

**The Teacher's Guide**  
**To Amateur Radio Instruction**

**Peter Kemp, KZ1Z**

## **About the Author**

Peter Kemp, KZ1Z, is an Extra Class radio amateur with over 45 years of experience. He began his radio adventures in the 1950s, making crystal radios in elementary school, and has been involved ever since.

Professionally, Mr. Kemp received his Bachelor of Science degree in Technology Education, a Master of Science degree in Educational Media, and a Professional Certificate of Advanced Graduate Studies in Educational Administration and Curriculum Development. He is retired from the Bethel Connecticut Public Schools and served on the Adjunct Faculty of Central Connecticut State University.

Mr. Kemp is the recipient of both the Herb S. Brier Volunteer Instructor of the Year and the Professional Teacher of the Year awards from the ARRL. He was also a recipient of the Marconi Award from the Veteran Wireless Operators of America and Connecticut's Technology Teacher of the Year. Mr. Kemp was the first Educational Advisor to the ARRL and continues in that role. He is the author of numerous articles and a co-author of the ARRL's popular series of Emergency Communications courses.

## Contents

Introduction.....	4
Class Organization.....	5
Finding a Location.....	6
Dealing with Public and Private Schools.....	7
Core Curriculum and STEM Linkages.....	9
Teacher Qualities.....	10
Classroom Management.....	11
Class Format.....	12
Setting the Learning Environment.....	13
Learning Styles.....	15
Organizing the Material.....	16
Lesson Building Blocks.....	17
Lesson Plans.....	18
Effective Use of Instructional Technology.....	19
Training Aides.....	20
Conducting a Demonstration.....	21
The First Meeting.....	22
Motivation: Positive Reinforcement.....	23
Humor in the Classroom.....	24
Questions, Questions.....	25
Teachable Moments.....	27
Using Social Media and the Internet.....	28
Offering Extra Help, Special Situations, and Working with Minors.....	29
Working with Special-Needs Students.....	31
The Final Task: Course Evaluation.....	34
A Final Thought.....	37

## **Introduction**

Teachers are not just dispensers of knowledge; they are educational managers.

In the real world, teachers motivate, provide resources and are co-learners in the educational process.

Among educators there is an old adage, "teachers never really learn their subject until they have to teach it." Teachers must understand how all the pieces of the puzzle fit together in a logical sequence, so that the final picture is clear.

In life you meet many people. Some are experts in their respective professions. Having knowledge and being able to share it with others are two different things. Some individuals lack organizational skills or have a "different" type of personality, while others are "naturals."

Many individuals have the traits to become excellent teachers. What they need is to take those qualities and develop them. This book will attempt to address the practical elements of conducting Amateur Radio classes. The basic principles presented are applicable to all types of Amateur Radio courses.

By understanding the educational process, you will be a more effective teacher. If you are willing to take on the challenge, then you have already taken the first step on the journey.

Watching students' eyes light up when they master a skill is the true joy of teaching. This spark will make all the hard work well worth the effort many times over.

## Class Organization

Classes are divided into a variety of segment plans. Their meeting frequency is usually based upon room or instructor availability. Traditionally courses meet anywhere between eight and 16 times, once a week. For students with a full-time job, school or family obligations, you don't want to overload them. In some cases, classes may meet multiple times a week for shorter sessions. If possible, many small meetings are preferable, especially if school-age students are participating. The fewer the class sessions, the longer each meeting will be. Having fewer sessions requires more planning on the part of the instructor so the flow of information will remain smooth.

In recent years, the hybrid class has come into being. These are one or two full-day sessions. To be successful, the students **MUST** prepare prior to the beginning of the sessions. This way some of the material and vocabulary will be familiar. This approach may cause sessions to be a bit more intense in order to squeeze in all the material that must be presented.

While a single instructor is most common for small classes, with larger classes a team-teaching approach is better. In this way, instructors can teach to their areas of strength and experience. This approach is very effective in Amateur Radio Emergency Communications Courses (ARECCs), as well as in general licensing classes.

When instructors use a Team Teaching concept, their students receive the added benefit of having their attention spans extended. Switching off segments is less tiring for everybody.

If utilizing a single experienced instructor, consider having co-instructors to assist. This gives another ham the opportunity to experience the nuts-and-bolts aspects of Amateur Radio instruction. Using a professional model, this would be equivalent to a student teaching or a mentoring experience. This is a double benefit. The student gets a bonus instructor and the process helps groom others for carrying on the fine art of Amateur Radio instruction.

Whether in a traditional or hybrid-type class, the theory of class organization is the same.

Structure is important to maximize the available classroom time. Teachers should develop a time line and syllabus. This will ensure the logical progression of information that is so essential for class success.

Students appreciate an instructor who is prepared and has a clear vision of what is to be accomplished. Having a routine in class makes the students feel more comfortable.

When structuring the overall class, remember that information is best shared in small bites. This way the material may be digested slowly and better appreciated. If too much material is shared too quickly, students may choke on the information.

## Finding a Location

One of the biggest obstacles faced by clubs and individuals is finding a location to conduct classes. Commercial sites often charge a fee, which can add up and be out of line for a volunteer public service organization, especially a non-profit one.

Many companies make meeting rooms available as a public service, as part of their being a good neighbor in the community. The broad cross section of members in any radio club will produce a number of potential leads. Some will pan out and others not, but don't be discouraged. You will be surprised by what is available if you just ask.

Public service and town agencies have rooms available for public meetings. Amateur Radio is a public service, so when approaching these people stress the mutual benefits of such a cooperative effort. Check out town halls and police and fire departments. Volunteer fire departments frequently rent out a meeting room and will often waive the nominal fee for service groups. These rooms are frequently available during the week.

In many communities the parks and recreation department offers a full range of activities, not just the traditional sporting events. Senior citizens and youth group meeting locations also offer potential. Not only do they have rooms for their activities, but also they present an opportunity for additional students.

Public libraries frequently will make a room available during their business hours, as will children- and science-oriented museums.

Public schools have facilities, but problems arise when using a room for an activity not sponsored by the school. There are often fees to be paid for custodians, and you may have to produce proof of insurance and other paper work.

Consider fraternal and civic groups with halls, such as the American Legion or Kiwanis Club. Many of these groups stress public service work.

