Multiple Intelligence Sound Unit

By Jay Maki

This summer while attending an ESMIS institute sponsored by Michigan Technological University and an Eisenhower Grant at Alberta Michigan, I developed a new Electromagnetic Wave unit for my sixth grade class. While at the institute, one of the finest features was a sharing time in which teachers shared their best teaching ideas. In one of these sessions, we started talking about multiple intelligences and it occurred to me that I could include these in my electromagnetic wave unit. So I DID!!

The unit that I'm discussing in this article is a sub-unit of the electromagnetic wave unit on Sound. The total unit includes: Overview of the electromagnetic spectrum, waves and wave behavior, light & color, infrared & ultraviolet, sound and microwaves and TV. Since the unit that I was using left much to be desired, I was able to search the internet and came up with scads of new teaching ideas for teaching all of the above concepts to my sixth grade students at Rudyard Middle School in Rudyard, Michigan.

While doing some research I found an excellent source text on multiple intelligence by Howard Gardner entitled Frames of Mind: The Theory of Multiple Intelligences. This text discusses 8 different ways that students learn and what sets our students apart. Mr. Gardner has also written several other books on this same topic that are listed in my bibliography and I found several web sites also devoted to this topic. The most useful site that I found was a site on angelfire.com called The Midas which gives a nice definition of each of the multiple intelligences. I will summarize these for you later in this work. There are also tests available to test people to try to determine how they learn if you are interested in this procedure. My intention is to use these definitions to try to make my lessons more applicable to more of my students, so I don't plan to use these testing instruments at this time.

Multiple Intelligences

So what are these multiple intelligences that Howard Gardner has delineated for us? Basically he has divided intelligences or learning patterns into 8 categories. These categories are 1) Verbal-linguistic intelligence, 2) Logical-mathematical intelligence, 3) spatial intelligence, 4) Bodily kinesthetic intelligence, 5) Musical intelligence, 6) interpersonal intelligence, 7) Intrapersonal intelligence and 8) Naturalist intelligence.

Each of these intelligences allows us to expand our knowledge base in different ways. In most classrooms, the students are taught using the Verbal-linguistic intelligence almost exclusively to the detriment of learners whom may be more inclined to use other intelligences to expand their databases. So let's look at a profile of each of these intelligences recognizing that almost all of us will learn in many different ways, but intrinsically we will learn better in some ways than others will.

The student who exhibits a high degree of verbal-linguistic intelligence will probably be a voracious reader and will probably use words in a skillful and persuasive manner. In
other words this person will be your typical outstanding student in English, and probably forensics.

The student whose main strength is logical-mathematical intelligence will think in terms of cause and effect connections. They will also be typically outstanding at tasks that involve calculations, quantifying and advanced complex mathematical problems. If a problem involves inductive or deductive reasoning, this person is going to excel in solving it. This person will be your typical math or computer whiz in the typical high school.

The student who exhibits spatial intelligence will think in terms of pictures and even in terms of three-dimensional solutions to design problems. These students will usually be successes in art and mechanical drawing and construction classes.

The student whose intellectual prowess is in bodily kinesthetic intelligence will typically be excellent at bodily movements that are required in sports and also in intricate detailed small motor activities such as constructing models and electronics.

A musically intelligent student typically will think in terms of sounds, rhythms, melodies and rhymes. They also will usually be sensitive to pitch, timbre and tone and will be able to reproduce music very easily having heard it or seen it recently.

Another kind of intelligence is interpersonal intelligence. This is the kind of intelligence that every good politician has. These are the kind of people who can recognize the needs of other people and empathize with them about their motives, moods and intentions.

The seventh kind of intelligence that Gardner delineates if Intrapersonal intelligence. This involves thoroughly understanding your own strengths and weaknesses and solving your own problems through introspection and self-awareness. This person could become rather self centered and even narcissistic.

The final intelligence that Gardner identifies is the Naturalist. This person intrinsically understands the natural world and has an affinity to interact effectively with living creatures and to discern their needs.

I think as teachers we have recognized these in intelligences in passing, and even at some times tried to design our lessons in ways that involve the learning patterns of all of our students. However, what I like about Gardner's taxonomy of learning styles is that it gave me a basis for designing lessons around one or more of these intelligences in my units for science. The other thing this grouping of intelligences did was make it very easy for me to check to see that I had included all of the multiple intelligences in this unit.

Actual Sound Unit

While setting up my sound unit, I was constantly aware of the 8 intelligences and really worked at including activities for all kinds of intelligences into the 8 stations of this unit.

I probably should explain my teaching style to you at this point. I try to use a hands on
student centered approach to all the learning that takes place in my room. I do lecture on occasion and I also use videos to introduce terms in some of our units. But primarily I try to assist the students in understanding concepts through hands on work stations. This particular sound unit was a fairly typical science interdisciplinary unit in my room. We started out the unit with a pretest on sound and on scientific attitudes.

This was followed by a 15-minute lecture by me on sound and some of the terms that we would be using. Students are expected to take notes during the lecture in their science journals. After the lecture, I divided the students up into Pods of 4 people each. These pods are ever changing groupings. My purpose is not necessarily to include students of different intelligences in each pod rather to give all students a chance to work with all the other students many times during the course of the school year.

