Unit4: Invention, Innovation, Discovery & Imagination

Mid-January through February 2021

School Age Curriculum Materials

Unit 4: Invention, Innovation, Discovery & Imagination

Unit Length: 6-8 Weeks (Beginning mid-January to the end of February)

Major Themes:

- Invention: Creativity; Creating Something "New"
- Innovation: "Thinking Outside of the Box;" Ways of "Change;" Experimental Process
- STEM Life: Embracing Science, Technology, Engineering, and Mathematics
- Being an Entrepreneur: Project Planning; Productivity; Career Options

Unit Description: This month is a celebration of innovation, invention, and imagination. The children should be given opportunity and encouragement to explore their questions and as well as expand their knowledge around the concepts of science, technology, engineering, and mathematics. Both the physical environment and teacher-facilitated activities should offer engaging materials and insightful instruction that enhances children's curiosity about their world. This curiosity should be extended into how the children can contribute their ideas to society through project planning and entrepreneurial work.

Conceptual Unit Questions and Main Ideas:

- *How can we work together to creatively create something innovative andfun?*
- *What is "imagination" and what does mine look like?*

Unit Objective:

- Researching and building upon brainstormed ideas
- Thinking creatively and innovatively
- Engaging in the experimental process
- Embracing Science, Technology, Engineering, and Mathematics
- Preparing, facilitating, and completing a project plan
- Understanding role in a collaborative process
- Using entrepreneurial skills to enhance workplace productivity and career options

21st Century Learning Standards & Skills:

Learning and Innovation Skills: Creativity & *Innovation*
- Implement Innovations

Learning and Innovation Skills: *Critical Thinking & Problem Solving*
- Make Judgments & Decisions

Learning and Innovation Skills: *Communication & Collaboration*
- Communicate Clearly Information,

Media & Technology Skills: Information *literacy*
- Access & Evaluate Information

Life & Career Skills: *Flexibility & Adaptability*
- Adapt to Change.

Life & Career Skills: *Initiative & Self-Direction*
- Work Independently

Life & Career Skills: *Social & Cross-Cultural Skills*
- Interact Effectively with Others
- Work Effectively in Diverse Teams

Life&Career Skills: *Leadership&Responsibility*
- Be Responsible to Others

Integrated State Core Subject Standards:

Pennsylvania	Ohio	New York
Approaches to Learning + *Engagement & Persistence* Arts & Humanities • *Production, Performance, & Exhibition of Dance, Music, Theatre, & Visual Arts* • *Aesthetic Response* • *Historical & Cultural Contexts* Health, Safety, & Physical Education • *Physical Activity* Personal Social • *Develop Self-Regulation* Reading, Writing, Speaking, & Listening • *Speaking & Listening* • *Types of Writing* Social Studies • *How* Government *Works* • *Rights& Responsibilities of Citizenship*	English Language Arts • *Speaking & Listening* • *Vocabulary Acquisition & Use* Fine Arts • *Drama/Theatre* • *Visual Arts* Physical Education Social Studies • *civic participation & Skills* • *Heritage* • *Human Systems* • *Roles & Systems of Government* • *Rules & Laws*	English Language Arts • *knowledge of Language* • *Speaking & Listening* • Text *Types & Purposes* • *Vocabulary Acquisition & Use*

Language of Instruction:	Environmental Enhancement Options:	
• Imagination • Invention • Entrepreneur • Technology • Innovation	***Classroom Displays:***	Laminate pictures of famous American inventors for display.
	Writing Area:	Graph paper; Stencils; Pencils; Erasers; Magazines andretail advertisements
	Block/Construction Area:	Construction, connection materials (e.g., Bristle blocks, magnets, erector sets)
	Science & Nature Area:	Science/experimental kits/materials; Litmus paper; Scale & Weights; Magnets
	Library Area:	Fiction/non-fiction literature regarding child-interest based concepts in Science, Technology, Engineering, and Mathematics
	Games Area:	Mathematic board games (e.g., Monopoly, Chutes & Ladders)
	Dramatic Play Area:	Prop box: Science labor Retail store

Songs & Stories:

Songs:

Younger School Age	*Stinky Shoes; Dissolve; Magnets*
Older School Age	*PEMDAS* (Watch the music video at http://mathstory.com/mathsongs/pemdas.aspx#.UP7G1PLoEtk); *Chemical Change; King Henry Died by Drinking Chocolate Milk by Science Maniacs* (Listen to the song from free: http://www.songsforteaching.com/math/metrics/kinghenry.htm)

Non-Fiction Books:

Younger School Age	*"Pattern,"* Henry Arthur Pluck rose; *"The Everything Kids" Science Experiments Book: Boil Ice, Float Water, Measure Gravity-Challenge the* World *Around You!"* Tom Robinson
Older School Age	*"Go Figure: A Totally Cool Boom* about Members, "Johnny Ball; *"Science in Seconds for Kids.' Over 100 Experiments You Can DOIII 10Minutes or Less,"* Jean Potter; *"The Kid Who Invented the Popsicle: And Other Surprising Stories about Inventions,"* Don Wulffson

Fiction Books:

Younger School Age	*"The Button Box,"* Margarette Reid; *Twoof Everything,* Lily Toy Hong; *"Growing Patterns,"* Sarah Campbell
Older School Age	*"Full House: An Invitation to Fractions,"* Dayle Ann Dodd's; *"Multiplying Menace: The Revenge of Rumpelstiltskin, "Pam* Calvert

Chapter Books:

"Norby the Mixed-Up Robot," Janet Asimov
"*Freckly Juice,"* Judy Blume

Poems, Stories, Fables, Etc.:

Poetry	*"The Fisherman and the Little Fish,"* Aesop (Watch the illustrated video of this fable at: http://www.umass.edu/aesop/content.php?n=8&i=1)
Quotes	*"I never did anything byaccident, nordid anyof my inventions come byaccident; they came by work." -Thomas Edison*

GrossMotor Play:

- 4-Square
- Magic Walk
- Peanut Butter

Transition Options:

- Guess Again
- Where Did You Work Today?
- I Think I See

Project-Based Learning Suggestions:

- "I'm an Inventor: I'm an Entrepreneur" Ask the children to brainstorm new inventions or innovations to already established items (e.g., shoelaces that will not untie on their own). The children should work in pairs or small groups, develop a description and picture of the invention/innovation, and propose how it would be sold/offered toothers (This is the development of a project plan). **(C/ossroom *O/Sp/oy* Suggestion:** Display invention/innovation pictures.)
- "Science Fair" Havethechildren plan experiments (see suggested readings for experiment examples) to conduct atan Academy Science Fair. The Fair will be a showcase of the children's work; families and Academy staff and children should be invited. The Fair should be planned for and hosted by the classroom children.
- "STEM" Have thechildren decorate one of the classrooms displays boards to emphasize the importance of Mathematics and Science. ***(Classroom Display Suggestion)***
- "Brain-Teaser Tournament" Create a tournament out of one of the classroom's mathematically related board games (e.g., Chess, Checkers, Monopoly)
- "Classroom Money" Have the children develop a classroom monetary system that is linked. to positive behavior strategies (e.g., a Token Economy).

Home Connections:

- Encourage families tocook meals together, discussing how theconcepts of Mathematics, Science, and Technology are apart ofeveryday life.
- Children and families should discuss ways that technology is a part of their lives. Encourage the family to then conduct an experiment of omitting one facet of technology from their lives for just one day (e.g., no cell phone or television) and record their experiences.

Do not Forget!

- Be sensitive towards children's "mathematics/science phobias" and encourage math and science activities/experiences daily.
- Be sure to provide literature and art materials throughout the classroom to encourage multi-faceted learning.
- Take notes! Conduct classroom and individual child observations at least once a week. Remember, each child should have at least one observation per weekly experience.

Supplemental Materials:

- Information: Definitions for Language of Instruction
- Song Lyrics and Aesop Fable
- Online Resources for Black History Month
- Facts about African American Inventors
- Entrepreneur Kids: Helping Kids Develop a Business Plan
- Information about Electricity
- Chain of Clues
- Information about Acids and Bases (Chemistry)

Suggested Activities:

Title: The Electric Lemon

Type of Activity: Individual or small group

Activity Objectives: *The children will:*

- Think creatively and methodically.
- Become familiar with the term and concepts of electricity.
- Embrace science and technology concepts.
- Engage in the experimental process.

