STEAM in the Classroom

SCIENCE-TECHNOLOGY-ENGINEERING-AGRICULTURE-ART-MATH

PIGPEN PARTY

March 1 - National Pig Day

Pigs are surprisingly intelligent animals, though many people are unaware of their remarkable cognitive abilities. Some pigs can even be trained as pets and learn tricks. In 1772, a pig in Dublin known as the “Learned Pig” could tell time, count, and perform other entertaining feats to captivate crowds.

Pigs have been beloved characters in stories for generations, from A.A. Milne’s Piglet to E.B. White’s Wilbur. Their charm has made them iconic, not just as pets but also in literature.

There are hundreds of pig breeds, most of which originate from the Eurasian Wild Boar. Female pigs, called sows or gilts, can give birth to 10 piglets in one litter. Pigs provide a variety of delicious food products like bacon, ham, ribs, and pork belly, making it only fitting to honor these animals on National Pig Day.

Piggy Power: Swine-sational Facts

1. Pigs talk to each other a lot. Over 20 different vocalizations have been identified.
2. Baby pigs can recognize their mama’s voice. Piglets find their mama’s voices soothing, so when nursing, mama pigs sometimes sing a little lullaby.
3. Pigs are practically blind. Pigs are only able to able to see certain colors, and they also have really bad short-range vision and a limited ability to visually focus.
4. A group of wild pigs is called a sounder. A group of swine is called a passel or a team.
5. Pigs have an excellent sense of smell. They’re capable of detecting scents 5 to 7 miles away and up to 25 feet underground! That’s why they’re traditionally used to sniff out truffles.

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PIGPEN PARTY

For this challenge/activity, you will need

- Small pink balloons or lightweight balls
- Large boxes
- Construction materials: cardboard, craft sticks, paint stirrers, strawers, chenille stems, scissors, etc.
- Markers
- Scissors
- Friends

Directions:

1. Inflate several pink balloons to serve as pigs and scatter them around the room.
2. Locate a few boxes that are big enough to hold all the pigs. Use a marker to write “Pig Pen” on them or create a sign.
3. Gather any available design materials.
4. Build a prototype of a pig-herding tool to get all the little pigs in the pen without touching them with your hands or feet.
5. Once the device is ready, begin rounding up the pigs as fast as you can!

Adapted from *https://www.invent.org/blog/stem-activity/farm-pig*

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WIND FLOWER AIR BLASTS VORTEX CANNON

March 10 is Mario Day! It's called Mario Day because when you write “March 10” like this – “Mar10” – it looks like “Mario!” Mario is a famous video game character who first appeared in 1981. He’s known for going on exciting adventures, jumping over obstacles, and saving Princess Peach from villains. Mario often eats special power-ups called “Wind Flowers,” which give him magical abilities like growing big, jumping higher, or turning into a super-powered version of himself. In the Mario games, these Wind Flowers are usually hidden in blocks that Mario has to hit. To celebrate Mario, some people like to build cool things, like a vortex cannon, which shoots a puff of air that moves quickly, almost like Mario’s special power-ups. It's a fun way to imagine what it would be like to have Mario’s powers in real life, blowing away obstacles just like he does in the games! Mario Day is a great chance to enjoy his adventures, play games, and share the excitement of his world with friends.

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WIND FLOWER AIR BLASTS VORTEX CANNON

For this challenge/activity, you will need

- Disposable plastic or paper cups (one eight-ounce and one 16-ounce size)
- Scissors
- Adult helper
- Balloons (2)
- Toilet paper
- Duct tape
- Measuring tape
- Pen
- Paper

Prep Work

1. Tape one strip of toilet paper to a door frame.
2. Use the measuring tape to make a mark on the floor about 1 foot, 3 feet, and 6 feet (ca. 2 meters)
3. Draw a 1.5-inch diameter circle on the bottom of both of your cups.
4. With the help of an adult, use the scissors to cut out both of the circles.
5. Inflate two balloons, then deflate them again. This makes them easier to stretch later.
6. Tie a knot in the neck of the balloons, then cut off the tip of the balloon
7. Cover the top of the cup with the balloon with the tied neck facing outward.
8. Make sure to tape the balloon tightly to the cup on the sides—you want an airtight seal.

