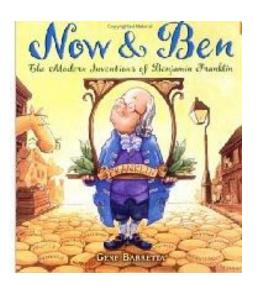
Project Bright IDEA 2: Interest Development Early Abilities

A Jacob Javits Gifted Education Program Funded by the US Department of Education 2004-2009



Concept: Systems

Topic: Influence of Discoveries and Inventions

By: Sandy Heath & Stacie Palmer

Grade Level: 5

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 - Influence of Discoveries and Inventions

Text - Now & Ben: The Modern Inventions of

Benjamin Franklin

Author – Gene Barretta

| Themes |
|--|
| All things are related, serve a purpose, and |
| change over time. |
| Change is inevitable and necessary for growth. |
| |
| |
| Problems or Challenges |
| Why are inventions needed? |
| What resources are needed for inventions? |
| |
| |
| Theories |
| Change is necessary for growth. |
| Systems are influenced by other systems. |
| Systems create order. |
| |
| Assumptions or Perspectives |
| Inventions make life easier. |
| Inventions are needed for growth. |
| Inventions improve over time. |
| |
| |

Concept: Systems Topic: Influence of Discoveries and Inventions

Suggested Text Selection(s): Now and Ben: The Modern Inventions of Benjamin Franklin

Look, Listen and Identify:

Intelligent Behaviors

Story Focus Thinking Flexibly, Striving for Accuracy and Precision, Questioning

and Problem Posing, Applying Past Knowledge to New Situations, Thinking and Communicating with Clarity and Precision, Gather Data Through All Senses, Creating, Imagining, and Innovating, Taking Responsible Risks, Thinking Interdependently, Remaining

Open to Continuous Learning

Student Activities Persisting, Listening with Understanding and Empathy,

Thinking Flexibly, Striving for Accuracy and Precision, Questioning and Problem Posing, Applying Past Knowledge to New Situations, Thinking and Communicating with Clarity and Precision, Creating, Imagining, and Innovating, Thinking

Interdependently, Remaining Open to Continuous Learning

NC Standards: Social Studies Goal 4 (4.03), Goal 5 (5.05), Goal 6 (6.02, 6.06)

Local Pacing Guide Timeline:

Thinking Skills Focus: Figural and Verbal Classifications

Describing Things

Topic Focus: Influence of Discoveries and Inventions

Concept Focus: Systems

Overarching Generalizations:

Systems are predictable.

Systems serve a purpose.

Systems create balance.

Systems create order.

More Complex Generalizations (Two or more concepts):

Systems work to complete a task or a mission.

Systems may be influenced by other systems.

Systems are interdependent upon one another.

Systems are influenced by new innovations.

Systems change with new innovations.

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:

Inventions, discoveries, innovations, change, inventors

Suggested Vocabulary Words for Discussion:

Bifocals

Citrus

Churned

Colonies

Contributions

Current

Discoveries

Efficient

Innovations

Interlude

Inventions

Odometer

Originated

Patent

Political

Primitive

Sanitation

Scurvy

Suffocation

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:

Three Ss – See it, say it, show it Charades – Act words for classmates Word of the Day- define together, post, listen for usage, make a tally for every time used Select a generalization(s) and essential questions. Introduce one or more of the following topics:

Six Facets of Understanding

Facet 1 – EXPLANATION

How are Benjamin Franklin's inventions connected to modern day inventions? How did the patent system come about?

Design a teacher lesson to explain Ben Franklin's connection with items we still use today.

Facet 2 – INTERPRETATION

How is an invention like a classroom?

Critique the analogy above in a journal entry.

Facet 3 – APPLICATION

In what ways do inventor's ideas exhibit change?

Propose a new system to reflect our need for natural resources. Ex. (Solar energy, wind, fossil fuels)

Facet 4 – PERSPECTIVE

How might inventions look from the perspective of 1950's and 2008 graduates?

Compare and contrast the life styles of these graduates.

Facet 5 – EMPATHY

What would it be like to walk in Benjamin Franklin's shoes?

Assume the role of Ben living with today's modern conveniences.

Facet 6 – SELF-KNOWLEDGE

How are my views about current inventions shaped by systems?

Consider the following inventions impact on every day life: cell phones, Hybrid cars, fighter jets, email.

Reflect in your journal how inventions make daily living more convenient.

Read: Now and Ben: The Modern Inventions of Benjamin Franklin Task Rotation Learning Activities

5th Grade

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

Mastery Learner (A) Sensing-Thinking

List/display on chart paper inventions from 1990 to present in a category of your choice in order to acquire knowledge about contemporary inventions. Include invention name, inventor, date of creation, purpose.

