BUILDING BLOCKS IN THE FOREIGN LANGUAGE CLASSROOM
PILARES BÁSICOS EN EL AULA DE IDIOMAS

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La revista está indexada en los directorios:

LATINDEX, REDALYC, IRESIE, CLASE, DIALNET, DOAJ, E-REVIST@S,

La revista está incluida en los sitios:

REDIE, RINACE, OEI, MAESTROTECA, PREAL, HUASCARAN, CLASCO

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Rossina Coto Keith[1]

"Education is a lifelong process, one purpose of which is to equip learners to cope in a changing world"
(Williams & Burden, 1997)

Abstract: *This article presents the advantages of integrating three areas commonly addressed in the teaching of languages: Learning Styles, Multiple Intelligences and Language Learning Strategies. Each of these areas plays a fundamental role when teaching and learning languages, but usually they are used separately or in the best of cases, instructors integrate either styles and intelligences or strategies, but not the three of them at the same time. Indeed, most of the literature presents each separately, giving the idea that only one or two can be used in the language classroom, thus missing some important matters. The point of this article is that in order to be more effective, Learning Styles, Multiple Intelligences and Language Learning Strategies must intertwine, so as to create a solid building block. The author first gives an overview of each of these areas. She then explains in the review of the literature how they should be used as a closely-knit unit. Next, she provides an example of this integration through a lesson plan on the topic of environmental conservation for an Oral Communication course for English majors at School of Modern Languages, University of Costa Rica. Finally, some advice is given to instructors on the incorporation of each of these building blocks.*

Key words: *LANGUAGE LEARNING, LANGUAGE TEACHING, LEARNING STYLES, MULTIPLE INTELLIGENCES, LANGUAGE LEARNING STRATEGIES*

Resumen: *Este artículo presenta las ventajas de la integración de tres áreas comúnmente estudiadas en la enseñanza de idiomas: Estilos de Aprendizaje, Inteligencias Múltiples y Estrategias para el Aprendizaje de Idiomas. Cada una de estas áreas tiene un papel fundamental en la enseñanza de idiomas y el aprendizaje, pero por lo general se utilizan por separado, o en el mejor de los casos, los y las docentes integran ya sea estilos e inteligencias o estrategias, pero no las tres al mismo tiempo. De hecho, la mayoría de la literatura presenta cada una por separado, dando la idea de que sólo una o dos se pueden utilizar en la clase de idiomas, por lo que en muchas oportunidades se ignoran aspectos fundamentales. La tesis principal del artículo es que, para ser más eficaz, Estilos de Aprendizaje, Inteligencias Múltiples y Estrategias de Aprendizaje deben entrelazarse a fin de crear un pilar sólido para el aprendizaje de idiomas. Primeramente, la autora ofrece una visión general de cada una de estas áreas. Luego en el referente teórico explica cómo estas deben usarse como una unidad, y posteriormente da un ejemplo de esto a través de un plan de clase sobre el tema de la conservación del medio ambiente para un curso de Comunicación Oral I de la carrera de inglés de la Escuela de Lenguas Modernas de la Universidad de Costa Rica. Por último, se ofrecen algunas recomendaciones a los y las instructores sobre la integración de estos pilares en el aula.*

Palabras clave: *APRENDIZAJE DE IDIOMAS, ESTILOS DE APRENDIZAJE, INTELIGENCIAS MÚLTIPLES, ESTRATEGIAS PARA EL APRENDIZAJE DE IDIOMAS*

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1. Introduction

The teaching profession is always changing. Teachers are always looking for new ways to make their classes more interesting, appealing and advantageous for their students. In second or foreign language teaching, we, as teachers, have been moving from one side of the pendulum to the other. Hence, we have moved from the more traditional trends, such as the Grammar- Translation Method, in which the objective was to teach grammar and to translate form L2 to L1, to the most innovative ones; for instance, the Natural Approach, where the learner is given the opportunity to experience the language through meaningful and natural input for acquisition; the Communicative Approach, where language teaching is learner-oriented, contextualized, authentic and recursive; or Neurolinguistic Programming, where learners are given enough input and training so they can feel motivated and with enough resources to learn the language. Right now, the L2 teaching profession is at a point where most teachers favor a more eclectic approach where the best a given method or approach can offer is capitalized on and integrated into the classroom. That is why, nowadays, one can run into teachers who might be using drilling (from the Audiolingual Approach), along with varied information gap activities or role plays (from the Communicative Approach), which cater to different kinds of learners (part of Neurolinguistic Programming) in the same language classroom. Indeed, one of the most important trends nowadays is not only what teachers teach and how they do it, but also how to help the learner be a better, more efficient learner. This new trend can be achieved through different means such as language learning strategy training or the study and application of Learning Styles and Multiple Intelligences Theory in the classroom, for instance.

In the market, there are several books and professional journals that cover extensively each of these areas. However, the author's experience as a professor and teacher trainer has demonstrated that most people see each of these areas in isolation and not as parts of a whole that would help the learner become better and more proficient in the learning of a foreign language. In fact, Learning Styles (LS), Multiple Intelligences (MI), and Language Learning Strategies (LLS) can be seen as the building blocks of learner training.

The purpose of this article is to explain in detail how these three areas intertwine to create a unit in which one area cannot work correctly and in full force without the help of the other. After this explanation, a sample lesson in which these three areas have been integrated will be provided. But, before looking at this perspective, it is important to explain what each of these fields entail.

2.   Review of the literature

2.1   Learning styles

When talking about learning styles (LS), researchers refer to a great variety of ways in which individuals learn due to genetic and environmental conditions. From a teaching perspective, learning styles are defined as "*specific actions, behaviors, steps, or techniques […] used by students to enhance their own learning*" (Scarcella and Oxford, 1992, p. 63). Denig (Cited in Chau) defines a learning style as "the way in which each person begins to concentrate, process, internalize, and remember new and difficult academic content" (p.1).
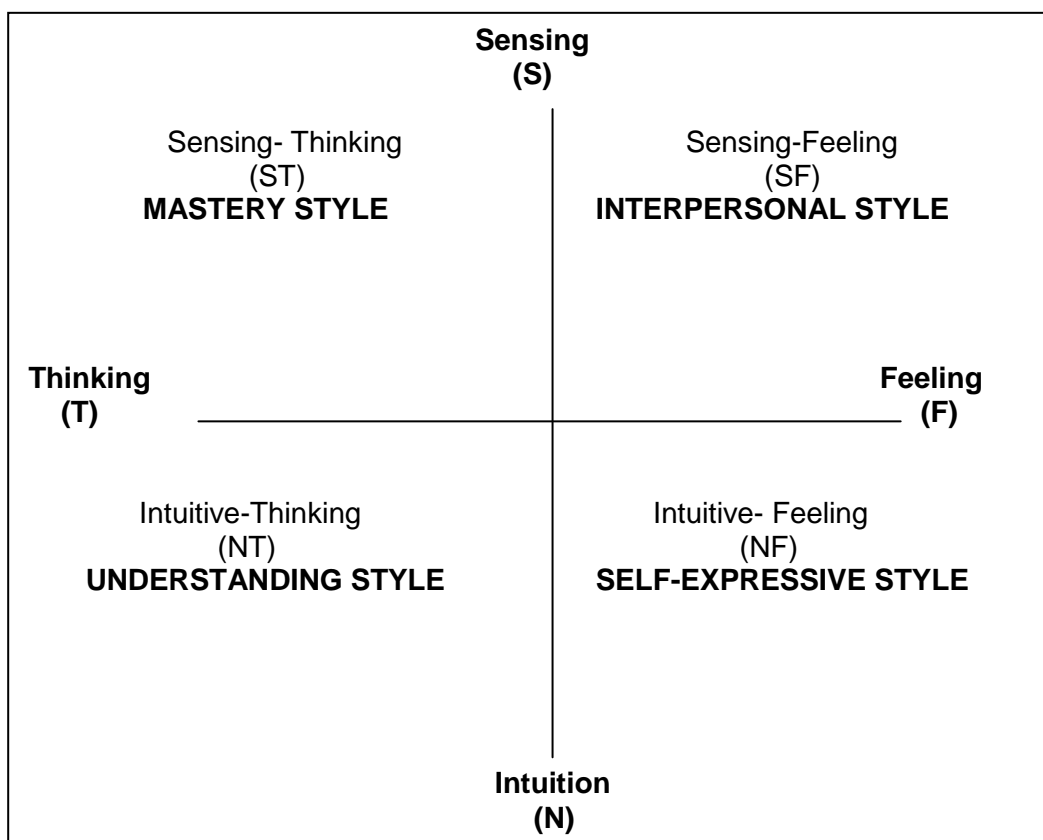
Though very current these days, the concept of learning styles dates back to 1923 when psychologist Carl Jung the idea of *human fourness*, or the existence of four different psychological types or personalities (sensing, thinking, feeling and intuition) in his book *Psychological Types*. Jung stated that each of these different personality types corresponds

> to the obvious means by which consciousness obtains its orientations to experience: *sensation* tells you that something exists; *thinking* tells you what it is; *feeling* tells you whether it is agreeable or not; and *intuition* tells you from where it comes and where it is going. (1923, p. 481)

For Jung, sensing represents procedure and concreteness, thinking represents logic and objectivity, feeling represents emotion and spontaneity, and intuition represents insight and abstraction (as cited in Sliver et. al., p.22). Though this is the oldest way to classify how a person acquires, learns and uses information, at the present time there are several ways in which how a given person makes sense of the information around him or her through four sensory channels—visual, auditory, kinesthetic, and tactile—can be classified.