In all cases, the possibility of finding a location may be facilitated if you are willing to have the group you're approaching co-sponsor the course.

**Remember, it is the teacher, not the facility, that makes the class work.**

## Dealing with Public and Private Schools

One traditional source of students, and locations for holding class, has been the public school system. Nearly all districts offer adult education courses in some form. In addition to the standard citizenship and diploma classes, a wide variety of enrichment courses is usually offered.

A little research will go a long way in saving time. Does the local school district offer adult education courses, or does it provide a regional program in conjunction with neighboring districts? How is your local district organized? Who is in charge of programming? The title of the person responsible will vary according to the size of the district. Titles such as director, coordinator, or assistant superintendent for instruction may be identified. Contact the right person to schedule an appointment. An in-person meeting is always preferable to a blind letter.

Remember that the person in charge is often a full-time teacher or part-time employee. Due to the nature of the school day, you may have to be flexible in scheduling a meeting with the proper staff member. Once you have a meeting scheduled, be prepared. Think of this meeting as a sales call. Today's technology allows you to bring along a laptop with a brief presentation. *PowerPoint* presentations augmented with audio/video clips from the ARRL work nicely. Be sure to leave informative material with the person you've contacted for review and future consideration.

Organizing classes for an adult education program often requires up to three months' lead time. How is the program set up — as a semester, trimester, or segmented in another way? Five, six, eight, 10 and 12 sessions are all common in different parts of the country.

Working with elementary and secondary schools requires some creativity. The best way to go is to have a licensed Amateur Radio operator on the staff. He or she could be approached about sponsoring a radio club or licensing class. This could also be the spouse of a ham or a subject area teacher (such as a technology education or science teacher) with an interest in the material. Having a staff member running interference with the administration, filling out any required forms and smoothing the waters makes contributing in a co-curricular manner easier.

The Parent Teacher Association often sponsors enrichment programs for the students after school. Administrators like to maintain a good working relationship with parent groups and booster clubs. From their point of view, it keeps more people happy, is a potential source of additional revenue for student materials and volunteers contribute without any salary/benefits or similar considerations.

School districts today are under a lot of pressure to teach to the test. An administrator's first response to anything not directly related to the test is usually, "No." Administrators are also burdened with a lot of paperwork, and they really don't want to take on any more work unless there is an overwhelming benefit.

Another very important consideration in schools today is security. Most states, towns and school districts have very strict regulations concerning non-staff members in the school or on school property being allowed to come into contact with students. In many cases, if you are working with students, without the benefit of a certified staff member present, you may be required to have a background investigation and be fingerprinted. This may be at your own expense. It is nothing personal: it just provides an added margin of safety for the students.

Private schools have a bit more flexibility. The principal, director, or institutional leader usually controls all aspects of life within the facility. Depending on the sponsoring entity, such as a religious, private prep, or charter school, additional regulations may be in place. Private residential schools offer additional opportunities, as these schools are often looking for enrichment opportunities to keep their students' schedules full.

### *Home Schools*

Another potential pool of students and class locations can be found through the home school movement. Students who are home-schooled have less opportunity for social interaction and participating in a wide selection enrichment activities. Amateur Radio is ideal to fill this void as it can readily be a co-curricular activity, applicable to many subject areas. To find home-schooled students, try contacting the home school associations found in many communities. These groups help participants share curricula and resources. Working with young people is very rewarding, so don't give up trying. The future of Amateur Radio, the community and the career paths of many young people will depend upon these experiences.



## Core Curriculum and STEM Linkages

We'll let you in on a big secret: When dealing with schools, a key factor in success is being able to connect the principles of Amateur Radio with the Core Curriculum standards being developed in many states as well as with the evolving STEM (Science, Technology, Engineering, Mathematics) curricula being implemented across the nation. Amateur Radio provides a great way to demonstrate practical applications of theoretical concepts, encouraging better understanding, retention and integration of knowledge. For example, the fabrication of a simple dipole antenna takes the principles of mathematics and science and breaks them down for a practical application. How long should an antenna be at a given frequency? What happens when one increases or decreases the length of wire used? A teacher can design a simple in-class experiment at a high frequency so the overall length of the wire is short. Students may also graph the results and interpret the data. This demonstration applies to many curriculum elements, such as conductors/insulators, measurement, division and harmonics.

Consider, too, that there are indirect associations with other curriculum areas, such as art. The simple QSL card or slow scan television transmission requires a practical application of color, measurement, proportion, font selection, complementary design and content selection. This process may be used to create linkages between Amateur Radio and all areas of the curriculum.

## Teacher Qualities

First impressions are lasting ones. What qualities do classroom participants, or clubs, look for in an ideal instructor?

- **Appearance and Bearing** — Being well groomed and properly attired, mindful of your posture. Having good health reflects vitality and energy.
- **Voice** — Having a clear, pleasant and natural-sounding voice, varying modulation and pitch, with enthusiasm and emphasis as appropriate.
- **Speech** — Being articulate and enunciating clearly, with a proper command of the language and an expressive vocabulary.
- **Platform Manner** — Gesturing in a natural, meaningful, decisive and emphatic way, but free from distracting mannerisms or movements. Maintaining eye contact that is smooth and continuous, direct and encompassing the entire class.
- **Teaching Personality** — Emotionally well balanced, always courteous and poised, objectively decisive, considerate of the students, friendly, but not overly familiar, displaying an appropriate sense of humor and confidence.
- **Knowledge of Subject Matter** — Demonstrating a mastery of the subject, able to find and organize relevant resource material and present it logically.
- **Preparation and Planning** — Showing imagination and ingenuity in the selection of training materials, integrating them into the unit and making the material crystallize for the students.

## Classroom Management

Effective classroom management is essential for success. Time limitations are the primary enemy. You only have a set period of time to transfer information to the students. To be successful, a teacher must be efficient and well prepared to make the best use of student contact time.

Having a set routine is of value for all. Many administrative tasks may be accomplished just prior to the start of class, so you can hit the ground running.

Always arrive to class early. Arriving late sets a poor standard, which, if emulated, will be a time waster and a distraction to all. Dashing into the classroom, papers flying, looking like you just ran 10 miles at top speed does not engender confidence.

