Painting with Physics

Grade 8

Subject: physical science

Time: 1 class period

Description

In this lesson, students can use marbles, bou - ncy balls, etc. to create an abstract painting while developing an understanding of Newton's Laws of Motion and basic physics. This activity can be done individually, in pairs, or in groups. Overall, these marble paintings are a great hands - on way for students to express their creativity while observing real - word physics in action.



State Standards

8-PS2-1 : Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.

8-PS2-2 : Plan an investigation to provide evid - ence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

Learning Objectives

Students will be able to apply the basic princi - ples of physics to create an artwork.

Students will be able to evaluate how Newton's Laws of Motion affect real objects in real time.

Students will be able to analyze the relationship between an object's mass and the transfer of energy.

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Materials

Required:

- Bouncy balls, marbles, golf balls, ping pong balls, etc.
- Acrylic paints *(in various colors)*
- Watercolor paper
- Shallow box, plastic tub, or pan
- Painters tape or artist tape
- Plastic cups
- Plastic spoons
- Scale
- Wet wipes
- Paper or tablecloths to protect surfaces
- Ruler

Additional:

- Disposable Gloves
- Acrylic paint pens *(for further decoration)*
- Paint brushes *(for further decoration)*



(Your set up might look something like this)

Assessment Questions

Describe the relationship between the mass of a ball and its kinetic energy.

What law of motion is happening when a ball hits the side of the container and bounces back?

Why do some balls stop when they collide with another ball?

Instructions



1 Prior to your classes, you should get your pieces of watercolor paper, and use a ruler or a straight edge to draw a ½ to ¾ of an inch border.



2 Tape the piece of watercolor paper to the inside of a shallow container. Make sure to dab the sticky side of the painter's tape to some clothing/fabric a couple of times before using it to prevent ripping the paper later on. *(Tip: If you're dividing your class into groups, you can create a simple grid with the tape so that each student gets a finished piece with a clean border.)*



3 Pour a bit of acrylic paint into a plastic cup. Then, slowly add a few drops of water at a time to the paint and stir it together with a spoon. What we are doing is thinning out the acrylic paint so that the marbles and other balls can roll around more easily. Keep adding a little bit of water to your paint until it has the consistency of a thin icing. The paint should easily drizzle off your spoon like shown in the picture. Continue to set up the rest of your station(s).

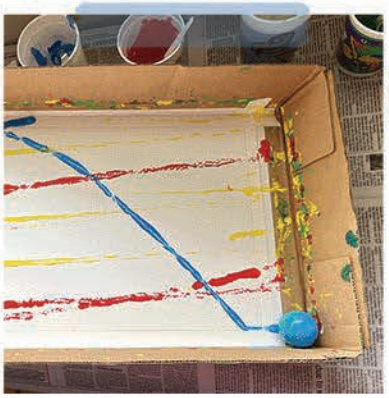


4 At the start of the lesson, have the students measure the mass of each ball with a scale, and have them take note of which balls have the lowest and highest masses. This step can be skipped if you cannot get a hold of a scale or do not want to place too much emphasis on mass in this lesson.

Instructions



5 Using a spoon, dip a ball in a cup of paint. Roll the ball around in the cup to fully cover it in paint before scooping it up and placing it on the paper in the shallow container. *(Note, use wet wipes to remove any leftover paint on a ball before placing a ball in a different colored paint cup.)*



6 Gently tilt the shallow container to move the ball in any direction. To demonstrate Newton's laws, you can have students do a number of things. For example, you could have students place balls at one end of the container, tilt it, and observe the rebound from the wall to showcase the 1st and 3rd laws of motion.



7 Another thing you can do is place two balls of varying mass close to each other, and hit one with your spoon so that it collides with the other ball. This can help demonstrate how mass affects the transfer of kinetic energy between objects. Whatever exercises you have your students do, the piece of paper will eventually start to get covered by multi - colored steaks and splatters, sort of mimicking a Jackson Pollock art piece.



8 Once the lesson is finished, carefully peel off the paper from the bottom of the container. Place the piece in a safe area and let it dry overnight, and by morning you should have a finished marble painting! You can distribute the marble paintings to your students, where they can experiment and make additions to them if they desire. Either way, they can make great additions to your walls or scrapbooks.

Art History

From the early to mid twentieth century, many western artists pioneered and experim - ented with abstract art, or art that doesn't depict our surroundings accurately, if at all. One such movement during this timeframe was Abstract Expressionism, where artists aimed to reflect the innermost parts of their minds in their artwork, and placed higher emphasis on the artistic process rather than the final work.

Some of these artists practiced action painting, which is a technique that puts more focus on the artist's movements than what is put down on the canvas. It is often character- ized by quick, random splatters, smears, and strokes of paint. One of the most famous action painters is Jackson Pollock, whose 'drip paintings ' garnered much acclaim and ended up defining much of his artistic legacy.

While marble paintings might not be true action paintings, the process as a whole still encourages students to focus more on their movements, prioritizing their expression over perfection.



Reflection of the Big Dipper, Jackson Pollock, 1947



Jackson Pollock in his studio, 1950, © Hans Namuth