

**MULTIPLE INTELLIGENCES  
AND  
GIFTED EDUCATION**

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## TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	ii
CHAPTER	
1. INTRODUCTION	1
II. RATIONALE	3
Explanation of Multiple	3
Implications of Multiple Intelligence Theory for Gifted Education	8
Multiple Intelligence Theory in Practice	14
Classroom Applications	14
III. PERSONALIZING MULTIPLE INTELLIGENCES THEORY	19
Personal Profile	19
IV. UNIT OF STUDY - DESCRIPTION AND IMPLEMENTATION	25
Learner Profiles Unit Overview	25
Unit Overview	32

V. FORMATIVE REFLECTIONS	34
VI. BELIEFS ABOUT TEACHING AND LEARNING	34
VII. CONCLUDING REMARKS	57
REFERENCES	63
APPENDICES	66
A Modified Version of Armstrong’s (1994) “Seven Smarts Checklist”	67
B Historical Connections Unit	70

## Introduction

Having been introduced to Howard Gardner's (1983) theory of multiple intelligences (hereafter, MI) in 1995, I have been intrigued and challenged to take an in-depth look at the educational applications of MI. His theory has given me encouragement, enthusiasm, and a desire to find ways to improve my educational environment in order to better reach all students and assist them in finding their unique gifts and talents. I have immersed myself in MI literature, both Gardner's work and others' interpretations of his ideas, talked to educational practitioners implementing MI theory, and experimented with applications in my own classroom setting.

I have become dedicated to studying and researching the many ways individuals learn. The more involved I have become in discovering the many ways that students learn, the more I realize what I do not yet know. My exploration of MI theory has revealed considerable information on how and when individuals learn and yet has raised many questions that need answers. Whether one believes there are seven, eight, or 120 intelligences, I am certain we must acknowledge, understand, and respect the differences of each learner. When students are allowed to develop, demonstrate, and strengthen their unique gifts, talents, and abilities, they will believe they can succeed. Once individuals know they can learn, they feel encouraged to try harder to achieve. This has made me extend beyond the daily routines of my classroom, to look seriously at how I facilitate the learning process in my classroom. I believe that one of my roles as a teacher is to prepare

students for life. One hopes that if students can succeed in school, they will be successful in life.

My investigation of MI theory in this paper is composed of four sections. First, I provide an explanation of MI theory and the implications of the theory for gifted education. Second, I report on the practical applications of MI, and recommendations of other educational theorists for classroom applications and assessment. Third, I explore my multiple intelligences as a means of personalizing MI theory. I follow this with a description of a unit of study with the learners in my grade five and six classroom entitled Historical Connections. Finally, through a self assessment process, I provide my formative reflections. These indicate how I have personalized the theory of multiple intelligences and integrated it into my beliefs about teaching and learning.

## Rationale

### An Explanation of Multiple Intelligence Theory

*There is no defense or security for any of us except in the highest intelligence and development of all.*

Booker T. Washington

Howard Gardner (1983) maintains that the purpose of schooling should be to develop students' dominant strengths or intelligences and to help them reach vocational and avocational goals that are appropriate to those strengths. Gardner (1983) provides a framework for education with his theory of multiple intelligences, one that recognizes that all students can succeed in school. He argues that we should view intelligence as the ability to solve problems or create products valued within a cultural setting, not as simply a score that has been determined through a single paper and pencil test (p. 60-61).

Gardner moves away from Spearman's unitary general factor of intelligence (g) and Binet's intelligence test as the accepted measure of determining intelligence. He believes that intelligences can be attained within cultural settings, not on conventional, single intelligence tests (Teele, 1995) .



Some educators and psychologists have moved away from viewing an individual's intellectual abilities as one single intelligence toward a multiple perspective of intelligence. Howard Gardner's MI theory is one perspective on the subject of human intelligence. He developed his theory from his study of diversity among gifted individuals, his examination of the effects of different kinds of brain damage on people, and his cross-cultural explorations of what constitutes intelligent behavior. According to Gardner (1983), "intelligence can be broadly defined as the ability to conceive of and to solve problems or to fashion products that are valued by a culture" ( p. 21). He hypothesizes that humans possess not one kind of intelligence, but at least the following seven:

Verbal - Linguistic: ability to use language effectively for a variety of purposes (exemplified in actors, writers, lawyers, linguists, writers)

Logical - Mathematical: ability to discern logical or numerical patterns and to follow or generate long chains of reasoning (exemplified in mathematicians, scientists, scholars, lawmakers)

Visual - Spatial: ability to perceive the visual-spatial world accurately and to perform transformations on one's perceptions (exemplified in artists, architects, engineers, navigators, sailors, interior designers)

Musical - Rhythmic: ability to produce and appreciate rhythm, pitch, timbre, and other forms of musical expression (exemplified in composers, musicians, singers)

Bodily - Kinesthetic: ability to use the body to solve problems, to fashion a product or to communicate (exemplified in athletes, carpenters, chiropractors, massage therapists, mechanics, mimes, surgeons)

Intrapersonal: ability to achieve self-knowledge and to set personal goals (exemplified in entrepreneurs, religious leaders)

Interpersonal: ability to discern and to respond appropriately to the moods, temperaments, motivations and desires of other people (exemplified in actors, charismatic leaders, politicians, public relations officers, salespeople, teachers, therapists)

Recently Gardner (1995) has turned his attention to possible additions to the above list. He would include an eighth intelligence-the intelligence of the naturalist. This intelligence is described as, “the individual who is able to recognize flora and fauna, to make other consequential distinctions in the natural world, and to use this ability productively (in hunting, in farming, in biological science)” (p. 206).

Chapman (1993) states that Gardner recognizes at least four distinct stages in the development of an intelligence. Factors in an individual's cultural environment can speed

or slow the process. The following steps are described by Chapman (1993) as a scheme of intellectual development:

*The First Encounter*

The child, from birth, encounters the cultural influences that will facilitate the development of his or her dominant intelligences. As the child manipulates ideas, the more the intelligence is developed.

*The Employment*

The individual receives many opportunities to exercise and strengthen an intelligence.

*The Formal Education*

The child learns by doing, with the guidance of parents and elders. This step involves training in solving problems and making products. Students work with master teachers; these teachers structure lessons that enable students to refine their problem solving and creativity skills. Formal preparation helps students to understand the key concepts and to apply the problem-solving skills.

*The Embrace*

The individual can embrace the intelligence fully when the basics for problem solving and making products are established. Students accept immersion into the life of the intelligence-thinking, feeling, and sensing its nuances, as they apply what they are learning to more and more complex problems. (pp. 7-8)

Important implications of Gardner's MI theory arise for educators. First, MI can help us to better understand how students process information, and second, to enable teachers to identify special strategies and skills to further develop each intelligence. Further, it is also important to explore the translation or connection process from dominant intelligences to less dominant intelligences (Teele, 1995). Educators will need to help students use their dominant intelligences to further develop their less dominant intelligences. Gardner (1996) feels that only by recognizing multiple intelligences can more students be reached, and be given the opportunity to demonstrate what they have learned.

## Implications of Multiple Intelligence Theory for Gifted Education

IQ scores are seen by most people as a measure of how much intelligence an individual possesses. Intelligence, as perceived by these individuals, is likened to a commodity, possibly leading to a person's self worth based upon how much more he or she possesses than others. Numeric values, such as an IQ score of 130, representing a very superior intellect when compared to a score of 100, is indicative of a "have" and "have not" paradigm. Feldman (1991) says, "The psychometric viewpoint assumes that intelligence is, by and large, a unitary quality, so that a high IQ indicates more intelligence and a low IQ less of the same kind of abilities" (p.6). No wonder programs for gifted learners take on an aura of elitism. People outside of the field of gifted education could view specialized programming as providing more opportunities to those who already have more than the average student.

MI theory supports personal intuitions about the nature of gifted learners. The screening test for admission into the Calgary Board of Education's special education gifted programs (for instance, the WISC-III, IQ test) relies heavily upon the two "school smarts" which Gardner identifies as verbal-linguistic and logical-mathematical intelligences (Frames of Mind, 1983, p. 321). From my experience teaching gifted and talented students, I recognize that gifted learners possess other dominant intelligences. Hoerr says that "The theory of multiple intelligences offers much to the dialogue on the nature of giftedness" (1994, p. 32), and goes on to point out that the linguistic and

logical-mathematical intelligences, the two focused upon in almost all standardized intelligence and achievement tests, are only the beginning of the sum of human talents and potentials.

Many talents and abilities are overlooked in our classrooms, even in congregated settings for gifted learners, because we tend to rely too heavily on only linguistic and logical-mathematical intelligences. A key factor in students' ability to solve problems in our complex society is the identification and development of the ability to process information in many different ways. In fact, Gardner (1996) believes the challenge confronting educators is to determine how to help individuals employ their distinctive intellectual profiles to help master the tasks and disciplines needed to thrive in their society.

Matthews (1988) argues that MI offers a potentially more viable theory of cognitive functioning, particularly because it is based on and takes into account the nature of real-world intelligent behavior. He found sufficient support in the cognitive science literature to consider multiple intelligence a viable construct of intelligence, a theory worthy of further investigation and consideration. To Matthews, it appears that MI, by virtue of its integrative possibilities and theoretical breadth, may have much to offer the field of gifted education (p.103).

Hoerr (1994) supports this real-world connection by asserting that adult success is not determined by reading, writing, or calculating better than peers; reading and writing, or calculating well are essential, but success comes from the other talents we bring to the table, especially our interpersonal and intrapersonal skills. MI theory presents a clearer picture of the many talents and abilities possessed by students; further, it reflects the talents esteemed later in life.