These different ways of perceiving information are called dimensions, of which some of the most common or recognized ones in the language teaching field nowadays are field dependence vs. field independence, tolerance for ambiguity, analytic vs. global processing, cooperation vs. competition, reflectivity vs. impulsivity, leveling vs. sharpening of detail, introversion vs. extroversion, perceiving vs. judging, sensing vs. intuition (perception), thinking vs. feeling (judging). Research into each of these dimensions has been carried out for many years, and there are several published investigations the reader can check.

Silver, Strong and Perini (2000) in their well-known book in the field called *So Each May Learn: Integrating Learning Styles and Multiple Intelligences* went even a step further and summarized all of these dimensions into four general but comprehensive areas. For them, learning styles can be divided into the four quadrants and categories (sensing, thinking,

feeling and intuition [or introversion]) proposed by Jung´s, but rather than having each category separately, they created combinations that would include many, if not most, of the dimensions mentioned above. This new way to classify styles would then be Mastery, Understanding, Interpersonal, and Self-Expressive, as represented in the Silver et.al.´s book (See figure 1).

Sensing (S)

| Sensing- Thinking (ST) **MASTERY STYLE** | Sensing-Feeling (SF) **INTERPERSONAL STYLE** |

Thinking (T) ————————————————— **Feeling (F)**

| Intuitive-Thinking (NT) **UNDERSTANDING STYLE** | Intuitive- Feeling (NF) **SELF-EXPRESSIVE STYLE** |

Intuition (N)

Figure 1. Learning Styles .Taken from: Silver, H.F., Strong, R.W., & Perini, M.J. (2000). So Each May Learn: Integrating Learning Styles and Multiple Intelligences, p. 25

With this systematization a mastery style person would be the kind of individual who likes to ask what and how (thinking) and who tends to be pragmatic and hands-on (sensing). An interpersonal style person would also prefer practical things (sensing), but the difference would be that this person tends to be more sociable and prefers to learn things that affect people´s lives and reflect emotions (feeling). On the other hand, the understanding style person is the classical intellectual, who likes theory and is knowledge-oriented (thinking) and who is also independent and prefers to work alone and in an organized way (intuitive or

introvert). Finally, the self-expressive style represents the person who is insightful (intuitive), full of curiosity and imagination and always looking for ways to show their creativity (feeling).

By being more comprehensive, this new categorization becomes simpler to understand and remember than the several dimensions presented before, even for the untrained individual. To make this classification even more applicable, some famous people can represent each of these quadrants:

- Alexander Graham Bell and Sir Isaac Newton would represent the Mastery style of learning, as they did rigid scientific research based on cause-effect and worked with experiments that required the use of their senses to check facts.
- Sigmund Freud and Mahatma Gandhi would embody the Interpersonal style of learning because they also depended on their senses, but they used these to get to know themselves and others better.
- Franz Kafka and Ralph Waldo Emerson would exemplify the Understanding style of learning, since they were classical thinkers and intellectuals who were introverts and individualistic.
- Andy Warhol and Frank Lloyd Wright would epitomize the Self- expressive style of learning for they were always looking for ways to innovate in their fields of expertise as a form of communicating their feelings.

2.2 Multiple Intelligences

Probably the most widely known of the three areas of interest of this article due to the great publicity it has received in the last two decades, the concept of Multiple Intelligences (MI) was first introduced by Howard Gardner in 1983. According to Gardner, there are 8 different *intelligences*, for "*human beings are better thought of as possessing a number of relatively independent faculties, rather than as having a certain amount of intellectual horsepower (or IQ) that can be simply channeled in one or another direction*" (A Multiplicity of Intelligences, p. 3). In this context, intelligence is defined by Gardner as "*psychobiological potential to process information so as to solve problems or to fashion products that are valued in at least one cultural context*" (A Multiplicity of Intelligence*s*, p. 3). The idea of perceiving a person as a being with different intelligences or faculties is based on a series of criteria derived from psychological, anthropological, cultural and biological concepts, together with observations Gardner did of several people, among them prodigies and idiot savants. This concept of intelligence is not static, as new intelligences may be or have been incorporated.

This is the case of the naturalist intelligence, which was not in the original seven Gardner proposed, or the spiritual or existential intelligence, which is next in line to be incorporated to the list. It is also important to mention that every human being possesses all the intelligences, but each of us have some intelligences that are stronger than others, or as Gardner puts it:

> …all human beings possess all of these intelligences: indeed, they can be considered a definition of *homo sapiens*, cognitively speaking. […] Just as we all look different and have different personalities and temperaments, we also exhibit different profiles of intelligences. No two individuals, not even identical twins or clones, have exactly the same amalgam of intelligences, foregrounding the same strengths and weaknesses. This is because, even in the case of identical genetic heritage, individuals undergo different experiences and also seek to distinguish their profiles from one another. (A Multiplicity of Intelligences, p. 5)

The current eight intelligences are the following:
- Verbal-Linguistic intelligence: ability to manipulate words
- Logical-Mathematical intelligence: capacity to find patterns and to establish cause-effect relationships
- Spatial intelligence: talent for perceiving, producing and reproducing pictures and images; a sharp sense of location and direction
- Musical intelligence: gift for melody and rhythm and for appreciating musical forms
- Bodily-Kinesthetic intelligence: ability to handle objects and manipulate one´s body easily
- Interpersonal intelligence: flair for interpersonal relationships, for understanding, identifying and reacting to others´ moods and needs
- Intrapersonal intelligence: capacity to know oneself, to one´s opinions, feelings and needs
- Naturalist intelligence: sense of nature, ability to see patterns and abnormalities in the environment (Silver et al., pp. 7-8).

Examples of the different intelligences one may find in the world abound. For example, there is the case of the person who is good with numbers and math (logical- mathematical intelligence), but who is not very much into plants or animals (naturalist intelligence); or the person who is very sensitive to art (visual-spatial intelligence), but is not very much into

human relationships (interpersonal intelligence). Actual examples of well known people from all walks of life who portray each of the intelligences are for instance,

- Verbal-linguistic intelligence: T.S. Eliot, Sir Winston Churchill, John F. Kennedy
- Logical-mathematical intelligence: Albert Einstein, John F. Nash Jr., Bill Gates
- Visual-spatial intelligence: Vincent Van Gogh, Pablo Picasso, Oscar Niemeyer
- Bodily-kinesthetic intelligence: Pele, Mikhail Baryshnikov, Meryl Streep
- Musical intelligence: Mozart, Andrew Lloyd Webber, Celine Dion
- Interpersonal intelligence: Martin Luther King, Jr., Pope John Paul II, Barack Obama
- Intrapersonal intelligence: Robert Frost, Virginia Wolf, Ernest Hemingway
- Naturalist intelligence: Charles Darwin, Jane Goodall, Dian Fossey.

2.3 Language Learning Strategies

Language learning strategies (LLS) are well-known in the teaching field, but they are not as familiar to the average public as multiple intelligences are. Indeed, when presented with strategies for the first time, most students show a lot of interest in this subject, for some them have already being using some "tricks" or "aids" to help them learn the language, but they do not know they have a name and that they are the focus of much research. The most widespread and thorough definition of language learning strategies, and the one that is going to be used for the purpose of this article, states that they are

> specific actions, behaviors, steps, or techniques that students (often intentionally) use to improve their progress in developing L2 skills. These strategies can facilitate the internalization, storage, retrieval, or use of the new language. Strategies are tools for the self-directed involvement necessary for developing communicative ability. (Oxford, 1992/1993, p. 18)

This definition is significant because it refers to the element of choice or intentionality from the learner when choosing an action plan to deal with the second language. Besides, it involves the concept of communicative ability.

There are diverse views on the different kinds of strategies a person can make use of when confronted with something new. For the purpose of this work, Rebecca Oxford´s categories will be applied as they are more detailed and simple to understand. First, Oxford refers to two classes of strategies: *direct strategies*, which are the ones a person employs to work with the language itself and *indirect strategies*, which are those strategies a person uses to manage his or her own learning. According to Oxford, language learning strategies can be

divided into 6 different groups (3 direct and 3 indirect ones), which in turn contain several different categories of strategies a student can draw on. The following table is a complete list of Oxford´s categories.

