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| Woodland S.T.E.A.M. Integrated Plan | |
| Grade Level: 5th | Time Frame: 3 weeks |
| Ask: How can we use our knowledge of electrical circuits to protect our snacks by building a security system? | |
| Focus Standards (all standards have been put into document yet, but are implemented throughout the unit)  **Math:**  5MD. C.3 Recognize volume as an attribute of a solid figure and understand concepts of volume measurement.  5.MD.C.5b Apply the formula V=l x w x h and V= b x h to find the base of a rectangular prism.  5.MD.A.1 Convert among different sized standard measurement units within a given measurement (convert cm to M.)  **Science:**  S5P3. Students will investigate the electricity, magnetism, and their relationship.  a. Investigate static electricity.  b. Determine the necessary components for completing an electric circuit.  c. Investigate common materials to determine if they are insulators or conductors of electricity.  d. Compare a bar magnet to an electromagnet.  **ELA:** ELAGSE5RI1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.  ELAGSE5RI2 Determine two or more main ideas of a text and explain how they are supported by key details.  ELAGSE5RI5 Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.  ELAGSE5RI6 Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.  ELAGSE5SL4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.  ELAGSE5SL5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.  ELAGSE5SL6 Adapt speech to a variety of contexts and tasks, using formal English when appropriate to the task and situation. (See grade 5 Language Standards 1 and 3 for specific expectations.)  **Social Studies**:  SS5E1 The student will use the basic economic concepts of trade, opportunity cost, specialization, voluntary exchange, productivity, and price incentives to illustrate historical events.  a. Describe opportunity costs and their relationship to decision-making across time.  b. Explain how price incentives affect people’s behavior and choices.  f. Give examples of technological advancements and their impact on business productivity during the continuing development of the United States.  SS5E3 The student will describe how consumers and businesses interact in the U. S. economy.  a. Describe how competition, markets, and prices influence people’s behavior.  c. Describe how entrepreneurs take risks to develop new goods and services to start a business.  SS5E4 The student will identify the elements of a personal budget and explain why personal spending and saving decisions are important. | |
| Essential Question(s)   * How are static and current electricity the same? How are they different? * How does electricity work in the world around me? * What are vocabulary words I need to understand to help me build a circuit? * How is an electromagnet like a magnet? How is it different? * Why are insulators important in a circuit? Why are conductors important in a circuit? * How will what you learned today help you complete the STEAM challenge? What new understandings do you have about electrical circuits? * How do we plan and write a commercial that will persuade customers to buy our alarm? * How does competition, markets and price influence people’s behavior? | Key Vocabulary Terms   * Electricity * Static electricity * Atoms, protons, neutrons, electrons * Insulator/conductor * Closed Circuit * Parallel Circuit * Switch * Schematic * Current Electricity * Electromagnet * Market * Price * Opportunity cost * Price incentives |
| Technology Needed   * Static Powerpoint/flipchart * Electricity powerpoint * Insulator/Conductor powerpoint * Youtube videos (listed in plans) * iPads for research and presentation | Supplies Needed   * Plastic rulers * Paper * Balloons * newspapers |
| Teaching the Target  Plan:   |  |  | | --- | --- | | Science | Math | | **Day 1:** SW share what they know in their journals (IAN) and create a KWL chart about electricity. S will respond to, “what would your life be without electricity?” They may write a short response or their may draw a picture. Class will discuss a problem occurring in the classroom (snacks being taken) and classroom will brainstorm  **Day 2:** S will view a 6 min video about the history of electricity and will record key facts in journals. T will open static with clip of funny dog hair (static). S will write a response to what they think is happening.  S will view a Power point about static electricity. Slide 1- 8, S will try to use static electricity with a rubber ruler. Try with a wooden ruler. Why didn’t it work?  S will explore static with a balloon and try to draw a picture of what is happening with the charges.  Watch a video about a dog being rubbed with a wool blanket. What is happening in the video? Use the vocabulary of the standards to explain their thinking. S will share responses with table groups and give each other feedback about descriptions for improvement.  