It is Gardner's (Ramos-Ford & Gardner, 1991) assertion that giftedness results from inborn abilities in interaction with an appropriately supportive environment. Gardner avoids identifying children as gifted, favoring instead to use diagnostic information to determine strengths that can be used to develop appropriate curriculum. He assumes that the majority of children have some talent area or intelligence which can be developed through focused curriculum attention.

In consideration of the emerging paradigm and current knowledge in the area of gifted education, Alberta Education (1997) has adopted the following definition:

Giftedness is a broad, evolving concept which addresses exceptional ability/or performance in a wide range of human endeavors including: intellectual and creative domains; talent in kinesthetic areas, music and visual arts; and socio-emotional dimensions such as intrapersonal and interpersonal strengths. Some students have potential to achieve that is not always demonstrated in their school work or through the school's identification, assessment, and evaluation procedures. To reach their maximum potential, gifted students need to be recognized and nurtured.  
(p. 9)

In the GATE program IQ tests are currently used for the purpose of screening and discerning among student populations. This practice is called into question by the above experts. The problem lies in the definition of intelligence and, as a result, how giftedness is determined. Alberta Education's definition of giftedness takes into account multiple intelligences. The Calgary Board of Education (i.e. GATE program) will need to revisit and adapt their definition and identification practices to reflect contemporary conceptions of giftedness.

Leroux & McMillan (1993) state that learning experiences for the gifted should differ in content, process, product, and evaluation and should involve modifications in type, depth, breadth, and pace. It is critical that the curriculum, as well as the time and space, be expanded to meet the demonstrated abilities of gifted students. An innovative gifted program needs to encourage learners to function with competence and integrity, to become active, independent, creative, and productive members of society. These goals can be developed through working with most elements of any gifted program: higher level thinking skills, including those of creative-thinking, critical-thinking, logical-thinking, and problem-solving.

MI theory promotes a multidisciplinary approach to teaching so that students can be allowed to connect school experiences with real-life situations. It also suggests that students should stretch their cognitive abilities beyond just the basic level of recall of knowledge. Bloom's Taxonomy (1956), a classification of educational objectives, is a



useful tool when planning MI learning activities with gifted learners. It is a series of cognitive levels that move from the simple to the complex. The taxonomy is a classification of question categories to cue various levels of thinking. It moves beyond the knowledge or rote level of cognitive complexity. The utilization of Bloom's Taxonomy allows teachers to focus attention on complex thinking skills. Application, analysis, synthesis, and evaluation, rather than factual knowledge are the focal point of program activities for gifted learners.

Leroux & McMillan (1993) suggest that teachers can use these levels to design effective curriculum and evaluation activities across subject areas for all students, including gifted and talented learners( p. 36). They also claim that this model may be used in conjunction with other models since it includes all cognitive activities students will undertake.

Bloom's Taxonomy (1956, p. 53) consists of six levels of thinking:

1. Knowledge - remembering facts/information
2. Comprehension - understanding facts/information
3. Application - using facts/information
4. Analysis - explaining facts/information
5. Synthesis - creating something new by using information
6. Evaluation - making judgments based on a criterion

Upon considering Bloom's taxonomy and the applications of MI theory, Armstrong (1994) points out that, "It would be easy to construct MI instructional methods that appeared compelling-owing to the wide range of intelligences addressed-but that kept

learning at the knowledge or rote level of cognitive complexity” (p. 154). He urges educators to design MI curriculums that incorporate all of Bloom’s levels of cognitive complexity.

As Gardner (1987) writes, “MI Theory is perhaps more accurately described as a philosophy of education, an attitude toward learning ... rather than a set program of fixed techniques and strategies. As such it offers educators a broad opportunity to creatively adapt its fundamental principles to any number of educational settings” (p.190 ).

Implementing MI into a gifted program is possible because students’ dominant linguistic and logical mathematical intelligences (as demonstrated on the IQ test) could be further developed and their other talents enhanced as well. It is of the utmost importance that we recognize and nurture all the varied human intelligences and all the combinations of intelligences which individuals may possess. Realizing and honoring this diversity will afford a better opportunity to deal successfully with life’s challenges.

## Multiple Intelligence Theory in Practice

### Classroom Applications

The ultimate challenge of any theory is to successfully translate it into practice. A personalized interpretation is necessary in order to integrate it into one's own individualized style. MI theory not only reinforces my teaching and learning practices, but also opens the door to further opportunities to refine and expand my repertoire of sound classroom practices. It is an invitation to developing effective teaching and learning practices.

MI theory, with its applications to instructional strategies, reinforces the belief that every student is gifted, has unique talents and abilities, can succeed, and should be taught and assessed in ways that reach all seven intelligences. Teele (1995) recommends that curriculum, instruction, and assessment should be designed to allow students to demonstrate their strengths, perform optimally, and be assessed with multiple types of assessment that reflect their dominant intelligences (p. 8).

According to Teele (1995), educators can teach students how to translate or make connections from their stronger intelligences to their less dominant intelligences in order to facilitate the learning process and provide opportunities to strengthen their

understanding. She calls this the “translation process”. She notes that instructional practices should address all seven intelligences. When teachers are able to present information through all seven intelligences, students can learn first how they process information and then be taught to translate their learning, thus enabling them to engage more actively in the learning process. She cites the example of spatially strong students learning to spell linguistically by allowing them to draw a picture of the word or concept then placing the correct spelling of the word in the picture. The translation process occurs when they write down the correct spelling of the word and translate it from the picture to the written word (p. 39).

When Teele (1995, p. 121) envisions an MI school, she recommends the following key aspects that contribute to creating a personalized learning environment:

#### *Curriculum and Instruction*

Quality instruction is linked to content that addresses the basic skills and is delivered through applications of all seven intelligences to allow students to process information through their dominant intelligences.

The curriculum is transformed into the range and scope of the student’s own life and demonstrates a natural, personal connection to real-life experiences.

Curriculum methods are content driven, thematically based, purposeful, integrated, meaningful, and interactive; involve strategies to reach all seven intelligences; and engage the talents and abilities of all students.

Translation of learning is facilitated to enable students to learn how to process from their dominant intelligences to the intelligences that are not as strong.

Cross-curricular or cross grade level classes offer opportunities for experiences in all the intelligences.

Content is learned through problem solving, critical and creative thinking, and applications of knowledge that encourage student achievement from comprehension to analysis, evaluation, and synthesis of information.

### *Assessment*

Assessment is an integral part of the learning process and focuses on the growth and progress of each student, what each is able to do, and the best methods for setting future learning goals.

A multiple assessment system provides several ways to assess students, including exhibitions, productions and performance, objective standardized tests, and individual records of student achievement. The assessment process considers the multiple ways students process information and can demonstrate their learning.

Student-centered assessment measures individual leaning capabilities of all students and matches the intelligences and teaching methods with assessment.

Both a formative and summative system of assessment that is aligned to student results are utilized.

Teaching, learning, and assessment are considered together as an integral part of the school learning process.

Gardner asserts that, because intelligences are the kinds of constructs that they are, it is simply not possible to assess an individual's intelligence or intelligences with any degree of reliability (1996, p.5). Rather it is the performance on some kind of task that can be assessed. Therefore, the greater number of tasks sampled, the more likely it is that a statement about "strength" or "weakness" in an intelligence will be valid. Inferences about mind or brain mechanisms should be avoided, according to Gardner.

For informal purposes, he states that it is acceptable to speculate that a person is relying on certain intelligences rather than others, or that he or she exhibits a strength in one but not another intelligence. Educators should be cautious about characterizing the

intellectual profiles of students. Labelling students with seven labels is as damaging as labelling with one, and should be avoided because such inferences could negatively affect a student's self confidence as a learner.

Gardner does not object to required curricula, but emphasizes that not all students need to learn in the same way and certainly should not be assessed in the same way. MI theory lends itself to "intelligence fair" (Gardner, 1983) assessments. Students have choices in the way they present their understanding of their learning. The concept that students are graded on projects they develop, create, and research helps support real-life applications to what they are learning. The information gained from assessment is the basis for designing instructional strategies and curriculum priorities.

Teele (1995) recommends that teachers keep a portfolio of their students' work throughout the year. A portfolio is a record of students' achievement which can include the following components: individual student's intelligence profile; students' self-assessments; a diverse compilation of work that includes open-ended questions, performance assessments, and standardized test results; parent/guardian input; student interviews; and special projects the students have completed (p.56). Thus, individual achievement is recorded as a result of progressive steps made toward instructional goals and mastery of specific learning.

According to Armstrong (1994), Gardner does not believe that there is a single royal road to an implementation of MI ideas in classroom. Gardner has been encouraged and edified by the wide variety of ways in which educators around the country have made use of his ideas and he has no problem seeing MI schools bloom. Gardner (1995) says, “When I visit an ‘MI school’, I look for signs of personalization: evidence that all involved in the educational encounter take such differences among human beings seriously; evidence that they construct curricula, pedagogy, and assessment insofar as possible in the light of these differences” (p. 208). From his perspective the essence of the theory is to respect the many differences among people, the variations in the ways that individuals learn and several modes by which learning can be assessed ( p. viii).

## Personalizing Multiple Intelligence Theory

### Personal Profile

Before applying any model of learning in a classroom environment, Armstrong (1994) suggests we should first apply it to ourselves as educators and adult learners, for unless we have an experiential understanding of the theory and have personalized its content, we are unlikely to be committed to using it with students. Consequently, an important step in using the theory of MI (after grasping the basic theoretical foundations) is to determine the nature and quality of our own multiple intelligences and seek ways to develop them in our lives. He suggests that as educators begin to explore their multiple intelligences, it will become apparent how their particular fluency (or lack of fluency) in each of the seven intelligences affects their competency (or lack of competency) in the various teaching roles ( p.16).