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WIND FLOWER AIR BLASTS VORTEX CANNON

Instructions:

1. Choose the smaller cup to begin with. Practice firing the air cannon by pulling back on the knot of the balloon and releasing it. Try pulling the balloon the same distance every time to create the same amount of force that pushes the air out.
2. Stand at the half-meter mark in front of the toilet paper and shoot your air cannon aiming at the hanging toilet paper.
3. Next move to the one-meter mark and shoot your air cannon at the toilet paper.
4. Finally go to the two-meter mark and again aim your air burst at the toilet paper.
5. Change to the bigger vortex cannon and repeat the steps

Adapted from *https://www.sciencebuddies.org/stem-activities/vortex-cannon?from=Blog*

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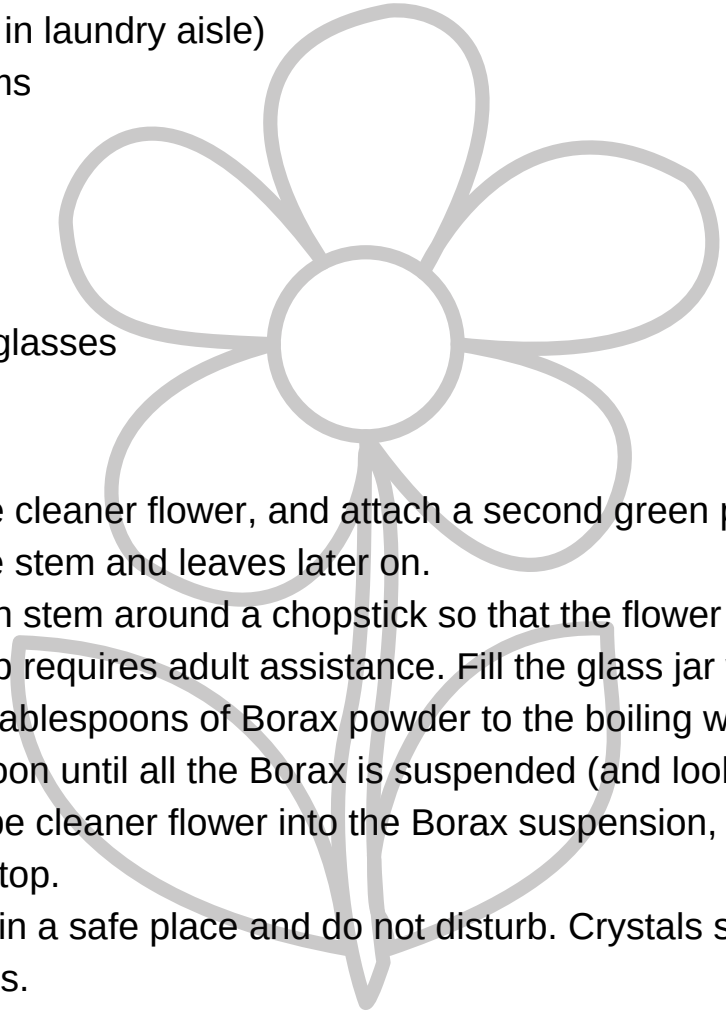
BORAX CRYSTAL FLOWERS

For this challenge/activity, you will need

- Borax (found in laundry aisle)
- Chenille Stems
- Glass Jars
- Chopsticks
- Hot Water
- Spoons

*Optional safety glasses



Directions:

1. Create a pipe cleaner flower, and attach a second green pipe cleaner, which will act as the stem and leaves later on.
2. Coil the green stem around a chopstick so that the flower can dangle below.
3. This next step requires adult assistance. Fill the glass jar with very hot water. Add several tablespoons of Borax powder to the boiling water in the jar, and stir with a spoon until all the Borax is suspended (and looks dissolved).
4. Lower the pipe cleaner flower into the Borax suspension, balancing the chopstick on top.
5. Place the jar in a safe place and do not disturb. Crystals should start to form in 24-48 hours.
6. After crystals form and are visible, remove the flower from the liquid and place it on a paper towel to dry.
7. To enjoy the sparkly flower, display it in a place with lots of natural light.

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ORIGAMI PANDA BOOKMARK

National Panda Day is a fun and exciting day to celebrate one of the most beloved animals on Earth—the giant panda! These adorable creatures are known for their fluffy black and white fur, round faces, and their love of eating bamboo, which makes up most of their diet. Pandas live in the mountain forests of China, and there are only about 1,800 pandas left in the wild, which is why it's so important to protect them. National Panda Day is a chance for people everywhere to learn about pandas, their habitats, and what we can do to help them.

This year, there's even more reason to celebrate! Two new pandas have arrived at the National Zoo in Washington, DC, bringing extra joy to visitors. These pandas are part of an important breeding program designed to help the species grow in numbers and stay healthy. The National Zoo has been a key part of panda conservation for many years and is one of the only places in the United States where you can see pandas up close. The new pandas will help researchers learn more about their behavior and care, which can improve efforts to protect pandas both in zoos and in the wild. On National Panda Day, people of all ages can enjoy learning about these amazing creatures, watch videos of pandas playing and eating bamboo, and understand how we can all work together to protect them.

