency: VFO or keypad, antenna connector, etc.).

Perhaps one of the hardest topics to teach is the Commission's Rules. Using maps of the United States, broken down into call areas, and world map, broken down by callsign prefixed, we

turned this class into a mini geography lesson (Where is our seat of government? Where is the FCC building located? Where is the International Telecommunications Union located?).

In addition to student guides and presentation materials, the curriculum will also contain an instructor's guide. The instructor's guide will help future instructors prepare for class and give them a structured curriculum to follow.

Future Work

The present amateur radio class will continue through the month of March with review sessions planned for early April. AJARC is sponsoring the Greeneville TN Hamfest on April 15th. We will do our best to prepare the children and their parents for taking the exam at the VE session.

We will hold another amateur radio class session in the second half of the grant period. Date and times to be determined.

We plan to continue the every second Wednesday evening Electronics and Computer Club Meetup at the Greene County Makers. The goal is to introduce electronics and get children and adults interested in the various aspects, including amateur radio.

We plan basic and intermediate soldering classes. There has been much interest in learning how to solder (basics) and improving one's soldering (intermediate). Our grant has funds to purchase soldering stations, solder, and tools.

Build out the electronics workbench at the Greene County Makers. The makerspace received a large donation of electronics from a retired laboratory at Vanderbilt University. Having just received the donation, the first job will be sorting through it all and putting up an electronics workbench. Our grant also has funds to purchase an oscilloscope and power supply.

Finally, build an amateur radio station at Greene County Makers. We've conducted a site survey and identified a location to place the station and a location for installing an end-fed half wave (EFHW) antenna.

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Financials

Activity	Order Date	Item	Vendor	Qty	Unit Price	Tax (9.75%)	Total
Classroom							
	6/8/2022	Elenco Snap Circuits Jr. SC-100 Electronics Exploration Kit	Amazon	1	\$ 20.99	\$ 2.05	\$ 23.04
	6/8/2022	Snap Circuits Pro SC-500 Electronics Exploration Kit	Amazon	1	\$ 68.74	\$ 6.70	\$ 75.44
	6/8/2022	The ARRL Operating Manual	Amazon	1	\$ 24.95	\$ 2.43	\$ 27.38
	6/10/2022	ARRL Ham Radio License Manual 5th Edition (Softcover)	ARRL	2	\$ 32.95	\$ -	\$ 65.90
	6/10/2022	ARRL Shipping	ARRL	1	\$ 10.50	\$ -	\$ 10.50
	6/13/2022	32 Pack Dry Erase Lapboards	Amazon	1	\$ 46.99	\$ 4.58	\$ 51.57
	6/13/2022	Sharpie 22478 Flip Chart Markers, Bullet Tip, Colors may vary, 8-Count, Colors may vary (Box)	Amazon	1	\$ 9.99	\$ 0.97	\$ 10.96
	6/13/2022	Extech - 645618 MN35 Digital Mini MultiMeter	Amazon	1	\$ 18.99	\$ 1.85	\$ 20.84
	6/13/2022	EXPO Low Odor Dry Erase Markers, Chisel Tip, Assorted Colors, 12 Count	Amazon	1	\$ 8.97	\$ 0.87	\$ 9.84
	6/13/2022	Texas Instruments TI-30Xa Scientific Calculator	Amazon	1	\$ 10.82	\$ 1.05	\$ 11.87
	6/13/2022	DARKBEAM Multimeter Test meter Leads with Banana Plug	Amazon	1	\$ 8.99	\$ 0.88	\$ 9.87
	6/13/2022	Post-it Super Sticky Portable Tabletop Easel Pad w/Dry Erase Panel, 20x23 inches, 20 sheets, 2 pads	Amazon	1	\$ 51.74	\$ 5.04	\$ 56.78
	6/19/2022	Ham Radio For Dummies	Amazon	1	\$ 19.89	\$ 1.94	\$ 21.83
	6/29/2022	ARRL Ham Radio License Manual 5th Edition (Softcover) [Coupon Special]	ARRL	4	\$ 23.07	\$ -	\$ 92.28
	6/29/2022	ARRL Shipping	ARRL	1	\$ 10.50	\$ -	\$ 10.50
	7/13/2022	Amazon Basics Low-Odor Chisel Tip Dry Erase White Board Marker, Assorted Colors -Pack of 12	Amazon	1	\$ 7.13	\$ 0.70	\$ 7.83
	7/20/2022	Science Kits Electronic Physics Experiments : Elementary Magnet Electricity Electromagnetism	Amazon	1	\$ 33.29	\$ 3.25	\$ 36.54
	7/22/2022	(2" x 4") 30 Sheets, Printable White Sticker Labels, Laser/Inkjet Printing - Matte,10 per Page	Amazon	1	\$ 6.59	\$ 0.64	\$ 7.23
	7/22/2022	Crayola Ultra Clean Washable Markers For School, Back To School Gifts For Kids, 40Classic Colors	Amazon	1	\$ 13.44	\$ 1.31	\$ 14.75
	7/22/2022	HORLIMER 9x6x4 inches Shipping Boxes Set of 25, White Corrugated Cardboard Box	Amazon	1	\$ 28.99	\$ 2.83	\$ 31.82
	9/23/2022	Calculator	Staples	2	\$ 8.92	\$ 0.87	\$ 9.79
	12/17/2022	SMA Dummy Loads, SMA barrel connectors	Amazon	1	\$ 34.87	\$ 3.40	\$ 38.27
	12/17/2022	Snap Circuits Extreme SC-750 Electronics Exploration Kit	Amazon	1	\$ 94.49	\$ 9.21	\$ 103.70
	12/30/2022	3-Ring Binders	Amazon	1	\$ 27.77	\$ 2.71	\$ 30.48
	12/30/2022	Post-it Super Sticky Portable Tabletop Easel Pad w/Dry Erase Panel, 20x23 inches, 20 sheets, 2 pads	Amazon	1	\$ 53.05	\$ 5.17	\$ 58.22
	1/16/2023	ARRL Ham Radio License Manual 5th Edition	Amazon	2	\$ 58.30	\$ 5.68	\$ 63.98
							\$ 901.23
Fox Hunt							
	8/12/2022	Kaunosta SMA Cable 6.5ft SMA Male to SMA Male RF Coaxial Extension Cable RG316	Amazon	2	\$ 16.38	\$ 1.60	\$ 17.98
	8/17/2022	Hose clamps, PVC Tee, Cross, Cap, Pipe (10-feet)	Lowe's	1	\$ 51.25	\$ 5.00	\$ 56.25
	8/21/2022	Hose Clamps, PVC Cross, Cap, Tee	Lowe's	1	\$ 41.56	\$ 4.05	\$ 45.61
	8/21/2022	Tape Measure. 1-inch	Harbor Freight	2	\$ 3.98	\$ 0.39	\$ 4.37
	9/7/2022	Byonics MicroFox 15 USB Combo	Byonics	1	\$ 105.00	\$ -	\$ 105.00
	9/7/2022	Byonics Shipping	Byonics	1	\$ 10.00	\$ -	\$ 10.00
	9/10/2022	SMA Male to Female RF Coaxial DC Attenuator 3 Pcs DC-6.0GHz 50Ω Constant Attenuation (30db)	Amazon	1	\$ 20.33	\$ 1.98	\$ 22.31
							\$ 261.52
Workbench							
	9/19/2022	Pack Safety Glasses in 7 Colors (Bulk Pack of 24+4)	Amazon	1	\$ 21.59	\$ 2.11	\$ 23.70
	12/17/2022	Large Silicon Soldering Mat	Amazon	1	\$ 26.99	\$ 2.63	\$ 29.62
	12/24/2022	Sponges for soldering, 20 pack	Amazon	1	\$ 8.99	\$ 0.88	\$ 9.87
							\$ 63.18
							Total \$1,225.92