Armstrong's (1994) "Checklist for Adults" enabled me to glean some insights into my preferred intelligences. As a learner four of the seven intelligences appear most dominant. I prefer verbal-linguistic activities such as reading both fiction and non-fiction text; writing letters, notes, research papers; and doing word games. My vocabulary skills are well developed and I can listen carefully and effectively. I speak persuasively, and give directions clearly and well.



Bodily-kinesthetic activities are also preferred. I enjoy physical activities and sports like jogging, weight lifting, cycling and hiking. I like working with my hands (e.g. sewing, flower arranging), and enjoy taking part in and attending theatrical performances. I am comfortable solving problems by manipulating objects and moving pieces around.

I know my strengths and weaknesses which has helped to develop my intrapersonal intelligence. I possess self-confidence, have a clear sense of direction in life, and the ability to set goals and follow through with them. Working and socializing with people indicates an interpersonal intelligence. I am able to identify with the feelings and moods of others. Working effectively in groups is natural for me; as well, I take leadership roles and am able to influence others. It is important to me to belong to clubs, and also, organize social activities for friends and family.

The other three intelligences areas of logical-mathematical, visual-spatial and musical-rhythmical comprise my least dominant intelligences. I prefer experiences in the four most dominant intelligences over these less developed intelligences. Childhood and early education opportunities help to explain both my most and least dominant intelligences. I recall feeling most comfortable and doing well in the school subjects of language arts, French, home economics, social studies, and physical education. I employed my interpersonal skills by working cooperatively with others in the math and science areas, and was able to develop some degree of competency to be successful.

My out of school experiences were centered around participating in extra-curricular sports on a very regular basis, reading novels and magazines, socializing with my peers, and setting goals for myself to pursue. These were very much supported by my parents. As I consider further, I realize that my younger brothers participated in many of the same activities. The three of us had little exposure to formal music lessons and were raised by parents for whom this was not an area of interest or value. One noticeable difference in our profiles is my brothers' stronger abilities in the visual-spatial intelligence as compared to mine. They spent more time with my father who has great skill in this area, as I pursued more verbal-linguistic activities.

Examining one's teaching style is a necessary next step in examining one's strengths. We often tend to do what we think we do best. Haggerty (1995) suggests using "The Teacher Checklist" to serve as an aid in the process of self-examination. The checklist revealed my preference for instructing in the areas of verbal-linguistic activities by allowing students the opportunities to talk, read and write; intrapersonal activities in which students are given many choices in their learning and the chance to reflect upon their learning; interpersonal opportunities for students to work cooperatively together; and finally encouraging students to use logical-mathematical abilities to experiment with materials and solve problems through reasoning logically. The subjects I teach coincide with these dominant teaching styles. Humanities (combination of language learning and social studies), health, and mathematics are my primary teaching responsibilities.

Instructing in a visual-spatial manner was not as pronounced as the others stated above; however, I do demonstrate the concepts and skills that I want students to learn, and, especially in math, provide opportunities for students to solve problems by having them try to visualize solutions. If I taught the subject of art rather than having it provided to the students by a colleague, my repertoire of visual-spatial instructional skills would be more dominant. This also helps to explain why my musical-rhythmic experiences are limited. This does not exclude musical-rhythmic possibilities integrated into the subjects I teach, but these are fewer than if I were the students' principal music teacher.

Physical education instruction allows me to provide bodily-kinesthetic activities, but these experiences are confined mostly to the gymnasium. I notice that fewer bodily-kinesthetic opportunities are extended to students in other subject areas. This is a disservice to the highly active students, especially the two in my classroom who are diagnosed as Attention Deficit Hyperactivity Disorder. If I were teaching art and science, I would provide many more opportunities for students working with their hands. There is room in my repertoire of instructional strategies to include more bodily-kinesthetic experiences.

Working in a collaborative team teaching community provides the students with opportunities for instruction in areas that are not my strengths, but rather the strengths of others. For example, the music specialist provides opportunities to listen to musical

recordings, to create and play musical instruments, to sing, and to compose musical pieces. In physical education class I can provide students with the chance to dance to music. Similarly, the art teacher can focus on images, textures, pictures and color, and provide opportunities for drawing, painting, and clay modeling. Hands-on art activities also provide experiences in the bodily-kinesthetic intelligence. The art teacher provides the formal instruction; however, I continue to present information in a visual manner. The use of filmstrips, videos, diagrams, charts, and maps is integrated into most subject areas.

Mathematics instruction provides opportunities for students not only to sharpen their logical-mathematical intelligence, but also to visualize problems and manipulate objects in order to solve problems. I feel most comfortable solving problems in a cooperative learning group by talking through the steps of problem solving. The expertise of the science specialist on the team helps to round out the students' logical-mathematical and bodily-kinesthetic experiences. She can provide opportunities for experimentation and exploration, and for classification and categorization through the use of science kits and lab materials. It takes a team teaching approach to capitalize upon the varying teaching styles which contribute to the development of our students' seven intelligences.

Every subject or concept does not lend itself to being viewed with equal clarity through the lens of each of the seven intelligences or presented in a way that is equally

intelligible by individuals whose strengths lie in different intellectual domains.

Nonetheless, content generally can be presented in a variety of ways that appeal to a variety of learners (Haggerty, 1995, p. 50). Students have unique and different cognitive profiles and when I instruct in three, four, five, or six modes, they have more opportunities for learning through their strengths. As Gardner notes, an effective teacher is one who can open a number of windows on the same concept (Campbell, 1989, p. 8). As a result, I can move beyond reading, writing, computing, and listening as instructional tools and invite students to learn through images, textures, rhythm, colour, model-making, role-playing, movement, sculpting, painting, designing, and singing.

As a I consider alternative instructional methods, I am able to identify frequently overlooked intelligences to integrate into lesson design. This helps me engage the full spectrum of human learning potential in my teaching. My hope is that, as I become more comfortable planning and instructing in the multiple intelligences, this will become second nature.

## Unit of Study - Description and Implementation

### Learner Profiles

My multi-aged grade five and six classroom is composed of 26 gifted students. To be accepted into this special education program in the Calgary Board of Education students had to have a very superior score (130 or better) on an individual psychological assessment, and superior to very superior achievement score on standardized tests in reading and mathematics. In addition, students needed to demonstrate the following characteristics: evidence of strong task commitment, resourcefulness, flexible and original thinking, risk-taking in thinking and in action, a high level of curiosity, and appropriate behavior in a variety of settings.

The linguistic and logical-mathematical intelligences are the focus of all standardized intelligence and achievement tests. Therefore, my students would be expected to have well-developed abilities in these two areas. My five years of experience with gifted students suggests they generally are strong in the verbal linguistic intelligence, but particular aspects of this intelligence are more or less developed. For example, students may have finely developed listening skills yet may be less adept at speaking or articulating ideas; or they may sense a real comfort in reading, as a lot of my students do, yet feel somewhat inadequate writing down their thoughts. Not all gifted students have the same verbal-linguistic profile. For some, their receptive language skills (listening and reading) are stronger than their expressive language skills (speaking and writing).

Students who exhibit strong logical-mathematical intelligence enjoy lively discussions, relish dialogue of controversy and argument, and are often comfortable with paradox and ambiguity. However, no two individuals' abilities are the same. As a population of gifted learners they tend to use their logical-mathematical intelligence to seek order by analyzing and compartmentalizing discreet pieces of information into chunks of meaning that can be abstracted into practical applications.

I assumed that my group of learners would exhibit strong verbal-linguistic and logical-mathematical intelligences, and prefer learning through these two intelligences as compared to the other five intelligences. To test my hypothesis, determining the students' multiple intelligences was the logical next step. I often administer interest inventories at the beginning of the year. I concluded that a multiple intelligences checklist or inventory would be useful in helping me to identify my learners' needs, strengths and interests, and understand how each of the learners in my classroom learns best. My question was which of the seven multiple intelligences are most dominant and least dominant for each student.

The two MI checklists administered were a modified version of Armstrong's (1994) "Checklist for Children" (See Appendix A) and the "Denmar Silhouette"(1996). The Denmar instrument is a forced choice pictorial inventory that contains numbered pictures representing characteristics of each of the seven intelligences and provides students with 21 opportunities to make their selections of two choices. The different intelligences are

matched with one another. Students are asked to select one of the two choices that they feel is the most like them. There are no “right” or “wrong” answers. When completed, the resulting data are compiled, and dominant intelligences are identified.

The either/or requirement of this inventory was troublesome for the students. Upon seeing the two picture choices, they would often interrupt to ask for clarification as to what was implied by the images. Frequently, they would read more into the two pictures than was intended. It is their nature to be curious and question what is presented to them; therefore, it was no surprise that they became sidetracked by what the hidden meaning in the picture might be rather than simply making a choice as to which of the two pictures represented a preferred activity.

Another unsettling component of the Denver inventory for students was the forced choice requirement. Numerous students commented that often two preferred activities were presented together, requiring them to choose between the two. The result was a profile that they felt did not clearly reflect their preferred intelligences. This feeling became very apparent when they completed the second checklist, a modified version of Armstrong’s (1994) inventory. This tool allowed the students to indicate all of their preferred intelligences with no restrictions. They simply added up the number of true statements in each intelligence category. This process gave them a profile of their most and least dominant intelligences. All the students chose this inventory as a truer reflection of themselves as learners because they could indicate all or some of the activities suggested



under each intelligence as being preferred choices. Therefore, the activities were not competing against one another. Both MI instruments provided ways for students to personalize the meaning of multiple intelligences. The process served as a springboard for further discussions around the topic of MI and helped set the tone for encouraging learning diversity. I agree with Gardner's emphasis that the question is not "How smart are you?" but is, instead "How are you smart?" (Staggs & Murphy, 1996, p. v) It was valuable to start the year by exploring the personal intelligences of each individual student.