21st Century Standards & Skills:

- Life & Career Skills: *Social & Cross-Cultural Skills*- Interact Effectively with Others
- Learning and Innovation Skills: *Creativity &* Innovation- Implement Innovations

State Integrated Core Subject Standards:

PA:

- YSA: 2.3.3 (K); 2.1.B (1st—2nd)
- OSA: 2.3.3.A (3rd); 2.3.4.A (4th); 2.3.5.A (5th)

OH: Science

- YSA: Physical Science (K-2nd)
- OSA: Earth and Space Sciences (3rd);

Physical Science (4th) NY: Science

- YSA: 1 Analysis, Inquiry, and Design Sl.la
- OSA: 4-The Physical Setting 4.2b

Activity Materials:

- Copper Wire and Wire Clippers (if accessible)
- Steel Paper Clip
- Sheet of Course Sandpaper
- Lemon

Activity Description:

Prior to the Activity: Remove any wire insulation around the copper wire, if any and straighten the paper clip. Straighten and clip the paper clip to be about 2 inches.

Introduce this activity by discussing with the children how batteries are used to create "current charges" that provides voltage to an electrical outlet to create power. To create a "charge," you must create a current between positive and negative ions. Let the children know that ions are everywhere (e.g., static electricity) and that, through experimentation, you can find them in the simplest items...like fruit and vegetables. (Refer to Supplemental Materials for more information on electricity). Show the children the experiment materials and have them brainstorm how an electrical charge is going to be produced using the items. As the children are brainstorming, have them each take turns sand papering the rough edges of the straightened, clipped paper clips and wire. Have someone gently squeeze the lemon(s), without rupturing the skin. Rolling the lemon on the table will help.

Push the ends of the paper clip and wire into the lemon, as close together as possible without having them touch. With the other end of the wire, place it lightly on the tip of your tongue. You should feel a slight tingle and taste something metallic. NOTE: To prevent the spread of germs, either provide each participating child their own wire and lemon OR wipe the end of the wire with an alcohol wipe (allowing for it to air dry) between each use.

Conclude the activity by discussing what the "tingly" sensation was and why it tasted metallic. If possible, record the children's responses.

Activity Accommodations:

- Provide each child their own experiment materials to avoid wait time as well as allow for individual task completion and more focused attention.
- Conduct this activity during large group experience (e.g., Circle Time) to use as an introduction to the concept of electricity/science.

Activity Extensions Ideas:

- Continue this activity throughout the year, incorporating the concepts of "recycling," "conservation," and "consignment" into the children's learning experiences. The teacher may also want to develop a home connection experience related to this activity.

Title: Thinking Out of the Box

Type of Activity: Individual or small group

Activity Objectives: *The children will:*

- Work creatively to freely express themselves and engage in problem solving.
- Preparing, facilitating, and completing a project.
- Understanding role within a collaborative project (if working in small groups), clearly communicating ideas.
- Building upon brainstormed ideas.

21" Century Standards & Skills:

- Learning and Innovation Skills: *Creativity &* Innovation-Implement Innovations
- Learning and Innovation Skills: *Communication & Collaboration-* Communicate Clearly
- Life & Career Skills: *Leadership &* Responsibility-Be Responsible to Others (If working in small groups)

State Integrated Core Subject Standards:

PA:

- YSA: 2.3.3 (K); 2.1.B (1" —2' d)
- OSA: 2.3.3.A (3rd); 2.3.4.A (4'^); 2.3.5.A (5°)

OH: Language: Speaking & Listening

- YSA: SL.K2.4c
- OSA:
- (3'd); Physical Science (4'^)

NY: Language: Speaking & Listening - 4 K-5th)

Activity Materials:

- Various pieces of colored heavy paper, oak tag, or card stock
- Various colored construction paper
- Stapler and glue
- Decorative embellishments (e.g. feathers, ribbon, stickers, sequins)
- Tempura paint and markers
- Medium- and/or large-sized cardboard boxes

Activity Description:

Prior to the activity: Collect as many cardboard boxes as possible; ask families and local business, such as grocery stores for donations.

Introduce the activity by asking the children to select a box and then to describe what the box was used for. Describe what it means to be "innovative" (refer to Supplemental Materials for definition). Then, ask the children to be innovative in developing innovative ways to use the box again. If possible, ask the children to think of different ways the box can be used (e.g. a cereal box re-created into a file folder holder).

The children may work in pairs or individually to complete this task. First ask the children to draw their "re-creations" on paper to serve as a reference guide. Once finished, the children then may use whatever materials necessary to create their design. Upon completion of their project, the children should be encouraged to describe it to the other classroom children, and if possible, put it to use.

Activity Accommodations:

- Provide additional time/days to allow for deeper thought and focused completion.
- Assist children during the brainstorming process; the teacher may also want to complete a project along side of the children to model how to complete the process.
- Pair younger children with older children to allow for peer mentoring.
- If working in small groups, assign "group leaders" to monitor the project process and completion.

Activity Extensions Ideas:

- Continue this activity throughout the year, incorporating the concepts of "recycling," "conservation," and "consignment" into the children's learning experiences. The teacher may also want to develop a home connection experience related to this activity.

Title: As Seen On TV

Type of Activity: Individual task

Activity Objectives: *The Children will:*

- Think creatively to freely express themselves.
- Strengthen creative writing and language skills.
- Making connections between Language, the Arts, Technology, and Social Application

21" Century Standards & Skills:

- Information, Media & Technology Skills: *Information Literacy-Access* & Evaluate Information
- Life & Career Skills: Initiative & Self-Direction-Work Independently

State Integrated Core Subject Standards:

PA:

- YSA: 9.2.1 (K); 9.2.C (1st);9.2.D (2nd)
- OHS: 9.1.3.E (3rd – 4th)

OH: FA: Connections, Relations, & Applications

- YSA: 3 (k); 4 (1st – 2nd)
- OSA: 2 (3rd); 1 (4th); 3 (5th)

NY: Language – Vocabulary Acquisition & Use

- YSA: 4.a. (K); 5.c(1st); 6 (2nd)
- OSA: 6 (3rd -5th)

Activity Materials:

- Large paper and markers

Activity Description:

Ask the children tothink of an item seen on television that theyliked or something that they "cannot live without." Have them describe why they selected their particular item(s).

As an entrepreneur, it is important to be able to not only describe whatever item/services/etc. you are providingbut that youdosoina way that isexciting andenticing toothers (Refer to theSupplemental Materials for information about being an entrepreneur). Ask the children to brainstorm slogans/posters/advertisements (or their selected item. They may use an already established slogan (e.g. "Just Do It"—Nike) or they caninventsomething new. Allslogans and/or posters toshowcase their selected item should be drawn ontotheprovided large paper. They are to create "visual advertisement."

Upon completion, display posters (with child permission) on one of the classroom display boards.

Activity Accommodations:

- Provide magazines, advertisements, or actual items (e.g. sneaker boxes) to serve as visual references.
- Provide additional time and allow for the children to change their ideas as many times as needed (Create a "save" area to allow for the children to safely store their large paper and written ideas during non-work times).
- Instead of drawing posters, provide magazines, clothing tags, pictures, etc. that the children may use to create their posters (Additional materials needed: Glue, Scissors).
- Provide sample pictures of posters, billboards, advertisements to serve as a visual reference and/or template for the children.

Activity Extensions Ideas:

- Ask the children to develop a television commercial, highlighting the concepts oftheir posters.
- Ask the children to create a plan for selling the item within the community-this would be the development of a "business plan."

