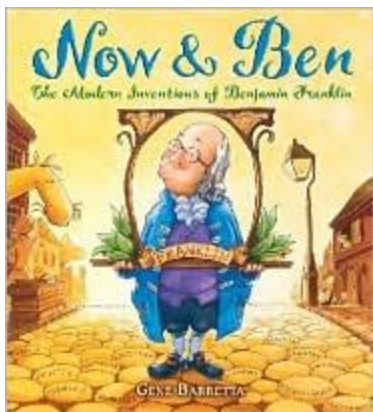


**DRAFT**



**Concept: Change/Systems**

**Topic: Inventions**

**By: Sharon Doehner and Traci Behrendt**

**Grade Level: 5**

## Big Ideas Manifested

**Topic - Ben Franklin...an influential figure of modern day inventions.**  
**Text – Now and Ben- The Modern Inventions of Benjamin Franklin**  
**Author – Gene Barretta**  
**Publisher/Date- Henry Holt and Company/2006**

Concepts	Themes
<ul style="list-style-type: none"> <li>❖ Change</li> <li>❖ Systems</li> </ul>	<ul style="list-style-type: none"> <li>❖ Inventions</li> <li>❖ Necessities</li> <li>❖ Consequences</li> <li>❖ Convenience/Comfort</li> </ul>
Issues or Debates	Problems or Challenges
<ul style="list-style-type: none"> <li>❖ Science vs. Religion</li> <li>❖ Safety vs. Risk</li> </ul>	<ul style="list-style-type: none"> <li>❖ Who was Benjamin Franklin?</li> <li>❖ Can inventions be used for purposes other than those originally planned?</li> </ul>
Processes	Theories
<ul style="list-style-type: none"> <li>❖ Historical research of Ben Franklin</li> <li>❖ Inquiry into inventions of the past and present</li> <li>❖ Students will create prototypes of some of Ben Franklin’s most famous inventions on their own.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Inventions bring change that can be both good and bad.</li> </ul>
Paradoxes	Assumptions or Perspectives
<ul style="list-style-type: none"> <li>❖ Inventions can be both positive and negative.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Inventions continue to improve over time.</li> </ul>

**Concept: Change/Systems      Topic: Ben Franklin...an influential figure of modern day inventions.**

**Suggested Text Selection(s): Now and Ben- The Modern Inventions of Benjamin Franklin by: Gene Barretta**

**Look, Listen and Identify:**

**Intelligent Behaviors**

**Story Focus - Questioning and Problem posing, Metacognition, Creating, Flexible Thinking, Taking Responsible and Intellectual Risks**

**Student Activities**

**Thinking Flexibly, Metacognition, Questioning and Posing Problems, Thinking and Communicating with Clarity, Creating, Imagining, Innovating and Thinking Independently**

**NC Standards:**

**Social Studies**

**Goal 5- The learner will evaluate ways the United States and other countries of North America make decisions about the allocation and use of economic resources.**

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

**Goal 6- The learner will recognize how technology has influenced change within the United States and other countries in North America.**

**6.01** Explore the meaning of technology as it encompasses discoveries from the first primitive tools to today's personal computer.

**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.

**Science Competency Goal 4: : The learner will conduct investigations and use appropriate technologies to build an understanding of forces and motion in technological designs.**

**4.01** Determine the motion of an object by following and measuring its position over time.

**4.02** Evaluate how pushing or pulling forces can change the position and motion of an object.

**4.03** Explain how energy is needed to make machines move.

**4.04** Determine that an unbalanced force is needed to move an object or change its direction.

**4.05** Determine factors that affect motion including: force, friction, inertia, momentum

**4.06** Build and use a model to solve a mechanical design problem.

**4.07** Determine how people use simple machines to solve problems.

**Language Arts Competency Goal 2- The learner will apply strategies and skills to comprehend text that is read, heard, and viewed.**

**2.01-** Use metacognitive strategies independently and flexibly to monitor comprehension and extend vocabulary ( e.g. Skim, scan, reread the text, consult other sources, ask for help, summarize, paraphrase, question).

