Name:	Group:	Date:	LAB 17
			FXPERIMENT

# MECHANICAL ENERGY OF AN OBJECT IN FREE FALL

STUDENT BOOK Chapter 2, page 39

#### Part I

#### Goal

Determine the degree of distortion to a surface caused by the mechanical energy of an object falling from different heights.

What is the independent variable in this lab?
What is the dependent variable in this lab?
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cause

### Part II

#### Goal

Determine the degree of distortion to a surface caused by the mechanical energy of falling objects of different mass.

2. What is the dependent variable in this lab?

## **Hypothesis**

I think that			
because			



1. What is the independent variable in this lab?

#### Parts I and II

#### **Materials**

- plasticine (about 400 mL)
- · large plastic container
- 1-m ruler
- 3 marbles (different sizes)
- · balance (optional)

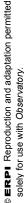
#### **Procedure**

#### Part I

- 1. Divide the plasticine into three even portions.
- 2. Shape each plasticine portion into a slightly flattened ball.
- **3.** Place each plasticine ball on the bottom of the plastic container.
- 4. Position the ruler vertically at the top of one plasticine ball.
- **5.** Hold the largest marble above the plasticine ball at a height of 25 cm.
- 6. Release the marble and let it fall.
- 7. Measure the diameter of the impression made in the plasticine ball. Record the result.
- **8.** Repeat steps 4 to 7 with the second plasticine ball, dropping the same marble from a height of 50 cm.
- **9.** Repeat steps 4 to 7 with the third plasticine ball, dropping the same marble from a height of 100 cm.

#### Part II

- 1. Reshape the plasticine balls.
- 2. Place each plasticine ball on the bottom of the plastic container.
- **3.** Position the ruler vertically at the top of one plasticine ball.
- **4.** Hold one marble above the plasticine ball at a height of 100 cm.
- 5. Release the marble and let it fall.
- 6. Measure the diameter of the impression made in the plasticine ball. Record the result.
- **7.** Repeat steps 3 to 6 with the second plasticine ball, dropping the second marble from the same height.
- **8.** Repeat steps 3 to 6 with the third plasticine ball, dropping the third marble from the same height.
- 9. Clean up and put away materials.





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#### **Results**

Record your results in the tables below. Give each table a title.

#### Part I

Title:

Height of free fall (cm)	Diameter of impression (mm)
25	
50	
100	

#### Part II

Title:

Mass of marble (g)	Diameter of impression (mm)		

## Analysis of the results

- 1. Which situation resulted in an impression of the greatest diameter?
- 2. How does diameter of impression vary according to height of free fall?
- 3. How does diameter of impression vary according to mass of object in free fall?
- **4.** The mechanical energy of an object can cause it to deform another object. During this experiment, in which situation did the object in free fall have the greatest mechanical energy?



Name:	Group:	Date	e:
5. What are the possible sources of erro	or in this lab?		
6. How could you improve the protocol	for this lab?		
Conclusion			
1. Complete the following sentences:			
a) In this experiment, the  the diameter of the impression form		energy of	f an object, the greater
b) The and the mass of an	object in free f	all affects its	energy.
c) Mechanical energy increases as the	ne	of an object in f	ree fall increases.
d) The greater the mass of an object,	, the	its mechanical energy.	
2. Was your hypothesis confirmed or no	ot? Explain you	r answer.	
Application			
How can the mechanical energy of a han	nmer be varied	when driving a nail	into a floor?