

Project Bright IDEA 2: Interest Development Early Abilities

**A Jacob Javits Gifted Education Program
Funded by the US Department of Education
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Concept: Systems

Topic: Environmental Studies

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Grade Level: 5th grade

**The North Carolina Department of Public Instruction
Exceptional Children Division
Academically or Intellectually Gifted Program**

The American Association For Gifted Children at Duke University

Big Ideas Manifested

Topic – Environmental Studies
Text – John Muir *America’s First Environmentalist*
Author – Kathryn Lasky
Publisher/Date- Candlewick Press/ 2006

Concepts	Themes
<ul style="list-style-type: none"> • survival • abundance or scarcity • protection • adaptation 	<ul style="list-style-type: none"> • endangered species • habitats • conservation • pollution
Issues or Debates	Problems or Challenges
<ul style="list-style-type: none"> • Natural or man-made causes of animals being endangered • Preservation vs. growth 	<ul style="list-style-type: none"> • How do we protect endangered animals a • What are the resources needed for growth? For protection?
Processes	Theories
<ul style="list-style-type: none"> • Problem solving • Decision making • Research • Writing process 	<ul style="list-style-type: none"> • Extinction is a natural process • Extinction and/or endangerment is affected by the environment/habitat destruction • Change is necessary for growth
Paradoxes	Assumptions or Perspectives
<ul style="list-style-type: none"> • Habitat destruction can be positive for one group and at the same time be negative for another group. • How will the extinction of an animal affect humans? • Are humans intentionally destroying habitats for insincere reasons or to further positive growth (from the human perspective)? 	<ul style="list-style-type: none"> • Protection measures are in place • Humans have experienced positive growth, but sometimes at the expense of habitats and others.

Concept: Systems

Topic: Environmental Studies

Suggested Text Selection(s): John Muir *America's First Environmentalist*

Look, Listen and Identify:

Intelligent Behaviors

Story Focus

Student Activities

NC Standards: Science:

Competency Goal 1- The learner will conduct investigations to build an understanding of the interdependence of plants and animals.

- 1.01 Describe and compare several common ecosystems
- 1.02 Identify and analyze the functions of organisms within the population of the ecosystem
- 1.03 Explain why an ecosystem can support a variety of organisms
- 1.04 Discuss and determine the role of light, temperature, and soil composition in an ecosystems capacity to support life.
- 1.05 Determine the interaction of organisms within an ecosystem
- 1.06 Explain and evaluate some ways that humans effect ecosystems
 1. Habitat reduction due to development
 2. Pollutants
 3. Increased nutrients
- 1.07 Determine how materials are recycled in nature

Competency Goal 2- The learner will conduct investigations and make observations to build an understanding of landforms.

- 2.01 Identify and analyze forces that cause change in landforms over time including: water and ice, wind, and gravity.
- 2.03 Discuss and consider the wearing away and movement of rock and soil in erosion and its importance in forming: canyons, valleys, meanders, and tributaries.
- 2.04 Describe the deposition of eroded material and it's importance in establishing landforms including delta's and floodplains
- 2.05 Discuss how the flow of water and the slope of land affect erosions
- 2.06 Identify and use models, maps, and ariel photographs as ways of representing landforms.

- 2.07 Discuss and analyze how humans influence erosion and deposition in local communities including school grounds as a result of clearing land, planting vegetation, building dams.

Competency Goal 3- The learner will conduct investigations and use appropriate technology to build an understanding of weather and climate.

- 3.02 Discuss and determine how the following are affected by predictable patterns of weather- temperature, wind direction and speed , precipitation, cloud cover , and air pressure.
- 3.06 Discuss and determine the influence of geography on weather and climate: mountains, sea breezes, water bodies.

NC Standards: Social Studies:

4.07 Compare and contrast changes in rural and urban settlement patterns in the United States, Canada, Mexico, and selected countries of Central America.

5.01 Categorize economic resources found in the United States and neighboring countries as human, natural, or capital and assess their long-term availability.