Direct strategies	*Indirect strategies*
a. Memory strategies	*a. Metacognitive strategies*
i. Creating mental linkages	i. Centering your learning
ii. Applying images and sounds	ii. Arranging and planning your learning
iii. Reviewing well	iii. Evaluating your learning
iv. Employing action	
b. Cognitive strategies	*b. Affective strategies*
i. Practicing	i. Lowering your anxiety
ii. Receiving and sending messages	ii. Encouraging yourself
iii. Analyzing and reasoning	iii. Taking your emotional temperature
iv. Creating structure for input and output	
c. Compensation strategies	
i. Guessing intelligently	*c. Social strategies*
ii. Overcoming limitations in speaking and writing	i. Asking questions
	ii. Cooperating with others
	iii. Empathizing with others

(Taken from: Oxford, 1990, p. 17)

In turn, these 19 categories comprise a grand total of 62 specific strategies learners can use when facing a second language. Some of them are outlined below:

- Memory strategies: placing new words into context, using imagery, creating semantic mappings, using movement;
- Cognitive strategies: repeating, practicing with sounds, analyzing, contrasting languages, translating, summarizing, highlighting;
- Compensation strategies: using clues, using gestures, using circumlocution;

- Metacognitive strategies: paying attention, delaying speech to focus on listening, setting goals and objectives, identifying the purpose of a task, planning, seeking opportunities to practice, self assessing one´s learning , self monitoring;
- Affective strategies: relaxing, using music, taking calculated risks, keeping a language diary, rewarding yourself;
- Social strategies: asking for clarification and correction, developing cultural understanding, becoming aware of others' feelings and thoughts (Oxford, 1990, pp.18-21).

An important point to ponder is that a person´s use of a specific strategy depends on several factors such as motivation and beliefs, age, gender, social background, second language learning stage, and nature of the task being performed. For instance, in terms of motivation, those students who have a reason for learning a second language are more motivated and use more strategies than the unmotivated learner. Women portray, or at least report using, a wider variety of strategies than men. The reason for this is in part because in general women are more conscious language learners and strategy users (Oxford and Nyikos, 1989, p. 296). Also, more advanced learners use more strategies than those in beginning stages because they are more aware of their value (Oxford and Nyikos, 1989, p. 296). In terms of age, strategy use is different depending on a person´s developmental stage (Oxford, 1990, pp.13-14).   Therefore, what works for one individual may or may not work for another one. Moreover, what worked for a person in a specific case under certain conditions may or may not work for that same person in another case under other circumstances. In regards to this, Oxford explains that a strategy is useful if three conditions are met:

1. The strategy fits the language learning task
2. The strategy tallies with the person´s specific learning styles
3. The person uses the strategy effectively (2001, p.362).

Because of this, instructors should try to introduce the different strategies to their students, so learners get a feeling of what strategies entail, try them, and then decide what works for them and when to use the different tactics.

2.4 Explicit or implicit teaching?

One point that is always present in a discussion of learning styles, multiple intelligences and language learning strategies is whether students must be told explicitly about these three

areas that would help them in their learning efforts, or if just using them without explicit training and explanations would suffice. Though some consider that it is not necessary to explicitly explain and teach these three components and that students would benefit the same just from practicing with different materials that would cover styles, intelligences and/or strategies, the tendency nowadays is to inform students, to help them grasp the different terms and appropriate them. In this way, students would become conscious and active users, and would understand why they are doing what they are doing in or outside the classroom in their language learning efforts. With this, teachers would be encouraging learners to become autonomous learners. Williams and Burden (1997), talking about language learning strategies, state that our goal should be to have an autonomous learner, "one who is equipped with the appropriate skills and strategies to learn a language in a self-directed way" (p. 147). Evidently, this view should also be applied to styles and intelligences as they would also help learners become more independent and proactive in their learning process.

3.   Putting it all together

Keeping in mind what learning styles, multiple intelligences and language learning strategies are, it is now possible to explain how these areas interconnect into a closely knit unit that would let students become more efficient and successful learners of a second language.

The relationship between learning styles and multiples intelligences or between learning and learning strategies can be more clearly seen, and have actually been the subject of a number of books and articles (for instance, Silver, Strong, and Perini, in *So Each May Learn: Integrating Learning Styles and Multiple Intelligences*, Oxford in *Language Learning Styles and Strategies* or Hall Haley in *Understanding Learner-Centered Instruction from the Perspective of Multiple Intelligences*). However, there are no articles or books presenting how these three areas interconnect and how they can be integrated into the class. Indeed, except from one article from Chau specific for library instruction (*Connecting Learning Styles and Multiple Intelligences Theories through Learning Strategies: An Online Tutorial for Library Instruction)*, the writer has not been able to find any other substantial source discussing this issue. That is the reason why this article is aimed at presenting how each of these areas of study complement each other and create a unit that should be addressed as such in the language classroom, and not as separate topics. Indeed, MI, LS and LLS can be thought of

as a set of building blocks or pyramid for language learning centered on the student, as represented in Figure 2.
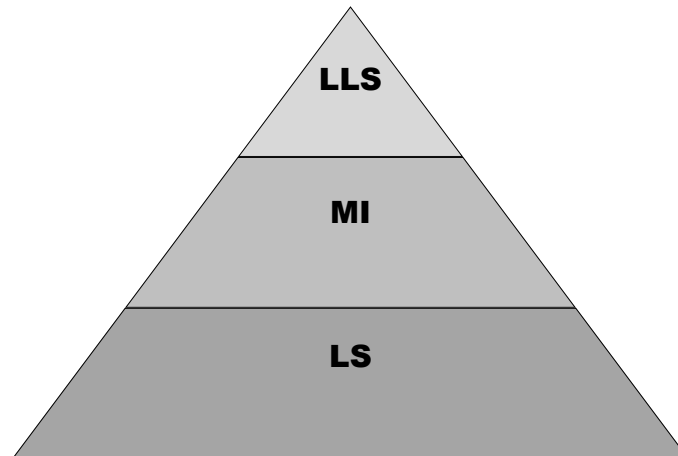
Figure 2. *The LS, MI, LLS Pyramid*

As seen in Figure 2, and thinking in terms of a building construction, Learning Styles are the foundation, the basis of everything without which an emphasis on the learner in the language classroom would never be successful. Multiple Intelligences are the body of the building, and the part we, as teachers, mostly see take place in the language classroom. Finally, Language Learning Strategies are the apex, the ultimate goal to have successful and proficient language learners. To explain further, it can be said that LS focus on the process of learning itself and would answer the question *"How do I learn?"* MI, on the other hand, address the relationship between learning and the eight different fields of knowledge or content and answers the question *"What do I want to learn?"* Last but not least, LLS deal with the specific course of action each person favors when learning; it responds to the question *"What tactics will I follow to actually learn?"* From an instructor´s point of view LS and MI would answer the question *"Why does each student interact with the world and learn the way he or she does, differently from other students?"*, whereas LLS would answer the questions *"What approach does each specific student use to learn?"* and more specifically*, "How can I help each of my students learn to identify those strategies that work for them based on their different styles and intelligences?"* The main point is that even if teachers had the best intentions when presenting and working with language learning strategies in the classroom, this effort would likely be fruitless if first educators do not help students identify their specific learning style and their sharpest intelligences.

4.   Some examples and a sample lesson

To help clarify the idea presented above, this section will illustrate two specific examples of how LS, MI, and LLS would combine in a person. Then, a sample lesson in which some styles, intelligences and strategies are combined will be presented.

4.1   Student A

Student A is a person who is very analytical, who likes to investigate and ask about the why of everything. Therefore, his or her learning style is the Mastery Style. Evidently, student A, being very analytical, has as his or her strongest intelligence the logical-mathematical one, since in order to investigate and find answers to his or her questions, this person has to look for patterns and establish cause-effect relationships. How student A would find these patterns and relationships depends on the strategies he or she uses.   In this case, for instance, Student A

a. analyzes the situation and reasons, a cognitive strategy,
b. makes plans about how he or she is going to investigate, a metacognitive strategy, and
c.   creates mental linkages that would help him or her establish patterns, a memory strategy.

In a language class, Student A would represent those students who like the grammar of the language, are very inquisitive and are always asking questions about how the language works and what is correct or incorrect. For them, speaking and writing almost perfectly is fundamental.

4.2   Student B

Student B embodies the self-expressive style since he or she is an extrovert who likes to innovate and likes to meet and help other people.   Being a people´s person, in terms of MI´s, Student B has the interpersonal intelligence as his or her strongest intelligence; he or she has a gift for identifying and understanding people´s dispositions and necessities. Moreover, spatial intelligence is strong in student B because a sense of location and direction is important in an innovative person. As for language learning strategies,   student B would have a preference for:

a. Empathizing and working with others (social strategies)

b. Analyzing reasoning, and receiving and sending messages (a cognitive strategy)

c. Using imagery (memory strategy) and

d. Organizing (metacognitive strategy)

In the language classroom, Student B would embody students who are very good for group work, who love to talk in class, who tend to be the leaders of the group and the ones who have creative ideas for oral presentations. For this type of students, near native speaking and writing are not as basic as in Student A´s case; on the contrary, for them being able to communicate their ideas and talking to others is more important, even if their proficiency in the second language is not so good.