Title: Making Play Dough

Type of Activity: Small-group or Individual-task

Activity Objectives: *The children will:*

- Be introduced to the creative arts
- Use measuring and calculation skills
- Strengthen their hand-eye coordination and fine motor skills

21st Century Standards & Skills:

- Learning & Innovation Skills: *Critical Thinking & Problem* So/v/n9-Make Judgments & Decisions

State Integrated Core Subject Standards:

PA-

- YSA: 2.3.3 (K); 2.1.B (1" —2'd)
- OSA: 2.3.3.A (3'd); 2.3.4.A (4'h); 2.3.5.A (s'")

OH: Mathematics

- YSA: KMD.1 (K); 1OA.1 (1"); 2OA.1 (2nd)
- OSA: 3NF.1 (3'd); 4NF.3.b (4to); 5NF.4.a (5'h)

NY: Mathematics

YSA: KMD.1 (K); 1OA.1 (1"); 2OA.1 (2' d)

- OSA: 3NF.1 (3'^); 4NF.3.b (4'^); 5NF.4.a (5'^)

Activity Materials:

- Salt
- Water
- Flour
- Food coloring
- Glitter
- Newspaper or a drop cloth
- Mixing bowl(s) and spoon(s)
- Ziploc bags or small plastic containers
- Paper Towels

Activity Description:

The opportunity to sculpt and knead play dough should be frequently provided. So, instead of purchasing an abundant amount of dough, the group is going to make their own. Making their own play dough also encourages the sense of" material ownership," in that, because they worked hard to make it, the children are more vested in taking care of the play dough. In addition, the activity will highlight various mathematics and science concepts.

First, cover the table with newspaper or a drop cloth and place the mixing bowl in the middle. The teacher may need several bowls due to the size of the group. The teacher should ask a child to measure 1 cup of flour and pour it in the bowl. Then, another child should be asked to measure / cup of salt.

Add the salt to the mixing bowl with the flour. Fill a measuring cup of cup of water and also put that in the bowl. Now mix! Each child should have an opportunity to mix the ingredients. The group should mix the mixture until its" mushy," either not being watery or floury.

The children can then add the food coloring to the mush. The mixture can be split apart at this point; each child can have their own play dough in a small bowl, adding whatever and how much color they desire. The more food coloring added, the darker the color the play dough becomes (Note: Be careful in adding too much food coloring. Too many drops may turn the mixture the color black.) Children may also put glitter in their play dough if they desire. The play dough should stay in the small bowls to mix and children should use spoons to continue mixing their dough; hands will become stained if used to mix fresh play dough since the food coloring did not dry yet).

Once the mixture begins resembling play dough, stop mixing. If it is still a bit sticky, the children can knead "pinches" of flour into it. The teacher may need to model what "kneading" is: Work (moistened flour or clay) into dough or paste with the hands; massage or squeeze with the hands. Use the paper towels to wipe off hands. The teacher should close this activity reviewing the steps in making Play dough.

Activity Accommodations:

- Provide direct teacher-assistance (e.g. hand-over-hand; teacher model) to ensure successful completion
- Assist the children in measuring the ingredients either by helping the children to determine if the correct amount has been obtained in the measuring cup or the teacher scoops the ingredients into the cups while the children count. The later may be conducted due to young children's fine motor immaturities.
- Allow for complete independence in this activity-provide a pictorial recipe and the materials in the Science area.

Activity Extensions Ideas:

- Split the Play Dough into separate containers to use for experimentation (e.g. what happens to Play Dough whenever water is added to it?)
- Encourage the children to create sculptures; use classroom scale to weigh sculptures. Create a guessing game of sculpture weight.

Title: Chain of Clues

Type of Activity: Large-group

Activity Objectives: *Thechildren will:*

- Think creatively and problem solve.
- Manage anindividual taskto completion.
- Strengthen musicality and listening skills.

21st Century Standards & Skills:

- Learning and Innovation Skills: *Critical Thinking & Problem Solving-Solve* Problems
- Information, Media & Technology Skill/5: *ICT*literacy-Apply. Technology Effectively

State Integrated Core Subject Standards:

PA:

- YSA: 9.la.3 (K); 9.4.C (1"); 9.4.D (2nd)
- OSA: 9.1.3.D (3rd); 9.1.4.D (4'^); 9.1.5.D (5'^)

OH: FA: Music-Connections, Relationships, & Applications 1 (K-5' h)
NY: Language-Speaking & Listening Skills 6 (K-5")

Activity Materials:

- Refer to the Supplemental Materials for activity materials.
- Tape

Activity Description:

Prior to *the activity:* Print and cut out the *Chain ofC/ues* clues.

Here's a chance for the young mathematicians to play detective. Give each child one clue to tape to the front or back of their shirt. Designate one child/one clue as the "first link" in the chain. All of the children should readthe first clueandthenbegintoreadeachother's clues. Allow for thechildren tostand and walkaround during this activity. The object is for each student to find the next number in the series, continuing until the entire series iscompleted. All theaddingand subtracting inthis game makesitgreat forpracticing mental math. The children should agree upon the chain when developing it. NOTE: The larger number serves as the "answer" to one of the clues provided on the *Chain of Clues* sheet.

Activity Accommodations:

- Create additional cluestocontinue the game, if child-interest is generated.
- Create clues for younger children, simplifying the mathematical concepts.
- With the entire group, start with one clue and then work through the chain together instead having the children work independently.

Activity Accommodations:

- Create additional cluestocontinue the game, if child-interest is generated.
- Create clues for younger children, simplifying the mathematical concepts.
- With the entire group, start with one clue and then work through the chain together instead having the children work independently.

Title: Create Your Own Video Game

Type of Activity: Small-group or Individual-task

Activity Objectives: *The children will:*

- Think creatively.
- Research and analyze media.
- Engage in creative writing experiences

21st Century Standards and Skills:

- Information, Media, &
- Technology Skills: *Information Literacy* – Access & Evaluate Information

State Integrated Core Subject Standards:

PA

- YSA: 25.2.1 (K); PS 2.B (1*'-2' d)
- OSA: 1.6.3.A (3'd); 1.6.4.A (4'^);1.6.5.A (5'^)

OH: Language-Vocabulary **Acquisition & Use**

- YSA: L.K2.4a (K-2"d)
- » OSA: L.35.6b (3'^-5'^)

NY: Language-Vocabulary Acquisition & Use 6 (K-5")

Activity Materials:

- Thick paper (tag board or cardboard)
- Writing utensils (e.g., pencils, markers, colored pencils)
- Old magazines or books that can be torn, preferably ones that include pictures from popular (and age appropriate) video games (e.g. Super Mario Brothers)
- Scissors
- Glue

Activity Description:

Video games are a part of our mainstream society. As children become more comfortable using technology, the developmental task of game play has extended to include technological experiences. Games are available for personal computers, phones, and electronic gaming systems. Children are fascinated by the concepts of video games, and many have taken the extra step in thinking of ways to either enhance already created games or create ones of their own. As a way to introduce this activity, ask the children *who likes to play video games and* what *they like about them.* Then ask i/ *given the opportunity* to*create a video game for kids their age, what would it look like and why7* These questions should serve as "story prompts." **(Story prompt: A** story prompt is a depiction or note that captures key elements of a story. Story prompts assists in the creation and completion of a story that includes an introduction, body, and conclusion. Story prompts can include pictures of key elements or characters as well as written notes, sayings, and languages.)

Distribute three pieces of paper to each child and ask them to label them with a "1 " "2" and "3." The children should then be encouraged to draw/write their video game ideas on the pieces of paper that correspond with when those ideas will be reflected during the game (1 - beginning the game; 2 - middle of game; 3 = how to conclude/win the game). The children may work in pairs or individually.

Upon completion, ask the children if they would like to share their ideas with the rest of the group. (Classroom Display Suggestion).

Activity Accommodations:

- Instead of drawing, the children can cut out pictures and glue to their labeled game prompt cards, from magazines to represent their ideas.
- Allow for additional time for completion. This activity may require several activity periods. Be sure to create a safe storage space for the children to "save" their work.

Activity Extensions Ideas:

- Create a classroom video game that all of the children to work on together. As they work on the video game, an entrepreneurial project can be developed around game development, production, and advertising/selling.
- Discuss how video gaming is a part of today's technology. Ask the children to brainstorm ways in which video games of the "future" will be played (e.g., virtual gaming).