As noted earlier, one of the criteria for admission to the GATE program is an IQ test. The intelligence test can be a useful tool for determining important information about students' multiple intelligence profiles. For example, on the IQ test, there are subtests that tap linguistic intelligence (vocabulary and information categories), logical mathematical intelligences (analogies, arithmetic) and spatial intelligence (picture arrangement and block design). I assumed that these three intelligences would have been in the most dominant category for most, if not all of the students. The results of the groups' most and least dominant intelligences was surprising. Logical-mathematical and visual-spatial intelligences were dominant for the majority of the group, but not linguistic intelligence. Bodily-kinesthetic and musical-rhythmical were the other two highly preferred intelligences.

Teele (1995) has developed an inventory, **The Teele Inventory for Multiple Intelligences (TIMI)**, to examine the dominant intelligences of students in kindergarten

through the twelfth grade, which acts as an indicator as to whether or not students in different grade levels possess different intelligences. An analysis by Teele of over 4,000 TIMI answer sheets revealed some interesting data. Worth noting is that students in both fifth and sixth grades demonstrated a much stronger preference for spatial, bodily-kinesthetic, interpersonal and musical than the other three intelligences. In comparing these results with those of my students, I found that similarities exist. These fifth and sixth grade students demonstrate a strong preference for processing knowledge through bodily sensations and using their bodies in differentiated and skilled ways. They need opportunities to move and act things out, and tend to respond best in classrooms that provide physical activities and hands-on learning experiences.

As well, students with a strong musical intelligence are sensitive to the sounds in their environment, enjoy music, and prefer listening to music when studying or reading. They appreciate pitch, rhythm, and timbre and often sing songs to themselves. Many of my students are involved in music lessons to either learn to play an instrument or develop singing skills.

The third commonality between the two groups is in the spatial intelligence. My students with this preference enjoy art activities, reading maps, charts and diagrams, and thinking in images and pictures. They are able to visualize clear images when thinking about things.

One difference was noted. The Teele study found in regular elementary students a tendency towards the interpersonal intelligence as compared to my students' logical-mathematical dominant intelligence. In fact, the interpersonal intelligence was the least dominant of the seven. For gifted students, one explanation may be that they prefer their own inner world, like to be alone, and are aware of their own strengths, weaknesses and inner feelings. Learning in cooperative group situations is not preferred. They have well developed independent work habits and are self confident learners. As with any student population, this varies from individual to individual. However, I do see the students choosing independent study projects more often than participating in partner or group learning situations. It is very apparent that this is a group of logical-mathematical students who like to explore patterns and relationships and enjoy doing activities in a sequential order. They prefer subjects like mathematics, experiment to test things they don't understand, enjoy opportunities to problem solve, and like to reason logically and clearly.

MI checklists provided some clues to the intellectual diversity within my students but was not the only means of assessing their most and least dominate intelligences. I also observed the students interacting with one another and the prescribed curriculum in those first few weeks of school. I found another source of valuable information in the application for the GATE program stored in the student's cumulative file. Both parents and former teachers filled in a nomination form that requires them to give them specific information about the child: school history, their likes and dislikes, their preferred

learning situations and even samples of their work. This information was very useful in determining information about the child's stronger intelligences.

I believe the most important source of information was the parent/student/teacher conference within the first month of school. This was the perfect opportunity to introduce the concept of multiple intelligences to the parents with the child present to discuss his or her multiple intelligences profile, to share teacher observations, and to elicit from parents information that helped me develop a broader understanding of the child's learning preferences. Armstrong (1994) concurs and suggests the parents are true experts of a child's multiple intelligences because they have had the opportunity to see the child learn and grow under a broad spectrum of circumstances encompassing all seven intelligences. Consequently, parents should be enlisted in the effort to identify the child's strongest intelligences.

## Unit Overview

Gardner's theory of multiple intelligences suggests the importance of diverse curriculum models. According to Teele (1995), interdisciplinary curriculums often integrate the seven intelligences, and team teaching enables educators to work from areas of strengths. Teachers can co-plan multiple intelligence-based lessons while maintaining responsibility in their self-contained classrooms. Lessons that include as many intelligences as possible can provide greater depth and content, and encourage collaborative and co-operative team planning of units. This was the rationale for the development of a thematic unit entitled *Canada's Legacy: Historical Connections*.

From September to December, 1996, a team of seven teachers and a teacher-librarian collaboratively planned learning activities for students at grades four through six. The intent of this historical study was to show students that a changing world results in a changing lifestyle. Implementation of the unit objectives varied according to each educator's individual style, allowing for the personalizing of lessons. The curriculum strands from two of Alberta Education's Social Studies topics, grades four and five, provided the subject matter base from which we worked. A humanities approach was emphasized, combining language learning and social studies concepts and skills in a historical context. Where appropriate, activities from other subject areas such as art, physical education, health, music, and French were also integrated.

A four month timeline was planned, employing a Museum-in-Progress (MIP) program (Koetsch et al., 1994, p. 54-57). In an MIP program students are trained in the responsibilities of a museum staff so that they can create an exhibition that reflects the curriculum objectives. Students conducted research on self-selected topics based on their focus of study. Based on field trips, access to guest speakers, and personal research the students designed interactive museum exhibit to reflect their learning. Community members, parents, and schoolmates toured the final exhibits and participated in its activities. A celebration of learning event consisting of an afternoon and evening showing of their exhibits was used to culminate the students' history study.

Finally, students who demonstrated exceptional depth of research, provided an excellent exhibit display, and articulated their understanding of the topic studied were selected to represent the school at the Calgary Heritage Fair in May 1997. The Heritage Fair is a multi-media education program developed to increase awareness and interest in Canadian history. The primary focus of the Fair is to encourage students to use any medium of their choice to tell stories and share information about Canadian heroes and events, and to provide a venue for students to present the results of their efforts to the community at large. (Reference: Appendix B)

## Formative Reflections

### BELIEFS ABOUT TEACHING AND LEARNING

According to Armstrong (1994), the multiple intelligence theory may be described as a philosophy of education, an attitude toward learning, or a meta-model of education in the spirit of John Dewey's ideas on progressive education rather than as a set program of fixed techniques and strategies ( p. 49). It is a theory of human intelligence on which educators may base decisions about teaching, learning, and assessment. It is not simply an instructional package that teachers implement, but rather it enhances current teaching practices. According to educators writing in the field of multiple intelligences (Campbell,1989; Chapman, 1993; Fogarty & Stoehr, 1995; Haggarty, 1995; Lazear, 1991) there are many ways to apply Gardner's MI theory. There does not seem to be a single preferred approach to implementing the theory, but rather teachers are encouraged to personalize MI and integrate it into their current practices; it also allows educators to question and critique their practices.

MI theory validates my teaching and learning practices. As I have grown to accept and develop both my stronger and lesser developed intelligences and to apply MI theory in my classroom in a meaningful way, I have attempted to transfer this understanding into my teaching practices. My work has affirmed my teaching and learning beliefs. They are as follows:

*I believe that education is a process of developing human potential.*

Developing a profile of a person's multiple intelligences is not a simple matter. No test can accurately determine the nature or quality of a person's intelligence. As Gardner has repeatedly pointed out, standardized tests measure only a small part of the total spectrum of abilities. Armstrong (1994) concludes that the best way to assess one's multiple intelligence's is through a realistic appraisal of performance in many kinds of tasks, activities, and experiences associated with each intelligence. He recommends that we look over the kinds of real life experiences we have had in the seven intelligences. The tool to do this is often an inventory, or in the case of my students, the two different inventories that were administered. Armstrong notes that the purpose of the inventories is to begin to connect us to our own life experiences as we use our seven intelligences (p.17).

Occasionally, my students felt that having a large number of check marks in an intelligence category meant that they were very smart in that category and did not require any further skill development. The inventories were beginning point to spark many discussions as to what comprised each of the intelligences. One student perceptively pointed out that, when completing the inventories, he found some of the choices difficult to make. He questioned whether enjoying an activity in an intelligence is synonymous with



having skill in that intelligence. His example was in the bodily-kinesthetic intelligence. He enjoys moving around exploring his world and solving problems with his body, but he appreciates that he does not have a well developed skill in gross motor activities, especially in particular athletic sports. Also, his fine motor skills, in particular paper-and-pencil activities, are less developed than those of his same aged peers. As a group we concluded that an intelligence needs to be considered in terms of sub-intelligences or sub-components. There are many ways to be intelligent within each of these. There is no standard set of attributes that one must have to be considered intelligent in a specific area. Consequently, a person may not be able to read and yet may be highly linguistic because he can tell a terrific story or has a large oral vocabulary. MI theory emphasizes the rich diversity of ways in which people show their gifts within each intelligence, as well as between intelligences (Armstrong, 1994, p.12).

A personal example is my verbal linguistic intelligence that encompasses reading, writing, and speaking abilities. I know, myself, that I am much more comfortable in listening, comprehending, oral presenting skills, and reading information than I am in expressing myself in written composition. I think that we can explore with students each intelligence to determine their stronger abilities and the lesser developed skills. A closer look at the seven intelligences reveals the complexity Gardner's theory offers in terms of developing human potential.

