

# Teaching to Multiple Intelligences by Following a “Slime Trail”

Carol J. Delaney & Francie Keller Shafer

In this age of teacher accountability and high-stakes testing, practicing middle school teachers face many complex issues. Because adolescents must deal with the challenges of physical, social, emotional, and intellectual change, they are considered the most diverse population in the public school system (Powell, 2005). Their varying levels and types of intellectual growth make the prospect of meeting young adolescents’ needs daunting to teachers, who already face the pressures of following curriculum mandates and standards. The number of standards and the narrowness of tests are often debilitating to teachers, who may teach to the test and base student performance on memorization of isolated facts (McNeil & Valenzuela, 2000; McNeil, 2000). Reverting to traditional authoritarian teaching styles often occurs at the expense of fostering connections between concepts and students’ interests, strengths, and experiences (Khourey-Bowers, 2005). These practices are particularly ineffective at the middle school level. The Carnegie Council on Adolescent Development (1989) earlier described the problem as “a volatile mismatch ... between the organization and curriculum of middle

grade schools and the intellectual and emotional needs of young adolescents” (p. 8).

One way to increase achievement and address the needs of young adolescents is to employ an assortment of innovative teaching methods.

At the same time, teachers’ assessments should allow for a wider range of evaluation of student performance that expand traditional assessments (Wu, 2004). Gardner’s (2004) theory of Multiple Intelligence accounts for a broader range of potential among individuals because it recognizes eight forms of human intelligence: visual spatial, verbal



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**This article reflects the following *This We Believe* characteristics:** High expectations for every member of the learning community — Multiple learning and teaching approaches that respond to student diversity — Assessment and evaluation programs that promote quality learning

linguistic, logical mathematical, bodily kinesthetic, interpersonal, intrapersonal, musical rhythmic, and naturalistic intelligences. His theory is based on the premise that individuals possess all eight intelligences but demonstrate different levels of functioning in these various intelligences. To develop this range of intelligences, instructional methods need to be varied so that students may use their intellectual strengths to better understand a topic (Shearer, 2004). Increased motivation and higher levels of academic engagement are additional benefits that are also prerequisites for academic success at the middle school level (Chen, Krechevsky, & Viens, 1998).

Because it shifts the focus to strengths rather than weaknesses, Gardner's Multiple Intelligence (MI) theory is not only good for all learners but has particular emotional and academic benefits for students with learning disabilities (Kornhaber, 2004). These benefits for students' achievement and progress are extended when assessment and evaluation are based on MI theory. When teachers use the MI theory in classroom assessment, they expand beyond sole reliance on paper and pencil tests. Their students' tasks and projects can address individual strengths, which might include the fine arts, visual arts, performing arts, naturalistic exploration, or bodily expression.

One major threat to implementation of MI theory is lack of acceptance by teachers. Shearer (2004) argued that teachers need to have personal experience with applying MI theory, because too many passing fads have caused teachers to become hardened to the acceptance of new ideas. Although teachers may be required to attend staff development sessions, such attendance alone does not guarantee that teachers will accept the ideas presented in the staff development session or have the support to successfully implement the recommended practices. Consequently, even though teachers might accept MI theory or believe it to be of value, classroom use cannot be forced.

## Context

As teacher-educators at Southern Illinois University, part of our responsibility was to teach the required courses for the middle school endorsement. The second course in this series, *Teaching in Middle Level Schools*, specifically addresses young adolescent developmental, cooperative learning strategies, and Multiple Intelligence



*Two boys have opted to present their depiction of the life of a slug. photo by Alan Geha*

theory. We taught these as interconnected elements of a strong middle school program. Bearing in mind the pressures and challenges that new teachers face, we have often pondered the question, "How can we teach in ways that produce teachers who will use innovative techniques, meet adolescent needs, and build on students' strengths?"

