

The Potential to Win

Potential and Kinetic Energy

GAMERS

QUEST 8
PHYSICS

STATE FAIR OF TEXAS
CURRICULUM

The Midway is an area full of exciting - yet challenging - games. Use your knowledge of force and energy to determine what it takes to win big!



During this Gamer Quest, you will:

- ★ Explore how force is used to win games in the Midway
- ★ Look at energy and how it affects a gamer's success
- ★ Create a portrait of a peer using force and motion utilizing the style of Chuck Close



Learning Standards

- ★ Science (Physics) TEKS: 4A, 6B, 6D
- ★ Art TEKS: Art I: 1A, 1B, 2C; Art II: 3A
- ★ ELAR TEKS: E3(16)(A), E3(16)(B) E3(16)(C)
- ★ Career Development TEKS: 2H, 4C, 6A



Source: <http://www.sparticl.org/assets/uploads/images/resource-images/54786-cropped.jpg>

Before You Go

- ★ Explain the scientific definition of work ($W=Fx$) and the measurement of work (Joule).
- ★ Introduce and discuss conservation of energy and conservation of momentum.
- ★ Discuss kinetic and potential energy.



Invitation

- ★ Invite students to bring the listed materials and follow the route, and perform the tasks below at the State Fair of Texas.



Plan Your Route

- ★ Enter through Gate 10, if you can.
- ★ Make your way to the Midway, in the center of the Fair.

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STATE FAIR MAP



Optional Materials to Bring

- ★ Writing utensil and something to write on

OR

- ★ A way to digitally take notes
- ★ A device with a slow motion camera or the free SloPro app



While You're There

The objective of your visit is to watch (or play) Midway games to observe the laws of conservation of energy and conservation of momentum. Examine how changes in energy make players successful... or not so successful.

- ★ **THE POTENTIAL TO WIN:** Find a throwing game on the Midway, and observe the different ways players are throwing the projectile.
 - Are players throwing directly at the target, or using more of an arch?
 - Record the game type, throwing style, and success rates of a few players.
 - Use your slow motion camera or app to record the path of the projectile.
- ★ **CLOSE-UP ACTION (ART COMPONENT):** As you are observing your peers throw an object at a target at the Fair, take a number of photos of them in action.
 - If possible, have your friends pause in an action pose so that you can get a clear shot of them.
 - If you are not able to bring a camera, create a number of strong sketches of your friend in their action pose.
 - Also, take note of the object that they are throwing (basketball, dart, baseball, etc.).

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After the Fair

When you return to class following your State Fair visit, you will analyze recorded data and videos from the Fair with a partner.

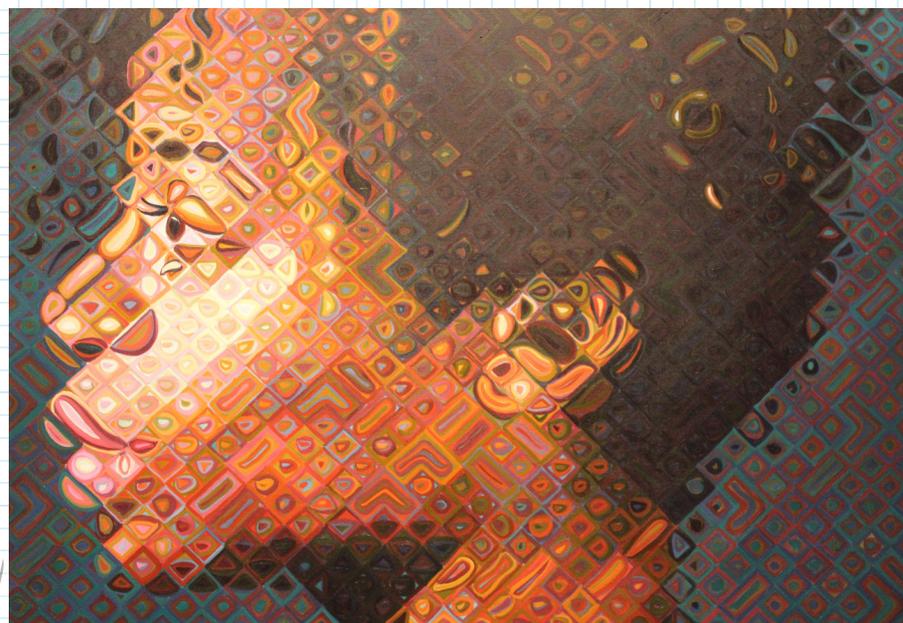
- ★ In the videos you took: note any change in energy type the projectiles underwent.
 - What type of energy was present as the player held the ball?
 - What did it change to?
 - Did the projectile undergo any change in type of energy on its way to the intended target, depending on the type of throw?
- ★ Based on your data, come up with a theory on what type of throw and energy changes makes for more successes.
 - Explain how and why you arrived at your theory.
 - Write your theory/conclusion as if you're going to use it to teach a class on how to win at the Midway.

over time, starting out as photorealism, and due partly to a health issue that left him partially paralyzed, moving on to a more abstract and colorful depiction of his subjects.

- He is an excellent example of the beauty of the human spirit to persevere and fight for what you love, even in the face of what can seem impossible.
 - His methods are also a fantastic way to learn, improve, or perfect your own understanding of shading in large-scale works.
- ★ Before your State Fair adventure, watch the video below to gain an understanding of the process that Close uses in his art:
<https://www.youtube.com/watch?v=w3YIhPs8Bn8>

ART COMPONENT: CLOSE-UP ACTION

- ★ Review and discuss the artwork of Chuck Close.
 - Chuck Close is an American artist who created a system of painting large-scale portraits using a grid system. His work has evolved tremendously



Source: http://www.artsobserver.com/wp-content/uploads/2012/11/IMG_3733.jpg

Handwritten physics notes and diagrams:

- $$m_b = h_b = p_b = v$$
- $$A = F \cdot S \cdot \cos d$$
- $$(\epsilon_x^2) - (\epsilon_x)(\epsilon_{xy})$$
- $$(\epsilon_y^2) - (\epsilon_y)(\epsilon_{xy})$$
- Diagrams showing coordinate axes with points x_1, x_2, x_3 and y_1, y_2, y_3 marked, and a curve passing through them.

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While You're There

- ★ See the main "While You're There" portion of the lesson for instructions.

When You Return

You will create a drawing or painting of your peer in the style of Chuck Close's gridded portraits.

- ★ First, print off your photo onto paper, or if you were not able to take a photo, create a clean drawing from your sketch.
 - You will need to add shading into your drawing as well.
- ★ Next, create a 1-inch x 1-inch grid on top of your photo or drawing.
- ★ Now, using a large sheet of paper or a canvas, create a grid that consists of 3 or 4 inch squares.
- ★ Just as Close did, copy what is in each square on the photo or drawing directly onto the squares on the canvas.
- ★ Think back to the video that you watched of the way Close fills in his squares with color and circle patterns. Do a similar style, but instead of using abstract shapes, use whatever shape your friend was throwing at their target (basketball, dart, baseball, etc.).
- ★ **Remember, be sure that you are thinking about shadows and highlights as you choose your colors for each square.



ENGLISH COMPONENT

Photos and videos are not the only ways to capture a moment. Using the images that you shot and recorded at the Fair, write a descriptive poem describing what it was like to watch a player throw a ball, dart, etc.

- ★ Use words to evoke the five senses and describe a scene.
- ★ Your descriptive poem should have three stanzas with five lines in each stanza.

$$(x^2) - (x)(x+y)$$

$$A = F \cdot S \cdot \cos \alpha$$