Title: Video Game Heroes

Type of Activity: Small-group or individual-task

Activity Objectives: *The children will:*

- Think creatively and express story comprehension through visual art.
- Use various art mediums to freely express themselves.
- Connect visual art with literary art.

21st Century Standards & Skills:

- Learning and Innovation Skills: Critical Thinking & Problem Solving-Make Judgments & Decisions
- Information, Media, & Technology Skills: *Information* Literacy-Access & Evaluate Information

State Integrated Core Subject Standards:

PA

- YSA: 9.1c.2 (K); 9.1.M (1"); 9.1.I (2"d)
- OSA: 9.1.3.A (3'd-4'^); 9.1.5.A (5t")

OH: FA: Visual Arts:

- YSA: Creative Expression & Communication 1 (K); 3 (1" — 2"d)
- OSA: Creative Expression & Communication 6(3'd); 4 (4'^); 3 (5")

NY: Language: Writing

- YSA: Text Types and Purposes 2 (K-2"d)
- OSA: Text Types and Purposes 2.a (3'd-5")

Activity Materials:

- Large paper
- Pencils and erasers
- Colored pencils
- Rulers and various drawing apparatuses

Activity Description:

Ask thechildren if they have continued tothink "creatively" about their videogame ideas (pertheCreate Your Own Video Game activity). If thechildren respond with "yes," askthe children to explain their current thinking (if they are willing to share) and state that this timecanbeusedtodepict their "Game Hero(es)." (Use this activity asa waytoreview the concepts of Heroism discussed during the *Heroes and Heroines Near& Far* unit) Ifthe children respond with"no," askthechildtoexplain what a "Video Game Hero" isandhow theimage helpsto"telthe gamestory." Then, the teacher shouldaskthechildren tobegin thinking of their video game ideas. Once a few ideas are shared, the teacher should ask the children about the characters described in their ideas. Ask questions such as "what would they look like?" and "what would they wear?"

Provide various art media for the children to begin creating their game characters. As the children draw, theteachershould continue askingprobingquestions regarding game concepts and characters to encourage creative thinking. Ask the children if they would be willing to share their character depictions with the group.

Activity Accommodations:

- Show the children pictures of famous video game characters (e.g. Mario Brothers; Link; Pac-Man).
- The teacher should ask the children questions about their ideas to encourage creative thought.
- Allow for the small group to create collaborative character depictions instead of working on this activity independently.
- Allow additional time for completion.

Activity Accommodations:

- Show the children pictures of famous video game characters (e.g., Mario Brothers; Link; Pac-Man).
- The teacher should ask the children questions about their ideas to encourage creative thought.
- Allow for the small group to create collaborative character depictions instead of working on this activity independently.
- Allow additional time for completion.

Title: Numbers Rule the World!

Type of Activity: Large-group experience

Activity Objectives: *The children will:*

- Discuss why numbers (and mathematics) are an important part of everyday life.
- Communicate clearly with others

21st Century Standards & Skills:

- Life & Career Skills: Social & Cross-Cultural Skills- Interact Effectively with others

State Integrated Core Subject Standards:

PA

- YSA: 25.1.3 (K); PS.3.H (1"-2'd)
  OSA: 9.1.3.B (3"); 9.1.4.B (4'^); 9.1.5.B (5°)

OH: Mathematics

- YSA: KCC.1 (K); 1.NBT.1 (1*'); 2.NBT.2 (2"d)
- OSA: 3.NBT (3'd); 4.NBT.1 (4'^); 5.NBT.1 (s'^)

NY: Mathematics

YSA: K.CC.1 & 2 (K); 1.NBT.1 (1"); 2.NBT.2 (2' d)

* OSA: 3.NBT.2 (3'd); 4.NBT.1 (4'^); 5.NBT.1 (5'")

Activity Materials:

- Paper and writing utensils (with erasers)

Activity Description:

To introduce this activity, talk about the different ways we use numbers in our everyday lives. Ask the questions: *What are some uses of numbers? Why are numbers important?*

Have the children walk around the classroom for 5 to 10 minutes and ask them to point out examples of numbers they find in the room. Direct them to some less obvious ways numbers are used, such as on a clock or the number of paintbrushes in a jar, cubbies, or windows in the classroom. When finished, asked the questions: *Where do you see numbers?* What ore *the numbers doing* there? *Are they measuring something, telling time, or representing a group?*

After sharing what they found, ask the children to imagine aworld without numbers. *What would* it *be* //#e? *How would things be different? How would school and their classroom be different?* Give the children a few minutes to think and share their thoughts withthe group. Talk about the things that children do in a day. *What things would be harder to do without numbers? How do numbers help them know when to go toschool? How do numbers help them know how many plates* toput *on the dinner table? How do numbers help us know where tostand in a line?* Help students come up with examples of ways they rely on numbers every day.

Have the children draw a picture showing an example of a time they have used numbers. Give them some examples: standing first or last in line, dividingcandy amongfriends, or havinga doctor measure their height. All of these represent important uses of numbers in everyday life. More advanced students could write words or a sentence or two explaining their drawing. (Classroom Display Suggestion)

When the drawings are complete, ask volunteers to share their work with the group. Display the drawings in theclassroom so that students are reminded of the importance of numbers in their everyday lives.

Activity Accommodations:

- Teacher modeling and/or participation may be needed during number hunt.
- Pairchildren toencourage peerlearning.

Activity Extensions Ideas:

- Have the children conduct a similar activity regarding science and technology concepts.

Title: Lemon Chemistry: A Scientific Experiment

Activity Objectives: *The children will:*

- Become familiar with the concepts of acids and bases, elementary chemistry.
- Engage in scientific process of experimentation.
- Use problem solving skills.

21st Century Standards & Skills:

- Learning and Innovation Skills: *Critical Thinking & Problem Solving* – Make Judgements & Decisions
- Life & Career Skills: *Flexibility & Adaptability* – Adapt to Change

Type of Activity: Large- or small group

State Integrated Core Subject Standards:

PA:

- YSA: 2.3.3 (K); 2.1.B (1" — 2")
- OSA: 2.3.3.A (3'd); 2.3.4.A (4^); 2.3.5.A (5")

OH: Science

- YSA: Physical Science (K-2' d)
- OSA: Earth and Space Sciences (3'd);

Physical Science (4'^) NY: Science

- YSA: 1 Analysis, Inquiry, and Design S1.la
- OSA: 4-The Physical Setting 4.2b

Activity Materials:

- Lemons
- A Knife (for teacher-use only)
- Measuring cup and measuring spoons
- Baking soda
- Liquid dish soap
- A clear cup

Activity Description:

Introduce this experiment as a classic example of an acid-base reaction. The baking soda (a base) and the lemon juice (an acid) combine torelease Carbon Dioxidegas. Theliquidsoap turns the bubblesinto foam that often erupts right out of the glass. Please refer to the Supplemental Materials for more information on acids and bases.

To conduct the experiment, first ask the children to predict what they believe will happen during the experiment and then whatwillhappen upon completion oftheexperiment. Thechildren aremaking "hypothesis." Next, roll thelemons onthe counter like dough. This releases the juice inside the lemon. The teacher should then cut the lemon in half and designate children to carefully squeeze out the juice into a small measuring cup. The group should note how much juice was created from each lemon and put the juice aside.

Into the met clear cup, ask a child to place 1 tablespoon of baking soda. Add 1 teaspoon of liquid dish soap to the baking soda. Stir these up a bit. Pour the lemon juice into the cup and stir. Now watch the lemon suds erupt!

To conclude the activity, brainstorm and review why these ingredients reacted the way they didwhenever mixed.

Activity Accommodations:

- Conduct this experiment in small groups only.

Activity Extensions Ideas:

- Re-create this experiment in the Science/Nature Area of the classroom (be sure to pre-cut the lemons) and ask the children to record results.