4.3   Sample Lesson

As there are many learning styles and intelligences and several language learning strategies, it is important to keep in mind that not all of them can be taught in a single lesson. Indeed, it is fundamental for the instructor to offer students the opportunity to work with different intelligences and strategies, so they can discover what their strengths are and what works for them. That is why classes and activities should be varied as to give each student a chance to succeed.

The following lesson plan is intended for high intermediate or advanced students, who already have some mastery of the second language. In fact, portions of this lesson plan have been used with English majors who take Oral Communication I at University of Costa Rica, where the topic of environment is studied during the second half of the semester. The lesson plan covers four different activities or learning experiences that include the four macro skills (listening, speaking, reading and writing) vocabulary as a micro skill, and are organized so that there is an pre-reading activity, a reading activity, the main activity, and the wrap-up activity. Each part will explain what learning styles, intelligences, and language learning strategies are involved in them using the taxonomies explained above.

I. General Objective

As part of the objectives of the course, students will get ready for investigating about initiatives carried in Costa Rica to preserve the environment.

II.Specific Objectives

1. To activate students' background knowledge by watching a video and reading an article on the environment and pollution in general.

2. To discuss about the reading and the video.

3. To do research and analyze the impact a topic related to Environment or Pollution has on people's lives in Costa Rica, with emphasis on a specific initiative carried in public or private organizations.

4. To develop awareness about the importance of working for the environment and about what is done in Costa Rica.

III. Learning experiences or activities

A. Watching a Video

- **Learning Style**: Understanding Learning Style, as the activity is to be done individually and it is directed to students who prefer to be more analytic.

- **Intellligences:**
  - Verbal-Linguistic Intelligence (manipulation of words)
  - Logical-Mathematical Intelligence (finding cause-effect relationships).

- **Language Learning Styles:**
  - Creating mental linkages for association of ideas and for placing new words in context and applying images and sounds to use keywords (memory strategies)
  - Analyzing and reasoning to think deductively and creating structure for input and output for summarizing and taking notes (cognitive strategies)
  - Guessing intelligently to use clues (compensation strategy)
  - Centering learning to pay attention, using background knowledge and identifying the purpose of the language task (metacognitive strategy).

As a pre-reading activity, students will watch a video called *The Story of Stuff*, (www.thestoryofstuff.com). This is a 20 minute video that analyzes where all products come from, where they go to when people throw them away, and what costs this has on the

environment. Students will watch the video three times and will complete an assignment sheet. Then, answers will be checked as a whole group activity (See Activity 1).

B. *Reading*
- ***Learning Styles:*** Interpersonal Style and Self-Expressive Style because the activity is for students who prefer to work as a team and to be creative (feeling) and to analyze the current situation (sensing).

- ***Intelligences:***
  - Verbal-Linguistic Intelligence (manipulation of words)
  - Logical-Mathematical Intelligence (finding cause-effect relationships)
  - Spatial Intelligence (producing images, sense of direction)
  - Bodily-Kinesthetic Intelligence (handling objects easily)
  - Interpersonal Intelligence: (understanding others´ needs).

- ***Language Learning Styles:***
  - Creating mental linkages for association of ideas and for placing new words in context and applying images and sounds to use keywords (memory strategies)
  - Practicing the language naturalistically, using resources to send messages, analyzing and reasoning and creating structure for summarizing and taking notes (cognitive strategies)
  - Guessing intelligently to use clues, adjusting or approximating the message and using circumlocution (compensation strategies)
  - Centering learning to pay attention, using background knowledge, identifying the purpose of the language task and planning for the language task (metacognitive strategies)
  - Cooperating with peers and showing empathy with others (social strategies).

Students will read *Pollution (Encarta Encyclopedia)*. This is a reading that presents succinctly all forms of pollution and other environmental issues such as water, noise, and soil pollution, hazardous wastes, acid rain, and others, and gives students an overview of the situation. Students will do the reading as homework. The day of the discussion of the

reading, the group will be divided in 6 groups and each group will receive a set of questions of a section in the reading. Group members will receive paper and markers to create a poster in which they will summarize the content and the accompanying questions for the assigned section. (See Activities 2A and 2B)

C. *Group work: research project assignment*

- **Learning Styles:** Mastery Style, Interpersonal Style, Understanding Style and Self-Expressive Style. Because this activity comprises several steps, all styles are practically included, from the more theory-oriented type to the more practical type of person and from the more socially to the more individualistic

- **Intelligences:** though the most important intelligence involved in this activity is the Naturalist Intelligence (sense of nature, ability to see patterns and abnormalities in the environment), almost all intelligences are contained in this activity:

  - Verbal-Linguistic Intelligence (manipulation of words)
  - Logical-Mathematical Intelligence (finding patterns and establishing cause-effect relationships)
  - Spatial Intelligence (perceiving, producing and reproducing pictures and images, a sense of location and direction)
  - Bodily-Kinesthetic Intelligence (handling objects and manipulating one´s body easily)
  - Interpersonal Intelligence (interpersonal relationships--understanding, identifying and reacting to others´ moods and needs)
  - Intrapersonal Intelligence (knowing one´s opinions, feelings and needs)

- **Language Learning Styles:**

  - Practicing (reading, writing and speaking skills) receiving and sending messages, reasoning, analyzing, summarizing and taking notes (cognitive strategies)
  - Guessing intelligently to use linguistic and other clues, overcoming limitations in speaking and writing (compensation strategies)

- Using background knowledge, identifying the purpose of the language task, organizing, seeking opportunities to practice, planning for the language task and self monitoring (metacognitive strategies)
- Taking risks and discussing feelings with others (affective strategies)
- Cooperating with peers and showing empathy with others (social strategies).

Students will receive set of instructions for a project on the environment and pollution in Costa Rica. They can choose to work with a specific environmental problem in Costa Rica or with an environment conservation effort in the country. Students will do research on the topic chosen and will do an observation visit of a place in Costa Rica where the topic chosen is present. With the information collected during the research and visit phases, students will prepare an oral presentation and a brochure or summary of their topic. They will also prepare an activity through which they will involve classmates and check how much their peers have learned during the presentation. (See Activity 3)

  D. Wrap-up activity
   - ***Learning Style:*** Interpersonal Style, as students will depend mostly on their feelings and will work as a team

   - ***Intelligences:***
     - Verbal-Linguistic Intelligence (manipulating words)
     - Logical-Mathematical Intelligence (finding patterns and establishing cause-effect relationships)
     - Musical Intelligence (a sense of melody and rhythm and appreciation of musical forms)
     - Bodily-Kinesthetic Intelligence: (handling objects)
     - Interpersonal Intelligence (working and sharing with others)
     - Naturalist intelligence (a sense of nature and seeing abnormalities in the environment)

   - ***Language Learning Styles:***
     - Associating and elaborating and using imagery and keywords (memory strategies)

- Practicing naturalistically, getting the idea, sending messages, reasoning and analyzing (cognitive strategies)
- Using linguistic and other clues, overcoming limitations in speaking (compensation strategies)
- Paying attention, organizing, planning for the language task, seeking opportunities to practice, self-monitoring (metacognitive strategies)
- Using music to lower anxiety, taking risks and discussing feeling with others (affective strategies)
- Cooperating with others and showing empathy with others (social strategies).

As a wrap up for this part of the unit on the environment, students will listen to the Michael Jackson´s *Earth Song.* Written in 1995, this song summarizes in very simple words the ecological footprint we are leaving on the planet up to these days. After listening to the song twice (students can sing along if they like to sing), students will work in groups and will imagine they are answering Jackson´s questions. For this activity, student s will be able to choose any format they want for their answers, which they will share with the rest of the class. *(See Activity 4).*

5.   Some final remarks

Summarizing, it is evident that what Multiple Intelligences, Learning Styles, and Language Learning Strategies have done is to put together numerous teaching philosophies, models and practices from several fields such as psychology, neurolinguistics, pedagogy, and sociology, for instance. These three elements are among the most important variables that would influence performance and success in a second language. As we have seen along this article, when they intertwine, both teachers and students would benefit as there are endless possibilities and options to use in the classroom, and as such the classroom would become more interesting, meaningful and challenging for the student and the teacher. Other benefits of including these building blocks as a unit might be the following:

 ➢ In the language classroom, there will be an emphasis on other areas such as intuition and imagination besides the traditional ones: analysis, reasoning and sequential problem solving. This will produce students with more critical thinking skills, more flexibility and more adaptability.

