

Strand: 8.2	Standard: 8.2.1	Episode 1	Big Idea: Objects amount of kinetic energy is based on their mass and speed
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Title: Phenomenon Hit it hard	Time: 30-45 minutes	CCCs: <u>Energy and Matter</u>	Practices: Use computational thinking to analyze data
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Episode Snapshot: Students will explore the phenomenon that if you are trying to throw something with a lot of force and energy it needs to have a lot of mass and a lot of speed to it. They do this by observing the fact that when they throw something light they can't throw it very hard. It leaves their hand at the same speed no matter what but slows down very quickly. Students will **ask questions** about how the matter and energy causes a change in how hard it is thrown.

Gather:

depending on the space you have available this can be done by students watching a few students try this or if you have space allowing multiple groups to do it at once. Basically set up the classic carnival game of bottles or cans stacked in a pyramid. Give the different students 2 types of balls, one a tennis ball and the other a styrofoam ball of the same size. Have them stand a far enough distance back that it will be hard for them to get enough energy in the styrofoam ball for it to hit the cans. Have them throw the balls and have the students make observations and ask some questions.

Reason:

Have students share their questions about why the same people can hit it sometimes but can't even get close other times. Allow them to share their ideas on why they think this might be. It may come up that the speed is different however technically they threw them both at the same speed one just slows down faster but help the students come to that conclusion on their own through the experiments without just telling them.

Communicate:

Have the students discuss if they had a choice which ball they would choose and why they would choose that ball. Have them write their reasoning on an exit ticket before the end of class.

Assessment: The exit ticket will be your way of seeing if the students understand that the amount of mass the ball has affects the total amount of force that will be output. At this point I wouldn't expect students to understand the terms kinetic energy but basic terms that would infer that type of thinking.	Materials, resources, handouts, etc: • Cans, plastic bottles or something for students to hit and knock down • Styrofoam balls • Tennis balls • Table or desk to set it up on • exit ticket • Somewhere for students to record their observations and questions (Example)
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