5.02 Analyze the economic effects of the unequal distribution of natural resources on the United States and its neighbors.

5.05 Evaluate the influence of discoveries, inventions, and innovations on economic interdependence.

5.07 Describe the ways the United States and its neighbors specialize in economic activities, and relate these to increased production and consumption.

5.08 Cite examples of surplus and scarcity in the American market and explain the economic effects.

6.02 Relate how certain technological discoveries have changed the course of history and reflect on the broader social and environmental changes that can occur from the discovery of such technologies.

6.03 Forecast how technology can be managed to have the greatest number of people enjoy the benefits.

6.04 Determine how citizens in the United States and the other countries of North America can preserve fundamental values and beliefs in a world that is rapidly becoming more technologically oriented.

6.05 Compare and contrast the changes that technology has brought to the United States to its impact in Canada, Mexico, and Central America.

6.06 Predict future trends in technology management that will benefit the greatest number of people.

NC Standards: Math:

1.0 The student develops number sense for rational numbers through 999,999.

3.03 The student classifies plane figures according to lines of symmetry (both line and rotational)

3.04 Students will solve problems using the properties of triangles, quadrilaterals, and other polygons

4.01 The student collects, organizes, analyzes, and displays data (including bar graphs and stem and leaf plots) to solve problems

Local Pacing Guide Timeline:

Thinking Skills Focus:

Topic Focus: Environmental Studies

Concept Focus: Systems

Overarching Generalizations:

- Parts of systems are interdependent upon one another and form symbiotic relationships
- A system may be influenced by other systems
- Systems interact
- Systems follow rules
- Systems are composed of subsystems

More Complex Generalizations (Two or more concepts):

- Everything is part of a system
- Systems are interdependent on one another

Directions for Teachers:

Display sentence strips with the generalizations. Discuss topics and vocabulary words needed to gain a deeper understanding of the conceptual lessons.

Suggested Topics for Discussion:

- Relationships between humans and animals
- Conservation
- Pollution
- Habitats
- Risk factors that contribute toward endangered animals
- Landforms
- Erosion

Suggested Vocabulary Words for Discussion:

* pollution *habitat *endangered species * conservation *environment
*adapt *environment * destruction *intentional/unintentional
*environmentalist *aurora borealis *thermometer/barometer *geology
*glaciers *protect *speculators *corporations *forest reserves *grassroots
*symbiotic *interdependence *restore *extinction *affect *effect
* Wildlife preserves *Global warming

A Six-Step Process for Teaching Academic Vocabulary Terms:

1. Provide a description, explanation or example of the new vocabulary term.
2. Ask students to restate the description, explanation or example in their own words using complete sentences.
3. Ask students to construct a picture, symbol or graphic representing the term or phrase.
4. Engage the students periodically in activities that help them add to their knowledge of the terms in a booklet that they have created (Keep it simple.)
5. Periodically ask students to discuss the terms with one another (**Think** of your favorite vocabulary words from the unit; **pair** with a vocabulary buddy, **share** by discussing the vocabulary terms with your vocabulary buddy.) Teacher should model process each time before students do the Think, Pair, Share with Vocabulary Buddy.
6. Construct games to periodically involve students and allow them to play with the terms.

Robert Marzano

Vocabulary Extension:
Discuss words and meanings
Illustrated dictionary of words
Role-play words
Synonym chart

Select a generalization(s) and essential questions. Introduce one or more of the following topics:

Six Facets of Understanding

Facet 1 – EXPLANATION
<p>What do you predict would happen if we continue to destroy our natural ecosystems? If we continue to destroy our natural environment, what would be the future of our earth? <i>Make an overlay book (using overhead sheets) to represent objects disappearing from our planet as a result of human influences. Provide explanations for each</i> <i>Make a T-chart to show the cause/effect relationship of human influence on the environment.</i></p>
Facet 2 - INTERPRETATION
<p>What implications do you speculate would happen if we had no national parks? <i>Listen to a partner’s story and combine the stories into one story.</i></p>
Facet 3 – APPLICATION
<p>What can I do to become a better conservationist? <i>Create a flip book with you ideas on how to improve your conservation skills.</i></p>
Facet 4 – PERSPECTIVE
<p>What are different points of view about an environmental issue (i.e. Reintroduction of wolves into Yellowstone park, offshore oil drilling, plover protection on the Hatteras seashore) <i>Compare and contrast at least 2 different points of view about your chosen topic.</i></p>
Facet 5 – EMPATHY
<p>Imagine that you are an animal and that your habitat is being destroyed by overdevelopment. Pretend that you are aware that you are on the endangered animals list. How would it feel to be an endangered animal? <i>Create a journal entry from your animal expressing your feelings.</i></p>
Facet 6 – SELF-KNOWLEDGE
<p>Reflect on the conservationists in your community or that you may know. To what extent are you a good conservationist? <i>Write a brief summary explaining to what extent you are or are not a good conservationist.</i></p>

**Read:
Task Rotation Learning Activities**

5th grade

All conceptual activities must include discussing and/or relating to the selected generalization(s) through essential questions.

<p style="text-align: center;">Mastery Learner (A) Sensing- Thinking</p> <p>In John Muir’s travels around the world he found plant and animal species that could be found no where else. Select a plant or animal from the list provided. Gather information about the ecosystem the animal or plant is natively a part. Describe the nonliving features of the ecosystem (i.e. Soil, climate, altitude, etc.) Make a list of 4 plants and 4 animals that also live in the ecosystem. Create a chart of your information. Be ready to present your chart to the class.</p> <p>HOM = Striving for Accuracy and Precision, Thinking and Communicating with Clarity and Precision</p> <p style="text-align: center;">V * L S * M B P I * N * _</p>	<p style="text-align: center;">Interpersonal Learner (B) Sensing-Thinking</p> <p>John Muir said, “When we try to pick out anything by itself, we find it hitched to everything else in the universe.”</p> <p>With your group, create a dance, dramatic presentation, or song to demonstrate the interdependence of the components of your ecosystem.</p> <p>HOM = Thinking Interdependently, Creating, Imagining and Innovating</p> <p style="text-align: center;">V * L S * M * B * P I * N _</p>
<p style="text-align: center;">Understanding Learner (C) Intuitive-Thinking</p> <p>Choose an ecosystem represented in the book. Debate preservation vs. progress in that ecosystem.</p> <p>HOM = Thinking Interdependently, Listening with Understanding and Empathy, Striving for Accuracy and Precision</p> <p style="text-align: center;">V * L S M B P * I * N * _</p>	<p style="text-align: center;">Self-Expressive Learner (D) Intuitive-Feeling</p> <p>Imagine you visit your animal’s ecosystem and develop a nature journal similar to John Muir’s in which you record your own observations of the natural world.</p> <p>HOM = Gather Data Through all Senses, Responding with Wonderment and Awe,</p> <p style="text-align: center;">V * L S M B P * I N * _</p>

Real World Connections with Products: organize, analyze, clarify, critique, debate, research, explain, examine, create, imagine, elaborate, decide, select, describe, list, develop

Real World Applications: developer, graphic designer, illustrator, author, environmental activist, biologist, conservationist, researcher, choreographer, playwright, composer, construction worker, zoologist, park ranger, stakeholder

Real World Terms: illustrate, demonstrate, choreograph, compose, journal, write, debate, invent, gather information

Connect all products in the unit to real world applications reflecting the concept, generalizations and topic. The above is an example of how this might be accomplished.