Gardner's MI theory is particularly difficult for teachers to apply to their practice for two reasons. First, there is a lack of information and structure to support implementation of MI theory (Kornhaber, 2004). Second, the theory requires deviation from the familiar, traditional textbook approach and authoritarian control of classroom settings, and results in differences in performance outcomes for children of varying intelligences (Eisner, 2004). While many would agree that effective middle level schools encourage and increase individual differences, such a notion conflicts dramatically with the high-stakes standardized testing approach to assessing student outcomes. Unilaterally, the high-stakes testing movement places a premium on uniformity of outcomes, thereby supporting an authoritarian, content-driven approach to instruction. Thus, the application of MI theory becomes problematic for those who cannot conceive its value as a tool for promoting deeper understanding or for those who are not supported in seeking deeper understanding among their students.

As instructors of preservice and practicing teachers, we worried that our students would find it too cumbersome to incorporate the MI theory in their teaching, thinking it too time-consuming, therefore,

**Figure 1** Projects surpassing the content of a worksheet or test

The following are several examples of student outcomes:

**Slug Stew**  
2 cups decaying organic matter (fact 1 – what slugs eat)  
1 can Light Beer (fact 2 – Yeast in beer attracts slugs and they drown.)  
1 tsp. pearl-shaped eggs (fact 3 – shape of slug eggs)  
8 hosta leaves, chopped (fact 4- a favorite food of slugs)  
7 cups bicycle crushed slugs, tentacles removed: best results if run over more than once (facts 5 & 6—a fun way to rid the garden of slugs; tentacles contain eyes)  
salt & pepper to taste (fact 7 –Salt is a major killer of slugs)

Bring hosta leaves to a rapid boil. Add remaining ingredients and simmer for 35–40 minutes.

To serve: Serve hot immediately after cooking. Best served with fresh hosta leaf salad and mucus dressing (fact 8 – *Slugs secrete mucus to keep them from drying out as they travel*). Sprinkle fireflies on top for an added crunchy delight!

Warning: This recipe may result in intestinal gas/tropod (fact 9—*Slugs are members of the class, “gastropod.”*)

**Figure 2** Slimy and spotty

Once upon a time there was a gray garden slug (fact 1 – color), Slimy, who was very hungry. He had been waiting for a nice rainy day to come out and find some yummy rotting vegetation (fact 2- *Slugs eat rotting vegetation*). It was his sixth birthday, and he wanted to celebrate, and he had even brushed his radula (fact 3 – *slug teeth*). He used his two sets of tentacles to look for and feel around for his girlfriend, Spotty (facts 4 & 5 – *Slugs have two sets of tentacles: eyes & feelers; some slugs have spots*).

Suddenly, Slimy sensed a wonderful aroma which smelled like yeast (fact 6 – *Slugs are attracted to yeast*). He blazed a mucus trail over to the scent and arrived at a shallow beer pool. That’s when he spotted Spotty, laying lifeless in the pool of beer (fact 7 – *Beer can be used to attract and drown garden slugs*). He was heartbroken because he had wanted to have a family with Spotty. He had been attracted to her 7” frame and was hoping they could have some long children (fact 8 – *Some slugs can grow to be 7” long*). Still, everything would be okay, because he could go home and be a single father (fact 9 – *Slugs are hermaphrodites*).

**Figure 3** Slug acronym

**S** Spotted garden slugs live in Illinois (fact 1).  
**L** Life extends from one to six years (fact 2).  
**U** Using children, beer, copper, cars, or bait helps your garden (facts 3,4,5,6, & 7).  
**G** Growth up to seven inches long (fact 8).  
**S** Slime trails are used for mating, moisture control, and defense (facts 9, 10, & 11).

sacrificing content coverage. Since we believe in Dewey’s (1916) conclusion that understanding the value of a given experience can be achieved by *doing*, we decided to have our students experience the value of classroom practice based on MI theory. Our plan was to model instruction that would have our students participate in classroom activities that address the various intelligences. To demonstrate that the theory can be applied to any subject, we chose to teach a set of little known facts about slugs, which are slimy creatures that are “cousins” to the snail.

We began instruction with a cooperative learning strategy called “telephone.” Telephone is one of many Kagan (1994) structures that we encourage and model throughout our coursework, specifically because these structures address the various intelligences. To begin, students were arranged in groups of four, with one student per team being asked to leave the room. Having written “slugs” on a whiteboard to activate prior knowledge, we led the students in a discussion of what they already knew about the slimy creatures. We then introduced the life cycle of slugs, their mucus secretions, mating habits, the destructive nature of slugs in the garden, and unusual ways to rid the garden of them (Snails & Slugs, 2005).