S respond to this question in their journals (IAN) – What effect will hairspray have on static electricity in your hair?  **Day 3**  **Display a picture of a lightning cartoon.**  S will write a description/diagram as they view pictures.  Ask – Why is lighting a form of static electricity? S will turn and talk to a partner to explain their thinking and justify their answer. Bring together whole group to discuss and share ideas.  Closing: S will respond to a cartoon picture to tell if they think the lightning will be able to start the car battery.  Extension: Create an ion image and label protons, neutrons, and electrons.    **Day 3:**  **Review Current and Static Electricity**  **Before:** Bill Nye the Science Guy clip – static Electricity (flashdrive). There are 2 types of electricity – static and current. Today we will focus on current electricity.  **Procedure:** Explain to students, there are two ways to be mean to your siblings. One way is to chase them – this is current electricity (movement). The other way is to hide and jump out at them, scaring them – this is static electricity. You either move – current, or sit still and build-up energy – static.  Use powerpoint of Electricity (Science folder – Electricity powerpoint).  In journals, students will create a Venn Diagram comparing current electricity and static electricity. On other side create drawing and definition for both types of electricity.  **Day 4: Insulators/Conductors**  Post Big Idea/Ask. Ask students throughout lessons – How will what you learned today help you complete the STEAM challenge? What new understandings do you have about electrical circuits?  When completed, S will discuss the problem of the missing snacks and will read several articles to discover if alarm systems can help deter crime.  **Using Insulator/Conductor powerpoint**  [**T:\5th Grade\Science\electricity\conductor and insulator.ppt**](file:///T:\5th%20Grade\Science\electricity\conductor%20and%20insulator.ppt)  (Teacher Share 5th grade science journal). S will explore various examples of insulators and conductors. In journals, S will complete a T-chart recording examples of insulators and conductors. Groups of students will be given a series circuit to test for Insulators and conductors.  Complete Insulator and Conductor lab (using Lab sheet) to explore insulators and conductors  [**T:\5th Grade\Science\electricity\Insulator and Conductor Framework Task 2.pdf**](file:///T:\5th%20Grade\Science\electricity\Insulator%20and%20Conductor%20Framework%20Task%202.pdf)  **Groups of students will go into 3rd, 4th and 5th grade classrooms to poll students, “How many of you have had an item taken from your desk, backpack, or lunchbox?” S will create a graph comparing grade levels.**  **Closing –** Why are insulators important in a circuit? Why are conductors important in a circuit?  **Day 5: Open/Closed (complete) circuit (switch)**  **Opening –** Use Energy Stick (material) with students to demo how electrons move through conductors. Touch hands (conductors) and clothes (insulators) and discuss what they notice and/or wonder.  Still using the Energy Stick have class stand and form a circle. Students can hold hands or touch finger tips. **Ask – Do you think we can make this work with the entire class?** Demo what happens when all are touching – This is an example of a closed circuit. Have one pair of students release hands, this is an example of an open circuit. When a circuit is opened, the electrons do not have a path to continue to move on so they are stopped. We can open and close a circuit with a switch (walk to classroom light switch and demo – using open/close vocabulary).  Students can use build from previous day to explore how a switch effects a circuit. (The paperclip will act as a switch). T will circulate and ask students to explain how/why the switch works.  After student explorations, watch video to review.  [**https://www.youtube.com/watch?v=VnnpLaKsqGU**](https://www.youtube.com/watch?v=VnnpLaKsqGU)  **Day 6:**  **Review open/closed with circuit song:**  **Mr Pharr song (saved in Favorites) You tube video, Pumped Up circuits**  **S will have a quick review of magnets by viewing Bill Nye (magnet video.) T will explain that today we are going to learn what happens when you combine electricity and magnets.**  **Electromagnets:**  **Discuss magnets and what they remember from magnets.**  **S will view a Power point on electromagnets (saved in documents electromagnet verses magnet)-start on slide 20 through 29.**  **Give students a nail, wire, battery, and metal objects and allow them time to discover and explore creating magnets.**  **Closing: How can we use this in our STEM challenge?**    **Day 7:** Begin Design challenge using STEM challenge plans and student blueprint (EDP)  **Day 8 – 10:** Students will work in their collaborative groups to complete the STEAM challenge.  **Day 11: S will present their ideas and complete the rubric and then work on improving their design.