Concept Focus:

Overarching Generalizations:

- Parts of systems are interdependent upon one another and form symbiotic relationships
- A system may be influenced by other systems
- Systems interact
- Systems follow rules
- Systems are composed of subsystems

More Complex Generalizations (Two or more concepts):

- Everything is part of a system
- Systems are interdependent on one another

Essential Question

(Include concept and intelligent behavior that leads to deeper understanding of the concept through exploration of the generalization)

Materials Needed for Task Rotation and/or Task Rotation Menu

- Paper
- Chart paper
- Crayons , markers, paint
- Materials for costumes
- CD's for background music to include in dance or dramatic presentation
- Instruments
- Tape recorder for songs
- Book making supplies for journal: heavy duty cardboard, waxed thread, large needles, book binding stapler, wallpaper book

MetaCognitive Discussion (Essential Questions):

(Whole Group)

Conceptual Perspectives:

- 1. How are parts of a system interdependent on one another?**
- 2. Are systems influenced by other systems?**
- 3. Within ecosystems is change necessary for growth?**
- 4. Who benefits or is harmed from the growth?**
- 5. How can change result in habitat destruction?**
- 6. How can change result in conservation?**
- 7. How can change be positive or negative?**
- 8. Are the changes evolutionary or revolutionary?**
- 9. Are the changes intentional or unintentional?**
- 10. Can change cause even more change?**
- 11. What factors cause change?**
- 12. Can changing the way you approach a problem affect the solution?**
- 13. Is change always necessary for growth?**

Intelligent Behaviors:

- 1. List all of the intelligent behaviors that we exhibit to help with conservation efforts.**
- 2. How do you demonstrate these intelligent behaviors on a daily basis?**
- 3. How could listening with understanding and empathy help you to fully understand issues related to preservation vs. progress?**
- 4. Why is it important to remain open to continuous learning when it comes to the subject of endangered animals?**
- 5. Based on what you know about endangered species, how can you apply past knowledge to new situations in regard to conservation efforts?**
- 6. Which of the intelligent behaviors do you think John Muir exhibited in his travels around the country?**
- 7. Which activities do you believe that thinking interdependently helped?**
- 8. Being a good environmentalist means gathering data through your senses. Which activities seemed to enhance this habit of mind?**
- 9. Thinking about thinking is an important part of learning. What kinds of thoughts, strategies, feelings and actions have you had about your environment and what effect do these have on your environment?**
- 10. In an ever changing world, how can you look at the problems we have within it a different way to change perspectives, generate alternatives and consider other options when dealing with the environment?**

Literary Perspectives:

Student/Teacher Reflections

Math Task Rotation Learning Activities

K-2

All conceptual activities must include discussing and/or relating to the selected generalization(s) through essential questions.

<p>Mastery Learner (A) Sensing- Thinking</p> <p>V _ L _ S _ M _ B _ P _ I _ N _</p>	<p>Interpersonal Learner (B) Sensing-Thinking</p> <p>V _ L _ S _ M _ B _ P _ I _ N _</p>
<p>Understanding Learner (C) Intuitive-Thinking</p> <p>V _ L _ S _ M _ B _ P _ I _ N _</p>	<p>Self-Expressive Learner (D) Intuitive-Feeling</p> <p>V _ L _ S _ M _ B _ P _ I _ N _</p>

Real World Connections With Products:

Real World Applications:

Real World Terms:

Connect all products in the unit to real world applications reflecting the concept, generalizations and topic. The above is an example of how this might be accomplished.

Concept Focus:

Overarching Generalizations:

More Complex Generalizations (Two or more concepts):

Essential Question(s):

(Include concept and intelligent behavior that leads to deeper understanding of the concept through exploration of the generalization)

Materials Needed for Task Rotation and/or Task Rotation Menu

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MetaCognitive Discussion (Essential Questions):

(Whole Group)

Conceptual Perspectives:

Intelligent Behaviors:

Literary Perspective:

Student/Teacher Reflections

Concept:

Topic:

Generalization(s):

Essential Question(s):

Task Rotation Menu

Level	Mastery	Understanding	Self-Expressive	Interpersonal
1				
2				
3				

Real World Connections With Products:

Real World Applications:

Real World Terms:

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Concept Focus:

Overarching Generalizations:

More Complex Generalizations (Two or more concepts):

Essential Question:

(Include concept and intelligent behavior that leads to deeper understanding of the concept through exploration of the generalization)

Materials Needed for Task Rotation and/or Task Rotation Menu

-
-

MetaCognitive Discussion (Essential Questions):

(Whole Group)

Conceptual Perspectives:

Intelligent Behaviors:

Literary Perspective:

Student/Teacher Reflections:

Student Reflections and Assessments
Task Rotation Learning Experience
K-2

All conceptual activities must include discussing and/or relating to the selected generalization(s) through essential questions.