Crystallizing experiences and paralyzing experiences are two key processes in the development of intelligences (Walters & Gardner, 1986). Crystallizing experiences are the turning points in the development of a person's talents and abilities. Often these events occur in early childhood, although they can occur at any time during one's life span. Crystallizing experiences can be the sparks that light an intelligence and start its development towards maturity. Conversely, paralyzing experiences can be those that shut down intelligences. Examples are a teacher humiliating a child in front of classmates, or a parent yelling at an individual to stop making a racket when that individual is trying to practice a musical skill. Paralyzing experiences are often filled with shame, guilt, fear, anger, and other negative emotions that prevent our intelligence from growing and thriving (Armstrong, 1994).

The museum project provided crystallizing experiences for many students, but most notably for one particular boy whose MI profile consists of strengths in the visual-spatial, bodily-kinesthetic, and logical-mathematical intelligences and a weakness in interpersonal skills. With my guidance and support from the classroom child-care aide, he was able to find many successes in this project. An expert was found to act as his mentor. The mentor's background in historical architecture helped to further develop his logical-mathematical, visual-spatial, and bodily-kinesthetic skills. His museum project entailed building a two-dimensional blueprint and a three-dimensional cardboard representation of a local historical fort. The relationship between the student and the mentor developed as the student became more and more appreciative of his expertise.

Many positive strokes were given by the mentor as he instructed and supported the child's endeavors. The degree of sophistication of the final product revealed the child's considerable skill in model building. More important was the process involved in this project. Evidence of perseverance, initiative, and originality were apparent, as well as improved interpersonal skills. The child's parent expressed her delight at the Celebration of Learning evening. She could not believe how expressive her son was as he described the fort, and commented on his ability to explain the intricacies of designing it and also the historical functions of the fort itself. The high level of sophistication of this child's project was evident. It was clear that this child has definite strengths in using his hands, solving problems logically, and designing two- and three-dimensional representations. We will capitalize on this successful project as we begin other ones.

If, in the museum project, we had concentrated on the skills of reading, writing, and arithmetic, we would have failed to recognize that linguistic and logical-mathematical thinking alone or in combination are insufficient to respond to the variety of tasks and challenges students encounter. We might have overlooked the key roles that spatial, bodily-kinesthetic, interpersonal and other abilities play in the development of a child's potential.

***I believe in a highly personalized education.***

Teaching all students in the same way, at the same time, in the same subjects, with the same material, fails to take account of the highly individualized ways in which we learn. Individual students in my classroom have different kinds of minds; they learn, represent, and recall knowledge in quite different ways.

According to Armstrong(1994), MI theory lends itself particularly well to the development of teaching strategies in individual educational planning (IEPs). The IEPs are developed as part of students' special education placement. MI theory can help teachers identify student strengths and preferred learning style, and this information can serve as a base for deciding what kinds of interventions are most appropriate in the IEP. The gifted students in my classroom are required by Alberta Education to have an Individual Program Plan (IPP) as part of the special education setting. This document is a collaborative effort between the teacher, parents, and student. Descriptions of student strengths and areas for growth were fashioned around the seven intelligences, as well as learning goals reflecting the seven intelligences. The IPP document and process allows the child's education to be highly individualized, to match the distinctive combination of intelligences possessed by each person. Together we update the IPP four times a year by tailoring the program to meet the individual learning needs of each student.

MI vocabulary quickly became part of the IPP process and the daily discourse among the students. This modeling of the practical use of MI theory, as Armstrong (1994) points out helped students internalize the theory. As a result, I saw students beginning to use MI vocabulary to make sense out of their own learning lives. An example of a student using MI to understand his strengths and weaknesses is provided in the following quote taken from his written response composed after completing two MI inventories, and also having his parents complete the same inventories. He entitled his response, "Multiple Intelligence Reading Response."

I used a wheel because visual/spatial is my most dominant intelligence. I also used a visual representation to improve my visual/spatial intelligence in my home. In pondering some ways to combine the most dominant intelligence to help my least dominant, I realized that the Multiple Intelligence wheel I had created acted like a colour wheel. I could see how opposite intelligence could compliment each other just like opposite colours on the colour wheel compliment each other. I can enhance my intrapersonal intelligence by using my visual/spatial intelligence. I could use drawings or painting to express my feelings. I could also enhance my intrapersonal intelligence with my bodily-kinesthetic. I can improve my leadership skills by using my baseball skills to help the other players on the baseball team. I could use logical/mathematical patterns to have fun with playing a musical instrument.

Through comparing my sense of myself to my parents sense of me, I discovered how many of my intelligences I practice at home. This is the first step to understanding how I may develop as many of my intelligences as I can in life.

This particular child also used his strong logical-mathematical skills to analyze and compare his point of view with that of his parents. The format used was a diagram in which two circles are interlocking. One circle represents his parents' understanding of his intelligence, the other circle represents his personal opinion, and where the circles

overlap are the similarities. I was delighted to see how MI inventories had facilitated a dialogue between the parents and the child, and I believe it was a step towards an even better understanding of this child as a learner.

When this student came to my classroom last year, I found him to be a complex learner. The student, his parents, and I collaborated to better understand his hidden talents. The commitment to this goal and dialogue between the parties has had a noticeable impact upon the child. His self-awareness as well as his self-confidence has increased, as well as his willingness to take risks and to try and attempt activities in different ways. MI has been one of the tools this student and his parents have used to unravel his complex nature as a gifted learner.

Children should be educated in the least restrictive and personalized environment, one that is understanding and sensitive to the needs of the child. Student learning should not be restricted by the program of studies, textbooks, and other prescribed documents. Rather, these should provide guidelines through which learning activities are built. It is necessary to provide students with many choices as to what they want to study within a given topic so that they feel in control of their learning. I provide my students with a considerable amount of choice in my classroom. For example, throughout the history unit, students were given opportunities to work individually, in partnerships, or in small groups. Choices of what they were to study and how they would go about investigating a particular topic were always open to negotiation. Students knew that their individual

needs would be honored as often as possible. If the program of studies dictated a certain concept or skill focus, the students and I would work to achieve a compromise. For example, responding to historical fiction was a requirement of the program of studies. Students were welcome to respond to what they were reading in the traditional linguistic manner by composing written responses. However, students frequently chose to demonstrate their understandings by using visual-spatial intelligence to produce images and pictures of their interpretation of the text. Similarly, logical-mathematical intelligence was demonstrated as students used lists, venn diagrams and graphs to analyze text. Going beyond a retelling of the plot is part of the emphasis in the gifted program to promote complex thinking. Therefore, students were required to analysis, synthesis and evaluate the text. They did this in a variety of ways as well.

MI vocabulary was present in the students' literature responses. For example, one student compared himself to a character in a novel and made the following comment: "Myself and Kayak both have a bodily-kinesthetic intelligence because we are agile." and "Kayak also had a logical-mathematical intelligence because he could estimate miles and guide how long it would take to get somewhere." Not only has MI become part of this child's vocabulary, it has allowed him to transfer what he knows about MI to the things he sees and experiences. Another example of a student demonstrating his understanding of MI theory is in a quote from a science competition essay in which the student argues that human teachers are more beneficial than computer-assisted teachers:

The computer couldn't learn the strengths and weaknesses of each student like a teacher does from which they can design a lesson plan that meets the needs of each individual. A computer might be able to learn

some of what the student's visual/spatial, verbal/linguistic and local/mathematical strengths and weaknesses from IQ tests but how would it determine the child's interpersonal, bodily kinesthetic and musical/rhythmical skills and intelligences. And it couldn't help the particular student who was having trouble with a computer and needed help. A computer could never help the student solve that kind of problem and help overcome mental obstacles the way a teacher can.

Thus, multiple intelligences theory in a personalized setting helped my students to recognize and verbalize their understanding of themselves in a more complete way. As well, it provided a framework for describing their full potential as learners.



*I believe the teaching and learning process should encourage students to establish their own learning goals and construct their own learning pursuits.*

Viewing children through the MI lens means that my role is to identify a child's talent and help nurture it. Rather than focusing on the mismatch between the school's agenda and the students', I focus on the student's many intelligences and on finding ways to bring them alive. Hoerr (1994) believes this approach means that curriculum, instruction, and assessment need to be designed to elicit success in all of the areas of a child's talents, not just the two which correspond most readily with standardized tests. One of the most successful ways of teaching students so they truly understand and can apply what they have learned is to provide them with opportunities to use their visual-spatial intelligence. Where possible, I integrate video tapes, diagrams, pictures, graphs, maps, charts, and other wordless images into my lessons. As this is one of the most dominate intelligences of the student population, assignments are structured to allow students the opportunity to demonstrate their knowledge in a visual-spatial manner. For example, students often will solve mathematics problems by drawing a diagram to explain the procedure used in the solution, they will draw elaborate scenes from the novel they are reading to demonstrate their comprehension of the text, and they will organize non-fiction information in a poster or model format. The chance to verbalize their understanding is provided as well; therefore, I can better assess their level of understanding more completely. Assignment parameters are established, and the students

and I negotiate their goals and the finer details together in order that they use a dominant intelligence. This methodology allows me to capitalize on the students' feelings of success in order to guide them in developing their intelligences. For instance, after a student illustrates a scene from the novel in which he or she has read, a written paragraph describing the scene is required. The visually strong students will use the drawing exercise as a springboard for the written composition. They are much more willing to express themselves in this manner since they have started with an intelligence with which they are most comfortable, and have then moved to a lesser developed intelligence. Student input into what they want to accomplish and how they want to do it is paramount to engaging them in the learning process.

In applying MI in the classroom, I strive to reach each child through engaging his or her individual learning potential and personal interests. This effort results in increased student choice. Students suggest themes to study, projects to pursue, and goals to achieve. Also, an MI focus provides students with opportunities to acquire and apply self-directed skills which prepare them for successful adult lives. These practices stem from my belief that lifelong learning is necessary for success in a complex and interdependent world. Most productive human work occurs in the form of meaningful and complex projects. Gardner (Armstrong, 1994) suggests that curriculum should regularly feature projects to prepare students for adult lives. In project-based classrooms, students are active initiators of their own learning.