The students previously sent to the hallway were called back into the room to rejoin their respective teams. The other three team members became teachers of “Slugs 101.” After this initial instruction, the hallway newbies then rotated to other teams to orally recount their newly acquired knowledge of slugs. After completing this first phase of instruction, the students affirmed the conclusions of Chen, Krechevsky, and Viens (1998) that

this cooperative method of learning was engaging and enjoyable.

We next distributed envelopes containing directions for slug projects that targeted specific intelligences. Previously, students had taken the Multiple Intelligences Developmental Assessment Scales (Shearer, 1994) to determine their greatest areas of strength, and they now arranged themselves in groups based on those strengths or on personal choice. One major requirement was that each project should convey a minimum of six content facts about slugs. The facts would be presented in various ways, depending on the strength of each group. For example, the musical-rhythmic group could create a slug song, rap, or rhythm; the bodily kinesthetic group could perform a slug skit, a slug cheer, or a slug dance; the verbal-linguistic group could write a creative slug story, newspaper column, or poem; the logical mathematical (also verbal-linguistic) group was to create and solve five mathematic word problems about slugs; and the visual-spatial group was instructed to draw a graphic organizer or poster about slugs. In a regular middle school classroom, multiple intelligence centers could be arranged so that students could participate in several activities, both playing to their strengths and strengthening their weaker intelligences.

As our students immersed themselves in their tasks, we observed their behaviors and listened to their comments. We specifically noted four encouraging details: first, students appeared to be thoroughly engaged in creating their projects; second, students were clearly enjoying the creation and presentation of projects; third, the final products displayed the learned content in a wider range of modes than worksheets or tests; and last, their performance exceeded our original expectations (See Figure 1-5 for examples of student projects).

Since one goal of this activity was to have the class members experience a form of teaching that they might subsequently use in their own instruction, we decided that an important final step would be to investigate their perspectives on Multiple Intelligence theory. We posed the following question: "Based on your own experience in learning about slugs, what are your beliefs about teaching through Multiple Intelligence theory?" Their written responses produced several themes: increased learning, engagement in learning, and learning for long-term memory. Their comments also included mention of humor, fun, and imagination in the learning process.

One student wrote, "I was having so much fun, I didn't even realize I was learning." Another wrote, "I learned that a teacher can take any content and creatively apply it to all intelligences."

All students expressed positive feelings about the experience and a desire to implement similar activities in their own classrooms. Of the more than 100 students who participated in this activity, only two expressed a concern about time restraints.

**Figure 4** The logical/mathematical approach to Slugs 101

- 1) a. If you have 340 slugs, how many sets of tentacles would you have (fact 1)?  
b. How many of those tentacle sets would contain eyes (fact 2)?  
a. 680      b. 340
- 2) a. If we have 15 adult spotted garden slugs in a line, how long is the distance from the first slug's head to the last slug's bottom (fact 3)?  
b. How many feet of slugs would that be?  
a. 105 inches    b. 8 feet 9 inches
- 3) a. Since slugs have 27,000 teeth (fact 4), how many teeth do 15 slugs have?  
b. If a cubic meter of garden contains 200 slugs (fact 5), how many slugs might be found in 8 cubic meters if half the slugs have been salted (fact 6)?  
a. 455,000    b. 800
- 4) Since slugs consume twice their body weight each day (fact 7), how many ounces of vegetation would a 1 oz. slug eat over 6 weeks?  
30 oz.

**Figure 5** A slug's day

Students in the bodily-kinesthetic group attached four antennae (fact 1) to their heads and squirmed around the room searching for rotting vegetation (fact 2). Other students acted as alarmed gardeners who did not want their hosta plants eaten (fact 3). The gardeners used various forms of slug control (facts 4, 5, & 6) with only partial success. Later that evening, the gardeners held a party and accidentally spilled some malt liquid, better known as beer, near the flower garden. The slugs, who were brothers and sisters, could not resist the smell of yeast and succumbed to an untimely death (fact 7). The mother/father of the slugs (fact 8 —hermaphrodites) was very sad and decided to start a new family.