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ORIGAMI PANDA BOOKMARK

For this challenge/activity, you will need

- 1 6-inch by 6-inch square of white paper
- 1 4-inch by 4-inch square of white paper
- Glue stick
- Pencil
- Black marker

Directions to make the panda's body:
Use the 6-inch by 6-square of paper.

1. Fold the paper in half diagonally, making a triangle.
2. Open the paper and fold it in half diagonally, the opposite way to make an X.
3. Open the paper back into a square and flip it over.
4. Take one edge over to the opposite edge to make a rectangle and crease.
5. Open and repeat step 4 with the opposite edge of the paper.
6. Open the paper and pop the center up to make a tent.
7. Press the sides in to make a triangle. Push down to crease firmly.
8. Take the top point of the triangle and fold it down to the center of the bottom edge, crease, and open up.

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ORIGAMI PANDA BOOKMARK

Directions to make the panda's body continued:

9. Slide your fingers into the pocket at the bottom of the triangle.
10. Push the top layer of the paper down. Rotate the paper so that two points face you and two are at the top.
11. Push the open pocket down to make a triangle. Turn paper and repeat with the other side. You now have a bowtie shape.
12. Rotate so that the bowtie is horizontal and fold in half so that the points match up.
13. Put the paper so that the part with only two layers is at the bottom. Fold the bottom corner up slightly. Open the fold back.
14. Push along the side fold and tuck the triangle you just made inside the large shape.
15. Now repeat steps 13 and 14 for each of the points that are left to make the panda's feet.
16. Open and use the glue stick to glue the two center triangles together.
17. Use pencil and black marker to color the panda's legs.

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ORIGAMI PANDA BOOKMARK

Directions to make the panda's face:

Use the 4-inch by 4-inch square of paper.

1. Fold the paper in half to make a rectangle.
2. Open the paper and fold it in half the opposite way.
3. Open the paper back into a square and flip it over.
4. Fold one corner up to the center to make a triangle.
5. Repeat with the next corner. You should make a pentagon.
6. Flip the paper over and fold each of the corners on the unfolded edge to the center to make a diamond.
7. Put the point of the shape toward the bottom, making sure the flaps are up towards you.
8. Take one outside corner and fold it to the center line. Fold the edge of the paper down the center line. A flap will pop out.
9. Repeat Step 8 on the opposite side.
10. Fold the bottom point up slightly to meet the edge that you just made.
11. Fold the top point down to meet the point you just folded up.
12. Glue the points down with glue stick.
13. Flip the shape over.
14. Use a pencil and marker to draw a face for your panda.
15. Glue face on the body.

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3-D (STEREOSCOPIC) DESIGN

National 3-D Day is celebrated on the third day of the third week of March (the 3rd month of the year). This is a great day to learn about the technologies used in making 3-D pictures, movies, and art.

CHARLES HULL

Charles Hull is the inventor of 3-D printing, a technology that has revolutionized how things are made. Born in 1939, Hull earned a degree in engineering physics from the University of Colorado. While working on lamps for UV-curable resins, he invented stereolithography, the first commercial rapid prototyping method, in 1986. He founded 3-D Systems to bring his invention to the world and created the STL file format, which helps translate designs for 3-D printers.

Hull's 3-D printing technology uses UV light to build objects layer by layer, and it quickly became popular in fields like manufacturing, healthcare, and art. His invention has been used to create everything from shoes and airplane parts to medical devices and clothing. Hull's work earned him The Economist's Innovation Award, and his company continues to lead in 3-D printing innovation today.

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3-D (STEREOSCOPIC) DESIGN

For this challenge/activity, you will need

- Cardboard (leftover boxes)
- Scissors
- Glue
- Pen or Pencil

*Optional paint and paintbrushes

Directions:

1. Using a pen or pencil, draw any shape on a piece of paper, then cut the shape out of the paper.
2. Lay the paper shape on top of a piece of cardboard, trace your shape, then cut it out of the cardboard.
3. Repeat steps 1 and 2 until your shape is cut out at least four times from the cardboard.
4. Stack the cardboard shapes on top of one another and glue them together, creating a thicker 3-D shape.
5. Add extra flair to your layered creation by painting your own designs!

Adapted from
https://www.invent.org/blog/stem-activity/3d-design-craft

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BAKING SODA POWERED BOAT

For this challenge/activity, you will need

- Styrofoam egg carton or meat tray
- Vinegar
- Baking Soda
- Scissors
- Straws
- Small plastic lid (one from a drink bottle)
- Tub or pool of water

Directions:

- **Start by cutting a large pentagonal shape (similar to home plate) from the styrofoam.**
- **Tape the plastic lid on the back (flat side) of the styrofoam. Make sure it is secure.**
- **Tape two short pieces of straw so that they are in the lid and are pointing to the back of the boat.**
- **Fill the lid with baking soda.**
- **Place the boat into a tub of water.**
- **Carefully pour vinegar into the lid and watch what happens.**

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BE A FASHION DESIGNER

On March 9, 1959, Ruth Handler introduced Barbie to the world at the American International Toy Fair. People immediately fell in love with her. Through the years, Barbie and her friends have become role models and fashion icons. Barbie and friends have worn fashions from Donna Karan, Givenchy, Oscar de la Renta, and Tommy Hilfiger, among others.