** | Day 1:  T will show a video introducing 3-D SHAPES  Hook: Ask S what they all have in common.  <https://www.youtube.com/watch?v=pdg3ucEJt-I>  T will ask S to compare 3-D to 2-D shapes and discuss with them how we might measure the size of a 3-D shape.  Day 2:  T will ask students to examine the lunch boxes that we will be storing our snacks in and describe the shape. How will we know if the box is going to be large enough to store our snacks in? Allow students time to discuss and explore some ideas.  T will show Flowcabulary to teach the formula: L x W x H to find the volume of a 3-D shape. Discuss when we can use this formula and we cannot.  Day 3:  Give groups of students a ruler, measuring tape, and rectangular prism. Have groups practice finding volume. Several groups will present their findings.  Day 4: Groups will be given their lunch boxes to measure the volume. Allow time to discuss how they can figure out if the snacks.  Students will find the volume of their lunch-box model to determine how many snacks they are able to fit into their final product. Students will find the dimensions of their box by measuring each side in inches and then using the formula to find the volume. In addition, students will find the dimensions in centimeters as well as the volume. They can use a ruler, measuring tape or an iPad to find the dimensions.  Day 5: T will discuss that we need to understand capacity verses volume:  <http://www.differencebetween.net/science/difference-between-volume-and-capacity/>  Show video:  <http://www.bing.com/videos/search?q=video+on+capacity+verses+volume&view=detail&mid=6F1DD8633A07CC3C90646F1DD8633A07CC3C9064&FORM=VIRE>  S will respond in journals: What is the difference of capacity verses volume and how will this help me know if my snack can fit safely in my box?    Students that show mastery of the standard (5.MD.C.5b) will construct three-dimensional shapes using PBC pipes. They will be provided with conditions that their shape must meet. In addition, they will find the dimensions of their shape by measuring each side in inches and then using the formula to find the volume. They can use a ruler, measuring tape or an iPad to find the dimensions |   **Humanities Connection:**  **Essential Questions:**  **How does competition, markets and price influence people’s behavior?**  **How do we plan and write an infomercial that will sell our product?**  **How does analyzing infomercials help us design our own infomercial?**  Humanities  Task: Produce an infomercial to sell your product to consumers who want an alarm to protect their snack.  Day 1  Students will view the Shamwow infomercial. While viewing it, kids will have the transcript. Pause the clip to analyze it for the following components:   1. What are the facts you see? Are they true? 2. What are the opinions presented? 3. What and how is the data presented? 4. Who is their audience? 5. What is the price point? What is their claim? 6. Which words are the strongest? 7. Were there counterclaims? 8. Is this infomercial successful or not? Evidence…   Analyze the second infomercial: Rejuvenique \*Stop at 1 minute 20 seconds  Use the same handout to review the infomercial.  After completing the second infomercial ask: Why is one argument stronger? why?  Groups will write a script for their product.  Provide the students with the reviews from Amazon and the data of the products. Analyze and code the firsthand accounts of the products Shamwow and Rejuvenique. Include the FDA article on Rejuvenique. Turn and Talk ….  Day 2  Is there a demand/need for this product? Who? What arguments will you use for this market?  Ask: How do we write a script for an infomercial to obtain maximize sales? First, analyze your product. The next step will be to write the script for the infomercial.   1. Who is my audience? 2. What is your claim? 3. What is the price point? 4. Select strong verbs/adjectives 5. Three reasons why your alarm is better than the others 6. Address the counterclaim   Members look at the data you have on your product to set the price. What can your market afford? Price must be set based on supply, demand and income of your customers.   1. What supplies were used? 2. What is the cost of each material? 3. How many of each did you use? 4. What price will you set? You need to make a profit. Mark it up 10% for the profit margin.   Groups write the script and design the product logo.  Day 3  Students use I- Pads to shoot their infomercial on the “Green Screen.”  Day 4  “Shark Tank Screening”  Show the clip from the show Shark Tank.  Students watch the infomercials with a rubric while viewing all the infomercials. After viewing all of them, choose the product you will endorse. You will explain why you chose that product. | |
| Assessment: Teacher created rubric for students to self-assess final designs. | |
| Career Connection: GA Power, Alarm company (ADT), Police officer, Electrician, marketing, advertising | |