When you arrive at class, immediately arrange the physical conditions of the classroom to enhance the delivery of information. Have students sit where they are comfortable, being able to view and hear the lecture, without any extra movement or distraction. Set up any demonstrations, training aids or handout materials.

Amateur Radio classes are voluntary. There is no need to seat students in alphabetical order by row. That technique, from the little, red schoolhouse days, is a thing of the past. Many students come with family members or friends to share the experience. A good teacher will take advantage of this energy during a class.

One advantage of this being a voluntary course is that students are there because they want to be. They are self-motivated, arriving with a goal and a positive attitude. Disciplinary situations are extremely rare.

Welcome each student to class as they arrive. This will help you learn their names and make you more approachable. While you are setting up, a student may have a question concerning a point developed in a previous lecture, or something in their preparation for that day's class may have been unclear to them. Some students are a bit shy naturally. They are reluctant to pose a question, with others nearby, for fear of being thought foolish. In truth, others probably have the same question. They will often interact with you during pre- and post-class times. Remember the questions as they may be used when reviewing or to set up a future lesson.

## Class Format

The general format of a class comprises the following elements:

- **Administrative** — Sharing information of importance, such as where to purchase study materials, resources on the Internet, upcoming Amateur Radio club meetings or hamfests.
- **Introduction** — Setting up the topic to develop an excitement for the subject to be covered.
- **Body** — Presenting the basic body of knowledge via lectures, demonstrations and hands-on experiences.
- **Summary** — Tying together the material presented. Remember, this is a review; do not introduce new subject material in this segment.
- **Evaluation** — Evaluating effectiveness. This does not mean a series of paper and pencil quizzes exclusively; effective questioning techniques will provide you with feedback very efficiently.
- **Wrap Up** — Prepare the class for what will be coming up in the next unit. Students may reflect upon what was learned today and put it in context for the next unit. Be sure to reinforce the availability of resources to support the material covered in class or for the next week's preparation.
- **Dismissal** — Encourage students to mingle and ask questions informally.

## **Setting the Learning Environment**

For students to learn productively they need a proper learning environment. When students feel comfortable and distractions are minimized everyone's time will be better spent.

### ***Room Temperature***

If it's too hot the students will be nodding; if too cold they will be freezing and more concerned with staying warm than learning. Having spent time attending classes in a Quonset hut in the Pacific (where it was hot and humid) and trying to teach during the oil shortage in the early 1970s (in a 55° room), I know firsthand the added challenge. You want to be comfortable.

### ***Noise***

Focus is important. Noise within the room and outside the classroom walls is a distraction. With a broad cross section of students, you'll find some will just tune it out and move on (they have good DX and net control potential), but others can become more distracted. Falling into the noise category are cell phones. Students may have cell phones on, but instruct them to set them to vibrate, so others in class will not be disturbed.

### ***Lighting***

If your class is conducted at certain times of the day, the sun may stream into the room at an angle, causing the students to squint or see reflections off a white board, chalk board, projection or monitor screen. If you are using these learning tools, be aware that their effectiveness will be compromised.

### ***Seating***

Students will, in general, take a seat where they feel comfortable. A teacher may enhance learning by maximizing a room's qualities. Sitting in rows one behind the other does not facilitate discussion. This arrangement also has the potential to block the view of some students. Depending on the numbers in a class, rearranging the chairs and desks may be a big benefit. The semi-circle is very effective; everyone can see each other and it enhances the interaction between the instructor and the class. Be aware that some students may have special needs; for example, poor vision or a degree of deafness.

### ***Smoking***

Most facilities have strict regulations against the consumption of tobacco. The bottom line: NEVER allow smoking in a classroom. Not only is it unhealthy, but the smell and visual distraction may be very irritating for others.

### *Alcohol and Drugs*

Under no circumstances may alcohol or drugs of any sort be tolerated. This could lead to a myriad of issues, legal and otherwise. Intoxicants impair the learning process for the ingesting student as well as others in the class. While you should be mindful, the odds of such a situation arising are slight, so don't stress about this aspect of setting the learning environment.

### *Security*

In today's world, personal security is a real concern. You can't conduct a class if students are distracted by gang activity outside the window, if they are uneasy about going to and from the parking area, or if they are concerned that their vehicles will be safe while they are in class. While this does not mean you are responsible for any situation that may occur, don't conduct a class in an area where you know detrimental conditions may exist. Many schools, libraries and public buildings have roving and stationary security personnel; some buildings have telephones and panic buttons in the classrooms, hallways or meeting areas. Know where these are located. Be aware of fire evacuation procedures for your area. Having an HT or cell phone handy is a good idea for personal safety.

## Learning Styles

Students learn in a variety of different styles and combinations of styles. Some are more visual, others auditory and others tactile (hands-on). Students who are highly involved learn more quickly. Those who have concepts reinforced through demonstrations and hands-on class segments are more successful, as the students are using more of their senses to absorb the information.

Teachers should encourage a learning environment that fosters both active and passive learning. In active participation the student is physically performing a task; passive participation may take the form of note taking, or focusing on your every word.

Most students have a dominant style but also use combinations of the others. While teaching you want to aim for the middle and make adjustments for individuals as needed. This is important when dealing with someone who has difficulty understanding a particular concept.

### **VARK<sup>1</sup> — A Guide to Learning Styles**

The acronym VARK stands for Visual, Aural, Read/write and Kinesthetic and refers to sensory modalities that are used for learning information. Fleming and Mills (1992) suggested four categories that seemed to reflect the experiences of their students, as follows:

#### **Visual (V)**

This preference includes the depiction of information in charts, graphs, flow diagrams and all the symbolic arrows, circles, hierarchies and other devices that instructors use to represent what could have been presented in words.

#### **Aural/Auditory (A)**

This perceptual mode describes a preference for information that is “heard.” Students with this modality report that they learn best from lectures, tutorials, tapes, group discussion, speaking, web chats and talking things through.

#### **Read/write (R)**

This preference is for information displayed as words. Not surprisingly, many academics have a strong preference for this modality. This preference emphasizes text-based input and output — reading and writing in all its forms.

#### **Kinesthetic (K)**

This modality refers to the “perceptual preference related to the use of experience and practice (simulated or real).” Although such an experience may invoke other modalities, the key is that the student is connected to reality, “either through experience, example, practice or simulation.”