MI theory is cross nurturing, since use of each intelligence has the potential to promote another.

## Conclusion

The preservice and practicing teachers in our classrooms re-confirmed in two ways our beliefs about addressing the learning needs of students using the Multiple Intelligence theory. First, by experiencing instruction based on the MI theory, students were able to feel and appreciate the benefits of teaching in nontraditional ways. We do not know at this point what barriers they may face in incorporating this type of teaching and assessment into their own classrooms, but their positive reactions showed promise. Second, our students' written descriptions of their learning processes reaffirmed our beliefs in the use of MI theory. The projects allowed for

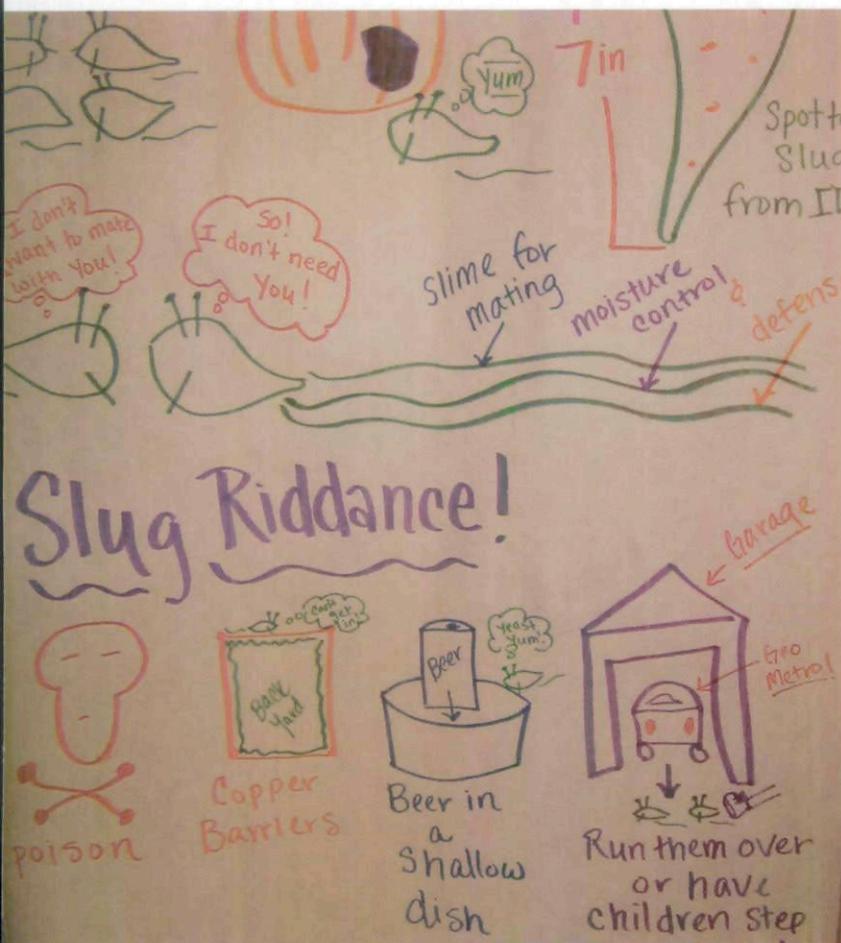
more creative forms of expression, and a deeper learning seemed to take place in the course of planning and presenting their projects.

As American middle school teachers face implementation of the No Child Left Behind policy, keeping to student-centered learning is crucial. MI theory is cross nurturing, because use of each intelligence has the potential to promote another (Sweeder, Bednar, & Ryan, 1998). If students can indeed attain deeper understanding of a topic through instruction based on MI theory, then this type of instruction becomes a key component in students' achievement, including high-stakes testing outcomes. Cuban (2004) concluded that Gardner's theory includes all children as learners and grants strong credibility to those teachers who individualize classroom practices and use instructional materials that embrace MI. Because teaching is the dynamic interaction of various components involving curriculum and instructional strategies (Wilens, Ishler, Hutchison, Kindsvatter, 2002), the challenge to the teacher is to be an effective decision maker when addressing the diversity of all learners.