**2.05-** Evaluate inferences, conclusions, generalizations and provide evidence by referencing the text (s).

**Language Arts Competency Goal 3- the learner will make connections through the use of oral language, written language, and media and technology.**

**3.06-** Conduct research ( with assistance) from a variety of sources for assigned or self-selected projects (e.g. print and non print texts, artifacts, people, libraries, data bases, computer networks).

**Language Arts Competency Goal 4- The learner will apply strategies and skills to create oral , written, visual texts.**

**4.03-** Make oral and written presentations to inform or persuade selecting vocabulary for impact.

**Local Pacing Guide Timeline: Please refer to the following link:**

**<http://www.wcpss.net/curriculum-instruction/resources/curriculum/elem/language/gr5/index.html>**

**Thinking Skills :**      **Relate personally with a historic personality of the past.**  
                                 **Comparing/Contrasting of inventions of the past and present.**

**Topic Focus: Influences of 18<sup>th</sup> Century Inventions**

**Concept Focus: Systems and Change**

**Overarching Generalizations:**

- ❖ **Change generates additional change**
- ❖ **Change can be evolutionary and revolutionary**
- ❖ **Systems have parts that work to complete a task**
- ❖ **Systems may be influenced by other systems**

**More Complex Generalizations (Two or more concepts):**

- ❖ **Humans bring about change through inventions, which in turn create more change.**
- ❖ **Systems may be modified by new ideas and additive design.**

**Directions for Teachers:**

**Display posters with the generalizations about inventions. (See lists above.) Discuss topics and vocabulary words needed to gain a deeper understanding of the conceptual lessons.**

**Suggested Topics for Discussion:**

**Explore the meaning of technology from the 18<sup>th</sup> to the most current technological developments.**

**Analyze how certain technological discoveries have changed the course of history.**

**Predict the future trends of inventions.**

**Categorizing inventions into groups: food, convenience, medicine, transportation, necessities, technology, music, public service, etc.**

**Suggested Vocabulary Words for Discussion:**

glass armonica	enigma	serendipity	Gulf Stream
bifocals	inspiration	sanitation	scurvy
odometer	posterity	Declaration of Independence	interlude
additive design	artisan	Treaty of Alliance	efficient
Rube Goldberg	feasible	Treaty of Peace	primitive
patent	phenomenon	Day Light Savings Plan	iron
political cartoon	newfangled	Poor Richard's Almanac	ventilation
second hand	establishment	pivotal	pro/con

**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. (Choose one of the extensions below.)

Robert Marzano

**Vocabulary Extension/ games:**

- ❖ **Vocabulary Whirl**
- ❖ **Three-way Tie Strategy (from Student Engagement Strategies/ Dan Moraio)**
- ❖ **Vocabulary Predictions**

**Hooks:**

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

**Six Facets of Understanding**

<b>Facet 1 – EXPLANATION</b>
After designing a prototype of one of Ben Franklin’s 18 <sup>th</sup> century inventions, students will describe the invention with complete sentences in their science journal including demonstrating how each invention is connected to its’ modern day version.
<b>Facet 2 - INTERPRETATION</b>
What is an invention? Judge which invention, which has made the most significant change in humanity, and illustrate a picture of the invention complete with labels.
<b>Facet 3 - APPLICATION</b>
How can we make adaptations to present day inventions to improve their design and meet a new need?
<b>Facet 4 - PERSPECTIVE</b>
Compare and contrast Ben Franklin’s inventions with his contemporaries of the 18 <sup>th</sup> century. Analyze how they are similar and different. What are the strengths and weaknesses of each of these inventions?
<b>Facet 5 – EMPATHY</b>
What would it be like to walk in Ben Franklin’s shoes the day of his kite and electricity experiment? Write a letter to Thomas Jefferson explaining your big discovery and how you think it will be utilized in the future.
<b>Facet 6 – SELF-KNOWLEDGE</b>
What is something you became aware of after reading the book, <i>“Now and Ben- The Modern Inventions of Benjamin Franklin”</i> ? What are your strengths and weaknesses in understanding the early development of inventions and how they affect our world today? Write your statements/questions in your journals.