<p style="text-align: center;">Mastery Learner (A) Sensing- Thinking</p> <p>Produce a music video to persuade someone to “Go Green” or “Save the Earth”. Collect ideas then list ways of going green for your video. Take notes then organize them before starting the video process. You will be judged not only on informational value but also on a correct, clear message and entertainment quality.</p> <p>HOM = Managing Impulsivity, Questioning and Problem Posing</p> <p style="text-align: center;">V _ L _ S _ M _ B _ P _ I _ N _</p>	<p style="text-align: center;">Interpersonal Learner (B) Sensing-Thinking</p> <p>You are a big lawyer either prosecuting or defending Jones Dairy Sausage Company. A group of local North Carolinians have filed a suit charging the company with being irresponsible with their disposal of pig waste. They have been seen dumping it into the Neuse River. As you prepare for this court trial, you should be getting ready to present a case which meets the following criteria: informative, factual, moving and convincing. You will need to prepare both questions to ask the opposing side as well as briefing your client on questions he/she may be asked by the opposing counsel. If you have been effective, after the closing arguments by both sides are completed, the jury should find in favor of your client.</p> <p>HOM = Thinking Flexibly, Listening with Understanding and Empathy, Thinking and Communicating with Clarity and Precision</p> <p style="text-align: center;">V _ L _ S _ M _ B _ P _ I _ N _</p>
<p style="text-align: center;">Understanding Learner (C) Intuitive-Thinking</p> <p>You are going on a nature adventure and only have a backpack to take with you for the weekend. What would you pack in it? You have limited space within this backpack and it can only hold fifty pounds. The purpose of this adventure is to learn about the surrounding area, the wildlife, the ecosystems, and to journal about the experiences that you witness while on your trip. Be careful with your choices. Make a detailed list and be sure to justify your choices. You have one hundred dollars to make your choices. There are no food sources along the trail. Compare and contrast the most cost effective choices using newspapers, internet ads etc.</p> <p>HOM = Thinking Flexibly, Questioning and Posing Problems</p> <p style="text-align: center;">V _ L _ S _ M _ B _ P _ I _ N _</p>	<p style="text-align: center;">Self-Expressive Learner (D) Intuitive-Feeling</p> <p>You are preparing to interview for a job as an environmentalist. It is your dream job and you anticipate many difficult questions. Articulate the job qualifications. Hypothesize the questions that the panel of interviewees may generate for your interview. Imagine you are in the interview and create a dialogue between you and the panel of interviewees. Predict how the interview will turn out and whether or not you land the big job!</p> <p>HOM = Applying Past Knowledge to New Situations, Thinking About Your Thinking (Metacognition) Creating, Imagining and Innovating</p> <p style="text-align: center;">V _ L _ S _ M _ B _ P _ I _ N _</p>

Real World Connections With Products:

Real World Applications:

Real World Terms:

Connect all products in the unit to real world applications reflecting the concept, generalizations and topic. The above is an example of how this might be accomplished.

Concept Focus:

Overarching Generalizations:

More Complex Generalizations (Two or more concepts):

Essential Question:

(Include concept and intelligent behavior that leads to deeper understanding of the concept through exploration of the generalization)

Materials Needed for Task Rotation and/or Task Rotation Menu

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MetaCognitive Discussion (Essential Questions):

(Whole Group):

Conceptual Perspectives:

Intelligent Behaviors:

Literary Perspective:

Student/Teacher Reflections

Math Student Reflections and Assessments

Task Rotation Learning Experience

K-2

All conceptual activities must include discussing and/or relating to the selected generalization(s) through essential questions.