- There will be a more balanced curriculum that would incorporate all sorts of people, not only those who have are stronger on the verbal-linguist and logical mathematical aspects and who prefer to see, memorize, compete, and who are more independent, which is the more traditional view of teaching. With the integration of different intelligences, styles and strategies, all students will have the opportunity to discover their strengths and weaknesses and to excel at some point or another in the class.
- The integration of MI, LS and LLS favors the use of all sorts of methods, experiential elements, and activities such as sound and music, movement, role plays, cooperative learning, visualization, prediction, guessing and memory tasks, and promote individual, pair and group work. This also creates variety in the classroom.

It is evident that most instructors use many of these methods and experiential learning activities, but they do so unaware of the fact that they are using different styles, intelligences and strategies, when the ideal would be to use them in an informed way. Integrating Multiple Intelligences, Learning Styles and Language Strategies in the classroom on the basis of an informed decision requires work and effort form the teacher, but the result is worth it.

Some recommendations for the teacher to use MI, LS and LLS successfully in the classroom are

- Learn from a variety of models; the more models you know, the more varied your class will be.
- Study and reflect on your own teaching methods and overall classroom style.
- Be comfortable with not knowing and with not having an answer to everything.
- Use a variety of methods of presentation, practice and production.
- Have a sense of purpose for everything you do in class.
- Learn about your students, their interests, motivations, and their strengths and weaknesses.
- Make sure students are aware of the intelligences, styles and strategies that are stronger in them.
- Train students on LLS use and make these explicit.
- Do not incorporate all the intelligences, all the styles and a very large number of strategies in every single class, but make sure you use all (or la least most) of them at some point of the school year or semester.
- Be willing to adapt and change to meet student needs.

> ➤ Believe in hands-on experience, movement, group work, time to reflect on one's learning, and self-paced work

> ➤ Relate class experience with real world.

> ➤ Be creative and accept creative form your students.

> ➤ And probably the two most important recommendations: *Enjoy your work and your students' work and have expectations of success for all students*.

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ACTIVITIES

ACTIVITY 1

UNIVERSIDAD DE COSTA RICA
Escuela de Lenguas Modernas
LM-1230
R. Coto K.
(Video taken from www.thestoryofstuff.com;
Activity prepared by R. Coto K.)

General instructions. *You are going to watch the video the Story of Stuff three times: pay attention to the presenter and do the exercises below.*

Part I--Introduction. *Circle TRUE or FALSE. If the statement is FALSE make it true in the line provided.*

1. TRUE   FALSE   The speaker worries about where her cell phone comes from and where it
        would end up. _____

2. TRUE   FALSE   The existence of materials starts with the production stage and finishes
         with the disposal stage._____

3. TRUE   FALSE   The major problem with the explanation of the materials economy is that it
         is a linear system. _____

4. TRUE   FALSE   According to the speaker the explanation of the materials economy is
        faulty because it does not include people in the picture.

        _____

Part II—Extraction. Working with numbers. From the number bank below, choose the correct number to complete the text. Some numbers might be repeated.

3	5	7	2000	1/3
4%	5%	30%	40%	75%	80%

1. _____ of the planet's natural resources base have been consumed in the past _____
    decades.

2. In the United States, there are less than _____ of our original forests left.

3. _____ of water resources have become undrinkable in the United States.

4. The United States has _____ of the world's population but they are consuming _____ of the world's resources and creating _____ of the world's waste.

5. If everybody in the world consumed at the rate the United States is consuming, it would be necessary to have _____ to _____ planets.

6. Nowadays, _____ of world fishing places are fished at or beyond capacity.

7. _____ of the planet's original forests have disappeared.

8. In the Amazon, _____ trees a minute are lost, which means _____ football fields a minute.

Part III—Production. Note taking. Complete the outline below.
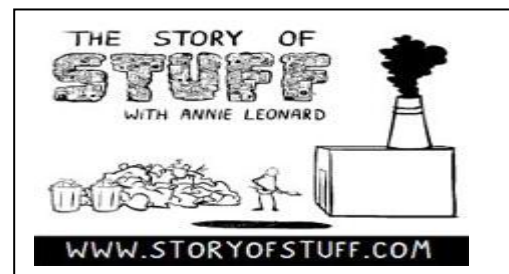
The production phase

I. It consists on _____

II. There are _____ synthetic chemicals in commerce today.

III. Problems with testing for chemicals:
    A. _____

    B. _____

IV. Consequence: _____

V. Example: BFR´s (Brominated flame retardants)
    A. Function: _____

    B. Problem: :_____

    C. They can be found in

        1. home objects such as _____

        2. the food chain, especially _____, which has the highest concentration of toxic contaminants.

VI.   Effects on factory workers: _____

VII. Byproducts:
    A.   The main byproduct is _____

    B.   Companies release _____

    C.   Their solution: _____

    D.   The irony of this solution _____

Part IV—Distribution. *Fill in the blanks with the missing words.*

So, what happens after all these resources are turned into products? Well, it moves here, for distribution. Now distribution means "selling All this toxic contaminated junk as quickly as possible." The goal here is to keep the prices _____, keep the people _____ and keep the inventory _____.
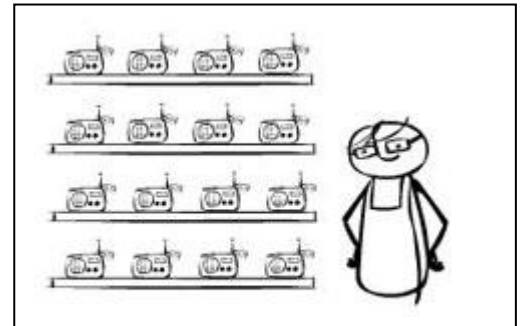
How do they keep the prices down? Well, they don't pay the store workers very much and skimp on _____ every time they can. It's all about externalizing the costs. What that means is the real costs of making stuff aren't captured in the price. In other words, we aren't really paying for the stuff we buy.

I was thinking about this the other day. I was walking to work and I wanted to listen to the news so I popped into this Radio Shack to buy a radio. I found this cute little green radio for $4.99 I was standing there in line to buy this radio and I wondering how $4.99 could possibly capture the costs of making this radio and getting it to my hands. The metal was probably mined in _____, the petroleum was probably drilled in _____, the plastics were probably produced in _____, and maybe the whole thing was assembled by some 15 year old in a *maquiladora* in _____. $4.99 wouldn't even pay the rent for the shelf space it occupied until I came along, let alone part of the staff guy's salary that helped me pick it out, or the multiple _____ and _____ pieces of this radio went on. That's how I realized, I didn't pay for the radio. So, _____?

Well. these people paid with the loss of their _____. These people paid with the loss of their clean air, with increasing _____ and _____ Kids in the Congo paid with their future— _____of the kids in parts of the Congo now have had to drop out of school to mine coltan, a metal we need for our _____ electronics. These people even paid, by having to cover their own _____. All along this system, people pitched in so I could get this radio for $4.99 And none of these contributions are recorded in any accounts book. That is what I mean by the company owners externalize the true costs of production.

PART V—Consumption and Disposal. *Answer the questions below.*

1. What is the "golden arrow of consumption"?
    _____

2. What did President Bush suggest American do after 9/11?
    _____

3. According to the speaker what is the primary identity of Americans?
    _____

4. What percentage of "stuff" is still in use in the U.S. after 6 months?
    _____

5. After World War II, what became the U.S.´s ultimate purpose?
    _____

6. What is "planned obsolence"?
    _____

7. What can´t computers be updated to the latest technology?
    _____

8. What is "perceived obsolescence"? How do they achieve this? Mention two examples.
    _____

9. How many ads do Americans see each day?
    _____

10. What is ironic about Americans' patterns of consumption?
    _____

11. How many pounds of garbage does each person produce in the U.S.?
    _____

12. How is garbage disposed of in the U.S.? Mention three ways.
    _____

13. What super toxins does burning create?
    _____

14. Why would recycling never be enough? Mention two reasons.

    _____

ACTIVITY 2A

Pollution

Paul Engelking
Taken from Microsoft Encarta Encyclopedia

I.   INTRODUCTION

Pollution, contamination of the earth's environment with materials that interfere with human health, the quality of life, or the natural functioning of *ecosystems* (living organisms and their physical surroundings). Although some environmental pollution is a result of natural causes like volcanic eruptions, most is caused by human activities.

There are two main categories of polluting materials, or pollutants. *Biodegradable pollutants* are materials, such as sewage, that rapidly decompose by natural processes. These pollutants become a problem when added to the environment faster than they can decompose. *Nondegradable* pollutants are materials that either do not decompose or decompose slowly in the natural environment. Once contamination occurs, it is difficult or impossible to remove these pollutants from the environment.
Nondegradable compounds like dichlorodiphenyltrichloroethane
(DDT), dioxins, polychlorinated biphenyls (PCBs), and radioactive materials can reach dangerous levels of accumulation as they are passed up the food chain into the bodies of progressively larger animals. For example, molecules of toxic compounds may collect on the surface of aquatic plants without doing much damage to the plants. A small fish that grazes on these plants accumulates a high concentration of the toxin. Larger fish or other carnivores that eat the small fish will accumulate even greater, and possibly life-threatening, concentrations of the compound. This process is known as bioaccumulation.