As noted earlier, the museum project provided students with choices as to how they would demonstrate their learning. They were asked to select, research, and produce an exhibit from any topic in Canadian history from pre-European to post World War II. This required that the teachers take a guidance role by supporting the students in their self-directed project. Students were in charge of deciding on sub-topics, finding appropriate resources, selecting pertinent information, and designing and constructing of a museum-like display. In essence they were experiencing the roles of the museum archivist and curator. At the Celebration of Learning event, students were also museum docents, leading the audience through their exhibits and answering questions. “We celebrate the product, but we honor the process,” was a guiding principle throughout the project. This process conveyed a message to the students that how they learn is valued and accepted. As a result, their enthusiasm for learning increased. Throughout the self-directed project there was a buzz and excitement in the air generated by active and eager learners. This was a rewarding and fulfilling teaching experience. It was positive and beneficial to both the learners and the teachers.

Through self-directed learning, students deepen their understanding of content knowledge and become more autonomous goal-oriented learners, thinkers, and creators. Student projects naturally foster academic and personal strength and provide insight into how to manage the numerous real-life projects they will undertake during their adult years.

***Effective assessment is crucial to student achievement.***

Assessment is a complex process important to student-centered classrooms. Assessment is integrated with learning and instruction and is intended to stimulate further learning (Haggerty, 1995). I build assessment into the daily routines of my classroom. Students are given the benefit of feedback when it is most useful, not simply at the end of the grading period. For example, the museum project included a number of required research components: first, a web or outline in which the student brainstormed all the possible sub-topics within the historical topic; second, a reference list using the standard format prescribed; and third, research notes that included both the facts and the student's personal reactions to them. These were evaluated in a private conference with each student which allowed me to give specific feedback about the assessment. The entire museum project from the initial research stage to the designing and creating of the display and the sharing of the exhibit consisted of ongoing assessment of student learning for quality and accuracy. The criteria included helping students understand what good performance is, establishing benchmarks to determine where the student is and what needs to be done in order to reach the next higher level, providing a variety of ways that the student can implement to improve, and helping students understand why one thing is better than something else.

It was encouraging to see many students taking the opportunity to polish or fine-tune their research assignments in order to increase their level of achievement. However, other students made the choice not to go beyond the minimum expectations of the assignment. The opportunity always exists for students to enhance what they have done in order to develop their ideas more fully. One-on-one discussions in the classroom allow me to give detailed and lengthy feedback that I would not be able to give if I evaluated the student's work without their being present. This face-to-face evaluation process allows me to impart much more specific details about what is working in students' assignments and ask how they might go about taking their responses one step further. Conferencing sessions are fashioned around a format I call "*Two Stars and a Wish*." The two stars categories include a focus upon the positive aspects of the student's work. The wish category includes constructive criticism through which I describe what they might extend or enhance to improve the quality and quantity of their work. My role is to facilitate the learning process for each student at his or her own level and the individual conference is one way to accomplish this. Fulghum puts it this way: "Teachers are like coaches - they see themselves on the sidelines doing everything they can do to make the players do as well as they can in the game, knowing that losses and failures are not shameful, but often more instructive in winning" (1995, p. 210).

Student projects offer a potentially fruitful means of assessing students' competencies and performances. The museum project was meaningful to the students. It was of sufficient complexity to stimulate their interest and invite their engagement, and took place over time, offering students opportunities for developing their understanding

and skill in specific domains and across domains. By far the most elaborate multi-media display was produced by the two female students who impersonated a Polish and a Ukrainian woman. Their research was centered around the women's journey to Canada in the late 1800s aboard a ship crossing the Atlantic Ocean and their homesteading experience in Alberta. Together the girls wrote about their journey from their homeland to a new country. Using their linguistic intelligence they composed journal entries which contained intricate details of the journey and of the friendship that developed between them. It was representative of their understanding of what it must have been like for new immigrants to come to an unfamiliar country. These two students have read much in the way of Canadian historical fiction and are superb writers. They even went so far as to imitate the broken English that might have been indicative of an immigrant learning a new language. The journal entries were shared between the girls as they were composing so that they could link the women's stories. The narratives contained a common thread. Each woman represented a different ethnic background and religious beliefs; therefore, there existed a dialogue between the two in which they were educating each other as to the similarities and differences of the other. To increase the authentic nature of their journals, the girls bound them in leather covers and tea stained and burnt the edges of the paper to resemble very old and fragile documents. The perseverance that these two girls demonstrated was extraordinary; their understanding for that period of time in history was also superior and the length and the depth of their writing was indicative of their strong linguistic skills.

The journals were the artifacts for the girls' museum display, but their exhibit also included an interactive component. Using their well developed musical-rhythmical and bodily-kinesthetic intelligences they included an example of a traditional Ukrainian folkdance. First they demonstrated the dance and then they invited audience members to participate in learning the dance steps. Traditional costumes were worn by the girls and other artifacts were also displayed to enrich the display. Assessing the students' understanding of this time in history was based on their written and oral expression, exhibit components and dance performance. Students were allowed to use tasks and materials with which they were familiar in contexts in which they typically performed.

The evolution of project work in the classroom now includes not only a final product, but a processfolio (Gardner, 1993). Students document their project work in a processfolio: initial plans; false starts; interim outlines, drafts, or sketches; dead ends; turning points; personal likes or dislikes; interim and final evaluations; records of project presentations; ideas and plans for related projects. These provide a realistic basis for assessing students' performances. More importantly, they provide students with a means of monitoring their own development, of seeing where they have been and where they are going.

snowshoeing physical education activities were a natural extension of the lessons in social studies on the lifestyles of Canadian First Nation People. Singing Alberta folksongs in music class enriched the research on settlers of the province. Themes as catalysts have kid appeal and are relevant, purposeful, meaningful, holistic, and contextual. Once students see the connection between things they are learning in class (e.g. designing and creating a museum exhibit) and things they are learning in life, learning at school becomes purposeful and meaningful.

Gardner (1993) recommends the use of project-centered instructions. Students looked in-depth at a particular area of inquiry (a historical focus) and developed a project (an interactive museum display that reflected an ongoing process of coming to grips with the many dimensions of the topic). Students went into the community to further extend their understanding of topics they studied in school. This meant they visited a local museum in which hands-on exploratory learning and play were encouraged and where interaction with docents and other experts took place. Technology enabled students to visit distant museum web-sites. Experts were also brought into the school to work with the students on their projects. A professional curator, archivist, historical author, historical architect and community representatives shared their expertise with the students. The real life connections made during the museum project resulted in the development of a future museum school experience for the students. It will entail relocating the classroom to a local museum for a one week period. Students will use the museum facility as their learning environment. It will bring students in contact with



individuals and institutions outside the school that can respond to their strengths, styles and interests.

***Learning is a shared partnership between students, parents, and teachers.***

The different relationships at the school are very powerful because we all believe we are participating as stakeholders who can make a difference in the educational process. These relationships are most important in the development of an effective MI classroom.

Partnerships among students, parents, teachers are built on trust, and in order to build this trust, relationships need to be formed and over time through positive and successful experiences, a trust will develop between all parties in the learning process.

The role of the teacher is to determine the most effective means of promoting successful learning experiences and that begins with the cultivation of a trusting relationship between teacher and student. An element of reciprocity exists. I show respect for students' individual needs, which in turn builds a safe and caring learning community. With this modeling, I set an example for the students. I observed that the students' self-esteem improved because of the process that MI encourages. Both the students and I increased our positive comments to one another. The climate in the classroom was one of recognizing how each individual is different. We often referred to one another as bodily intelligent, visually intelligent, or musical intelligent. Students

know each other's strengths and used the MI terminology to describe characteristics of each other.

Teacher and parent relationships are vital to the development of a child's potential. Communicating to the parents their child's potential is important to help parents better understand the learning process. The educational process has changed considerably since the parent was a student in school, so it is essential that innovations be explained in a manner that demonstrates how teaching and learning practices foster the child's growth as a learner.

Parents are a good source of information about their children and should be encouraged to share their perceptions, their observations, and their reflections. After the students completed two different MI inventories, a package of similar inventories was sent home with the instructions that students should review what they had been learning in school and explain it to their parents. They were invited also to fill in the inventories, and the results were to be compared and discussed together. An adult checklist was sent along for parents who were interested in pursuing it for their own interests. Initial feedback was positive. Parents found it a worthwhile exercise.

Parents also shared some reservations. One parent commented that she was concerned that students might begin to categorize themselves as being very good in one, two or many of the intelligences, and not so good in the other intelligences and just leave

it at that. After discussing the intent of the exercise and giving some background information, I had to conclude that I also shared similar reservations. I wondered if students would use their knowledge about their dominant intelligences as a crutch or a way out of developing skills in their least dominant intelligence, and focus their energy and time in developing their stronger intelligences. It was important then to follow up with a discussion to help students understand that these inventories were a brief snapshot of the student's preferred intelligences on that particular day.