For this challenge/activity, you will need

- Imagination
- Markers, colored pencils, pens
- Sketchpad/paper
- Materials to create your design

Directions:

Use your imagination to sketch a new fashion design. Will you use traditional fabric or unconventional items like duct tape? Is your design practical for everyday wear, a costume, or something for a special occasion or use?

Try using materials to create your fashion item for a doll or person to wear.

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CLEANING COINS

For this challenge/activity, you will need

- Dirty coins (pennies work best)
- Small containers
- Any of the following cleaning agents to try: ketchup, vinegar, milk, lemon juice, apple juice, water, dish soap

Directions:

1. Place a coin into a small container.
2. Cover the coin with the cleaning agent of your choice.
3. Repeat with as many coins and cleaning agents as you would like.
4. Watch what happens.
5. Take coins out of the cleaning agents and dry them off. Do they look any different?

What worked the best? What did not work? Were there any surprises?

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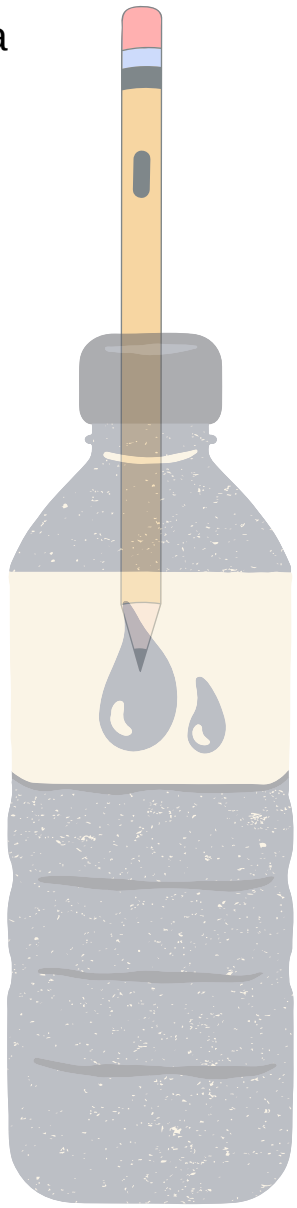
PENCIL MAGIC

March 30 is National Pencil Day. In 1858, Hymen Lipman received a patent for attaching an eraser onto the end of a pencil. This made each item more convenient to use. During World War II, pencils with a hollow middle were used to hide miniature maps and compasses to use to escape if needed. Pencils are also used to express creativity through writing and drawing.



For these activities, you will need

- Pencils
- Empty water bottle
- Rice or other small filler item
- Drinking glass
- Water
- Funnel
- Imagination

Directions for picking up a bottle with a pencil:

Use a funnel to fill the water bottle completely with rice. Carefully push a pencil (unsharpened works best) down into the rice. Try to get it all the way to the bottom of the bottle. Wiggle the pencil back and forth if necessary. Then, try lifting the bottle with the pencil. If it doesn't work, wiggle the pencil more and try again.

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PENCIL MAGIC

For this optical illusion, you will need

- Pencil
- Glass of water

Directions:

1. Fill a jar halfway with water.
2. Ask a friend, “Can you break a pencil without touching it?”
3. Let the friend experiment with trying to break the pencil using the glass, water, and pencils.
4. If your friend can’t figure it out, show them how to place the pencil in the water and tilt the pencil and jar so that the pencil appears broken when you look at it from the side.

*The pencil looks broken because of light refraction. Light refraction happens when something causes the light waves to bend. Illustrate this principle by having your friend run their hands through the air. It’s easy! But running their hands through water is harder. Light travels faster through the air than water, just like your hand, which can cause image distortion and “break” the pencil.

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MAGICALLY APPEARING ART

For this challenge/activity, you will need

- Paper Towels
- Black Permanent Marker
- Washable Markers
- Water
- Pipettes or droppers

Directions:

1. Start by tearing off two paper towels, leaving them connected.
2. Next, fold the paper towels so that one is on top of the other.
3. Use the permanent marker to outline a simple picture on the bottom paper towel.
4. Color in the outlines with the washable markers.
5. Fold the plain white paper towel down to cover the picture.
6. Use a pipette or dropper to drip water onto the top paper towel.
7. Watch as the picture underneath magically appears.

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