Title: Robots All Around Us

Type of Activity: Small-group; Individual-task

Activity Objectives: *The children* w///:

- Describe what their idea of design is and how it is used.
- Participate in group and class discussions.
- Brainstorming, sketching, building, and re-designing engineering ideas

21st Century Standards & Skills:

- Learning and Innovation Skills: *Creativity &* Innovation-implementing Innovations
- Life &Career Skills: Initiative & Work Independently

State Integrated Core Subject Standards:

PA:

- YSA: 9.2.1 (K); 9.2.C (1"); 9.2.D (2' d)
- OSA: 9.1.3. E (3'^ — 4'^); 9.1.5.D (5'^)

OH: FA: Historical, Cultural, and Social Contexts:

- YSA: 3 (K); 1 (1st); 3 (2' d)
- OSA: 3 (3'd - 4tNt; 5 (5'^)

NY: Language:

- YSA: Vocabulary Acquisition and Use 4.a (K); 4.b (1"); 5.a (2nd)
- OSA: Knowledge of Language 3.a (3' d-4t"); Vocabulary Acquisition and Use 4.a (5'^)

Activity Materials:

- Large paper and markers
- Various pencils and writing utensils.
- Thick paper (cardstock, oak tag)
- Popsicle sticks
- Masking tape
- Decorative embellishments such as paper towel rolls, aluminum foil, pipe cleaners, and buttons
- Glue
- Paint and paint brushes
- Construction paper
- Scissors

Activity Description:

Askthechildren aboutrobotstheyhaveseeninmovies or on TV.*Whatdotheylike aboutthem, whatwouldthey change** Ask the children if they were to create their own robot, what would it look like? What would it do? And why? After brainstorming for a few minutes, the children should sketch their design ideas on a large piece of paper.

The teacher should then challenge the children to design a three-dimensional sculpture, using the boxes and tape that resembles their robot design.

Upon completion, theteacher should encourage the children todiscuss their robot design. Ask thechildren to speak about positive and negative experiences while designing and building their pieces. What would they change if they could start over? What would stay the same?

Activity Extensions Ideas:

- Provide additional time for completion. This activity may require several work periods.
- Encourage the children to work in small groups or pairs to encourage peer learning and problem solving.

Activity Accommodations:

- Provide a teacher-made model and/or laminated pictures of robots to serve as visual references.
- Ask the children to continue drawing robot designs. Once additional designs have been drawn, put them in a pile and ask the children to select designs to build-the children are to follow the designs to engineer the robot.

Title: What is an Invention?

Type of Activity: Large- or small-group

Activity Objectives: *The children will:*

- Discuss what inventions and recognize some of the many inventions around them.
- Learn about famous inventors, their inventions, and how the inventions impacted others.
- Communicate clearly.
- Research and evaluate information.

21st Century Standards & Skills:

- Life & Career Skills: *Social & Cross-Cultural* Skills-Interact Effectively with Others

State Integrated Core Subject Standards:

PA:

- YSA: 1S.1.2 (K); AU.1(1"); AU.2 (2")
- OSA: 1.6.3.A(3'd); 1.6.4.A (4'^); 1.6.5.A (5'h)

OH: Social Studies

- YSA: 4 (K); 5 (1"); 8 (2'd)
- OSA: 9 (3'd); 17 (4!^); 12 (5t

NY: Language:

- YSA: Vocabulary Acquisition and Use 4.a (K); 4.b (1"); 5.a (2nd)
- OSA: Knowledge of Language 3.a (3'd-4"); Vocabulary Acquisition and Use 4.a (5 tt)

Activity Materials:

- Large paper and markers

Activity Description:

Asawaytointroducethisactivity, writethefollowing wordsonalargepiece ofpaper: *telephone,* /re, toothpaste, *aspirin,* electricity, *wheel, gold.* Ask the children to choose which of these are inventions. (Answer: telephone, toothpaste, aspirin, wheel) and which are not inventions. (They're found in nature; people didn't create them.) Which of these items might be considered discoveries? (fire, electricity, gold) Why? (They had already existed in nature when someone discovered them for the first time.)

On another piece of large paper, write: "An invention is ..." and ask the children to brainstorm answers. Then, ask the children to name inventions they can see in the classroom. For each invention, ask them to describe what the invention is used for. As they brainstorm, keep alist.

Next, write the following names on the paper: Alexander Graham Bell, Thomas Alva Edison, Henry Ford, Orville and Wilbur Wright. Tell the children that these are some of the most famous inventors. Ask them if they know what each of them invented and write the invention next to the name.

Alexander Graham Bell: Telephone
Henry Ford: Assembly line and the Model T (the first popular car to be sold to many people)
Wright brothers: Airplane
Thomas Alva Edison: Light bulb and phonograph (the first machine to record and play back sounds), and many others.
Eli Whitney: Cotton gin

Divide the children into small groups, each assigned to one of the inventors above (or other inventors thought of by the children). Ask them to answer the following questions.

- How does this invention help people?
- How do you think this invention changed the way people live?
- What kinds of things did this person need to know in order to create his invention?
- Would you consider this a successful invention? Why or why not?

To conclude this activity, bring the groups together and have each read their answers. Ask the final question: *What makes all these inventions important?*

Activity Accommodations:

- Allow additional time for completion.
- Assign small groups based upon communication and/or research ability.

Activity Extensions Idea:

- Discuss inventions that the children feel have not contributed to the betterment of society (in the children's opinions). This may include controversial inventions such as nuclear power, gun powder, and money. Discuss how these inventions can be used for good, if possible.

Definitions: Language of Instruction

Imagination: The formation of a mental image of something that is not perceived as real and is not present to the senses; the ability to deal resourcefully with unusual problems

Invention: A creation resulting from study and experimentation.

Entrepreneur: Someone who organizes a business venture and assumes the risk for it

Technology: The practical application of science to commerce or industry; the discipline dealing with the art or science of applying scientific knowledge to practical problems

Innovation: The act of starting something for the first time; introducing something new

Unit Songs & Fables

Stinky Shoes

(http://mathstory.com/mathsongs/stinkyshoes.aspx#.UP7GM_LoEtk)

1 and 1,
Smelly Shoes,
Make 2very,
Stinky shoes,
1 and 1 stinky shoes,
Give you 2 stinky shoes,
1 and 1 odd up to 2,
Very, smelly,
Stinky shoes,
I don't know what I will do,
Withtheseverystinkyshoes,
Stinky, stanky,
Smelly, danky,
Scented, dented,
Stinkyshoes...
What will I do with these shoes?
Stinky shoes,
Stanky shoes,
Pee-yoo, Pee yoo pee you shoes,
Pee-yoo shoes, Pee you shoes,
1 + 1,
Give you 2!
Pee-yoo, Pee yoo, pee you shoes,
Pee-yoo, Pee yoo, pee you shoes,
1 + 1,
Give *you 2!*
That's a pair to me and you!!

Stinky, stanky,
Smelly, danky,
Scented, dented,
Stinkyshoes...
What will I do with those stinky shoes?
Stinky Stanky,
Pee yoo, danky,
Icky, yicki,
Mucky, yucky
Scented, dented
Muddy, ugly,
Dirty, dingy,
Filthy, grimy,
Grubby, reeky,
Filled with fungus,
Rotting shoes,
Areamong us,
Icky yicki,
Mucky, yucky,
Muddy, ugly,
Dirty, dingy,
Stinky, stanky,
Smelly, danky,
Scented, Dented,
Stinkyshoes...
1 and 1,
Give you 2!
Smelly, smelly, smelly,
Smelly shoes!!
1 and 1,
Give you 2!
Smelly, smelly, smelly,
Smelly shoes,
Pee-you shoes,
Pee-you shoes,
Pee-you!!

PEMDAS

PEMDAS tells you which to use,
You gotta' use your PEMDAS when you feel conyused...
PEMDAS goes just like this;
It's never ever something you ever want to miss...

Parenthesis,
Exponents,
Multiplication,

Division,
Addition,
And last is Subtraction...
You don't know your PEMDAS,
What's first and what's last,
You don't know your PEMDAS,
You can't pass math class...

When you do math,
You gotta' work with precision,
Use PEMDAS,
To make a decision,
(left to right multiply or you dooddition)
When you domath,
You gotta' take action,
(left to right addition left to right subtraction)
Use PEMDAS to get a reaction...
PEMDAS goes just like this,
It's never ever something,
You'll ever wanna' miss...