**Read: “Now and Ben- The Modern Inventions of Benjamin Franklin”**

## Task Rotation Learning Activities

### Fifth Grade

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

<p style="text-align: center;"><b>Mastery Learner (A)</b> Sensing- Thinking</p> <p><b>Take notes on 3 of your favorite Ben Franklin’s inventions from the provided websites and organize them on a chart. Then post your findings and answer questions from your peers.</b></p> <p><b>HOM: How did you communicate with clarity and precision? (Thinking and communicating with clarity and precision.)</b></p>	<p style="text-align: center;"><b>Interpersonal Learner (B)</b> Sensing-Thinking</p> <p><b>With a friend, write your thoughts about how Ben Franklin’s inventions have impacted your lives today. Then put your thoughts on a postcard and exchange them with each other.</b></p> <p><b>HOM: How did thinking interdependently help you work together? (Thinking interdependently.)</b></p>
<p style="text-align: center;"><b>Understanding Learner (C)</b> Intuitive-Thinking</p> <p><b>Research Ben Franklin and his contemporaries’ inventions. Explain how they are similar. Explain how they are different. Use a graphic organizer to share your discoveries.</b></p> <p><b>HOM: Which intelligent behavior did you use to gather data through your senses. (Gather data through all senses.)</b></p>	<p style="text-align: center;"><b>Self-Expressive Learner (D)</b> Intuitive-Feeling</p> <p><b>Create an acrostic poem about Ben Franklin’s inventions to explain their importance in our “Digital Age”.</b> ~OR~ <b>If I Was A...? Choose any invention and pretend you are this invention for the remaining questions? Who created you? Where? How do you benefit human life? What would happen if humans could not make any more of you ever? Is there anyone or anything on the planet that has had a negative effect on you?</b></p> <p><b>HOM: How did creating, imagining, and innovating help you create your poem complete your “If I Was A” activity. (Creating, imagining, and innovating.)</b></p>

**Real World Connections With Products:**

Creating prototypes, journaling, composing poetry, use of technology (websites), illustrations, writing a friendly letter

**Real World Applications:**

Historical figures of the 18<sup>th</sup> century, inventors (past and present),

**Real World Terms:**

**Design, describe, compare, contrast, illustrate, adapt, and write**

**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: Systems and Change**

**Overarching Generalizations:**

- ❖ Change generates additional change
- ❖ Change can be evolutionary and revolutionary
- ❖ Systems have parts that work to complete a task
- ❖ Systems may be influenced by other systems

**More Complex Generalizations (Two or more concepts):**

- ❖ Humans bring about change through inventions, which in turn create more change.
- ❖ Systems may be modified by new ideas and additive design.

**Essential Question**

**As an inventor, what responsibilities should you show in regards of your invention’s impact on future generations?**

**Materials Needed for Task Rotation and/or Task Rotation Menu**

- |                                    |  |
|------------------------------------|--|
| Paper- (lined and construction)    | Model of an Acrostic Poem  |
| Access to Internet                 | Samples of Simple Machines   |
| Printed text                       | Chart paper  |
| Color pencils                      | Resource books about Ben Franklin, Colonial Times, and 18th century  |
| Chart paper                        | Rubrics for acrostic poetry and fictional writing (create if we have time...do on March 6 <sup>th</sup> meeting) |
| Issue bin for ideas for discussion |  |



## **MetaCognitive Discussion (Essential Questions):**

### **(Whole Group)**

#### **Conceptual Perspectives:**

In thinking about how inventions have changed our societies' views on convenience and time saving, what impact do you predict future inventions will have in 20 years? 100 years?

In thinking about how Ben Franklin's ability to accept intellectual risks, how do we as fifth graders demonstrate the ability to make intellectual risks?

Can changing your approach to solving a problem affect the outcome of your invention?

#### **Intelligent Behaviors:**

As fifth graders, what intelligent behaviors do we need to develop to create inventions for future societies?

How do we demonstrate intelligent behaviors when we use the "Scientific Method"?

#### **Literary Perspectives:**

How many different inventions from the book, *"Now and Ben- The Modern Inventions of Benjamin Franklin"* are still used today?

What possible conflicts possibly occurred between Ben Franklin and family/ neighbors/community/ church?