One astute parent recognized that students might be in a cooperative mood when taking the MI inventory, and might indicate a preference for participating in group activities. This might result in students registering a strong interpersonal intelligence. However, on a different day the students' mood might be different and another intelligence might be found to more dominant. It was recommend by this parent that the inventories be re-administered at different points in time in the year, and the students reflect upon the differences. I concurred with this observation and planned to do so. It was also pointed out that part of the education around MI is to develop the notion that one's intelligences are not set in stone or static, but rather developing entities. Using MI categories as labels defeats the purpose. They are not there to categorize individuals, but rather to reveal students preferences, strengths, and areas which need to be developed. Categories can be limiting to students who perceives themselves as only able to do certain things or only good in some areas. As educators we must be cautious that we do not use MI as another means of categorizing students and using a new label to replace other

labels that were used in the past. For example, instead of saying a student is learning disabled one might say that the child has fewer strengths in an area like verbal-linguistic or logical-mathematical, but has greater strengths in visual-spatial or bodily-kinesthetic areas.

Parents who offered their volunteer services made significant contributions to support learning in the classroom. Many would conference on a one-to-one basis with the students about plans for the museum exhibit project. For instance, they discussed the possibilities within students' topics, where resources could be located, how students might organize their information and finally, how to display their research findings. As well, two parents used their Internet expertise to search for web sites that might contain information relevant to the student's individual topics. One parent, in fact, conducted searches from his home computer and shared these with students. Another parent offered his services for the day and assisted the students in browsing through the Canadian Museum of Civilization web site. Students were able to peruse different historical exhibits and with the parent discuss the intricacies of the displays. Many of the students had access to the Internet at home and consequently would record particular web site addresses in order to visit them later from home. A group of parents organized themselves into carpools, driving small groups of students to both the public library and local museum. Without parents' time and support, the students' learning experiences would not have been enriched and extended. Parents worked as partners in the teaching and learning process.

As a learner I do not have strengths in all of the seven intelligences; some are more developed and others are less developed. However, in a collaborative and cooperative teaching situation, I can access those intelligences that are not as well developed. In the larger team teaching situation I have access to very logical-mathematical people. I am surrounded by many colleagues with strengths in what we think of as the traditional fine arts area (e.g. visual-spatial and musical-rhythmical). Team teaching allows us to capitalize on each other's expertise. For example, the music teacher coordinated her focus in her lessons to include historical Canadian folk songs, and also incorporated spoons, traditional French Canadian instruments. Snapshots of history appeared through song. Students were also given the opportunity to compose their own melodies, songs, and rhythms with the spoons that would match the traditional folk songs they had been studying.

Ultimately I am working towards a bigger goal of changing the perceptions of what school is, not only for myself, but for the students, their parents, and my colleagues. Therefore, classroom experiences look less like traditional verbal-linguistic and logical-mathematical activities; they also include the five other and equally important intelligences. The program of studies mandates not only the content that needs to be taught, but also the amount of time to be spent on the different subject areas. One way to adhere to these requirements, and at the same time allow students multiple ways to express their understanding, is through an integrated thematic approach. This allows the

combining of different subject areas around a common theme. Humanities was the combination of language learning and social studies, melded together. With any new approach to teaching it is helpful for me to discuss with colleagues what works and what does not. Teacher collaboration is essential.

### Concluding Remarks

My personal reflections on the theory of multiple intelligences are not meant to reflect an “either-or” position of wrong versus right approaches to pedagogy, curriculum, and assessment. I do not believe that I have arrived at some kind of superior understanding because I know that my understandings are always evolving. Change is the result of continuous inquiry. I believe my experience in designing and implementing a unit of study which incorporated MI, and the reflections upon that teaching and learning process, reflect the examination and transformation of beliefs and actions that are constant part of my life as a teacher and learner.

It is important to critically examine my beliefs and actions. I need to pay attention to the tensions that I feel about teaching and take time to explore them, though most of my inquiry involves exploring new actions based on current beliefs and models of effective teaching and learning. I remain open to the possibility that I also need to make a major leap to a new paradigm. Having taken the time to peruse many teacher resource books on applying multiple intelligences in the classroom, I feel some applications are nothing short of recipe books offering very superficial applications of MI. Some educational resources tend to apply the seven “smarts” to every topic, which I do not think makes sense. Too often it would be very contrived to present information in seven different ways, and not every topic lends itself to seven different ways of exploration. Gardner (1995) has spoken

out against such a practice. "... there is no point in assuming that every topic can be effectively approached in at least seven ways, and it is a waste of effort and time to attempt to do this" ( p. 206).

Deeper application of MI challenges us to move beyond maintaining the status quo and invites us to examine critically and question our beliefs as well as our practices. As a teacher, I need to be free to ask the questions that really matter in my life just as students need to ask questions that are significant in their lives. I believe MI has allowed me to examine the complexity of teaching and learning and to move beyond trying to find simple solutions to complex problems. It is not just about better ways to enhance student learning. It has allowed me to question, rethink, rephrase, reflect upon my teaching and learning practices. It has helped my continuing growth as life-long learner.

I think that elementary level education is well suited to the theory of multiple intelligences because we see the theory as a way of recognizing something we already know - children are different, one from the other. It also provides a means of moving pedagogy, curriculum, and assessment in directions with which we are comfortable. It provides a kind of protective shield for those of us who have ideas for doing things differently. In his own words, Gardner (1994) believes

“...that MI Theory has proved catalytic in schools all over the country precisely because it allows individuals (particularly parents and teachers), in a nonthreatening way, to look more carefully at children, to examine their own assumptions about potential and achievement, to consider a variety of approaches to teaching, to try out alternative forms of assessment-in short, to begin the fundamental kind of self-transformation that is necessary if schooling is to improve significantly.” (p. 582)



I concur with Hoerr (1994) that, at the elementary level, students who have possessed superior skills in the musical, bodily-kinesthetic, or visual-spatial intelligences have often only been able to display and pursue their unique gifts in art class, or, perhaps, at recess. And opportunities for manifesting and developing the personal intelligences have been few and far between. Secondary teachers often do a better job of allowing students to pursue their many talents. Sports, drama, leadership, and art enrichment opportunities are pervasive in secondary schools.

There are those in gifted education that see MI as trendy, simple, and convenient. Delisle (1996) spoke out against the use of MI with gifted learners. He claims that MI advocates have ignored two important elements: the developmental nature of giftedness, and the fact that giftedness is someone you are, not something you do. He goes on to argue, "Growing up gifted is a lot more complicated than merely determining what talents someone chooses to display or which of Gardner's eight intelligences best fit particular behaviors and strengths" (p. 13). To debate this position is not in the scope of this paper; however, I can comment upon the impact of MI on the gifted learners in my care.

My students receive admittance into the program through very superior scores on assessments of cognitive functioning. Therefore, the program is geared for enriching and extending students. The inclusion of MI provided for students to express their understanding in multiple ways in academic subjects such as: reading, writing, social studies, and mathematics. Communication of their understanding was not just limited to

talking and writing, but opportunities existed for students to draw, act out and for personal reflection. MI allowed students to take their learning in school and personalize it. They used their intrapersonal skills to better understand their strengths and weaknesses in order to customize the learning activities. In this fashion they used stronger intelligences to increase their achievement in academic subjects. For example, students used their strong visual-spatial abilities to draw a scene from a novel as part of a reading comprehension assignment. This freedom of expression made students feel more confident and successful because they were offered a chance to use a stronger intelligence. This in turn boosted their self-concept as learners. It was then that students felt more comfortable in developing least dominant intelligences. Again, the visual-spatial activity allowed students to draw a picture to represent their understanding the elements of a novel. Next they were encouraged to use their verbal-linguistic skills to initially discuss the meaning behind the drawing, and then to produce a written composition. On a regular basis students would customize learning experiences in academic subjects to better suit their multiple intelligences.

For gifted education, I believe MI has a multitude of possibilities. First, it can expand our definition of giftedness. However, as long as giftedness is based on a very superior IQ score (130 or better), it will be a challenge. MI goes against the grain of how traditional gifted programs are structured, based on a standard intelligence quotient which is measured through an IQ test. I believe if educators want to provide different kinds of experiences for gifted students, then MI theory is very helpful. It moves us beyond

verbal-linguistic and logical-mathematical skills, and helps to introduce five other intelligences which we can nurture in gifted, as well as all, students.

I have now come to a better appreciation that the theory of multiple intelligences has numerous implications for teaching and learning. I believe it impacts on the way we think about instruction, about curriculum, and about assessment. At the heart of MI is the notion that each student can succeed academically as well as discover areas of individual interest and talent. This belief is now the guiding principle of my classroom. It is each teacher's responsibility to personalize education so that students are linked to their own strengths. In this way students benefit from increased choice over what they learn, how they learn, and how they demonstrate their learning. According to Gardner (Armstrong, 1994), an essential tenet of MI is that we need to educate for understanding. Living in an information age, it is not possible to survey all information available within a single discipline. We must make choices about what to teach, how to teach, and how to allow students to apply their knowledge to demonstrate their understandings. Life-long learning is another tenet of MI, and to quote Gardner, "I want students to love learning because they love learning. They will be able to continue their education as long as they're alive" (p. 24).

I am closer to personalizing the use of Gardner's theory into my teaching and learning practices. I strive towards change that will not be superficial, but can be integrated into the life of the classroom in a more complete way. The following quote from Garmston

(1995) describes the point at which I now find myself, "I have not succeeded in answering all my questions. The answers I have found only serve to raise a whole set of new questions. In some ways I feel as if I am as confused as ever, but I believe I am confused on a higher level and about more important things."

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**APPENDICES**



**APPENDIX A****Modified Version of Armstrong's (1994) "Seven Smarts Checklist"**

Adapted by Denise Kisilevich and Nancy Picone, Calgary, AB.

1. I am a good writer.
2. I tell jokes and stories.
3. I remember things I hear or read about.
4. I enjoy word games.
5. I enjoy reading books.
6. I am a good speller.
7. I like things like rhymes and tongue twisters.
8. I like listening to stories, talking books, and television.
9. I know lots of words and use them.
10. I like to talk and listen to other people.
  
