

Lesson overview: During this lesson, students will use knowledge of energy transfer to build a catapult to use as a tool for action painting.

## STEAM Lesson Plan

Content Area: STEM	Fine Arts Area: Visual	Lesson Title: Action Jackson Catapults
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Grade Level: 3 - 5	Duration: 1 week	Author: Dyan Branstetter
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Standards and Alignment			
Content Area Standard(s): <b>S:</b> Explore energy’s ability to cause motion or create change. <b>T:</b> 4c Students develop, test and refine <b>prototypes</b> as part of a <b>cyclical</b> design process. <b>E:</b> 3.4.3.C1. Recognize design is a creative process and everyone can design solutions to problems. <b>M:</b> Solve problems involving measurement and estimation of temperature, liquid volume, mass or length.		Fine Arts Standard(s): <b>Visual Art:</b> 9.1B: Recognize, know, use and demonstrate a variety of appropriate arts elements and principles to produce, review and revise original works in the arts. (Visual Arts: • paint • draw • craft • sculpt • print • design for environment, communication, multi-media)	
Big Idea: We can use the design process to build tools for making art.		Essential Question:	How do I design a catapult to use as a tool for creating action painting?
21st Century Skills:	Critical thinking Creativity Collaboration Communication Problem-solving	Key Vocabulary:	Kinetic energy Potential energy Action painting Catapult Tension

			Balance Medium
Vertical Alignment	<p>Before Lesson:</p> <p>Students must understand both potential and kinetic energy in order to understand how to build their catapult. The <b>potential energy</b> (energy at rest) that is stored can be turned into <b>kinetic energy</b> (energy in motion). You can provide another example of this by discussing a ball rolling down a slide. If you place the ball on the top of the slide, it is still and has potential energy. If it rolls down the slide, it turns into kinetic energy. <b>Gravity</b> (the force that pulls from the Earth) is responsible for this potential</p>	<p>During Lesson:</p> <p>Share information about Jackson Pollock. Make sure students understand the connection between the energy transfer of the catapult and the energy transfer in the action painting and how they are woven together during this activity.</p> <p>Facilitate students working through the engineering design process. Make sure to guide students by asking questions to ensure they are following guidelines but without giving suggestions.</p>	<p>After Lesson:</p> <p>Guide students through reflection on their design. Allow time for them to revise and retest so that they can achieve the desired result of splatter painting.</p> <p>Examine catapult painting after completion and compare/ contrast with Jackson Pollock's technique. Revise and redesign catapult to get the desired artistic result. Guide students to notice that there are many more differences than similarities.</p>

to kinetic energy. When it is set into motion, it increases kinetic energy and decreases the potential energy. When you have a ball resting on the ground, it has potential energy until a **force** (a push other than gravity) creates kinetic energy. When you are talking about a rubber band (as you will in this challenge), energy can come from the **elasticity**. When a rubber band is stretched, its potential energy increases (causing it to slow down/stop). When it snaps back, it creates kinetic energy, and then the energy returns to potential again.

Materials List:	<ul style="list-style-type: none"> <li>A. 20 rubber bands per group</li> <li>B. 15 craft sticks per group</li> <li>C. 1 water bottle cap</li> <li>D. Hot glue gun/sticks (To be used by teacher with student directions)</li> <li>E. ½ in. pom poms</li> <li>F. liquid water color paint</li> <li>G. One ruler per group (or yardstick)</li> <li>H. Butcher paper (hang outside during testing sessions)</li> </ul>
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Instructional Delivery (guided, collaborative, and self-directed)

Student Learning Outcome(s):	Students will be able to work with a partner to design a working catapult that can be used as an action painting tool.
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Pre-Engagement:	<p><b>Pre-assessment:</b>          Activate prior knowledge by having a discussion about catapults. Have students share their knowledge on a shared Padlet, and then discuss what they know. Through this discussion, the teacher can determine what background knowledge students have and how much more information students need on catapults.</p> <p><b>Engagement:</b>          Present the challenge to the students: They will need to build a working catapult to fling a pom pom in liquid paint onto a piece of paper to create a work of art.</p>
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Focal Lesson:

- Prior to creation: observe examples of catapults in real life.
- Introduce students to the art of Jackson Pollock and how he was an action painter. Watch video clips of his work.
- <https://www.slideshare.net/nivaca2/jackson-pollock-for-kids> (Slides 8, 9 and 10)
- Possible Read Aloud: Action Jackson by Jan Greenberg: A Jackson Pollock picture book for background information.
- Have students follow the Action Jackson packet (below) to work through the engineering design process to build a catapult that will transport a pompom in paint to a piece of hanging butcher paper. Examine catapult painting after completion and compare/ contrast with Jackson Pollock's technique. Revise and redesign catapult to get the desired artistic result.

**Background information for teacher:** Catapult painting example (Sharing this with students prior to their creation may influence their creativity in the design process.

When students are ready to test their catapults, you may want to lay down butcher paper where they stand since they might not fly well at first. Also, smocks are a must. Sometimes the pompoms fly backwards and hit the kids on their first attempts!

Integrated  
Assessment and  
Extension

Assessment:

Have each group of students present their artwork, and demonstrate how their catapult worked to create the art. Each group should share the challenges they had, and how they worked to overcome those challenges.

Scoring tool: Use the single point rubric at the end of the student guide to score students' ability to meet the target.

Suggested Extensions:

Students can use the app Clips to make a mini movie as their presentation.

Students can write an artist's statement to display near their artwork. It should compare and contrast their artwork and process with Jackson Pollock's technique.

## Reflection Opportunities

Student Reflection Prompts:	<b>Key Questions to Ask Students:</b> <ol style="list-style-type: none"><li>1. What challenges did you have?</li><li>2. How did you overcome those challenges?</li><li>3. What revisions did you make and how did they change your outcome?</li><li>4. How is your action painting similar and different to Jackson Pollock's?</li><li>5. How does your catapult demonstrate potential and kinetic energy?</li></ol>	Teacher Reflection Prompts:	<b>Key Questions to Ask Yourself:</b> <ol style="list-style-type: none"><li>1. Was there a seamless connection between the art and math in this lesson?</li><li>2. What pieces of this lesson were challenges? Which pieces were most engaging for my students and me?</li></ol>
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See next page for Action Jackson student packet.

