Wind Brake

Purpose
To demonstrate the effect of air on motion.

Materials
Empty Styrofoam cup
Thread spool
Scissors
Ruler
Stiff paper (an index card will work)
String
Cellophane tape
2 paper clips
Knitting needle

Procedure
• Cut four slits at right angles in the thread spool.
• Cut four 3-inch x 1 1/2-inch (7.5-cm x 4-cm) cards from the stiff paper.
• Cut a 16-inch (40-cm) piece of string and tape it to the side of the spool.
• Attach two paper clips to the end of the string.
• Put the knitting needle through the center of the spool.
• Wind the string around the spool.
• Hold the knitting needle and observe the speed of the unwinding string.
• Insert the four paper cards in the slits in the spool.
• Wind the string around the spool.
• Hold the knitting needle and observe the speed of the unwinding string.

Results
The spool turns more slowly when the paper cards are in place.

Why?
Gravity causes the paper clips to fall and pull the attached string with them. As the string unwinds, it spins the spool. Air pushes against the paper cards as the spool spins, reducing the speed of the turning spool.