II. IMPACTS OF POLLUTION

Because humans are at the top of the food chain, they are particularly vulnerable to the effects of nondegradable pollutants. This was clearly illustrated in the 1950s and 1960s when residents living near Minamata Bay, Japan, developed nervous disorders, tremors, and paralysis in a mysterious epidemic. Over 400 people died before authorities discovered that a local industry had released mercury into Minamata Bay. This highly toxic element accumulated in the bodies of local fish and eventually in the bodies of people who consumed the fish. More recently research has revealed that many chemical pollutants, such as DDT and PCBs, mimic sex hormones and interfere with the human body's reproductive and developmental functions. These substances are known as endocrine disrupters. *See* Occupational and Environmental Diseases.

Pollution also has a dramatic effect on natural resources. Ecosystems such as forests, wetlands, coral reefs, and rivers perform many important services for the earth's environment. They enhance water and air quality, provide habitat for plants and animals, and provide food and medicines. Any or all of these ecosystem functions may be impaired or destroyed by pollution. Moreover, because of the complex relationships among the many types of organisms and ecosystems, environmental contamination may have far-reaching consequences that are not immediately obvious or that are difficult to predict. For instance, scientists can only speculate on some of the potential impacts of the depletion of the ozone layer, the protective layer in the atmosphere that shields the earth from the sun's harmful ultraviolet rays.

Another major effect of pollution is the tremendous cost of pollution cleanup and prevention. The global effort to control emissions of carbon dioxide, a gas produced from the combustion of fossil fuels such as coal or oil, or of other organic materials like wood, is one such example. The cost of maintaining annual national carbon dioxide emissions at 1990 levels is estimated to be 2 percent of the gross domestic product for developed countries.

In addition to its effects on the economy, health, and natural resources, pollution has

social implications. Research has shown that low-income populations and minorities do not receive the same protection from environmental contamination as do higher-income communities. Toxic waste incinerators, chemical plants, and solid waste dumps are often located in low-income communities because of a lack of organized, informed community involvement in municipal decision-making processes.

III   TYPES OF POLLUTION

Pollution exists in many forms and affects many different aspects of the earth's environment. *Point-source* pollution comes from specific, localized, and identifiable sources, such as sewage pipelines or industrial smokestacks. *Nonpoint-source* pollution comes from dispersed or uncontained sources, such as contaminated water runoff from urban areas or automobile emissions.

The effects of these pollutants may be immediate or delayed. *Primary* effects of pollution occur immediately after contamination occurs, such as the death of marine plants and wildlife after an oil spill at sea. *Secondary* effects may be delayed or may persist in the environment into the future, perhaps going unnoticed for many years. DDT, a nondegradable compound, seldom poisons birds immediately, but gradually accumulates in their bodies. Birds with high concentrations of this pesticide lay thin-shelled eggs that fail to hatch or produce deformed offspring. These secondary effects, publicized by Rachel Carson in her 1962 book, *Silent Spring*, threatened the survival of species such as the bald eagle and peregrine falcon, and aroused public concern over the hidden effects of nondegradable chemical compounds.

A. Air Pollution

Human contamination of the earth's atmosphere can take many forms and has existed since humans first began to use fire for agriculture, heating, and cooking. During the Industrial Revolution of the 18th and 19th centuries, however, air pollution became a major problem. As early as 1661 British author and founding member of the British Royal Society John Evelyn reported of London in his treatise *Fumifugium*, "…the weary Traveller, at many Miles distance, sooner smells, than sees the City to which he repairs. This is that pernicious Smoake which fullyes all her Glory, superinducing a sooty Crust or Furr upon all that it lights…"

Urban air pollution is commonly known as smog. The dark London smog that Evelyn wrote of is generally a smoky mixture of carbon monoxide and organic compounds from incomplete combustion (burning) of fossil fuels such as coal, and sulfur dioxide from impurities in the fuels. As the smog ages and reacts with oxygen, organic and sulfuric acids condense as droplets, increasing the haze. Smog developed into a major health hazard by the 20th century. In 1948, 19 people died and thousands were sickened by smog in the small U.S. steel mill town of Donora, Pennsylvania. In 1952, about 4,000 Londoners died of its effects.

A second type of smog, *photochemical* smog, began reducing air quality over large cities like Los Angeles in the 1930s. This smog is caused by combustion in car, truck, and airplane engines, which produce nitrogen oxides and release hydrocarbons from unburned fuels. Sunlight causes the nitrogen oxides and hydrocarbons to combine and turn oxygen into ozone, a chemical agent that attacks rubber, injures plants, and irritates lungs. The hydrocarbons are oxidized into materials that condense and form a visible, pungent haze.

Eventually most pollutants are washed out of the air by rain, snow, fog, or mist, but only after traveling large distances, sometimes across continents. As pollutants build up in the atmosphere, sulfur and nitrogen oxides are converted into acids that mix with rain. This acid rain falls in lakes and on forests, where it can lead to the death of fish and plants, and damage entire ecosystems. Eventually the contaminated lakes and forests may become lifeless. Regions that are downwind of heavily industrialized areas, such as Europe and the eastern United States and Canada, are the hardest hit by acid rain. Acid rain can also affect human health and man-made objects; it is slowly dissolving historic stone statues and building facades in London, Athens, and Rome.

One of the greatest challenges caused by air pollution is global warming, an increase in

the earth's temperature due to the buildup of atmospheric gases such as carbon dioxide. With the heavy use of fossil fuels in the 20th century, atmospheric concentrations of carbon dioxide have risen dramatically. Carbon dioxide and other gases, known as *greenhouse gases*, reduce the escape of heat from the planet without blocking radiation coming from the sun. Because of this greenhouse effect, average global temperatures are expected to rise 1.4° to 5.8° C (2.5° to 10.4° F) by the year 2100. Although this trend appears to be a small change, the increase would make the earth warmer than it has been in the last 125,000 years, possibly changing climate patterns, affecting crop production, disrupting wildlife distributions, and raising the sea level.

Air pollution can also damage the upper atmospheric region known as the stratosphere. Excessive production of chlorine-containing compounds such as chlorofluorocarbons (CFCs) (compounds used in refrigerators, air conditioners, and in the manufacture of polystyrene products) has depleted the stratospheric ozone layer, creating a hole above Antarctica that lasts for several weeks each year. As a result, exposure to the sun's harmful rays has damaged aquatic and terrestrial wildlife and threatens human health in high-latitude regions of the northern and southern hemispheres.

B. Water Pollution

The demand for freshwater rises continuously as the world's population grows. From 1940 to 1990, withdrawals of fresh water from rivers, lakes, reservoirs, and other sources has increased fourfold. Of the water consumed in the United States in 1995, 39 percent was used for irrigation, 39 percent was used for electric power generation, and 12 percent was used for other utilities; industry and mining used 7 percent, and the rest was used for agricultural livestock and commercial purposes.

Sewage, industrial wastes, and agricultural chemicals such as fertilizers and pesticides are the main causes of water pollution. The U.S. Environmental Protection Agency (EPA) reported that about 37 percent of the country's lakes and estuaries, and 36 percent of its rivers, are too polluted for basic uses such as fishing or swimming during all or part of the year. In developing nations, more than 95 percent of urban sewage is discharged untreated into rivers and bays, creating a major human health hazard.

Water runoff, a nonpoint source of pollution, carries fertilizing chemicals such as phosphates and nitrates from agricultural fields and yards into lakes, streams, and rivers. These combine with the phosphates and nitrates from sewage to speed the growth of algae, a type of aquatic plant. The water body may then become choked with decaying algae, which severely depletes the oxygen supply. This process, called eutrophication, can cause the death of fish and other aquatic life. Agricultural runoff may be to blame for the growth of a toxic form of algae called *Pfiesteria piscicida,* which was responsible for killing large amounts of fish in bodies of water from the Delaware Bay to the Gulf of Mexico in the late 1990s. Runoff also carries toxic pesticides and urban and industrial wastes into lakes and streams.

Erosion, the wearing away of topsoil by wind and rain, also contributes to water pollution. Soil and silt (a fine sediment) washed from logged hillsides, plowed fields, or construction sites, can clog waterways and kill aquatic vegetation. Even small amounts of silt can eliminate desirable fish species. For example, when logging removes the protective plant cover from hillsides, rain may wash soil and silt into streams, covering the gravel beds that trout or salmon use for spawning.

The marine fisheries supported by ocean ecosystems are an essential source of protein, particularly for people in developing countries. Yet pollution in coastal bays, estuaries, and wetlands threatens fish stocks already depleted by overfishing. In 1989, 260,000 barrels of oil spilled from the oil tanker *Exxon Valdez* into Alaska's Prince William Sound, a pristine and rich fishing ground. In 1999 there were 8,539 reported spills in and around U.S. waters, involving 4.4 million liters (1.2 million gallons) of oil.