Parenthesis,
Exponents,
Multiplication,
Division,
Addition,
And last is Subtraction...
You don't know your PEMDAS
What's first andwhot's last,
You don't know your PEMDAS,
You can't pass math class...

Use PEMDAS to get o solution,
Parentheses,exponents, multiplication,
Division, addition, and then there's subtraction,
Use PEMDAS to get a solution,
Use PEMDAS to get a solution,
Parentheses,exponents, multiplication,
Division, addition, and then there's subtraction...

Chemical Change

Chemical Change,
I'm feeling strange,
I've changed to something new,
Chemical change,
Atoms changed,
Properties differenttoo..

Chemical change,
I'm feeling stronge,
My bonds,
I think they're breaking...
Chemical change,
I'm rearranged,
Like change that's caused by baking...

Baking, or burning,
Or mixing things,
That cause them to react,
Table salt,
Na-Cl,
We know it's just afact!

Oxidi£e, or useaflame,
To cause things to combust,
Iron tends to oxidize,
And makes a thing called rust...

Chemical change,
I'm feeling strange,
I'm different, how 'bout you?
Chemical change,
Changes things,
And gives us something new!

Dissolve

Eat too much sugor?

Nobody should!
But I like toeatsugar,
It tastes really good...
So I hid all thesugar,
Where it couldn't be found,
Not up in the air,
Notdownintheground!
Eachday Ihadsugar,

But nobody knew,
They searched and searched,
Until they were blue!
Eachday Idranksugar,
From a glass jor,

It looked just like water,
But better byfar!
Ittastedsosweet,
And nobody solved,
My cleor bottled liquid,
Had sugor dissolved!

Magnets

Iateamagnet,

Tasted good,
Momgot mad,
I knew she would...
”Getthatmagnet out!"she cried,
"Magnets oren‘t goodinside!“
Tried tofish it out withwood,

But magnet didn’t stick too good...
Magnetism had a trick,
Without it,
I’d be feeling sick!
Tried to fish it *out with rubber,*

Then I tried,
Some whale‘s blubber,
Tried tofish it out with glass,
Then I tried,
Some green crab grass,

Tried tofish it out withplastic,
Things were getting pretty drastic,
Paper, onions, basketball,

Nothing pulled it out at all!
Dad saw and said,
"Here's the trick,
To certain things,
Will magnets stick!
Things with iron,
Are thekey,
Try one, son,
I think you'll see..."
So I found,
An iron nail,

Now I'll reolly,
End this tale...
Tied the nail,
To astring,
Dropped it down my mouth,
Thot thing,
And when I pulled that nail out,
The magnet was attoched no doubt...
Don't eat magnets,
And in fact,
Stick to food,
That won't attract!

King Henry Died By Drinking Chocolate Milk
By the ScienceManiacs

King Henry died by drinking chocolate milk.
He drank 1 kiloliter in his robe of silk
1000 liters were more thon he could take
1 million milliliters turned out to be a big mistake

A princess in a traveling band
Passed through King Henry's land

She had o gift that he'd never seen
She said that it was chocolate milk
Andthe Kingdrankonedropjusttotry
1 milliliter is not a lot
But poor King Henry just could not stop

Chorus

King Henry drank1000 drops
1 liter's not a lot
/t barely filled uphisroyalcrown
He continued to keep drinking on
'ti/ 1000 more liters were gone
A bathtub full of chocolate milk
Drowned King Henry in his robes of silk

10 millimeters equols 1 centimeter
100 millimeters equals 1 decimeter
1000 millimeters equals 1 meter
We've got to keep poing, we just keep getting bigger
10 meters equals 1 dekameter
100 meters equals 1 hectometer
1000 meters equals 1 kilometer
In the *metric system* that's the *way* that *weconvert*

Millimeter, centimeter, decimeter, meter
Dekameter, hectometer, kilometer - LENGTH

Milligram, centigram, decigram, gram
Dekagram, hectogram, kilogram —MASS

Milliliter, centiliter, deciliter, liter
Dekaliter, hectoliter, kiloliter - VOLUME

The Fisherman and the Littie Fish
an Aesop's Fabie

AFisherman who lived ontheproduceofhis nets, onedaycaughtasinglesmallfish asthe result of his day's labor. The fish, panting convulsively, thus entreated for his life: "0 Sir, what good can I beto you, and how little am Iworth! I am not yetcome tomyfull size. Pray spare my life, andputmebackintothesea. Ishallsoonbecome alargefish,fit for thetobles of the rich; andthenyoucancatchmeagain, andmakeahandsomeprofit oyme." Thefisherman replied: "Ishould beaverysimplefellow, if Iwere toforego mycertain gainfor on uncertain profit."

Moral ofAesop's Fablr: Do not]'orc•go a certain nin for an uncertain profit

Online Resources: African American History for Kids

Black History Links for Kids
http://www.kidsdomain.com/kids/links/Black_History.html

Black History from A-Z
http://www.kulturezone.com/kidz/

African-Americans Who Changed Our Nation
http://teacher.scholastic.com/lessonrepro/
reproducibles/instructor/crossword/0101/cyberhunt_htm

Black History Month
http://www.cnn.com/EVENTS/black history/
Stories and exhibits from CNN

African American History
http://www.enchantedlearning.com/history/us/aframer/
Learn about famous African-Americans such as Martin Luther King, Harriet Tubman, and Rosa Parks. There are coloring pages and word puzzle activities, too.

Educational Bookmarks for Black History Month
httJD://www.gpschools.org/ci/ce/multi/bhmes.htm
Resources for Grades K-5

African American World
http://pbskids.org/aaworld/
Play games, send E-cards and meet kids.

Black History Month: Free **Resources**
http://www.pale.com/free resources/bhm/
Download bookmarks and a calendar

The African American Journey
http://www.worldbook. com/features/aajOtJrPley/html/intro. html
World Book editors have assembled a comprehensive look at the history of African Americans and their struggle for freedom.

African American History and Heritage
http://creativefolk.com/toolkit/library.html
Teacher Toolkit for Grades K-12

Afro American Kids Zone
http://www.afro.com/children/index.html
Black History quizzes and learn about African animals.

Favorite Books for Black History Month
http://www.readingrockets.org/calendar/blackhistory
The following are some of our favorite books for Black History Month (and anytime!). Some describe our different histories while others show the joys and challenges that are shared by children of all colors as they learn and grow. All are recommended reading with kids ages 0-9.

African-American Inventors

BLOOD BANK

IThe idea of a blood bank was pioneered by Dr. Charles Richard Drew (1904-1950). Dr. Drew was an American medicaldoctor andsurgeon whostartedtheideaofa blood bank andasystem forthelong termpreservation ofblood plasma (he found that plasma kept longer than whole blood). Hisideas revolutionized the medical profession and saved many, many lives. Dr. Drew set up and operated the blood plasma bank at the Presbyterian Hospital in New York City, NY. Drew's project was the model for the Red Cross' system of blood banks, of which he became the first director.

CARVER, GEORGE WASHINGTON

George Washington Carver (1865?-1943) was an American scientist, educator, humanitarian, and former slave. Carver developed hundreds of products from peanuts, sweetpotatoes, pecans, andsoybeans; his discoveries greatly improved the agricultural output and the health of Southern farmers. Beforethis, theonly maincropinthe South wascotton. Theproducts that Carver invented included a rubber substitute, adhesives, foodstuffs, dyes, pigments, and many other products.

CRUM, GEORGE

The potato chip was invented in 1853 by George *Crum.* Crum was a Native American/African American chef at the Moon Lake Lodge resort in Saratoga Springs, New York, USA. French fries were popular at the restaurant andoneday adinercomplained thatthefries weretoothick. Although Crum madeathinner batch, the customer was still unsatisfied. Crum finally made fries that were too thin to eat with a fork, hopingtoannoy theextremely fussycustomer. Thecustomer, surprisingly enough, washappy- and potato chips were invented!

