

# Using Indirect Evidence to Develop Models

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Topic		Key Vocabulary	
Using indirect evidence to build models.		Balance	
		Magnet	
		Magnetic force	
		Attraction	
		Repulsion	
Major Project(s)			
Written Report			
Major Activities/Steps (Steps leading to the completion of the project)			
Hands-on experiment with magnets to determine magnetic properties of objects- use of balance to determine mass of objects	Create tables to record observations	Conduct research to find out how scientists used indirect evidence to develop the atomic model of matter.	

## Problem

How can indirect evidence be used to build a model?

Materials (per group)

Shoebox, numbered and taped shut, containing unidentified object

Balance

Magnet

## **Procedure**

1. You are given a shoebox with an object or objects inside. Do not open or damage the shoebox.
2. Use a magnet to determine if the object in the box has any magnetic properties.
3. Determine the mass of an empty shoebox. Then the mass of the shoebox with objects inside. The difference between the two masses is the mass of the objects inside your shoebox.
4. Determine something about the object's shape by tilting the box. Does it slide? (flat) Does it roll? (rounded) Does it collide inside? (more than one object)
5. Shake the box up and down to determine if the object bounces. How hard does it bounce? Does it flip?
6. Record your observations in the data table below.

## **Observations**

1. How many objects are in the shoebox?
2. Is the object soft?
3. Is the object flat or rounded?

	<b>Results</b>	
<b>Test Performed</b>	<b>Trial 1</b>	<b>Trial 2</b>
Magnet brought near		
Mass of object(s)		
Box tilted		
Box shaken		

### **Analysis and Conclusion**

1. Make a sketch of what you think is in the box. Draw the object(s) to show the relative size.
2. What other indirect evidence did you gather to help you make the drawing?
3. How does your sketch compare with the actual object(s)? Make a sketch of the actual contents of the box.
4. Describe how you can develop a model of an object without directly observing the object.