Spinner
Purpose
To determine the effect of ball bearings on motion.
Materials
1-gallon paint can (4-liter) (one that has never been opened)
6 marbles
3 heavy books
Procedure
• Place the can on a table.
• Space the marbles evenly around the rim of the can.
• Balance a stack of books on top of the marbles.
• Use your hand to push gently against one corner of the stack of books.
• Observe the movement of the books.
Results The books spin around easily on top of the marbles.
Why? Wheels allow you to move things more easily, and ball bearings within wheels allow them to rotate faster. Ball bearings are spheres placed between a wheel and an axle. These balls reduce the friction (the resistance to motion) between the surface of the wheel and the axle. Without the ball bearings, the surfaces would rub together because even very slick materials have slight bumps on their surfaces. As a wheel turns, the bumps on the surface of the wheel catch on the bumps of the axle's surface, thereby slowing the wheel's rotation. The marble bearings in this experiment rotate as the book pushes against them, and things that roll cause less friction than things that slide. Since the surface of the marbles roll over the book, there is less friction. The motion of the marbles and the reduction of friction between the book and the marbles increases the rotation speed of the book.