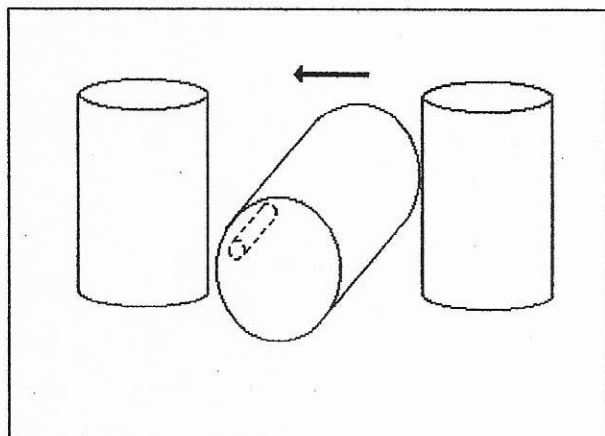


## Battery Operated Cans

This is a great demonstration that provides a chance for teachers to talk about science and the way that it works. All you need is three coffee cans (or similar round cans) with tops to keep students from seeing inside. Mark the outsides of two of the cans with a strip of tape running from top to bottom and place them about 50 cm apart. Ask the students to observe what happens when you place the third can on its side midway between the other two. When you put it down, it rolls towards one of the cans. Next, ask the students to predict what will happen when you turn both of the original upright cans around 180 degrees. Then put the third can down and let them observe that it rolls in the opposite direction. Ask them to predict what might happen if one of the upright cans faces one way and the other faces the opposite way. Put the third can down and let them see that it does not move in any direction.

Ask the students to develop a hypothesis that explains why the can moves the way it does. Ask them to think of some other experiments that might be helpful in figuring it out. Try some of them if you have time. After the students have some **hypotheses** as to how things are working, give them the hint: "It is battery operated." See if some of the students change their minds.

Explain to students that this is really the scientific process. Scientists make **observations** of things. From initial observations they ask a question about what is happening. They then try to predict (**hypothesis**) what is going to happen if certain conditions are met. They then test their predictions (**experiment**). After they have taken more observations (**data**) they try and form a (4) **conclusion** that explains their original question. Finally their conclusion may have raised more questions which lead to more experimentation (although most students will be convinced that magnets are somehow involved in this demonstration). Scientists also almost invariably end up generating many more questions about what they observed happening as well.



How do scientists choose between two conclusions? The one that best explains what has been observed is generally the accepted one. If two or more explanations explain the observations equally well then Ockham's Razor is used. This is the idea that if two explanations equally explain the facts then the simplest explanation is generally more likely to be valid.

Ask your students if there might be a simpler explanation of their observations. They then perform the ultimate experiment and take the lid off the can that has rolled back and forth and show how things worked. Inside have a AAA battery (thus battery operated) glued to one side. The teacher has simply set the can down so that the battery inside has made the can roll in the desired direction.