<p style="text-align: center;">Mastery Learner (A) Sensing- Thinking</p> <p>The city of Raleigh has received a grant to provide additional funding for one of the outdoor recreational facilities in your town. You have been chosen to conduct a study about the use of the recreational areas. Make a survey to collect data from the student population at your school to see which area their families use most often. After completing the survey, organize your data into a table and create a bar graph showing the information. Finally, write a report and make a display with your recommendations about how to use the funds. Be prepared to give your presentation to stakeholders. Extension: contact the parks and recreation department to ask for information about park usage. Compare and contrast your finding with those of the parks service. Discuss why your findings may have been the same or different.</p> <p style="text-align: center;">V * L * S * M * B * P * I * N</p>	<p style="text-align: center;">Interpersonal Learner (B) Sensing-Thinking</p> <p>Using the following figures , students will estimate the total amount of water their family uses during one day, one week, one month: *Flushing toilets use 5-7 gallons per flush *Average shower uses 6-7 gallons per minute *Filling a bathtub could use 25-30 gallons, but a garden tub could hold more. *A clothes washer uses 25-30 gallons per load (large machines can use up to 50 gallons) * A dishwasher uses 15 gallons per load * The bathroom faucet uses 2-5 gallons per minute.</p> <p>Devise a “tool” for collecting the data as well as for organizing the data. Students will determine ways to try to cut their water use in half. Try the experiment for 3 days, collecting data each day.</p> <p style="text-align: center;">V * L * S * M * B * P * I * N</p>
<p style="text-align: center;">Understanding Learner (C) Intuitive-Thinking</p> <p>Due to the boom in neighborhood construction in Wake County, the habitat for many wild animals is being destroyed. Students will calculate the area of a triangle to determine the carrying capacity of a habitat for deer</p> <ul style="list-style-type: none">• see attached information and map <p>* P. 55 PLT 7-12</p> <p style="text-align: center;">V * L * S * M * B * P * I * N</p>	<p style="text-align: center;">Self-Expressive Learner (D) Intuitive-Feeling</p> <p>The first part of the Sierra Club’s Mission is to “explore, enjoy, and protect the wild places of the earth”. Go on a nature walk through a “wild place” near your home or school. Using a digital camera, photograph examples of symmetry in nature. Then using print shop or another photo editing software, add lines of symmetry. Create an original work of art using your photographs which includes both line and rotational symmetry.</p> <p>What gifted intelligent behaviors do a photographer/ artist exhibit in creating a work of art?</p> <p>In creating art, what value should be placed on balance and symmetry?</p> <p style="text-align: center;">V * L * S * M * B * P * I * N</p>

Real World Connections With Products:

Real World Applications:

Real World Terms:

Connect all products in the unit to real world applications reflecting the concept, generalizations and topic. The above is an example of how this might be accomplished.

Concept Focus:

Overarching Generalizations:

More Complex Generalizations (Two or more concepts):

Essential Question:

(Include concept and intelligent behavior that leads to deeper understanding of the concept through exploration of the generalization)

Materials Needed for Task Rotation and/or Task Rotation Menu

-
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MetaCognitive Discussion (Essential Questions):

(Whole Group)

Conceptual Perspectives:

Intelligent Behaviors:

Literary Perspective:

Student/Teacher Reflections:

Additional Support Materials:

Favorite Read-Alouds:

Finger Plays, Nursery Rhymes and Songs:

Video Clips:

Paintings & Prints:

Teacher Reflections

Literary Selection

Date

School

Grade

1. What were the strengths of the task rotations and/or other activities?
2. How did the task rotations and/or activities reveal students' Intelligent Behaviors? Please discuss how each Intelligent Behavior manifested it self.
3. What would you change or add the next time you taught this lesson?
4. What opportunities for growth does the resource unit have?
5. What were "ah ha's?" for the students? For teachers?

“Additional Comments

APPENDIX

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Additional Instructional Concept-Based Activities