11. I ask a lot of questions about how things work.
12. I can quickly answer math questions in my head.
13. I enjoy math class.
14. I like to play math computer games.
15. I like playing games where you have to think a lot.
16. I enjoy working on puzzles or brain teasers.
17. I am a good thinker.
18. I am good at putting things into groups.
19. I like to try out different ways of solving problems.
20. I know what will happen if I do something.
  
21. I tell others the pictures I see in my mind.
22. I can read maps, charts, and diagrams easier than printed things.
23. I daydream more than other kids.
24. I enjoy art activities.
25. I draw better than other kids.
26. I like to look at television, movies, and slides.
27. I enjoy art activities.
28. I build interesting things with lego and blocks.
29. I learn more from pictures than from words when I read a story.
30. I like to doodle.

31. I am good at one or more sports.
  32. I move, tap, or fidget when I sit in one place for a long time.
  33. I can imitate other people's movements and actions.
  34. I like to take things apart and put them back together.
  35. I like to touch things that I see.
  36. I enjoy things like running, jumping, and wrestling.
  37. I am good at crafts and printing.
  38. I am good at using my body to express myself.
  39. I have different physical feelings while thinking or working.
  40. I enjoy making things with my hands.
- 
41. I know when music sounds off-key or annoying.
  42. I remember melodies of songs.
  43. I have a good singing voice.
  44. I play a musical instrument or sing in a choir or a group.
  45. I use rhythm when I speak or move.
  46. I hum to myself without knowing it.
  47. I tap rhythmically on the table or desk when I'm working.
  48. I am good at hearing the sounds around me.
  49. I like it when I can listen to a piece of music.
  50. I sing song that I have learned.
- 
51. I enjoy getting together with other kids my age.
  52. I am a leader.
  53. I give advice to friends who have problems.
  54. I know a lot about what goes on in the world around me.
  55. I belong to a club, social group, or organization.
  56. I enjoy teaching other kids.
  57. I like to play games with other kids.
  58. I have two or more close friends.
  59. I care about how other people feel.
  60. I think that other kids like to be around me.
- 
61. I like to be independent and decide things for myself.
  62. I know my own strengths and weaknesses.
  63. I do well when I'm left alone to play or study.
  64. I live and learn in different ways than my friends.
  65. I know what to do when I'm asked to do something.
  66. I have an interest or hobby I don't talk much about.
  67. I prefer to work alone rather than with others.
  68. I know how to tell people what I feel.
  69. I can learn from what I do well and from my mistakes.
  70. I feel good about myself.

## The Seven Smarts

Word smart (1-10)=

Logic smart (11-20)=

Picture smart (21-30)=

Body smart (31-40)=

Music smart (41-50)=

People smart (51-60)=

Self smart (61-70)=

**APPENDIX B****TITLE: HISTORICAL CONNECTIONS UNIT***SCOPE AND SEQUENCE*Introduction

Focus: *Time Machine*

- establish mindset for travel into the past
- use the picture book entitled Olden Days Coat by Margaret Lawrence as a springboard
- students can imagine, develop, and design their own travel machine; the intent is for quick stops at different times in Alberta and Canadian history
- possible focus questions:
  - what artifact, from present day, will you take with you in your time machine and why?
  - why is this particular artifact of value and important to take on your travels into the past?
  - what impact would this particular artifact have upon the various time periods you have visited?
  - evaluate the artifact at the end of your time travel experience. Was it useful or not? Why was it important or unimportant? How would you have chosen differently?

- time travel activities could include individual and/or group role playing

### Personal Histories

- introduce by reading aloud from the novel, Journey by Patricia MacLachlan
- emphasize health topic, self awareness and acceptance. Sub themes: 1) finding yourself; 2) feelings; 3) personality; and 4) responsibility to others in the world
- opening activity could include baby photographs, whereby students match name to picture
- creation of a personal timeline that includes interviewing parents, chronological order of events and/or milestones, and photographs
- short written piece (i.e. paragraphs) describing a significant change in the student's life
- autobiographical written piece that could include the following components:
  - sketch of life
  - memorable moments from the past or present day
  - accomplishments
  - quotes
  - similar qualities of famous people
  - future predictions
- published as an accordion booklet with photographs

### Teacher-Directed Activity

#### *Topic: Plains Indian Tribe*

- research skills instruction with emphasis on brainstorming and organizing facts through webbing
- fictional literature through native folklore (i.e. legends and myths); response journal guided practice followed by independent practice
- make a simple map with accompanying legend to show a specific area
- guest speaker: First Nation person from the Glenbow Museum Outreach Program - Starlite family member

### Cooperative Learning Groups

#### *Topic: Canadian Native Indian Tribes*

- students in groups of three research one particular tribal group and produce a visual organizer of researched information (i.e. construction paper tri-fold display); groups share finished product with one another.
- research components include an outline which features basic needs: physical (food, shelter, clothing and transportation); social (occupations, language, defense, family roles, government, education and games); and psychological (art, music, drama,

religion, literature, entertainment and traditional celebrations); a reference list, map of the region, and three myths/legends (one written by each group member)

- use historical maps and map legends to locate the territories occupied by different Indian tribes
- read aloud from the novel, Finders Keepers by Andrea Spadling, teacher models literature response/reflective journal writing, followed by guided and independent practice by students

### Independent Activity

*Topic: Canadian Explorers and Fur Trading Settlements*

- students choose one explorer or an example of a fur trading settlement and apply the research skills learned in previous activities
- use historical maps and map legends to locate the major fur trading posts and communities under study, and to explain how geographic relationships and settings have influenced historical events; i.e. direction of river flow affected voyages of exploration. Also, give possible reasons for the location of the major fur trading posts, fur trade routes, railroads and settlements, such as towns and cities
- interpret historical maps showing European voyages of discovery and the location of early British and French settlements in Canada
- research notes required components: along with a formal written report

The necessary features are:

introduction

body

conclusion

- guest speakers: settlers dramatization by the author, Edna Bakkan; Quest Theatre drama production entitled Veronia; and N.W.M.P. Commemorative Association (three presenters)

### Culminating Activity

*Time Period in Canadian and Alberta History: Pre European Era to Post World War II*

*Optional Topics: Homestead Settlement (1890-1939), Immigration of a Specific Group, or immigration into a Specific Area (1880-1930), The Great Depression (1939-1945), World War II (1939-1945), and Boom Years (1947)*

- Museum-in-Progress (MIP) approach whereby the students form small groups of three, partnerships, or independently research a specific time period
- MIP entails that students are trained in the responsibilities of a museum staff to create an exhibition that reflects the curriculum objectives. First, students conduct research on the exhibition theme and study museum function by visiting a local museum (e.g. Glenbow Museum curator, Cindy Maurice, and archivist, Liz Denham, to speak to students and a visit to the museum to participate in a guided tour of historical displays). Use of Internet as a resource: firstly, to browse the Canadian Museum of



Man web-site in Ottawa; secondly, as a source of information that pertained to individual student research topics.

Students search for artifacts that exemplify the concepts they have researched. Next, they design a plan for learning from the exhibition through interaction with the artifacts. They document their knowledge and list the artifacts in a catalogue they write and illustrate themselves. Finally, community members and schoolmates tour the final exhibition and participate in its activities.

# HISTORICAL CONNECTIONS PROJECT

**KEY:**

V.L. - Verbal Linguistic  
 V.S. - Visual Spatial  
 B.K. - Bodily Kinesthetic  
 L.M. - Logical/Mathematical

M.R. - Musical/Rhythmic  
 Interp. - Interpersonal/Social  
 Intrap. - Intrapersonal/Introspective

BLOOM'S TAXONOMY	ACTIONS	PROJECT ACTIVITIES & PRODUCTS	MULTIPLE INTELLIGENCES
<b>KNOWLEDGE</b>	Identify, list, research, read, define, discover, name, record, describe, locate, state, select, write	select resources, note taking, individual and small group activities, geographical maps	V.L., Interp.
<b>COMPREHENSION</b>	classify, summarize, outline, show, indicate examples, tell, paraphrase, select, represent, explain, reword, discuss, interpret	time line, web, outline, paragraphs, topic organization, rough draft, response journal/reflections	L.M., V.L., Interp., Intrap.
<b>APPLICATION</b>	predict, identify, paint, sketch, report, judge, group, explain, illustrate, construct, graph, dramatize, select, choose, results, demonstrate, report, organize, collect, show, draw, listen, compose	paragraph development, illustrations, graphs, visuals and summary explanations, oral presentation, written report, role play, response journal/reflections	Interp., V.L., B.K., M.R., V.S., L.M., Intrap.
<b>ANALYSIS</b>	distinguish relevant ideas, identify point of view, main idea and supporting ideas, fact vs. opinion, chart, introductions and conclusions, compare/separate/contract, classify, categorize	essay format and organization, formal introduction and conclusion, comparison chart, prepare oral presentation, response journal/reflections	V.L., L.M., M.R.
<b>SYNTHESIS</b>	combine, invent, compose, role-play, write, create, tell, make, construct, infer, generalize, solve, plan, design, revise, develop, suppose, connect, improve, adapt	interactive museum display, oral presentation, visual presentation, edited and revised draft to final draft, group work and cooperation, response journal/reflections	V.L., V.S., B.K., Interp., Intrap., M.R.
<b>EVALUATION</b>	judge, discuss, decide, recommend, debate, summarize, compare, rate, determine, justify, assess, select, prove, criticize, validate, interpret, measure, choose	summary chart, self evaluation, peer evaluation, artifact selection, goal setting, response journal/reflections, answer questions about display	Intrap., Interp., V.L., L.M., V.S.