How would remaining open to continuous learning contribute to changes in inventions? (remaining open to continuous learning)

V*_L_S_M_B_P_I_N_

Understanding Learner (C) Intuitive-Thinking

Select and identify the similarities and differences between inventions found in the book using the open compare/contrast graphic organizer.

What gifted intelligent behavior/s did you use while working on this activity? (gathering data, communicating with clarity and precision)

V_*_L_*_S__M__B__P__I__N__

Interpersonal Learner (B) Sensing-Thinking

Pretend you just created an invention that has become popular after you posted it on your website. Email a friend about how you felt the day your invention was patented.

How did showing persistence help get your invention patented? (persisting)

V_*_L__S__M__B__P_*_I_*_N__

Self-Expressive Learner (D) Intuitive-Feeling

Create *The Inventor's Newspaper* including a feature story, political cartoon, advertisements, and two hard news stories. The newspaper should focus on current inventions.

How did you communicate with clarity and precision in your newspaper? (communicating with clarity and precision)

^{**} Students must complete mastery task before completing understanding task.

Real World Connections With Products: compare, contrast, invent, create, dream, reflect, explore, prove, solve, celebrate, argue, decide, debate

Real World Applications: scientists, physicists, doctors, teachers, lawyers, teachers

Real World Terms: computers, ipods, wii, tv, musical instuments, cameras, paper, maps, gps, light bulbs, greeting cards, youtube

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

Overarching Generalizations:

Systems are predictable. Systems serve a purpose. Systems create balance. Systems create order.

More Complex Generalizations (Two or more concepts):

Systems work to complete a task or a mission.

Systems may be influenced by other systems.

Systems are interdependent upon one another.

Systems are influenced by new innovations.

Systems change with new innovations.

Materials Needed for Task Rotation and/or Task Rotation Menu

Chart paper

Markers

Paper

Pencils

Computer

Open compare/contrast graphic organizer

Art supplies

Essential Question

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

MetaCognitive Discussion (Essential Questions):

(Whole Group)

Conceptual Perspectives:

In thinking about the process an inventor experiences to invent, how does this system affect the usefulness of an invention?

How would our world be affected without the invention of the light bulb?

How do systems interact?

How are systems predictable?

How do systems serve a purpose?

Do systems create balance? Explain.

How do systems create order?

How do systems complete a task or a mission?

Are systems influenced by other systems? Explain.

Why are systems interdependent upon one another?

Intelligent Behaviors:

How would remaining open to continuous learning contribute to changes in inventions?

How did showing persistence help get your invention patented?

What Gifted Intelligent Behaviors did you use while working on this activity?

How did you communicate with clarity and precision in your newspaper?

What intelligent behaviors do inventors use?

Describe how an inventor creates, imagines, and innovates.

Literary Perspectives:

Predict the content of the book by viewing the cover only.

From looking at the cover, tell what you know about inventions.

Student/Teacher Reflections

Did the task rotation lead to a better understanding of systems?

Task Rotation Learning Activities

5th Grade

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

Mastery Learner (A) Sensing-Thinking

Create an itinerary for a trip to Benjamin Franklin's memorial. Plot your mileage from beginning to end. How is this trip connected to Benjamin Franklin and his inventions and discoveries?

What thought processes (meta-cognition) did you use when you created your itinerary? (meta-cognition)

V_*_L_*_S_*_M__B__P__I__N__

Understanding Learner (C) Intuitive-Thinking

Compare and contrast the postal system to our traffic system. What are the similarities and differences? Debate which system is more important to the United States. Explain.

Which gifted intelligent behavior did you use when you compared and contrasted the two systems? (gathering data, striving for accuracy and precision)

V_*_L_*_S__M__B__P__I_*_N_

Interpersonal Learner (B) Sensing-Thinking

Pretend you are Benjamin Franklin. What, in your opinion, is your best invention or discovery and why? Roleplay your idea at a town meeting.

Which gifted intelligent behavior/s did you use when you role played Benjamin Franklin? (creating, imagining, and innovating; taking risks)

V_*_L_*_S__M__B_*_P_*_I__N_

Self-Expressive Learner (D) Intuitive-Feeling

Plan a "Ben Franklin Day" celebrating his discoveries and inventions. Include posters, buttons, a song, and a radio announcement or TV commercial honoring his accomplishments.

How did you create, imagine, and innovate as you designed your "Ben Franklin Day"? (create, imagine, and innovate)

V_*_L_*_S_*_M_*_B_*_P_*_I_*_N__

Real World Connections With Products: compare, contrast, invent, create, dream, reflect, explore, prove, solve, celebrate, argue, decide, debate

Real World Applications: scientists, physicists, doctors, teachers, lawyers, teachers

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Systems are interdependent upon one another.

Systems are influenced by new innovations.

Systems change with new innovations.