---

<sup>1</sup> Copyright for this version of VARK is held by Neil D. Fleming, Christchurch, New Zealand, and Charles C. Bonwell, Green Mountain, Colorado, USA.

## Organizing the Material

The course syllabus, or curriculum guide, describes the course scope (what is to be covered) and sequence (in what order the information will be presented.) First ask: In what sequence should topics be presented to build upon each other? Then ask: What are the objectives of each lesson?

You may refer to the table of contents in *The ARRL Ham Radio License Manual* as an outline for a course syllabus.

Using the course syllabus as a guide, an instructor should consider:

- The complexity of the material to be covered
- The amount of time available to cover the subject
- The academic background of the students
- The learning styles of the students

The technical nature of Amateur Radio theory has a tendency to be written at a higher reading level. This can be an obstacle to younger students, or those with a more limited academic experience. This does not preclude all students from being successful at understanding a concept.

When approaching new material, look at the vocabulary. For example, the word “pecuniary” is not an easy one. This word shows up all the time in Amateur Radio courses, yet is rarely heard in general conversation or read in a newspaper. When introducing an unfamiliar word, an instructor should explain what it means. What is it? Define it. In this example, pecuniary means relating to or involving money. Follow up with concrete examples to clarify this word's application.

Always be practical. Theory is only theory unless it can be applied and made real to the student. Pepper your instruction with examples so the student can relate to the concepts presented.



## **Lesson Building Blocks**

A class lesson has three basic parts: introduction, lesson development and summary (see below). The breakdown of an individual unit will be discussed in the next chapter.

### ***Introduction***

Secure and maintain the immediate attention of your students. Define the purpose and object of the unit clearly and fully. If giving a follow-up lesson, tie in the previous lesson so the students will see the relationship of the material they are about to be presented with. Emphasize the importance of the information. Provide an interesting scope of what is to be covered during the unit. Always relate the material to students in such a way that they can identify with a previous experience and feel part of the lesson.

### ***Lesson Development***

A good lesson flows from one segment into another, slowly developing a concept. This may be accomplished through a variety of teaching methods. Consider hands-on demonstrations, audiovisual materials, effective questioning techniques and exploiting students' contributions. Make your examples realistic and vivid. Paint pictures in the minds of your students by utilizing a rich vocabulary.

### ***Lesson Summary***

Use creativity and imagination in concluding a lesson. Review the material, checking for understanding. This is an opportunity to emphasize the bullet points of the lesson, pulling all the elements together. Employ a strong closing statement. A teacher always wants to leave his or her students on an academic high note, drawing the concepts together in anticipation of the next unit.

## Lesson Plans

Lesson plans come in various formats, but their basic information is universal. They include:

### ***Title***

What is the subject of the lecture?

### ***Objectives***

What do you hope to accomplish?

These are sometimes referred to as behavioral or student objectives. Well-written objectives contain three basic parts: Who? (the student), What? (referring to what students must do) and What Level? (referring to level of achievement).

For example, the student (“who”) will be able to correctly identify schematic symbols (“what”) from a standardized list, and be able to identify 15 of 20 items on the list (“what level”).

Don't get hung up on the educational jargon. Just ask yourself, what will the student be able to do if the material is successfully transferred?

### ***Teacher Preparation***

What materials will the teacher need to present this topic? Be sure to include tools, materials, training aids or equipment.

### ***Student Preparation***

Will the student require any advanced knowledge to be able to fully participate? For example, the student may have been asked to review the material from the last class and to read Chapters X and Y for this lesson.

### ***Lecture/Demonstration***

This is the meat and potatoes of the lesson. List the major points of the presentation to be covered.

### ***Student Activity***

Provide opportunities for the student to reinforce the knowledge acquired through interaction. For example, solder a wire or draw a simple circuit.

### ***Review***

Summarize the material, with a final check for understanding.

### ***Homework***

What the student will need to do to prepare for the next lesson.

Proper lesson planning will reduce stress. It will also ensure that you cover certain points and assist you in your pacing of the material. Feel free to jot down notes next to each topic, such as a reminder to ask a question or to solicit from the class a personal experience that relates to the topic. Consider printing your lesson plans in larger type so you may refer to them more easily.

## **Effective Use of Instructional Technology**

Instructional technology embraces any hardware that may be used to assist the student in the acquisition of information. Traditional items that come to mind include slides, overhead and movie projectors, tape recorders and videotape recorders. In today's world, many of these tools have been replaced by digital projection units, computers and wireless devices.

The availability of hardware support may range from nothing to a flip chart or chalkboard to a complete state-of-the-art electronic classroom. The instructor's task is to identify appropriate devices and utilize them effectively.

Courses that meet in schools, churches or businesses may have interactive whiteboards, projectors and wireless Internet connections available, if you make arrangements prior to class. But always be ready with a back-up solution in case the equipment does not materialize.

Using technology just because it's fun is not a justification for its inclusion in a lesson. Technology should be used to expand a student's level of understanding, not because it is a novelty. It is not a replacement for good teaching.

Instructional technology offers the student an opportunity to view or hear material that normally would not be available. For example, bringing a class of students to the E-911 Dispatch Center would be nice, but it's not necessarily practical. However, you could take a tour with a video camera and share the recording with your class. This technique could also be used to demonstrate specialized radio modes, such as Packet, SSTV, or satellites. Using a video camera, you can help your students get a better understanding of a process that is not easy to demonstrate in the classroom.

## Training Aides

When using a training aid, keep in mind its effectiveness. Educators sometimes refer to this as levels of authenticity. Level one refers to the actual object being used as a training aid, which is the most effective. Other levels — represented by perhaps a three-dimensional model, a two-dimensional display, a video or audio file, or a picture — have reduced effectiveness. The closer you get to reality, the more effective the training aid.

When using any training aide, be sure to preview material before showing it to a class. You would not want to get in an uncomfortable situation caused by a mislabeled tape or illustrative content that may not be appropriate for general viewing.

Due to time restrictions, you may wish to consider only playing the portion of a media presentation that relates directly to the topic, instead of viewing the entire production. Just cue up the section you need. If using a DVD in a unit, you may wish to note where on the disc a segment is located, making a list of segments. You could also prepare a secondary CD/DVD disc, with just those segments you will need.

