

# Introduction



## Reviewing the Seven Intelligences and Unwrapping the Eighth

Gardner (1993) defines *intelligence* as the “ability to solve problems or fashion products that are valued in one or more cultural or community settings.” In his original work, he outlined seven intelligences. In 1995, he added the naturalist intelligence. Following is a brief description of these intelligences.

- Verbal-linguistic:** the ability to recognize, understand, and compose meaning with words
- Logical-mathematical:** the ability to learn through numbers, order, and reasoning
- Visual-spatial:** the ability to conceive mental images and transform them
- Musical-rhythmic:** the ability to learn, create, and communicate through rhythm, rhymes, and musical patterns
- Bodily-kinesthetic:** the ability to learn by using simulations (becoming) and other highly physically skilled methods
- Intrapersonal:** the ability to know the self
- Interpersonal:** the ability to work with and understand others
- Naturalist:** the ability to understand patterns, relationships, and connections in nature

Each intelligence is utilized to some degree in various ways by each person. All people are considered gifted and usually excel in one or two intelligences.

Gardner's perspective provides Western educators with a new concept of what is smart that looks beyond only mathematical and linguistic talent. No longer can we be content with providing only for these two intelligences. We must consider the variety of other ways in which kids learn and process information. All children can be successful if they are provided a variety of learning opportunities. Because the naturalist is the most recent of Gardner's discoveries and therefore has less information about using it in the classroom, we chose to focus on that intelligence while integrating it with other identified intelligences.

## The Naturalist Intelligence

*The sun shines not on us, but in us. The rivers flow not past, but through us.*

—John Muir

Gardner defines a naturalist as a person who recognizes flora and fauna plus other consequential distinctions in the natural world and uses this ability productively. In our culture the term *naturalist* is applied to people who have an outstanding knowledge of the living world. Gardner mentions Charles Darwin and E. O. Wilson. Others are Sylvia Earle and Jane Goodall.

## Naturalist Checklist

You can identify a child or adult who has a strong naturalist intelligence through observation. Usually a naturalist is a person who

- is very comfortable outdoors
- chooses to read books and watch programs about animals and the ecosystem
- nurtures living things (plants and animals)
- readily follows cyclic phenomena such as tides, seasons, phases of the moon, and climate
- recognizes patterns, colors, and classifications
- automatically uses senses to explore the environment
- observes patiently
- feels a definite connection and relationship with nature
- feels an affinity for natural habitats such as oceans, forests, deserts, and wetlands
- wants to view and appreciate the aesthetics of nature
- favors natural settings over the human-influenced environment
- is renewed by visiting natural settings
- is constantly aware of surroundings
- touches and explores "yucky things"
- enjoys collections of rocks, minerals, leaves, flowers, shells, feathers, and so on
- seeks music related to nature
- prefers to go to a zoo over an amusement park
- sets up feeding stations for birds, small mammals, and other wildlife
- participates in volunteer projects that benefit plants, animals, watersheds, or Earth
- uses binoculars, telescopes, microscopes, and hand lenses when observing
- feels satisfaction in learning names of flowers, trees, animals, rocks and minerals, cloud types, volcanoes, and so on
- collects articles, posters, pictures, figurines, stuffed animals that relate to wildlife or nature
- grows plants (gardens, window boxes, indoor plants, herbs)
- photographs or sketches animals, plants, habitats (places)
- shares observations with others (enjoys showing something such as a flower blooming or small insect)
- shows a sense for detail and notices even the smallest things
- manipulates equipment to find out more about environmental water test kits, butterfly nets, plant presses, and so on
- makes crafts and projects of natural materials (dried arrangements, plant presses, shells, and wood)
- documents by sketching, photographing, or listing natural phenomena
- names pet stores, aquariums, wild life parks, zoos, farms, and so on as "special places"
- enjoys recreations such as hiking, fishing, mountain or rock climbing, cross country skiing, camping, sailing, scuba diving, and so on

## Educational Implications for the Naturalist Intelligence

Developing the naturalist intelligence is no less important than teaching math or reading skills. We must provide the opportunity for this intelligence to grow. Our primary responsibility is to be sure all children have a chance to experience success. We must consider all children and the skills they need to grow, all ways to deliver curriculum, all intelligences when planning and organizing lessons. As Tom Hoerr (1996) states, "The naturalist intelligence offers one more way to help students understand and learn" (xxiv). Successful employment in our students' future requires them to be computer literate, so we have stocked our classrooms and constructed computer labs to provide this opportunity. In a similar way, the quality of life on this planet requires that our children have some experience with nature. We must provide the best educational learning opportunities for this intelligence.

We are faced with determining the various benchmarks for learning and teaching to standards. Naturalist topics and themes integrate the curriculum in ways that will help us reach these goals. For example, change, cycles, and connections are themes that would help curriculum revolve around the ecosystem where the school is located. Teachers in the Pacific Northwest could develop integrated studies of marine ecology, watersheds, forests, and aquatic life. Educators in the Southwest could focus on the desert. Knowing and understanding your environment and using it as an extended classroom just makes sense.

But how do we develop such knowledge and understanding? How do we extend our classroom in such a way? Getting on a bus to go to an appropriate site is just as important as walking down the hall to the gym or the art room. Doing field studies allows one to see patterns in nature that are no different from the pattern blocks children use in math class. By observing outside, we can understand these connections.

