

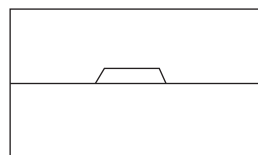
G4 When Objects Collide

NGSS 4-PS3-3: Ask questions and predict outcomes about the changes in energy that occur when objects collide.

Before Class Prep:

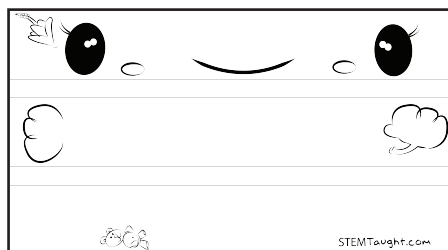


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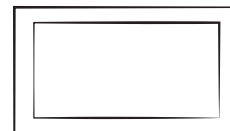
Get the Marble Koa

2



Get the Blocky Car Kea

3



Bamboo trays

4

Before the Lab:

Read the introduction to the chapter “When Objects Collide”. This helps students build vocabulary and understanding behind energy and collisions before their experiment. Watch the in-class movie.

Part 1. Experimenting with Collisions (55 min): You may need more time.

1. Make predictions (5 min) Use the prediction pages in the STEMTaught Journal under the chapter “When Objects Collide”. It is recommended to make predictions for one experiment at a time and then discuss what happened as a class after the experiment.

2. Pass out supplies (5 min) - “Now you get to experiment. We will work in pairs (3 to a group can also work) to play a game of marbles. For the first experiment we will use small marbles. Every student needs to get a tray with:

1. A handful of small marbles
2. 1 String/2-3 students
3. 1 Ramp and 1 Spacer (Choose a ramp height to use each time so that speed can held constant in your experiment)



3. Run the experiment, play the game (≈10 min per game total 30 min) - To play marbles:

1. Find a spot on the floor and make a circle with the string.
2. Put two colors of marbles randomly around the inside of the string.
3. Choose the 3rd color to be the striker. 1 Striker/student.
4. Take turns placing the ramp (that is at a consistent height) anywhere in the circle and let the marble roll down the ramp.
5. Watch what happens when the marbles collide! If a marble hits the string or goes out of the string you get to keep it and add your points up for the end of the game.
6. At the end of the game share your observations with the class and then make predictions for the next game (small marbles vs. big marbles and then big marbles vs small marbles)

Part 2. Exploration time! Make your own game (45 min):

4. Exploration time, make up your own game! (45 min)- Students learn a lot when they get to experiment on their own. Allow students some time to make up their own game using the marbles and any of the other lab resources. You will be amazed at the creativity of your students and they will be so excited to share with you what they discovered. Journal about the rules of their game and draw a picture of it. Let them present their game idea and share what they learned about collisions.