DORTICUS, CLATONIA JOAQUIN

Clatonia Joaquin Dorticus was an African-American inventor who received many patents. He invented an apparatus forapplying dyestothesides ofthesolesandheels ofshoes (patent # 535,820, March 19, 1895), a machine forembossing (contouring the paper of) photographs (patent # 537,442, April 16, 1895), a device that helped develop photographs (patent # 537,968, April 23, 1895), and a leak stopper for hoses (patent # 629,315, July 18, 1899).

DOWNING, PHILIP B.

The street letter drop mailbox with a hinged door that closed to protect the mail was invented by Philip B. Downing. Downing, an African-American inventor, patented his new device on October 27, 1891(US Patent # 462,093).

DREW, CHARLES RICHARD

Dr. Charles Richard Drew (1904-1950) was an American medical doctor and surgeon who startedtheidea ofabloodbank andasystemforthelong-term preservation of bloodplasma (he foundthat plasma kept longer thanwholeblood). His ideas revolutionized the medical profession and have saved many, many lives.

GAS MASK

The gas mask was invented by Garrett Morgan, an African-American inventor. Morgan used his gas mask (patent No. 1,090,936, 1914) to rescue miners who were trapped underground in a noxious mine. Soon after, Morgan was asked to produce gas masks for the US Army.

GOODE, SARAH S.

Sarah E. Goode was a businesswoman and inventor. Goode invented the folding cabinet bed, a space-saver that folded up against the wall intoa cabinet. Whenfolded up, it could be used as adesk, complete with compartments for stationery and writing supplies. Goode owned a furniture store in Chicago, Illinois, and invented the bed for people living in small apartments. Goode's patent was the first one obtained by an African-American woman inventor (patent #322,177, approved on July 14, 1885).

LATIMER, LEWIS H.

Lewis Howard Latimer (1848-1928) was an African-American inventor who was a member of Edison's research team, which was called "Edison's Pioneers." Latimer improved the newly-invented incandescent light bulb by inventing a carbon filament (which he patented in 1881).

MAILBOX

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McCOY, ELIJAH

Elijah McCoy (1843 or 1844-1929) was a mechanical engineer and inventor. McCoy's high-quality industrial inventions (especially his steam engine lubricator) were the basis for the expression "the real McCoy," meaning the real, authentic, or high-quality thing.

MORGAN, GARRETT

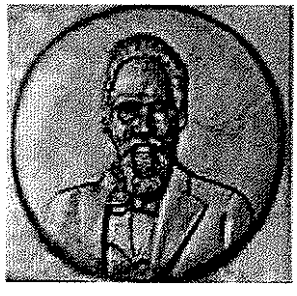
Garrett Augustus Morgan (March 4, 1877 - August 27, 1963), was an African-American inventor and businessman. He was the first person to patent a traffic signal. He also developed the gas mask (and many other inventions). Morgan used his gas mask (patent No. 1,090,936, 1914) to rescue miners who were trapped underground in a noxious mine. Soon after, Morgan was asked to produce gas masks for the US Army.

POTATO CHIPS

The potato chip was invented in 1853 by George Crum. Crum was a Native American/African American chef at the Moon Lake Lodge resort in Saratoga Springs, New York, USA. French fries were popular at the restaurant and one day a diner complained that the fries were too thick. Although Crum made a thinner batch, the customer was still unsatisfied. Crum finally made fries that were too thin to eat with a fork, hoping to annoy the extremely fussy customer. The customer, surprisingly enough, was happy - and potato chips were invented!

RILLIEUX, NORBERT

Norbert Rillieux (March 17, 1806-October 8, 1894) was an African-American inventor and engineer who invented a device that revolutionized sugar processing. Rillieux's multiple effect vacuum sugar evaporator (patented in 1864) made the processing of sugar more efficient, faster, and much safer. The resulting sugar was also superior. His apparatus was eventually adopted by sugar processing plants all around the world.



TRAFFIC SIGNAL

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WALKER, MADAME C. J.

Madam C. J. Walker (December 23, 1867 - May 25, 1919) was an inventor, businesswoman and self-made millionaire. Sarah Breedlove McWilliams C. J. Walker was an African-American, who developed many beauty and hair care products that were extremely popular. Madam Walker started her cosmetics business in 1905. Her first product was a scalp treatment that usedpetrolatum andsulphur. Sheadded Madamtohername andbeganselling her new "Walker System" door-to-door. Walker soon added new cosmetic products to her line. The products were very successful and she soon had many saleswomen, called "Walker Agents," who sold her products door to door and to beauty salons.

Entrepreneurial Kids

A Sample Project about Business

In this project, students develop business skills. Takingarole ofyoungentrepreneur. The children set up business goals, conduct market research, determine product potential, seek funding and market their product. They do research to determine the suitable business opportunity andusetheir knowledge of marketing tostart their ownbusiness andreach their goals. Then, the children use their business plan and experience running business to teach others in a workshop.

Objectives: The children will:

- Gather data by conducting a survey to determine sales potential
- Summarize findings, draw conclusions, and rank items based on surveY And research data
- Create a business plan
- Run the business

Sample Activities:

Activity 1:Set the stage

Teacher tells thechildren that they willbetakingon arole of youngentrepreneurs andtheir task is to start and run their own company successfully. They discuss and brainstorm ideas.

Then theygenerate a list ofthings that they can make and sell. Teacher asks questions to promptstudent thinking, such ashowdid youdecide which items wouldor would not be good to sell?

Activity 2: Market Survey

For the market survey, the related terms is introduced such as producer, consumer, marketing andprofit. The terms are defined byusing simple language. The children create anonline market survey and persuade their friends to answer the survey.

Activity 3: Poll and Business Decision

The children collect data from the survey, put the data in spreadsheets and create a chart. They write a simple summary. Teacher helps students draw conclusion.

Activity 4: Business Plan

For this activity, teacher creates a business plan template. Once the children have decided on which product to sell and determine sales goals, they write a business plan using the template.

Activity 5: Inform and Persuade Others

The children will write a letter asking for the start-up money to help launching the business.

Activity 6: Advertise

The children create a poster and promote their business.

Activity 7: Sell

The children sell their products. They are allowed to practice giving correct change and tracking products sold. Finally, they will keep track of money received. The sales information entered into a spreadsheet daily that will give the overall picture of the profit/loss.

Activity 9: Measure Success

Teacher and children revise the original goals, business plan, research, funding effort, marketing strategies and profit. They will draw their own conclusion about whether their effort is paid off and worth the risk.

Activity 10: SharingSession

The children conduct a workshop about starting a business. They will invite their friends to participate in the workshop.

Conclusion

The number of business opportunities for kids have exploded with the growth of the Internet. Hopefully this project will arouse children interest to set up their own business andgrab the opportunities.

Facts about Electricity

- Modern society relies heavily on the convenience and versatility of electricity. It powers your microwave, helps light your house, and lets you watch TV and so much more.
- Electric current is measured in amperes (amps).
- Electric potential energy is measured in volts.
- Two positive charges repel each other, as do two negative charges. Opposite charges on the other hand attract each other.
- When an electric charge builds upon the surface of an object it creates static electricity. You have probably experienced static electricity in the form of a small electric shock, which is what happens when the electric charge is quickly neutralized by an opposite charge.
- Electric eels can produce strong electric shocks of around 500 volts for both self defense and hunting.
- Electric circuits can contain parts such as switches, transformers, resistors and transformers.
- A common way to produce electricity is by hydropower, a process that generates electricity by using water to spin turbines attached to generators.
- The world's biggest source of energy for producing electricity comes from coal. The burning of coal in furnaces heats boiler water until it becomes steam which then spins turbines attached to generators.
- Lightning is a discharge of electricity in the atmosphere. Lightning bolts can travel at around 210,000 kph (130,000 mph), while reaching nearly 30,000 °C (54,000 °F) in temperature.
- Electricity plays a role in the way your heart beats. Muscle cells in the heart are contracted by electricity going through the heart. Electrocardiogram (ECG) machines used in hospitals measure the electricity going through someone's heart, when the person is healthy it usually shows a line moving across a screen with regular spikes as the heart beats.
- You may have heard of direct current (DC) and alternating current (AC). The difference between the two is in the way the electrons flow. In DC electrons move in a single direction while in AC they change directions, switching between backwards and forwards. The electricity use in your home is AC while DC comes from sources that include batteries.
- Back in the 1880's there was even a 'war of currents' between Thomas Edison (who helped invent DC) and Nikola Tesla (who helped invent AC). Both wanted their system to be used with AC eventually winning out due to the fact that it is safer and can be used over longer distances.
- Electric fields work in a similar way to gravity with an important exception being that while gravity always attracts, electric fields can either attract or repulse.
- American Benjamin Franklin carried out extensive electricity research in the 18th century, inventing the lightning rod amongst his many discoveries. Lightning rods protect buildings in the event of lightning by conducting lightning strikes through a grounded wire.