In our exploration of slug facts, we discovered that the silvery mucus that slugs excrete is meant to assist them as they glide to their destination (Snails & Slugs, 2005). Similarly, MI theory, with its focus on student strengths, serves to help students arrive at their own destination of increased achievement, especially crucial as young adolescents face the physical, social, emotional, and intellectual changes of their developmental stage.

## References

- Carnegie Council on Adolescent Development. (1989). *Turning points: Preparing American youth for the 21st century*. New York: Carnegie Corporation.
- Chen, J., Krechevsky, M., & Viens, J. (1998). *Building on children's strengths: The experience of project spectrum, 2*. New York: Teachers College Press.
- Cuban, L. (2004). Assessing the 20-year impact of multiple intelligences on schooling. *Teachers College Record, 106*(1), 140-146.
- Dewey, J. (1916). *Democracy and education*. Mineola, NY: Dover Publications.
- Eisner, E. W. (2004). Multiple intelligences: Its tensions and possibilities. *Teachers College Record, 106*(1), 31-39.



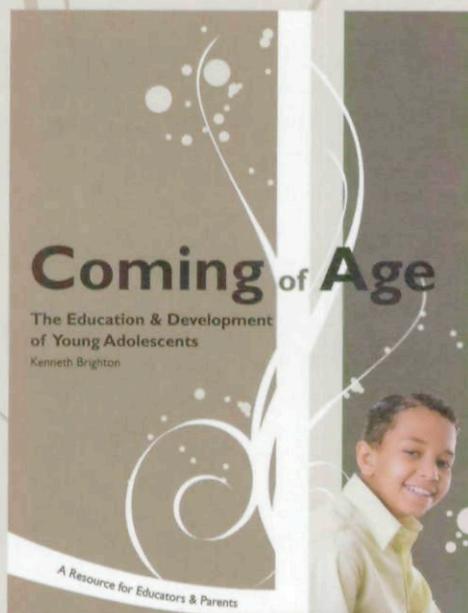
This student poster explains ways to control the slug population.  
photo provided by Francie Keller-Shajfer

- Gardner, H. (2004). *Frames of mind: The theory of multiple intelligences* (2nd ed.). New York: Basic Books.
- Kagan, S. (1994). *Cooperative learning*. San Clemente, CA: Kagan.
- Khourey-Bowers, C. (2005). Cultivating positive attitudes and higher achievement in middle level mathematics and science. *Middle School Journal*, 36(3), 50–56.
- Kornhaber, M. L. (2004). Multiple intelligences: From the ivory tower to the dusty classroom—but why? *Teachers College Record*, 106(1), 67–76.
- McNeil, L. M. (2000). *Contradictions of school reform: Educational costs of standardized testing*. New York: Routledge.
- McNeil, L. M., & Valenzuela, A. (2000). *The harmful impact of the TAAS system of testing in Texas: Beneath the accountability rhetoric*. Houston: Department of Education and Center for Education, Rice University.
- Powell, S. D. (2005). *Introduction to middle school*. Upper Saddle River, NJ: Pearson Education.
- Shearer, C. B. (1994). *The MIDAS: A professional manual*. Kent, OH: MI Research and Consulting.
- Shearer, C. B. (2004). Using multiple intelligences assessment to promote teacher development and student achievement. *Teachers College Record*, 106(1), 147–162.
- Snails & Slugs. (2005). Retrieved October 12, 2005, from <http://www.backyardnature.net/snail&sl.htm>
- Sweeder, J. J., Bednar, M. R., & Ryan, F. J. (1998). Conjoining product technologies with multiple intelligence theory: Rethinking teacher preparation. *Journal of Technology and Teacher Education*, 6, 273–282.
- Wilén, W., Ishler, M., Hutchison, J., & Kindsvatter, R. (2002). *Dynamics of effective teaching* (4th ed.). New York: Addison Wesley Longman.
- Wu, W. (2004). Multiple intelligences, educational reform, and successful careers. *Teachers College Record*, 106(1), 181–192.

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