When designing training aides, consider font style, type size and color. Charts have to be read at a distance. A pretty chart that contains too much information will have compromised effectiveness.

Use the resources on the Internet and in the ARRL library. ARRL course instruction manuals contain many supplementary resources. Reinventing the wheel is not a productive endeavor.

## Conducting a Demonstration

The demonstration is a primary method of sharing information. This technique is especially effective for students as it helps solidify retention. The more senses employed, the deeper the knowledge. If students can see it, hear it, feel it, smell it and taste it, they will have a richer experience, which aids recall.

Presenting a proper demonstration lesson has a number of predetermined steps to aid success:

- Clearly identify the goal.
- Physically obtain and set up the materials to be used ahead of time.
- Always stress the safety aspects of the process.
- Make sure that all students have a clear line of sight and can hear you. Consider where you are standing. You may wish to be seated and have the students standing over your shoulder to get a personal point of view. You may consider standing behind the equipment, performing the demonstration from behind so the students' view is unobstructed. Mirrors may be effective in certain instances.
- Demonstrate the process, step by step, verbally and physically.
- Repeat the process, with the teacher performing the task, as students identify the steps. This step may be modified depending on the difficulty of the task being presented.
- Repeat the process, with the student performing the task, while the instructor observes, offering guidance and reinforcement, as needed. This step may be modified depending on the difficulty of the task being presented.
- Review the process, relating the results to the subject presented.

## The First Meeting

The first meeting is full of anticipation for students and teacher alike. A teacher wants his or her first meeting to set the stage for the rest of the course.

Have your name written on the board, on a folded piece of stiff paper or on a sticky name label. This way, students may address you properly from the start.

In the relatively informal environment of Amateur Radio instruction, address students by their first names. If you want to use a last name, always be sure to put a Mister, Mrs., Ms or Miss in front of it. Calling on a student by their last name only is cold and impersonal.

If you did not previously get student details, take a moment in class to collect some information from the students on a 3 x 5 card. You don't need their life histories, just basic contact information, including an e-mail address. Also be sure to include any special medical issues, such as diabetes or seizures, so you can be prepared if a problem arises.

Explain the procedure that will be followed in the event of a class cancellation, such as due to a snowstorm or hurricane. If meeting as part of an adult education program, an announcement will usually be made in the local media.

While going over that procedure, add in the rules of the facility, such as prohibition against smoking or the consumption of food in class and where to go in the event of a fire alarm.

Once you collect the cards, go around the room asking the students to identify themselves. This will start the bonding process. The process of getting to know each other may be modified to accommodate the size of the class. You may also wish to have the students wear a nametag or place a folded paper with their name on their desk.

The first class usually has a fear-of-the-unknown factor. Share with the students the goal for the course. The goal is a successful completion of the final examination. You should convey to the students that you are there to work with them all the way to the end. Students must feel secure in that knowledge. Students should understand that you have a plan to get them there. During this process you will provide any assistance that may be required so they WILL be successful. Students have to know you are on their side and that the end result will be a teamwork approach to learning.

Have a course overview for distribution, a syllabus containing the dates of meetings and the chapters/topics to be presented. Arrange ahead of time with a local VE Team to be available on a set date so you have a definite goal. Be sure to also have a back-up date, however, should some unforeseen circumstances happen.

Answer any questions, take a break. Prepare for your first actual lesson topic.

## Motivation: Positive Reinforcement

The ability to motivate is one of the most important attributes a teacher may possess. This skill, if properly used, will allow the student to grow academically and personally.

If your supervisor calls you in for chat at work and commends you for a task well done, guaranteed you will walk out of the office with a sense of accomplishment. You'll be able to look at yourself in a mirror and honestly say, "I'm a successful person." You will continue to work hard, desirous of repeating this event.

Students also respond well to positive reinforcement. This technique gives them a sense of a pride, having mastered a particular skill or curriculum knowledge. They then say to themselves, "I'm ready for the next step, so I can do this again. I'm smart, my brain electrons are flowing." Motivational words must be honestly given. A student will see a gratuitous comment as your putting them on or mocking them. If you use the wrong tone of voice or a curt word, not only will the student feel embarrassed, but may also mentally shut down. This often leads other students in the class to feel badly and may create a tense atmosphere. Motivation can be verbal ("good job") or physical (a thumbs-up sign) when a proper response is given. Either way, the student receives the message.

If an improper response is given, you still have the opportunity to turn this into a positive one, rehabilitating the student's status. When acknowledging an improper response, give the student a redirect. Examples include:

- Why do you think the answer is \_\_\_?
- Are you sure of that answer?

Rephrase the question to lead the student to the correct answer. Note that this approach also reinforces the material for all students in the class. Other students will then mentally self-evaluate the response they would have given.

Positive reinforcement will provide a better learning environment for your students. As a by-product you will find a lower dropout rate and a higher pass rate.

**Remember, ALWAYS offer positive reinforcement.**

## Humor in the Classroom

Humor is a very important part of life; without it, the world would be a much sadder place. The most important thing about using humor in the classroom is to remember that there is a proper time and place for everything.

Humor may be used to help introduce a lesson. A funny story, a joke or illustration directly relatable to the topic may be an attention getter to hook the students. Keep in mind that the purpose of the course is to transfer information to the student, not to audition at the local comedy club.

Some people are just naturally funny. If you have this character trait, use it. Some people have a dry sense of humor and some are humorless. Forcing humor doesn't work and will be a distraction. This is the equivalent of a joke bombing during the opening monologue in a late night talk show. A joke that falls flat kills a mood.

There are some ground rules. Humor is *never* to be used negatively or sarcastically. Stay away from race, religion and politics. These subjects are non-starters and will often alienate students.

The expression, "we're laughing *with* you, not *at* you" is to be remembered. Never embarrass a student, as the class will immediately react negatively toward you, feeling empathy for a classmate. If this innocently happens, apologize immediately. Take whatever corrective action is needed to get the students refocused on the topic.

Often the funniest events transpire without any set-up; they just happen. Being able to think on your feet can transform a spontaneous event into a learning reinforcement tool or stress reducer.