Materials Needed for Task Rotation and/or Task Rotation Menu

Now & Ben Pencil/Paper Internet Poster Board Chart Paper

Maps

Art Supplies

Project Bright IDEA Javits Research funded by US Department of Education North Carolina Department of Education and The American Association for Gifted Children, Duke University

CamCorder

MetaCognitive Discussion (Essential Questions):

Essential Question(s):

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

Conceptual Perspectives:

In thinking about the process an inventor experiences to invent, how does this system affect the usefulness of an invention?

How would our world be affected without the invention of the light bulb?

How do systems interact?

How are systems predictable?

How do systems serve a purpose?

Do systems create balance? Explain.

How do systems create order?

How do systems complete a task or a mission?

Are systems influenced by other systems? Explain.

Why are systems interdependent upon one another?

Intelligent Behaviors:

What thought processes (meta-cognition) did you use when you created your itinerary? Which gifted intelligent behavior/s did you use when you role played Benjamin Franklin? Which gifted intelligent behavior did you use when you compared and contrasted the two systems?

How did you create, imagine, and innovate as you designed your "Ben Franklin Day"?

Which intelligent behaviors did Ben Franklin use the most?

How did Ben Franklin apply past knowledge in new situation?

Literary Perspectives:

How did your perspective of Benjamin Franklin change from the beginning to the end of the story?

Why did the author write this story?

Student/Teacher Reflections

Concept: Systems

Topic: Influence of Discoveries and Inventions

Generalization(s):

Systems are predictable.

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Systems create order.

Essential Question(s):

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Task Rotation Menu

| | rask Rotation Menu | | | | |
|-------|---|--|--|--|--|
| Level | Mastery | Understanding | Self-Expressive | Interpersonal | |
| 1 | List inventions from 1990 to present in a category of your choice in order to acquire knowledge about contemporary inventions. Include invention name, inventor, date of creation, purpose. | Select and identify the similarities and differences between inventions found in the book using the open compare/contrast graphic organizer. | Create a system of movements which reflects your inventive side. | What do you think of when you hear the word invention? Brainstorm a list of words related to inventions. | |
| 2 | Organize 10 of Benjamin Franklin's inventions into a timeline. | "Will [Benjamin Franklin's] contributions help to form the future?" What message is the author trying to make? What effect will Franklin's ideas have on the future? | Create 5 analogies comparing inventors with their inventions. Ben Franklin is to bifocals as Thomas Edison is to light bulb. | Pretend you just created an invention that has become popular after you posted it on your website. Email a friend about how you felt the day your invention was patented. | |
| 3 | Choose 3 inventions and demonstrate their usefulness to society. | Research 5 inventors and their inventions. Draw sketches of the inventions. Debate the most important of the 5 inventions. | Create The Inventor's Newspaper including a feature story, political cartoon, advertisements, and two hard news stories. The newspaper should focus on current inventions. | Write an editorial about the energy-saving light bulb. In your editorial, choose to be for or against its use. | |

Real World Connections With Products: compare, contrast, invent, create, dream, reflect, explore, prove, solve, celebrate, argue, decide, debate

Real World Applications: scientists, physicists, doctors, teachers, lawyers, teachers

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Materials Needed for Task Rotation and/or Task Rotation Menu

Paper Pencil

Art supplies

Essential Question:

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

MetaCognitive Discussion (Essential Questions):

(Whole Group)

Conceptual Perspectives:

In thinking about the process an inventor experiences to invent, how does this system affect the usefulness of an invention?

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How do systems serve a purpose?

Do systems create balance? Explain.

How do systems complete a task or a mission?

Are systems influenced by other systems? Explain.

Why are systems interdependent upon one another?

Intelligent Behaviors:

Literary Perspective:

What conclusions have you drawn about how systems are predictable and how they serve a purpose?

How do systems create order?

Student/Teacher Reflections:

Student Reflections and Assessments Task Rotation Learning Experience 5th Grade

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

Mastery Learner (A) Sensing- Thinking

Display in a newspaper advertisement the usefulness of an iPhone. How does this invention have a positive impact on society?

Which intelligent behavior/s did you use when you analyzed the iPhone's positive impacts on society? (thinking flexibly, thinking and communicating with clarity and precision)

V_*_L_*_S_*_M__B__P_*_I__N__

Interpersonal Learner (B) Sensing-Thinking

Select an invention from past or present and explain how this has changed your future.

Interpret how this invention has changed the United States.

How did you apply past knowledge to explain how the invention has changed your future and the United States? (applying past knowledge)



Understanding Learner (C) Intuitive-Thinking

Create a graphic organizer that compares and contrasts 5 of the MOST important inventions developed from 1700s to present.

What factors determine new innovations?

