

# Hit Me With Your Best Shot

## Summary

In this lesson students will learn about objects in motion and the transference of energy.

## Materials

Ramps  
Marbles  
Blocks  
Rulers  
Protractors  
Blank white paper  
Color pencils.

## Background for Teachers

An object in motion tends to stay in motion unless acted upon by another force or object. If an object encounters another object as it travels along a straight path, it will transfer some of its energy to the other object. The amount of energy transferred to the object is related to the angle of the impact. If the moving object grazes the object then only a small amount of energy is transferred and the moving objects path of travel is only affected slightly. If on the other hand the impact is direct and the moving object must completely change its path of travel, a more significant energy transfer takes place.

## Intended Learning Outcomes

1. Use Science Process and Thinking Skills.
6. Understand the Nature of Science.

## Instructional Procedures

Invitation to Learn

### [Bumper Cars](#)

Instructional Procedures

Hit Me With Your Best Shot

Fold a piece of blank paper in half so there are two short, thick, columns. Trace the crease.

Draw a line six cm from the left side that is perpendicular to the crease line.

This T-chart represents the right angle used to start [The Shadow Knows](#) activity. Use the protractor and a ruler to mark the angles used in The Shadow Knows activity on the new page. Make sure the lines are extended to the end of the paper.

Mark each of the angle lines at 12 cm from the vertices to assure the same distance between the ramp and the block.

Center the target block on the angle's vertices and place the ramp on the 90° line at the 12 cm mark.

Roll the marble down the ramp and strike the target block.

Carefully hold the block down and use a colored pencil to mark a line that represents the block's new position.

Replace the block to the original line and move the ramp to the next angle, placing it on the 12 cm line.

Roll the marble and strike the block. Use a different color pencil to represent the movement of the block when struck from the new angle.

Repeat the steps from the last two angles using a different color pencil each time.

When the activity is complete, students will write a statement that describes the relationship between the angle and the movement of the block.

### Extensions

#### Curriculum Extensions/Adaptations/Integration

Use cheap eye shadow on the marble to show the change in the objects path of travel.

Using the information from the chart, is there a math formula that predicts the block movement based on the angle of impact?

### Bibliography

Bass, Kristin.M., Glaser, Robert.(2004) Developing Assessments to inform teaching and learning. *CSE Report 628*

Informative assessments for students incorporate methods for visualizing progress over time. Like teachers, students also need concise, comprehensible records of past and present accomplishments in order of set future learning goals. Some assessment programs address this need through student-friendly graphical displays.

Hodson, Derek (fall96). Rethinking the role and status of observation in science education. *European Education*, Volume 28.3

Teachers are too often unaware that children have their own intuitive views about scientific theory often flies in the face of common sense(children's views) and if we do not recognize and cater to this conflict, a number of courses are likely: children may resist the teacher's explanations, misinterpret them, become totally confused and lose the security even of their naive commonsense views, accept them blindly and unthinkingly, or become "conceptually schizophrenic"-- producing the "official" scientific viewpoint of formal occasions, while privately believing their personal views to be more sensible.

### Authors

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