A teacher must set the proper environment so that humor is welcomed. Students may also contribute. Avoid creating a situation where a "class clown" mentality is encouraged. This will waste time through bantering back and forth, often ending with a "can you top this?" scenario.

Every class has a personality. Be aware of your class composition. Humor that works with one group may not be effective with another. Comedians often say, "You have to know your audience." The classroom is your stage — use it wisely.



## Questions, Questions

Contrary to the adage, “there is no such thing as a bad question,” there can be.

Questioning techniques are essential to good teaching. Asking a question is an ideal way to interact with students, reinforcing elements of a lesson. This process also gives you the opportunity to gather immediate feedback by verbally testing for understanding on the fly.

The responses you receive may then be built upon to introduce the next aspect of a lesson. If the responses are off the mark, recycle your instruction using a different technique to share the information again.

A well-formed question is clear and requires a response other than a simple “yes” or “no” from a student. The question is directly related to the objective being presented.

In your lesson plans, have a few pre-written questions that you can use to reinforce a talking point or in case you draw a blank.

When a question is asked, allow some “wait time.” Do not be too quick to give the answer. This will give the students more time to formulate an answer. Students don't like silence and will put pressure on themselves to come up with an answer. Sometimes a simple rephrasing of the question will elicit a response. If nothing else, you know the information or the question was not understood. Share the bullet point again with emphasis, presenting the question in a different manner.

When a proper answer is given, be sure to use positive reinforcement (“Nice job! You're making this look easy!”). Be sure that your praise is honest, not mechanical. If sincere, your response will be appreciated; if not, the students will see right through you. People don't like being played with in such a manner.

In a larger class, you may want to involve more people in an answer. When a proper response is given, select another student and ask, “Is this answer correct?” “Do you agree with that answer?” When a “yes” or “no” is given, follow up with “why?” Another technique is to ask a question with multiple correct answers. For example, you can say, “Amateur Radio has four basic principles. Can you name one?” Then select different students around the room, until all four answers are obtained. This way you have involved more people in the learning process. It also keeps the attention of other students and reinforces the correct response.

Be sure to constantly scan the room, so you won't be looking for responses in the same area of the room or from certain students. It may be surprising to some, but classroom observations find that teachers have a tendency to select students on one side of the room over the other, depending on whether they are right-handed or left-handed. This is an unconscious behavior based in physiology. Also be sure to share questions proportionally by gender. Don't get yourself hung up on this, however, just be aware of the possibility so that no student is overlooked.

Awareness of non-verbal communication is important. While raising a hand for attention is the traditional manner, watch a student's eyes and demeanor. Does a student look tentative? Is a student trying to hide in the seat or gazing away to avoid eye contact? These clues and other body movements provide feedback to you. This may also signal a good time to take a break.

When a student asks a question there are a variety of possible reasons for doing so, among them:

- The student has an honest request to clarify an issue.
- The student likes to hear his or her own voice.
- The student desires to prove to others how brilliant he or she is or wants to play stump-the-teacher.

Most of us fear being asked a question to which we don't have a ready response. This is also true for teachers. Students may believe a teacher is a fountain of wisdom and knows all the answers. If that were true, the teacher would be in a bottle at Yale being studied. Being in this situation may make you feel uncomfortable.

If you are unable to come up with a quick, accurate and complete response, have no fear. Compliment the student on his or her insightful question. Offer to obtain the information and respond after the break. If this happens at the end of class, you may wish to fall back on the old, "hold that question. We will start with that in our next session."

If the question is off-topic, you may redirect it or ask the student to remain after class for a response. Should the question be related to a topic to be covered in a subsequent class, ask the student to hold the question. You may use this inquiry when the topic comes up in a future class or as a topic starter in your next class.

Students respect any teacher who is willing to go the extra distance for them.

## Teachable Moments

In the learning process there are moments that happen when students are super-receptive to information. This may be the result of a natural internal rhythm, or it could be spontaneous, based upon something that has recently happened in class or in a student's daily life. Regardless of the reason, be aware of these events and adjust your teaching accordingly.

Think back to your school experiences. How did the class react the first period of the day verses mid-day or at the end of the day? What was the mood of the class after a tragic world event? How do you feel yourself when attending class after a long, tiring day at work or if there has been a family issue?

Recent serious weather-related events may present an opportunity to discuss Amateur Radio in an emergency or as a public service. Current weather may represent a chance to discuss radio wave propagation or static electricity.

Teachable moments will often occur when a student asks a question. In general, when students ask questions, they have a real interest you should address. If students didn't care, they wouldn't ask. Sometimes the question will be out of left field, or perhaps it will be relatable from a different perspective.

When answering any question be aware of the big picture of information to be presented. You may wish to introduce information a little out of sequence, because the timing is right for student reception. Often this requires quick thinking and flexibility. Be willing to go with the flow, while also directing its movement.

## Using Social Media and the Internet

Social media and the Internet provide added avenues for teacher and student interaction.

Internet security is a growing concern, however, so before progressing into the Internet domain, think of the framework you wish to establish and the reason for its development.

If you are working with a compressed class format (say, a weekend cram course), then the use of the Internet would be minimal. On the other hand, if you are running a traditional weekly course you may consider establishing a closed newsgroup or even a Skype session or a webinar. Remember, if someone in class has a question, chances are that others do, too — they may just be hesitant to ask. An online closed room situation can address this. You want your students to feel safe and to avoid distraction.

Participation in online activities should be optional (unless of course your class is only being offered in an online, webinar format!) and considered an additional opportunity for your students. Establish a personal e-mail account that you are willing to share, should a student wish to ask a question by that method.

In either the traditional class setting or a hybrid one (with an online element), it would be valuable to have your students' e-mail addresses. This way you can inform them of weather cancellations, send reminders, or provide VE testing information in an efficient and timely manner.

You might also suggest available apps for Morse code instruction, online Amateur Radio practice exams, and other related material. You might develop a list of specific suggestions for online resources or refer students to ARRL's exam study pages to find supplementary resources.

If your class is sponsored by a club, you might consider offering a mentor's "Help" forum on the club's website.

## Offering Extra Help, Special Situations, and Working with Minors

Teachers enjoy sharing; it is part of their being. The Amateur Radio term “Elmering” refers to the act of assisting newcomers into Amateur Radio. Think of this as one-to-one, or small group tutoring.