C. Soil Pollution

Soil is a mixture of mineral, plant, and animal materials that forms during a long process that may take thousands of years. It is necessary for most plant growth and is

essential for all agricultural production. Soil pollution is a buildup of toxic chemical compounds, salts, pathogens (disease-causing organisms), or radioactive materials that can affect plant and animal life.

Unhealthy soil management methods have seriously degraded soil quality, caused soil pollution, and enhanced erosion. Treating the soil with chemical fertilizers, pesticides, and fungicides interferes with the natural processes occurring within the soil and destroys useful organisms such as bacteria, fungi, and other microorganisms. For instance, strawberry farmers in California fumigate the soil with methyl bromide to destroy organisms that may harm young strawberry plants. This process indiscriminately kills even beneficial microorganisms and leaves the soil sterile and dependent upon fertilizer to support plant growth. This results in heavy fertilizer use and increases polluted runoff into lakes and streams.

Improper irrigation practices in areas with poorly drained soil may result in salt deposits that inhibit plant growth and may lead to crop failure. In 2000 BC, the ancient Sumerian cities of the southern Tigris-Euphrates Valley in Mesopotamia depended on thriving agriculture. By 1500 BC, these cities had collapsed largely because of crop failure due to high soil salinity. The same soil pollution problem exists today in the Indus Valley in Pakistan, the Nile Valley in Egypt, and the Imperial Valley in California.

D. Solid Waste

Solid wastes are unwanted solid materials such as garbage, paper, plastics and other synthetic materials, metals, and wood. Billions of tons of solid waste are thrown out annually. The United States alone produces about 200 million metric tons of municipal solid waste each year. A typical American generates an average of 2 Kg (4 lb) of solid waste each day. Cities in economically developed countries produce far more solid waste per capita than those in developing countries. For instance, Washington D.C. produces five times the solid waste, per person, of Quito, Ecuador. Moreover, waste from developed countries typically contains a high percentage of synthetic materials that take longer to decompose than the primarily

biodegradable waste materials of developing countries.

Areas where wastes are buried, called landfills, are the cheapest and most common disposal method for solid wastes worldwide. But landfills quickly become overfilled and may contaminate air, soil, and water. *Incineration*, or burning, of waste reduces the volume of solid waste, but produces dense ashen wastes (some of which become airborne) that often contain dangerous concentrations of hazardous materials such as heavy metals and toxic compounds. *Composting*, using natural biological processes to speed the decomposition of organic wastes, is an effective strategy for dealing with organic garbage and produces a material that can be used as a natural fertilizer. *Recycling*, extracting and reusing certain waste materials, has become an important part of municipal solid waste strategies in developed countries. According to the EPA, over one-fourth of the municipal solid waste produced in the United States is now recycled or composted. Recycling also plays a significant, informal role in solid waste management for many Asian countries, such as India, where organized waste-pickers comb streets and dumps for items such as plastics, which they use or resell.

Expanding recycling programs worldwide can help reduce solid waste pollution, but the key to solving severe solid waste problems lies in reducing the amount of waste generated. *Waste prevention*, or source reduction, such as altering the way products are designed or manufactured to make them easier to reuse, reduces the high costs associated with environmental pollution.

E. Hazardous Waste

Hazardous wastes are solid, liquid, or gas wastes that may be deadly or harmful to people or the environment and tend to be persistent or nondegradable in nature. Such wastes include toxic chemicals and flammable or radioactive substances, including industrial wastes from chemical plants or nuclear reactors, agricultural wastes such as pesticides and fertilizers, medical wastes, and household hazardous wastes such as toxic paints and solvents.

About 400 million metric tons of hazardous wastes are generated each year. The United States alone produces 250 million metric tons—70 percent from the chemical industry. The use, storage, transportation, and disposal of these substances pose serious environmental and health risks. Even brief exposure to some of these materials can cause cancer, birth defects, nervous system disorders, and death. Large-scale releases of hazardous materials may cause thousands of deaths and contaminate air, water, and soil for many years. The world's worst nuclear reactor accident took place near Chernobyl', Ukraine, in 1986 (*see* Chernobyl' Accident). The accident killed at least 31 people, forced the evacuation of over 200,000 more, and sent a plume of radioactive material into the atmosphere that contaminated areas as far away as Norway and the United Kingdom.

Until the Minamata Bay contamination was discovered in Japan in the 1960s and 70s, most hazardous wastes were legally dumped in solid waste landfills, buried, or dumped into lakes, rivers, and oceans. Legal regulations now restrict how such materials may be used or disposed, but such laws are difficult to enforce and often contested by industry. It is not uncommon for industrial firms in developed countries to pay poorer countries to accept shipments of solid and hazardous wastes, a practice that has become known as the waste trade. Moreover, cleaning up the careless dumping of the mid-20th century is costing billions of dollars and progressing very slowly, if at all. The United States has an estimated 217,000 hazardous waste dumps that need immediate action. Cleaning them up could take 30 years and cost $187 billion.

Hazardous wastes of particular concern are the radioactive wastes from the nuclear power and weapons industries. To date there is no safe method for permanent disposal of old fuel elements from nuclear reactors. Most are kept in storage facilities at the original reactor sites where they were generated. With the end of the Cold War, nuclear warheads that are decommissioned, or no longer in use, also pose storage and disposal problems.

F. Noise Pollution

Unwanted sound, or noise, such as that produced by airplanes, traffic, or industrial machinery, is considered a form of pollution. Noise pollution is at its worst in densely populated areas. It can cause hearing loss, stress, high blood pressure, sleep loss, distraction, and lost productivity.

Sounds are produced by objects that vibrate at a rate that the ear can detect. This rate is called frequency and is measured in hertz, or vibrations per second. Most humans can hear sounds between 20 and 20,000 hertz, while dogs can hear high-pitched sounds up to 50,000 hertz. While high-frequency sounds tend to be more hazardous and more annoying to hearing than low-frequency sounds, most noise pollution damage is related to the intensity of the sound, or the amount of energy it has. Measured in decibels, noise intensity can range from zero, the quietest sound the human ear can detect, to over 160 decibels. Conversation takes place at around 40 decibels, a subway train is about 80 decibels, and a rock concert is from 80 to 100 decibels. The intensity of a nearby jet taking off is about 110 decibels. The threshold for pain, tissue damage, and potential hearing loss in humans is 120 decibels. Long-lasting, high-intensity sounds are the most damaging to hearing and produce the most stress in humans.

Solutions to noise pollution include adding insulation and sound-proofing to doors, walls, and ceilings; using ear protection, particularly in industrial working areas; planting vegetation to absorb and screen out noise pollution; and zoning urban areas to maintain a separation between residential areas and zones of excessive noise.

IV   CONTROLLING POLLUTION

Because of the many environmental tragedies of the mid-20th century, many nations instituted new, comprehensive regulations designed to repair the past damage of uncontrolled pollution and prevent future environmental contamination. In the United States, the Clean Air Act (1970) and its amendments significantly reduced certain types of air pollution, such as sulfur dioxide emissions. The Clean Water Act (1977) and Safe Drinking Water Act (1974) regulated

pollution discharges and set water quality standards. The Toxic Substances Control Act (1976) and the Resource Conservation and Recovery Act (1976) provided for the testing and control of toxic and hazardous wastes. In 1980, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund, to provide funds to clean up the most severely contaminated hazardous waste sites. These and several other federal and state laws helped limit uncontrolled pollution, but progress has been slow and many severe contamination problems remain due to lack of funds for cleanup and enforcement.

International agreements have also played a role in reducing global pollution. The Montreal Protocol on Substances that Deplete the Ozone Layer (1987) set international target dates for reducing the manufacture and emissions of the chemicals, such as CFCs, known to deplete the ozone layer. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989), serves as a framework for the international regulation of hazardous waste transport and disposal.

since 1992 representatives from more than 160 nations have met regularly to discuss methods to reduce greenhouse gas emissions. In 1997 the Kyoto protocol was devised, calling for industrialized countries to reduce their gas emission by 2012 to an average 5 percent below 1990 levels. The Kyoto Protocol went into force in February 2005 with more than 130 countries having ratified it. Under the administration Regulations and legislation of President George W. Bush, however, the United States, a major producer of greenhouse gases, refused to submit the treaty for ratification. In 2006 the Global Carbon Project reported that carbon dioxide emissions were increasing at an annual rate of 2.5 percent in the first five years of the 21st century, compared with an annual increase of 1 percent in the 1990s.