#### **Student/Teacher Reflections**

## Task Rotation Learning Activities

### Fifth Grade

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

<p style="text-align: center;"><b>Mastery Learner (A)</b> Sensing- Thinking</p> <p><b>After reading <u>Now &amp; Ben</u> demonstrate (through any method) what it would be like to live in a community without the amenities of a fire department, post office or hospital?</b></p> <p><b>HOM: How did you use the Thinking about thinking strategy? (Metacognition)</b></p>	<p style="text-align: center;"><b>Interpersonal Learner (B)</b> Sensing-Thinking</p> <p><b>Revisit the pages regarding Daylight Savings Time in <u>Now &amp; Ben</u>. Then read Franklin’s letter to the Journal of Paris. Google and evaluate the present controversy about Day Light Savings Time. Judge for yourself which side (pro or con) and try to convince the class to agree with you.</b></p> <p><b>HOM: How did you think flexibly when you chose your pro or con? (Thinking flexibly.)</b></p>
<p style="text-align: center;"><b>Understanding Learner (C)</b> Intuitive-Thinking</p> <p><b>How did Ben Franklin’s contributions help form the future? Analyze the struggle Ben Franklin may have faced with his peers in regards to the religious beliefs of the time, and his scientific pursuits of his inventions.</b></p> <p><b>HOM: How did you use questioning and problem posing in your research. (Questioning and problem posing.)</b></p>	<p style="text-align: center;"><b>Self-Expressive Learner (D)</b> Intuitive-Feeling</p> <p><b>Imagine you are a young inventor during colonial times. What types of inventions do you think would be most needed?</b></p> <p><b>In what ways could you modify one of Ben Franklin’s inventions to improve it and make it more useful during our digital age.</b></p> <p><b>HOM: How aspects of creating, imagining, and innovating did you use? (Creating, imagining, and innovating.)</b></p>

**Real World Connections With Products: Demonstrate, evaluate, judge, analyze, convince, explain, imagine, modify**

**Real World Applications: famous inventors (18<sup>th</sup> century to present), guest speakers (parent volunteers, students from The School of Science and Math, engineering students from NC State, etc.)**

**Real World Terms:**

**Design, describe, compare, contrast, illustrate, adapt, and write**

**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: Systems and Change**

**Overarching Generalizations:**

- ❖ **Change generates additional change**
- ❖ **Change can be evolutionary and revolutionary**
- ❖ **Systems have parts that work to complete a task**
- ❖ **Systems may be influenced by other systems**

**More Complex Generalizations (Two or more concepts):**

- ❖ **Humans bring about change through inventions, which in turn create more change.**
- ❖ **Systems may be modified by new ideas and additive design.**

**Essential Question(s): As an inventor, what responsibilities should you show in regards of your invention's impact on future generations?**

**Materials Needed for Task Rotation and/or Task Rotation Menu**

- Resource books on Ben Franklin
- Favorites of Ben Franklin websites
- Copies of *Now and Ben*
- Pencils, Markers, Crayons, Fine Line Markers
- Paper and Chart Paper

## **MetaCognitive Discussion (Essential Questions):**

**(Whole Group)**

### **Conceptual Perspectives:**

**What are some possible changes that would impact our communities without the amenities of services (hospital, post offices, etc.)**

**As you looked at the pros and cons of both sides of Day Light Savings Time, what lead you to choose your side of the position? What might be some possible strategies that will help you clearly communicate with your classmates?**

**How do peers influence our decisions and choices? How did Ben Franklins' contemporaries influence his decisions and choices of his time?**

**When thinking about being a young inventor during colonial times, how would you modify and improve the existing inventions of the time?**

### **Intelligent Behaviors:**

**What gifted intelligent behaviors would a community planner or inventor need to create the needed services?**

**What gifted intelligent behaviors enhance clear communication with others in defending your position on Day Light Savings Time?**

**What gifted intelligent behaviors influence and shape our decisions and choices?**

**What gifted intelligent behaviors did you use to complete this task?**

### **Literary Perspective:**

**How many different inventions from the book, *“Now and Ben- The Modern Inventions of Benjamin Franklin”* are still used today?**