After the students sorted themselves into pods, they were given the pod duty list for the sound unit. These duty lists change as the needs of the units change. We try to encourage students to take different roles in the pods as the year goes on. The roles for this Sound unit are shown in figure 1.

There are typically 6-7 pods in my science classes so the pods could pick a Station and get started on the activity at that station. The students have an assignment sheet with 20 items on it that includes all 8 stations plus several reading and question sets to be entered into their science journal. Each station will have an index card (laminated) with the activity instructions, a "Flex Your Brain " worksheet (see figure 2) and the equipment necessary to carry out the activity. If all the equipment isn't there the grip gets the missing equipment. Then each pod starts their station activity. When they are through with the station's activity, the grip and the straw boss clean up while the recorder and tester complete their results in the science journals of all 4 members.

The stations that we used for this 6th grade sound unit were:

Station 1-listened to tape recordings of natural and unnatural sounds and each individual describes them to the recorder and in turn tried to guess how they might have been created and how they made them feel. (Types of Intelligence used 1,7,8)

Station 2-used a xylophone to create music and then try to duplicate their music using a series of 8 Glass Mountain Dew bottles and water. (2,4,5)

Station 3- used the Gut Bucket and wave trough to demonstrate that sound can cause waves in other materials and to see if they could measure how the sounds caused changes. (2,3,5) (Figure 2)

Station 4-used tuning forks and various solid, liquid and gaseous medium to demonstrate sound conduction, they also tried to compare the various media for sound conduction. (3,4)

Station 5- used a video, VCR and TV to show sonar and ultrasound as ways of detecting information and then had the young scientists use their sense of sound to discern the contents of each of ten (10) separate boxes. (2,4,8)

Station 6- had a computer setup to the internet site The Soundery where students performed 3 specific experiments dealing with wave length and the Doppler Effect.
Station 7- used an oscilloscope to demonstrate some mathematical relationships of sound waves. (2,3)

Station 8- utilized another computer and a internet site called explorescience.com to see some fun applications of sound.(1,3,4,5,6,7,8)

The pods took about 12 class periods to complete the circuit of all 8 stations. At that point each member of the pod had 3 "Flex Your Brain" sheets in their journals plus other reports on each of the stations. The recorder is responsible for providing each pod member with a copy of each sheet.

At this point, each student in the pod could opt to compile a final report on Sound as a member of the pod or as an individual. These final reports can take as many forms as there are intelligences (or perhaps even more.) They can be written, a poster, a video, mathematical graphs or models, artistic models, poems, songs, introspective readings, or how sounds could apply to natural situations.

On the final day of this unit, the students presented their report to the class on what they had learned in the sound unit. This presentation was as short as 2 minutes for a couple of students who displayed their posters and for the one pod that did the PowerPoint demo it took about 10 minutes. After the presentations, the students took a short post-test on sound terms and a post unit attitude survey toward science.

The last thing that the students did is a peer participation rubric on their fellow pod members.(Figure 3.)

Assessment of the Unit and Assessment Strategies

All in all, I was very pleased with the Sound unit, I felt it forced me to concentrate on the various intelligences and I find this a very good way to develop units that meet the needs of many more students. I plan to continue to use this strategy into the future.

As you have probably figured out, we used multiple assessment strategies in this unit. Obviously, we used a pre and post test both on content and on attitudes toward science. In addition, the students are graded on their journals, their completed "Flex Your Brain" sheets and their final class presentations and report. The final step in the assessment process is the pod peer group participation rubric. The total points available for this unit were broken down as follows: Post test-200pts, 20 Science Journal entries- 800 points, final sound report-300 points, peer participation rubric-100 points.

I'm really happy that I developed this unit this summer at the ESMIS institute and I've found that the entire electromagnetic spectrum unit that I have developed is a refreshing change from the unit that we used last year. Incidentally, I would highly recommend these ESMIS institutes to any teacher. In addition to providing great informational content: (I went to 2 one week long institutes during the summer of 2000 and had instruction from over 25 different MTU professors and instructors.) The institutes I attended were at...
Alberta Forestry Center where the food is so fantastic that you may want to move in. Everybody was very warm and friendly and extremely helpful. The Eisenhower Grants that helped fund these institutes made it a very economical method to gain accreditation and advanced degrees.

Michigan Science Standards Addressed

SCI.I.1.MS 1,2,4 & 6

SCI.II.1.MS 2

SCI.IV.1.MS 6

SCI.IV.4.MS.1 & 2

Bibliography


2. The Midas Multiple Intelligences. accessed 6/29/00 10:14 P.M.


Other books by Dr. Howard Gardner;

1. Gardner, Howard The Disciplined Mind Simon & Schuster May 1999


Figure 1

The responsibilities of each member of the pod are:

Straw Boss- Reads the assignments and tries to keep the group on task.

Recorder- Records the results of all experiments and copies results to all Science
Journals.

Tester- Actually carries out the experiments and helps clean up

Grip- Gets equipment and cleans up--requests everything not at stations

Figure 2--Gut Bucket Drawing

Wash Tub Bass--Consists of a washtub, string and pole.

Figure 3

Peer Participation Rubric---100 Points Total

Did this person do their job as assigned (1-40) __________

Did this person go above and beyond to help the team ? (1-30) __________

Was this person pleasant and helpful at all times ? (1-30) __________

Total Rubric Points __________