## Learning Strategies for the Naturalist

Provide opportunities that encourage the following:

- Observing through senses: feeling, smelling, listening
- Collecting data from observation
- Grouping natural objects (classification)
- Observing animal behavior
- Growing things—plants, gardens, butterfly garden
- Creating worm boxes and recycling projects
- Doing field studies out of doors
- Observing through the microscope, telescope, binoculars, hand lens
- Drawing, sketching, photographing, videotaping nature
- Manipulating outdoor equipment or kits (such as water testing kits or nets)
- Observing, reflecting, and journalizing silently outdoors
- Identifying sounds in nature
- Interacting with animals, bugs, and plants
- Establishing nature trails, viewing decks, or outdoor classrooms
- Inventing scientific instruments
- Designing experiments
- Going on real, electronic, video, and imagined field trips

- Walking outside in fresh air to listen to sounds of nature and feel dirt underfoot
- Modeling, measuring, or drawing to scale animals, plants, or outdoor settings
- Writing poems or songs using adjectives from the outdoors
- Identifying shapes in natural setting
- Observing plants or changes outdoors over the course of the school year
- Observing a fruit, vegetable, or other plant or animal material decompose over time
- Collecting trash or other items (rocks, feathers, flowers, leaves) in the school yard and grouping the items by their characteristics
- Reading aloud stories or articles that relate to the outdoors, space, natural phenomena, animals, and plants
- Performing role-plays of cycles in nature, animal behavior, plant growth, and so on

## Process Skills Developed by Naturalist Learning Opportunities

A process skill is a basic tool in the world of learning and problem solving. The process skills needed to develop the naturalist intelligence are those that encourage exploration, discovery, creativity, and innovation. Most scientists would identify these skills as part of the scientific method. The logical progression of this method begins with observation of the world around us, which means simply stopping and taking in information through the senses when appropriate.

As the foundation of these experiences builds, the questions being to flow. Why does this happen? How did that work? The *whys* and *hows* can be answered through data collection, which is a way of recording the information: drawing, writing descriptions, and graphing to name a few. *Data collection* simply means that the experiences are not just consumed but measured in a way that can be remembered and later investigated. One can count on all sorts of estimating, measuring, counting, sorting, and classifying activities in this book.

Eventually, from the collected data, students can predict something or solve a problem to possibly answer the original question. On occasion the question goes unanswered because the students needs to observe more, collect more data, and predict and analyze further.

Following are brief definitions of the process skills used in this book. Many contain suggestions of activities that are appropriate to develop those skills.

- **Observing:** Using one or more of the five senses to gather information, often aided by the use of scientific equipment
- **Collecting data:** Gathering information through observation and measurement in a systematic manner
  - **Drawing and sketching:** Creating visual images of observations
  - **Describing:** Using words to record qualities
  - **Recording:** Documenting what has been observed
  - **Measuring:** Comparing objects to arbitrary units that may or may not be standardized
- **Predicting:** Forming an idea of an expected result based on inferences; guessing an outcome based on experience or evidence
  - **Estimating:** Calculating an approximate quantity or value based on judgment

- **Analyzing:** Looking at the data and trying to discover what it means
  - **Comparing:** Pointing out similarities of and differences between two or more things
  - **Classifying:** Grouping or ordering objects or events according to observed common characteristics
  - **Graphing:** Converting numerical quantities into a diagram that shows the relationship among them
  - **Calculating:** Adding things up
  - **Ordering:** Ranking, separating, or grouping
- **Communicating:** Giving or exchanging information orally or in writing to discover answers
  - **Cooperating:** Working together to share knowledge and create a better understanding
  - **Problem solving:** With the help of others, using observations, collected data, and analysis of information to draw conclusions or answer a question

## Teaching for Understanding through Cross-Age Tutoring

Using the multiple intelligences as a tool to develop curriculum enhances understanding, which is the desired result of all schooling. Many times Maggie engages students in experiences but isn't confident that they understand what she hopes the experiences would lead them to understand. She often asks herself what she accomplished. She uses various forms of assessment to determine if learning has taken place. Her students have been involved in projects, presentations, teacher-made tests, student-made tests, student-designed rubrics, and portfolios that were used in student-led conferences. All these tools were helpful, but one of the more effective tools she used was cross-age tutoring with the lessons in this book as a foundation. Cross-age tutoring is a wonderful way to develop a true learning community.

An old Chinese proverb notes that people learn 10 percent of what they read, 20 percent of what they hear, 30 percent of what they see, 50 percent of what they see and hear, 70 percent of what they discuss with others, 80 percent of what they experience personally, and 95 percent of what they teach to someone else. During the school year Maggie involved her students in most of the lessons in this book. Students did some reading, but they mostly listened, looked, discussed, and personally experienced the natural environment that surrounds her school. Maggie's taught natural science to two first-grade classes in our building. The sixth graders experienced the lessons, mastered the objectives, then, every Friday afternoon, taught the lessons to the first graders. Not only was everyone involved in learning, but students developed leadership, responsibility, organization, integrity, and other life skills.

Everyone, teachers included, looked forward to Friday afternoon. Maggie's students valued these performances, finding them relevant and authentic. She engaged a variety of intelligences. She often adapted the lessons to the curriculum of the first graders and to her curriculum needs. She found the lessons in this book simple but adaptable for use with older students. She has also used this book in what she calls her *messing around stage*. She is looking forward to developing a thematic approach to these natural experiences so she can integrate the curriculum at higher levels.