When running a class, the more assistance you can get the better. You may wish to maintain an Elmer contact list with phone numbers, or e-mail addresses. This way if students have questions in between classes they can try to have them answered. Depending on the class composition, you may wish to match up certain individuals with specific Elmers, based upon compatibility, learning styles or geographic areas.

E-mail can be an effective way to handle questions. This technique is often seen in schools and businesses today, so it is familiar to most individuals. Depending on the size of the class and the degree of technical expertise available, you may wish to set up a chat room on the Internet, making yourself available at a set time. Another Internet approach is creating a mail reflector to share questions and answers or for class administrative activity.

Situations may develop when it will be necessary to offer additional assistance to those with special circumstances, such as limited mobility or medical problems. When assisting outside of class time, there are some considerations to address.

Society has changed a lot over the years, and some behaviors may be misinterpreted. The basic rule is that you want to avoid any appearance of impropriety or incidental physical contact, so it is best to follow some guidelines for everyone's protection:

- Never meet alone in a classroom with a student. Should there be no alternative, make sure that the classroom door is open and that you are in full view of the doorway.
- Always try to have another adult in the room. This is especially true when working with minors.
- Meeting with a group of students collectively is fine. When you have completed your business, all students should leave the room together.
- Do not offer to drive a student home. There are times when car-pooling is practiced and even the norm in a community. If you participate in such a routine, make sure that you are never alone with a minor.
- If you meet a student outside of class for tutoring, always meet in a public place, such as a library.

Working with adults is usually not a problem, but when working with minor children extra precautions must be taken. One way to get younger students participating is to get their parents involved. If a parent is present many issues are automatically reduced. While a minor is in your

care you must maintain a high standard of diligence. For example, if a child is waiting for a ride home, he or she should not be left alone or in any area that is not supervised.

Often new hams need assistance putting up an antenna or setting up their stations for the first time. Antenna parties are common in the hobby. If working with a minor, ALWAYS be sure to have the permission of a parent and request that at least one parent be present if you will be at a student's home.

## Working with Special-Needs Students

Amateur Radio offers a variety of experiences for all people. When Amateur Radio operators contact others they don't have any idea with whom they will be speaking. Every time a radio amateur operator puts out a call they are looking forward to meeting new people and traveling around the world via the airwaves.

For operators with special challenges this is an opportunity to communicate with others on an even playing field. The person on the other end of the conversation has no idea what challenges the other operator faces. Hams only know if the operator is friendly and has competent communications skills.

Working with people who have special needs may be intimidating for some if they have not had previous personal experiences. They may even be concerned that they could unintentionally offend another person by using a wrong choice of words. Today's politically correct world can be a landmine. Remember common sense is the rule. Saying to a blind student, "I'll see you next week" is a common expression, not an insult to draw attention or ridicule. This won't be given a second thought.

Instructors have a skill that they want to share with everyone. Often a little creativity and preparation will be needed to put a plan into action. Having a student with special needs can mean many things. Not all students have multiple or severe issues. Do not get yourself overly worked up. Take a breath and think for a moment: What can I do to make this experience a more meaningful and successful one for this student? A good teacher would be following this process whether or not a student has special concerns.

Basic class planning is universal. Good teachers have always known that they must tailor their lesson plans to the group of students they are teaching. Having special-needs students in class really requires very little additional modification.

When planning any class, the first consideration is where the class is going to meet. Since 1990 all public facilities have had to comply with the Americans with Disabilities Act (ADA). Since most classes meet in public facilities, this is usually not a problem. Even older buildings must be brought up to code through renovation. Again, common sense is the key. Just think to yourself: If I hold the class in this facility will students be able to come and go without difficulty? Is the classroom on the ground floor? Are there ramps or elevators available? Is there proper signage?

Once the class sessions are organized, preparation for class sign-ups may begin. While students are signing up, it is incumbent upon students with special needs to make their concerns known. This way proper accommodation may be made.

Instructors are volunteers. They are not expected to spend large amounts of money to teach the class. If a student requires special hardware, such as a computer, sound amplification device, or other adaptive technology, it is the responsibility of the student to provide it.

In most cases the students themselves are aware of agencies that can provide additional support for those who may need transportation, readers, signers or other assistance. Remember, students who want to earn their licenses will find a way to do it. They are motivated with that "can-do" spirit.

School age (K-12 through college) individuals may also be able to call upon specialists, such as instructional technology professionals, social workers or special education teachers, as a resource for materials. In some cases, students with adaptive technology hardware are able to use these items full time, not just when in school.

As a general rule, have all students with special needs sit up toward the front and side. This allows for less distraction. You also want to make sure that they are not potentially blocking the view of other students.

Seat students with hearing difficulty close to you, perhaps on the left or right side, depending on whether impairment is in one or both ears. Does the student have audio amplification equipment? A deaf individual may also desire to be up close for lip reading. Another option is having the student provide his or her own signer to interpret the class.

Students with physical limitations should have clear access to their seating area and easy egress. This is especially important for those on crutches, wheelchairs or a gurney. Students using non-battery assistive devices should be seated where they will have access to electrical power without the need of long extension cords that could pose a tripping hazard.

Space should also be provided if a student has a learning or other special assistant. In many cases, family members serve this function. Always try to get both parties to take the course. There will be many benefits, both while learning and into the future.

Students with special needs sometimes require assistance with transportation to or from class. Often a simple comment made at the beginning of the class is all it takes. You can simply state that a fellow classmate, who lives in the XYZ area of town, would appreciate having back-up transportation to participate. Do not name the student. Ask that anyone interested in helping see you after class.

Visual issues vary. Total blindness, shadows, color blindness, low vision and inability to focus are a few of the possibilities. Creating verbal descriptions while lecturing and using physical items for hands-on reinforcement are important for these students. Software is also available for viewing ADA-compliant websites, converting text to speech and other functions, such as Brailing.

Remember when dealing with all special issues that it doesn't hurt to ask the student, in a confidential manner, what you can do to assist him or her. Your student will likely know what approaches would be beneficial and will appreciate your caring enough to ask. Teaching is a cooperative process.