Testimonials

When we were first talking about getting our daughter Anna started in Amateur radio, we could tell by the sounds of things that it would be a good opportunity for her, but we had no idea how much connectivity it would introduce to us in regards to not only HAM radio but other subjects such as electronics, engineering, science, soldering, etc. Our family has always been fascinated with astronomy and space, so needless to say it really excited us to hear that we could potentially speak to an actual astronaut in space if we were to obtain our amateur radio license. Since we have been involved the children have been encouraged to participate in an amateur radio "field day" event, a "fox hunt", and they've built a functioning antenna in the class.

We go to the classes on Mondays to the Greene County Makers where Steve Bible teaches HAM radio classes using slide shows, hands on presentations, and actual radios. He also prints off works sheets for us to take home to study every week. Our goal is to study the material together each night as a family, so we'll have a good grasp of it and be ready to move on to new material the next week.

It blows my mind how much my daughter Anna has learned in this program in only a matter of months. There are things she has learned in these classes that I use in my job as a cable technician, and she's only 9 years old!

Sincerely,
Josh Fox

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My eldest Devin, who is 11, and in 6th grade is flourishing with the HAM radio class. He loves that in the class. He LOVES that he is not just learning how to pass a test but is learning all aspects involved. From atoms, radioactivity, how to work the ham radio, how to read RFs, how to build an antenna, or truly understand the need for different antennas.

As a parent, I LOVE how it's making him think. His interests are expanding, and his knowledge on a lot of different science subjects. He is confident that he can pass his exam. His confidence is another HUGE bonus. I am thankful for the instruction. We look forward to continuing our HAM classes.

Brenda Chavez

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My daughter Mae age 8 and I have together attended both the summer 2022 Ham Radio classes and currently the winter 2023 Ham radio classes held by Mr. Steven Bible. We have both greatly enjoyed our time in this learning experience together. Through this class we were introduced to circuit boards which has opened up a whole new engineering world to my daughter as she enjoys experimenting in building different projects with the circuit board. Together we have learned such things about radio frequency and electric currents, ohm's law and the formulas for calculating voltage, resistance, and current. Thanks to Ham radio class we also got to do hands on projects like helping to build an antenna and one of our favorites the exciting experience of participating in our first fox hunt for a radio transmitter. I believe that not only is this class beneficial to learning for the families that participate but also helps build

confidence in the children that participate as well. I love that we get to experience this learning adventure together and I love that it has increased my daughter's desire to learn. We are both looking forward to obtaining our ham radio technician level licenses.

Thank you,
Elura Peters

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Your class has been incredible for my children. They did not have much interest or any knowledge at all about what HAM radio is or how it functions. Throughout your class, my children learned so much about wavelengths, antennas, call signs, and so much more. The kids love the way you explain the most complicated topics in the simplest form so they can understand and learn about it. My eldest is fascinated by radios now and always asks me about the call sign of radio stations in the car. We appreciate the time you are taking to teach our children and open this whole new world for them.

Janina Geary

## Signatures

We hereby affirm,

None of the Grant has been expended for the private benefit of any individual,  
that no Grant proceeds have been used for commercial activities,  
and that Andrew Johnson Amateur Radio Club remains in full compliance with this  
Agreement.

Respectfully submitted,

Bryan Smith, AA4BS  
President

Larry Whiteside, KN4MVH  
Secretary/Treasurer

Steven Bible, N7HPR  
Project Manager