Regulations and legislation have led to considerable progress in cleaning up air and water pollution in developed countries. Vehicles in the 21st century emit fewer nitrogen oxides than those in the 1970s did; power plants now burn low-sulfur fuels;

industrial stacks have scrubbers to reduce emissions; and lead has been removed from gasoline. Developing countries, however, continue to struggle with pollution control because they lack clean technologies and desperately need to improve economic strength, often at the cost of environmental quality. The problem is compounded by developing countries attracting foreign investment and industry by offering cheaper labor, cheaper raw materials, and fewer environmental restrictions. The *maquiladoras,* assembly plants along the Mexican side of the Mexico-U.S. border, provide jobs and industry for Mexico, but are generally owned by non-Mexican corporations attracted to the cheap labor and lack of pollution regulation. As a result, this border region, including the Río Grande river, is one of the most heavily polluted zones in North America. To avoid ecological disaster and increased poverty, developing countries will require aid and technology from outside nations and corporations, community participation in development initiatives, and strong environmental regulations.

Nongovernmental citizen groups have formed at the local, national, and international level to combat pollution problems worldwide. Many of these organizations provide information and support for people or organizations traditionally not involved in the decision-making process. The Pesticide Action Network provides technical information about the effects of pesticides on farmworkers. The Citizen's Clearinghouse for Hazardous Waste, established by veterans of the Love Canal controversy, provides support for communities targeted for hazardous waste installations. A well-organized, grassroots, environmental justice movement has arisen to advocate equitable environmental protections. Greenpeace International is an activist organization that focuses international attention on industries and governments known to contaminate land, sea, or atmosphere with toxic or solid wastes. Friends of the Earth International is a federation of international organizations that fight environmental pollution around the world.

ACTIVITY 2B *(Reading <u>Taken from Microsoft Encarta 2001</u>; Activity prepared by R. Coto K.)*

GROUP # 1

In your group answer the questions below. Use your own words. Then, create a poster to summarize the information. Be ready to present.

1. What is pollution? Give one example of your own of primary effects of pollution and another of secondary effects of pollution. Think about cases in Costa Rica.

2. What are the two categories of pollutants? Explain and give an example for each.

3. What is bioaccumulation?

GROUP # 3

In your group answer the questions below. Use your own words. Then, create a poster to summarize the information. Be ready to present.

1. How is acid rain formed? What effects does it have?

2. What is the cause of global warming? What are its effects? What specific effects are we seeing in Costa Rica?

3. How does air pollution damage the stratosphere? What effects does this damage have? Provide specific examples from Costa Rica.

GROUP # 2

In your group answer the questions below. Use your own words. Then, create a poster to summarize the information. Be ready to present.

1. What are the four main impacts on pollution? Explain each in your own words.

2. What are endocrine disrupters? What effect do they have on a person's body?

3. What is point source pollution?

4. What is non-point source pollution?

5. Give examples of point and non-point source pollution in Costa Rica.

GROUP # 4

In your group answer the questions below. Use your own words. Then, create a poster to summarize the information. Be ready to present.

1. What are the main causes of water pollution?

2. What is water runoff? What does it cause?

3. How does erosion affect water?

4. Give examples of water runoff and erosion in Costa Rica.

GROUP # 5

In your group answer the questions below. Use your own words. Then, create a poster to summarize the information. Be ready to present.

1. What is hazardous waste? What is it made of?

2. What problems does hazardous waste pose?

3. What is waste trade?

4. From your own knowledge, what happens to this type of waste on Costa Rica?

GROUP # 6

In your group answer the questions below. Use your own words. Then, create a poster to summarize the information. Be ready to present.

1. What is noise pollution? What consequences does it have?

2. How can noise pollution be reduced?

3. Think of specific examples of places where we can find noise pollution in Costa Rica.

4. What are some international efforts to control global pollution?

5. Why is pollution difficult to control in developing countries? How could this situation be improved?

ACTIVITY 3

UNIVERSIDAD DE COSTA RICA
Escuela de Lenguas Modernas
LM-1230 Oral Communication I
R. Coto

Project Guidelines

For this assignment you are going to work in groups of 4 members on a topic related to environment or pollution.

All groups ready by: June 28

Allotted time: 35 -40 minutes (approximately 20-25 minutes for presentation and 10-15 for activity)

Step 1: You have to select any topic related to **Environment** or **Pollution**. Choose a topic that really interests your group as well as your audience. ***Do research*** and ***analyze*** the impact this topic has on people's lives in Costa Rica. Some possible choices are

water pollution	acid rain	waste management
open pit mines	water conservation efforts	noise pollution
reforestation	electronic waste disposal	recycling

You have to narrow down the topic, for instance: waste management at *Facultad de Letras*/UCR, water pollution in *Quebrada Los Negritos*/ *Río Virilla*, recycling in *Curridabat*, Environmental education in *Escuela República de Haiti,* and so on.

Step 2: After you have read and researched about the topic, you need to do an ***observation visit*** to the place you have chosen (e.g., a governmental institution, a laboratory, a private company, an industrial plant) in order to analyze what is being done to help the environment and to do further research and interview employees. You have to ask the person(s) you interviewed to sign and seal the visit verification form.

Step 3: You have to be ready to report on your research and your observation visit on June 28.

Step 4: Your group will have to carry out a class activity (for example, bingo, rally, scavenger hunt, *Who Wants to be a Millionaire, Jeopardy*) to check how much your classmates have learned from your presentation.

Step 5*:* Bring copies of no more than a two-page summary (Arial or Times New Roman 12, space and a half) based on the most important content of your project. You can be as creative as you want: a brochure, a leaflet, or any other format ***PLEASE CHECK GRAMMAR and VOCABULARY***.

Additional instructions:
   a. Before working on your presentation, inform your instructor about the topic you have chosen. It may be useful to have a team leader. Topics should not be repeated.
   b. Define the goal and format of your project presentation. This format may be traditional or creative (e.g., talk show, discussion group, TV newscast, debate). Practice for grammar, pronunciation and timing.
   c. You need to prepare an appropriate outline, summary and audio-visual aids (e.g., authentic materials, short video segments, newspaper articles, ads, headlines, magazines, and others).
   d. Remember to ***acknowledge all your sources***.
   e. You ***ARE NOT*** allowed to read the content of the presentation; however, you may use brief notes if necessary (people who read the content of the speech will automatically obtain a grade no higher than 5.This also applies to memorization).
   f. If you need special equipment (computer, projector, DVD, TV or others), you have to do all the necessary arrangements in Centro de Recursos (316LE) ahead of time and ask your professor to go and sign for the equipment. All members of the group will be responsible for equipment pick up and drop off and installation.

ACTIVITY 4
UNIVERSIDAD DE COSTA RICA
Escuela de Lenguas Modernas
LM-1230 R. Coto K.

INSTRUCTIONS:
I.   *Listen to Michael Jackson´s Earth Song twice. (You can sing along if you want!).*

Earth Song

What about sunrise?
What about rain?
What about all the things
That you said we were to gain?
What about killing fields?
Is there a time?
What about all the things
That you said was yours and mine?
Did you ever stop to notice
All the blood we've shed before?
Did you ever stop to notice
This crying Earth, its weeping shores?

Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...
Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...

What have we done to the world?
Look what we've done!
What about all the peace
That you pledged your only son?
What about flowering fields?
Is there a time?
What about all the dreams
That you said was yours and mine?
Did you ever stop to notice
All the children dead from war?
Did you ever stop to notice
This crying Earth, its weeping shores?

Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...
Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...

I used to dream...
I used to glance beyond the stars...
Now I don't know where we are,
Although I know we've drifted far...

Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...
Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...
Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...
Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...

Hey, what about yesterday? (What about us)
What about the seas? (What about us)
The heavens are falling down (What about us)
I can't even breathe! (What about us)
What about apathy? (What about us)

Can't we feel its wounds? (What about us)
What about nature's worth?
(Ooo, ooo)
It's our planet's womb! (What about us)
What about animals? (What about it)
We've turned their kingdoms to dust
(What about us)
What about elephants? (What about us)
Have we lost their trust? (What about us)
What about crying whales? (What about us)
We're ravaging the seas (What about us)
What about forest trails? (Ooo, ooo)
Burnt despite our pleas... (What about us)
What about the holy land? (What about us)
Torn apart by creed (What about us)
What about the common man? (What about us)
Can't we set them free? (What about us)
What about children dying? (What about us)
Can't you hear them cry? (What about us)
Where did we go wrong? (Ooo, ooo)
Someone tell me why!(What about us)
What about baby boys? (What about it)
What about the days? (What about us)
What about all their joy? (What about us)
What about the man? (What about us)
What about the crying man? (What about us)
What about Abraham? (What about us)
What about death again? (Ooo, ooo)
Do we give a damn?

Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...
Aaaaaaaaah, Ooh ooh ooh ooh, Ooh oooh...

II.   Pay attention to the questions the Michael Jackson makes. Imagine you are talking to the singer. What would tell him? How would you answer his questions? In your groups, choose what questions you would like to answer him (at least 10 questions from the song). Then, decide how you are going to answer them. You can choose any format you want, for example:

1. A role play
2. A poem
3. A letter

4. A television program
5. A drawing

Be ready to present your answers to the class.