On occasion, you may be aware of a special needs radio amateur in the community who may have challenges similar to those of a student in your class. This operator may be willing to be a mentor, offering the student specific tips on becoming licensed and for operating afterward.

### ***Courage Kenny Handiham Program***

The Courage Kenny Handiham Program is an excellent organization with a long history of success providing tools for people with disabilities to learn Amateur Radio and technology skills and to earn their Amateur Radio licenses. The Handihams Program teaches technology to people with physical disabilities and sensory impairments. Ham radio, computing and more can be learned at home through the podcasts or at one of their residential camps. Handihams has a list of resources to assist with licensing people with disabilities. Visit their website at [www.handiham.org](http://www.handiham.org) for more information.

### ***Testing***

The testing process under the Volunteer Examination (VE) system may be adapted for administration to people with disabilities. A VE may read the question and possible answers for those with special needs. There are software exam generators that can create special tests for those with a visual impairment. If working with a specific VE team, make sure that they are aware that there will be an individual with special needs who requires testing so that proper preparations may be made.

*The ARRL VE Exam Maker* software is available to ARRL VEs to generate printed exams. This software is maintained with updates to the FCC question pools as they occur, easing the challenge for the VE of staying up-to-date with changes. It also provides for special tests for those with a visual impairment.

Being an Amateur Radio instructor is a most satisfying experience. Having the added opportunity to open horizons for students with special needs makes it even more rewarding.

**The basic physical layout of the classroom itself will solve many learning issues.**

## The Final Task: Course Evaluation

High-quality instruction requires constant assessment. The depth of this feedback varies and depends on its purpose. What is it you want to know?

During a class the instructor gets immediate feedback by interacting with students. Are the students attentive? Are they asking quality questions? When asked a question do students give responses indicating comprehension of the information presented? This feedback allows instructors to make immediate changes in their delivery.

Course/instructor assessment is needed to provide information for future classes. The goal is to constantly strive for improvement. This can only be achieved through proper evaluation and planning.

The methods used to gather this data vary. The tool you develop should reflect the academic level and number of the students participating. Do you have a large group, a small group or multiple sections? Was the course traditional or high intensity?

The same content, delivered in a different process could yield different results.

Regardless of the method employed, there are certain areas of interest to focus on when evaluating.

- Student learning
- Communication and clarity of materials
- Class organization

Sample questions for determining success in each area are given below as a starting point for developing your evaluation tool.

### *Student Learning*

- Did the classroom environment encourage questions?
- Did the course provide you with the information needed?
- Did you learn to appreciate communications concepts?
- Did the course motivate you to learn more about Amateur Radio?

### *Communications/Clarity*

- Did the instructor use clear examples?
- Were handout materials focused and easily understood?
- Did the instructor effectively use demonstrations and media to present material?
- Did the instructor understand and clearly respond to students' questions?

### *Class Organization*

- Was the instructor well prepared for class?
- Was the course content presented in a logical manner?
- Was the instructor accessible during non-classroom sessions?
- Did the instructor use class time effectively?

An effective evaluation tool is quick and meaningful. Class time is valuable. There usually isn't enough time at the end of the course for tying up many loose ends. You don't want a student to either plod or rush through many detailed items and options. This could lead to less-than-thoughtful responses or question misinterpretations.

### *Methods*

- **True/False:** A true/false questionnaire must be clearly written. The data collected could be fuzzy, depending on how the student reads the question. Trigger words like "sometimes," "always" or "usually" often raise a question on the part of the student ("Is this a trick question?").
- **Scale:** Questionnaires that offer a range of responses are very effective. Consider this approach: 1 - "strongly agree" through 10 - "strongly disagree." With a 1–10 scale the student must make a decision favoring one extreme or the other. A scale of 1–5 is sometimes used (1 - "strongly agree" through 5 - "strongly disagree"). This gives the student a possible 3 – "neutral" response. Students could use this to take the easy way out in responding.
- **Open-ended questions:** Open-ended questions offer an opportunity to really respond in depth to specific items. The quality of responses can vary depending on the class' composition.
- **Combination:** When constructing an evaluation tool a combination of methods may be employed. Often scale-type questions are used, with an option for open-ended responses at the end.
- **Small group discussion:** Sometimes in a small class you may conduct a roundtable type of discussion for an informal evaluation. This technique can be intimidating to some, altering potential responses.

### *Teacher Preparation*

Once the teacher has decided upon the scope of the evaluation, an easy-to-understand form should be put together. The size of the class will determine the amount of effort needed on the teacher's part to get accurate feedback.

Always try to keep the form under one side of one page. If many items are involved, place the scale questions on one side of the paper and give directions to complete open-ended questions on the reverse side.

You could also give the students large index cards. Write the questions on a white board, asking the students to number their card's lines for responses. For an open-ended question, use the reverse side of the card.

Data spreadsheet programs can be effective as well. This would also allow you to tabulate the data, placing it in a visual form to aid interpretation.

The evaluation form is the final classroom activity. After completing them, have students hand in the forms in some area where they won't distract others still working on their evaluations.

Some instructors may prefer to give out the forms and leave the room. Depending on requirements, you may have another adult monitor the process.

One new approach is to construct a student feedback page on a club's website. Using a web form, students may input their responses after the class sessions are over. This would also save class time during your course wrap-up class. Or you may use one of the many online survey tools that allow you to send a form directly to your students' mailboxes.

### *Student Preparation*

Proper student preparation is mandatory for meaningful results from an end-of-course evaluation. The students must clearly understand that you are interested in their feedback to make improvements for students in the future. You do NOT want them to sign their names. Students should understand that you take their input seriously and appreciate their assistance.

**Evaluation is an important tool, for both the teacher and the student.**

## **A Final Thought**

For a teacher, sharing is caring. You have knowledge and a desire to pass it on to your students. For maximum success, effective teachers will customize their lessons according to their students' needs. From your first lesson, you should be constantly assessing your effectiveness, ever willing to make adjustments. Your students have to know that you will be there for them every step of the way.

When you see in your students the unmistakable light of understanding when they have mastered the material, you will share in their feeling of accomplishment. The mentoring relationship you form with your students will carry them forward through a long career in our wonderful world of Amateur Radio.

**“A teacher affects eternity; he can never tell where his influence stops.”**

— Henry Brooks Adams