NKU | **CINSAM:** Center for Integrative Natural Science and Mathematics

STEM2U Fall 2025
Schedule & Lesson Details

Date/Times	Activity & Description	Materials Needed for Activity	Standards Connection

September 17
9:30 - 10:30 am EST
2:00 - 3:00 pm EST
	Bubble Juice
	
	Let's get popping! Things will get a little slippery as students learn about solutions and polymers while creating their own Bubble Juice.
	
	Each team of students will compete by choosing the best ingredients for Bubble Juice Company to use in their newest Bubble Juice. After testing the company's current Bubble Juice as a baseline, each team will work to design its own Bubble Juice recipe. Careful consideration must be given to variables as students investigate.
	
	Students will test their solutions by blowing a bubble until it pops. Groups will measure and record the diameter of each popped bubble to determine which Bubble Juice Solution is the best.
		Each team of students will need a flat, smooth surface to test their bubble solutions. The solution will go directly on the surface (this will get "science messy").
		
		Per group:
		- teaspoon
		- tablespoon
		- measuring cup
		- 3 paper or plastic bowls
		- 3 plastic spoons
		- 1 straw per student
		- access to water
		- ruler
		- pencils
		- cardboard (or multiple sheets of dark colored construction paper)
		- 3 types of liquids that produce bubbles when mixed with water. Students can choose what they want to test, including, but not limited to:
		  ○ different liquid soap brands
		  ○ shampoo
		  ○ bubble bath
		  ○ laundry detergent
		  ○ hand soap
			DCI: ETS1.B Developing Possible Solutions
			
			SEP: Engaging in Argument from Evidence
			
			CCC: Influence of Science, Engineering, and Technology on Society and the Natural World

October 1 9:30 - 10:30 am EST 2:00 - 3:00 pm EST	**Papa's Fish** Students learn science from literature as we read Papa's Mechanical Fish and	**Per student:** - mini bottled waters - plastic container (shoebox size or larger)	**DCI**: PS1.A Structure and Properties of Matter **SEP:** Developing and Using Models

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	discuss the importance of failures in engineering. As we dive into submarine science, students will apply the concepts of buoyancy and density to this underwater engineering challenge. Using the idea of biomimicry, students will be challenged to design and build a working submarine. As scientists and engineers, we constantly turn to the world around us for solutions to our problems. In this lesson, students will research features of different ocean animals that allow them to successfully navigate the water. Groups will use the features they learn about to design and build the ultimate submarine.	- tape - other recyclable materials - scissors - disposable cups - disposable plates - permanent markers	**CCC:** Cause and Effect
October 15 9:30 - 10:30 am EST 2:00 - 3:00 pm EST	**Rocket Booster** Companies like SpaceX and Blue Origin have been trying to make spaceflight cheaper. They just designed reusable rocket boosters to accomplish their goals, but they need a team of engineers to help them recover the rocket boosters after a spacecraft's launch. A rocket booster burning up in the atmosphere or crashing down on Earth is no longer acceptable. Engineers at their companies have been left spaced-out with how to recover the rocket boosters gently	Rocket Booster Materials: - cardstock or 1 paper towel tube - tape - markers Rocket Booster Catcher: - paper (printer, notebook, or construction – NO cardstock) - 12x12 pieces of cardboard - string - paperclips - tape	**DCI:** ETS1.B Developing Possible Solutions **SEP:** Developing and Using Models **CCC:** Influence of Science, Engineering, and Technology on Society and the Natural World

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	so they don't get damaged and can be reused. Your team has been hired to design, build, and test a rocket-catching device while following the Engineering Design Process. Our aerodynamics student engineers must carefully consider a range of STEM concepts, like energy and force, to successfully catch their rocket standing up.		

October 29
9:30 - 10:30 am EST
2:00 - 3:00 pm EST
	It's Getting Wild in this Zoo (Day 1)
	
	Think back to a fun visit you've had to the zoo, or seeing zoo animals do funny things on videos. Now, picture everything that surrounds the zoo animal you are thinking about. A zoo isn't a place for entertaining community members as they walk around and look at animal exhibits. It is also a home to those wild animals, and it needs careful planning and construction for the health and safety of the animals. Join us for a two-part lesson as students become zoo engineers and plan and develop a zoo from the planning and blueprint stages on Day 1, to building an animal exhibit on Day 2.
	
	Day 1: Students use the criteria of area and perimeter to design a zoo that will include the most animals possible while ensuring they have enough space in their
		- scissors
		- glue
		- crayons/colored pencils
		- large construction paper
		- Provided by CINSAM:
		  ○ Zoo Exhibit Regulations sheet
		  ○ Blueprint of the zoo for design
		  ○ Zoo picture cut-outs to include in design
		  ○ Exhibit Area and Perimeter Recording Track sheet
			Common Core Math Standards: 4.MD.A.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems.
			
			DCI: ETS1.B Developing Possible Solutions
			
			SEP: Constructing Explanations and Designing Solutions
			
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	exhibits.		
November 12 9:30 - 10:30 am EST 2:00 - 3:00 pm EST	**It's Getting Wild in this Zoo (Day 2)** Think back to a fun visit you've had to the zoo, or seeing zoo animals do funny things on videos. Now, picture everything that surrounds the zoo animal you are thinking about. A zoo isn't a place for entertaining community members as they walk around and look at animal exhibits. It is also a home to those wild animals, and it needs careful planning and construction for the health and safety of the animals. Join us for a two-part lesson as students become zoo engineers and plan and develop a zoo from the planning and blueprint stages on Day 1, to building an animal exhibit on Day 2. **Day 2:** Groups will choose one zoo animal from their blueprints and design and build a model of a zoo exhibit for them.	Building materials may vary depending on the animal students choose to design an exhibit for. These materials are suggestions, and other materials may be included. - modeling clay - craft sticks - scissors - glue - cardboard - construction paper - pipe cleaners - beads - craft noodles - cotton balls - tape - markers - materials from nature (ex., grass, rocks, sticks, etc.) - craft tubes - string - tissue paper - felt pieces - recycled materials	**Common Core Math Standards:** 4.MD.A.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. **DCI:** ETS1.B Developing Possible Solutions **SEP:** Constructing Explanations and Designing Solutions **CCC:** Influence of Science, Engineering, and Technology on Society and the Natural World
December 10 9:30 - 10:30 am EST 2:00 - 3:00 pm EST	**Robotic Hand** Many different robots are built from models designed after humans and/or things in nature; robotic arms are no	- cardboard - string - straws - clear tape - ruler	**DCI:** ETS1.B Developing Possible Solutions **SEP:** Developing and Using Models **CCC:** Influence of Science, Engineering, and

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	different. For a robotic hand to work just as well as a human hand, it needs to function exactly like the bones, muscles, and tendons of a human hand do. With robots becoming increasingly popular, even the North Pole is recruiting robotic help this winter! After learning about the anatomy of a hand, students will design and build a robotic hand. Each robotic hand will face a challenge from the North Pole to move a set of presents to a designated location.	- pencil - glue - small, light objects to pick up (ex., small foam blocks or balls)	Technology on Society and the Natural World

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