**What possible conflicts possibly occurred between Ben Franklin and family/ neighbors/community/ church?**

### **Student/Teacher Reflections**

**Concept: Change/Systems**

**Topic: Ben Franklin...an influential figure of modern day inventions.**

**Generalization(s):**

**Change generates additional change, change can be evolutionary and revolutionary, systems have parts that work to complete a task, systems may be influenced by other systems**

**Essential Question(s): As an inventor, what responsibilities should you show in regards of your invention’s impact on future generations?**

**Task Rotation Menu**

<b>Level</b>	<b>Mastery</b>	<b>Understanding</b>	<b>Self-Expressive</b>	<b>Interpersonal</b>
<b>1</b>	<p><b>Gathering Information</b></p> <p>Rank in order of importance the following inventions: Cars, telephones, eye glasses, plastic, xray machines</p>	<p><b>Evaluating Data</b></p> <p>Group and label 10 of Ben Franklin’s inventions. Do a copy paste using your technology skills.</p>	<p><b>Generating Ideas</b></p> <p>Brainstorm some ideas for some new inventions of the future.</p>	<p><b>Expressing Feelings</b></p> <p>If you lived in the 18<sup>th</sup> century, what would be your likes and dislikes of the conveniences of that time.</p>
<b>2</b>	<p><b>Organizing Information</b></p> <p>Make a visual organizer listing the steps an inventor has to go through in order to create a new invention.</p>	<p><b>Interpreting Data</b> (Progress vs Digression)</p> <p>What are some examples of inventions which have eventually caused problems down the road? Use the Internet to site these examples.</p>	<p><b>Reorganizing Ideas</b></p> <p>Create you own metaphor that attitudes about the invention of cell phones.</p>	<p><b>Understanding Feelings</b></p> <p>My favorite invention is a _____. Here is an illustration and description of how it works.</p>
<b>3</b>	<p><b>Presenting Information</b></p> <p>Create a timeline of what you feel are Man’s Most Valuable Inventions. You must choose 20 from the course of the history of man.</p>	<p><b>Extrapolating Data</b></p> <p>Identify an environmental problem caused by some of our more recent and modern inventions. Analyze its causes and effects and develop a campaign to make people aware of the problem.</p>	<p><b>Creating Original Work</b></p> <p>Design a prototype of an invention which you feel would benefit man. Your model must not be larger than 12” by 12”.</p>	<p><b>Act On Feelings</b></p> <p>What do you feel about the rapid pace technology is progressing and the role it playing in our lives?</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**

- 
-

**MetaCognitive Discussion (Essential Questions):**

**(Whole Group)**

**Conceptual Perspectives:**

**Intelligent Behaviors:**

**Literary Perspective:**

**Student/Teacher Reflections:**

**Student Reflections and Assessments  
Task Rotation Learning Experience**

*Assessment*

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

<p align="center"><b>Mastery Learner (A)</b> Sensing- Thinking</p> <p>You are in the colonial era. Construct a newspaper article explaining how the invention will have either a positive or negative impact on your community.</p> <p>What are some of the possible changes that can occur among your readers?</p>	<p align="center"><b>Interpersonal Learner (B)</b> Sensing-Thinking</p> <p><b>Invention Creative Writing-</b> As a group of 3, you will have 25 minutes to write a brief story using 10 of our “Invention Vocabulary” words.</p>
<p align="center"><b>Understanding Learner (C)</b> Intuitive-Thinking</p> <p>Write a letter to one of the inventors of the 18<sup>th</sup> century and thank them for changes in your life due to creation of their invention/ contribution to society. How would you evaluate the changes the invention has made in your life?</p>	<p align="center"><b>Self-Expressive Learner (D)</b> Intuitive-Feeling</p> <p>Find a partner, choose an invention to debate the pros and cons on its’ effect on society. Perform a short skit in which each of you will debate your position. Use supporting details in your skit. Discuss both positive and negative effects.</p>

**Social Studies-5.05,6.01, 6.02,6.03**  
**Science- 4.01, 4.02, 4.03, 4.04, 4.05, 4.06, 4.07**  
**Language Arts- 2.01, 2.05, 3.06, 4.03**





**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**

- 
-

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

**(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**

### **A**

#### **Additional Instructional Concept-Based Activities**