Which gifted intelligent behavior/s did you use as you decided which were the 5 most important inventions? (applying past knowledge, questioning, thinking and communicating with clarity and precision)

V_L_*_S_*_M_B_P_I_N_

Self-Expressive Learner (D) Intuitive-Feeling

Using an invention that you are familiar with, reinvent it three different ways:

- 1. adding a new element
- 2. changing an existing element
- 3. rescaling

How does each change benefit people?

Which gifted intelligent behavior/s helped you reinvent the invention you chose? (thinking flexibly, applying past knowledge)

V_L *_S_M_B_P_I_N_

Real World Connections With Products: compare, contrast, invent, create, dream, reflect, explore, prove, solve, celebrate, argue, decide, debate computers, ipods, wii, tv, musical

Real World Applications: scientists, physicists, doctors, teachers, lawyers, teachers

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Materials Needed for Task Rotation and/or Task Rotation Menu

Newspaper examples Internet/computer

Paper Pencil

Art supplies

Essential Question:

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

MetaCognitive Discussion (Essential Questions):

(Whole Group):

Conceptual Perspectives:

In thinking about the process an inventor experiences to invent, how does this system affect the usefulness of an invention?

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Are systems influenced by other systems? Explain.

Why are systems interdependent upon one another?

Intelligent Behaviors:

Which intelligent behavior/s did you use when you analyzed the positive impacts on society?

How did you apply past knowledge to explain how the invention has changed your future and the United States?

Which gifted intelligent behavior/s did you use as you decided which were the 5 most important inventions?

Which gifted intelligent behavior helped you reinvent the invention you chose?

How have you shown intelligent behaviors during this unit? How have you been able to think flexibly throughout this unit?

Literary Perspective:

What conclusions have you drawn about how systems are predictable and how they serve a purpose?

How do systems create order?

Student/Teacher Reflections

Math Student Reflections and Assessments Task Rotation Learning Experience 5th Grade

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

| Mastery Learner (A) Sensing- Thinking | Interpersonal Learner (B) Sensing-Thinking |
|--|---|
| Label and list the numbers used to organize the Dewey Decimal System used in our library. Display your information. How did you remain open to continuous learning while researching the Dewey Decimal System? (remaining open to continuous learning) | Convince your parents that your family does not need to participate in daylight savings time this year. How will this affect a 24 hour day during a school week? Create a skit to explain your findings. Which gifted intelligent behavior/s helped you understand how daylight savings time helps us? (questioning and problem posing) |
| V_L_S_M_B_P_I_N_ Understanding Learner (C) | V_L_S_M_B_P_I_N_ Self-Expressive Learner (D) |
| Intuitive-Thinking Explain the postal system's reason for increasing the price of stamps. Design a chart to display the information? Incorporate the ideas of change and innovation in your reasoning. How did you remain open to continuous learning while researching the price of stamps? (remaining open to continuous learning) | Imagine you are a world traveler like Benjamin Franklin. You are going on a journey to London, England; Paris, France; and Beijing, China. You will have \$5, 147 to spend in each country. Convert your American currency. Also include several purchases you made in each country. Create a collage displaying your currency conversions and your purchases. Which gifted intelligent behavior/s did you use on your travels? (creating, imagining, and innovating; remaining open to continuous learning) |
| V_L_S_M_B_P_I_N_ | V_L_S_M_B_P_I_N_ |

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Systems change with new innovations.

Materials Needed for Task Rotation and/or Task Rotation Menu

Newspaper examples Internet/computer

Paper Pencil

Art supplies

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North Carolina Department of Education and The American Association for Gifted Children,
Duke University

Essential Question:

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

MetaCognitive Discussion (Essential Questions):

(Whole Group)

Conceptual Perspectives:

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Why are systems interdependent upon one another?

Intelligent Behaviors:

Literary Perspective:

What conclusions have you drawn about how systems are predictable and how they serve a purpose?

How do systems create order?

Student/Teacher Reflections:

| Additional Support Materials: | | | | | | |
|---|--|--|--|--|--|--|
| Favorite Read-Alouds: | | | | | | |
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| Finger Plays, Nursery Rhymes and Songs: | | | | | | |
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| Video Clips: | | | | | | |
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| Paintings & Prints: | | | | | | |
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Teacher Reflections

Literary Selection

| Date | School | Grade |
|------|--|---|
| 1. | What were the strengths of the task rotation | ns and/or other activities? |
| 2. | How did the task rotations and/or activities discuss how each Intelligent Behavior man | s reveal students' Intelligent Behaviors? Please nifested it self. |
| 3. | What would you change or add the next tin | me you taught this lesson? |
| 4. | What opportunities for growth does the res | source unit have? |
| 5. | What were "ah ha's?" for the students? F | or teachers? |

"Additional Comments

APPENDIX

A

Additional Instructional Concept-Based Activities