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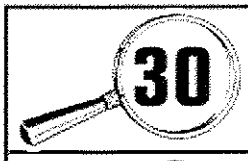
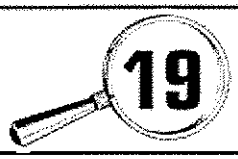
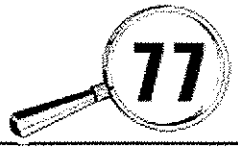
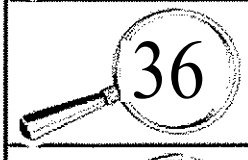
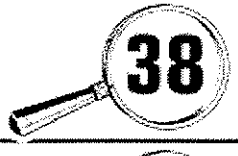
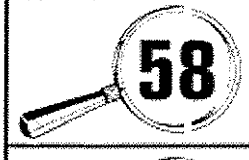
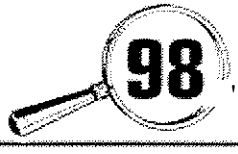
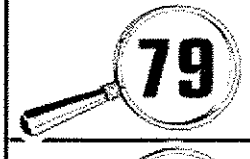
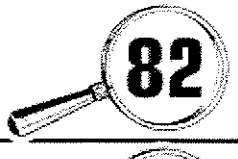
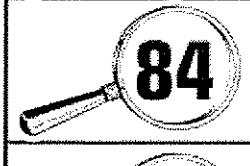
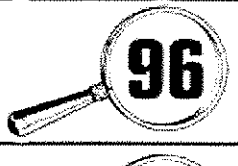
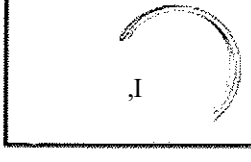
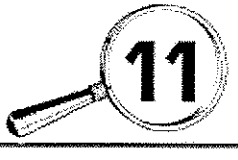
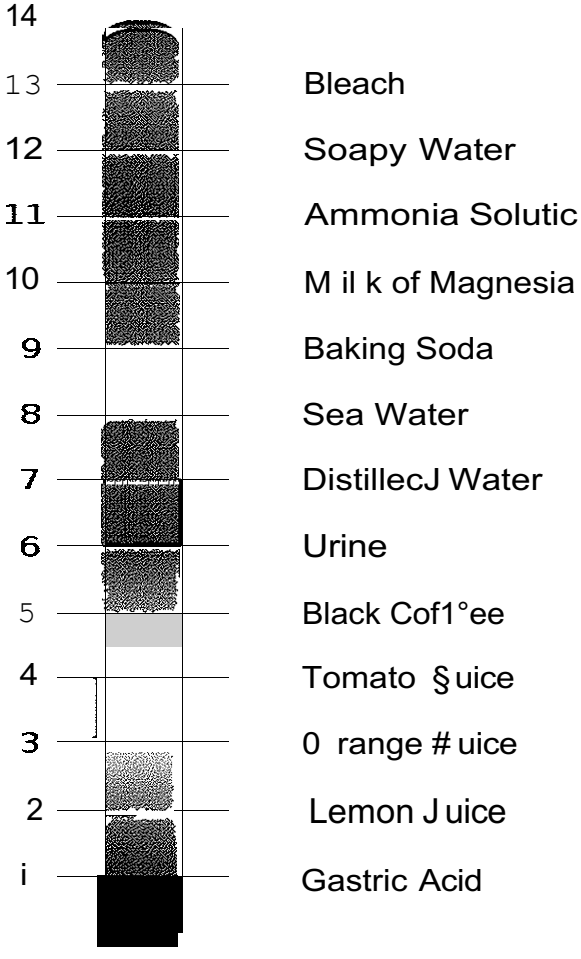
 This next number is this number minus 4 fl	 This next number is greater than this number but < 21
 This next number is this number plus 57	 This next number is this number minus 41
 This n ext numoer ›s > sh is number , plus 30 minus GB	 This next number is this number plus 15, plus 5
 This next number is th is number plus 4O	 Ths nextnunDer‹ s ' this number minus 11
 This next nu m0e r is this number minus 38	 This next number is this number plus 32
 This next number is this number plus 16, minus 13	 This next number is greater than this number but < (77+9)
 This next number is this number plus 12	 This next number is this number minus 69
 This next number is ,I this number minus S	 This next number is this number plus 18

Acids and Bases

Acids and bases are two special kinds of chemicals. Almost all liquids are either acids or bases to some degree. Whether a liquid is an acid or base depends on the type of ions in it. If it has a lot of hydrogen ions, then it is an acid. If it has a lot of hydroxide ions, then it is a base.

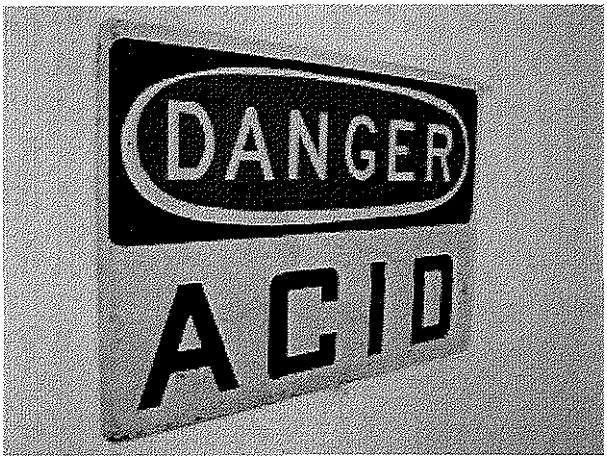
pH Scale

Scientists usesomething calleda pHscaletomeasure howacidic orbasic a liquid is. pHisa number from 0 to 14. From 0 to 7 are acids, with 0 beingthe strongest. From 7 to 14 are bases with 14 beingthe strongest base. If a liquid has a pH of 7, it's neutral. This would be something like distilled water.



Strong Acids and Bases

Acids with a low pH of around 1 are very reactive and can be dangerous. The same is true for bases of a pH near 13. Chemists use strong acids and bases to get chemical reactions in the lab. Although they can be dangerous, these strong chemicals can also be helpful to us.



'** Never handle acids or bases in a chemistry lab unless supervised by your teacher. They can be very dangerous and can burn your skin.

Acids and Bases in Nature

There are many strong acids and bases in nature. Some of them are dangerous and used as poisons by insects and animals. Some are helpful. Many plants have acids and bases in the leaves, seeds, or even their sap. Citrus fruits like lemons and oranges have citric acid in their juice. This is what makes lemons taste so sour.

Acids and Bases in our Bodies

Our bodies use acids and bases too. Our stomachs use hydrochloric acid to help digest foods. This strong acid also kills bacteria and helps to keep us from getting sick. Our muscles produce lactic acid when we exercise. Also, our pancreas usesabasecalled analkalito help withdigestion. These are justafew examples of our chemistry of bases and acids help our bodies function.

Other Uses

Science andtechnology makesgooduseofacids andbases. Carbatteries useastrongacidcalled sulphuric acid. Chemical reactions between the acid and lead plates in the battery help make electricity tostartthecar. They arealsousedinmany household cleaning products, bakingsoda, andtomake fertilizer for crops.

Fun Facts

- Acids and bases can help neutralize each other.
- Acids turn litmus paper red, bases turn it blue.
- Strong bases can be slippery and slimy feeling.
- Acids taste sour, bases taste bitter.
- Proteins are made up of amino acids.
- Vitamin C is also an acid called ascorbic acid.
- Ammonia is a base chemical.