

Drag

Friction Is a Drag

Supplies

For each group:

One standard rubber pencil eraser

Wax paper (cut one 8-1/2- by 11-inch sheet)

Ruled writing paper
(one 9- by 11-inch sheet)

Sandpaper (one 9- by 11-inch sheet)

Procedure

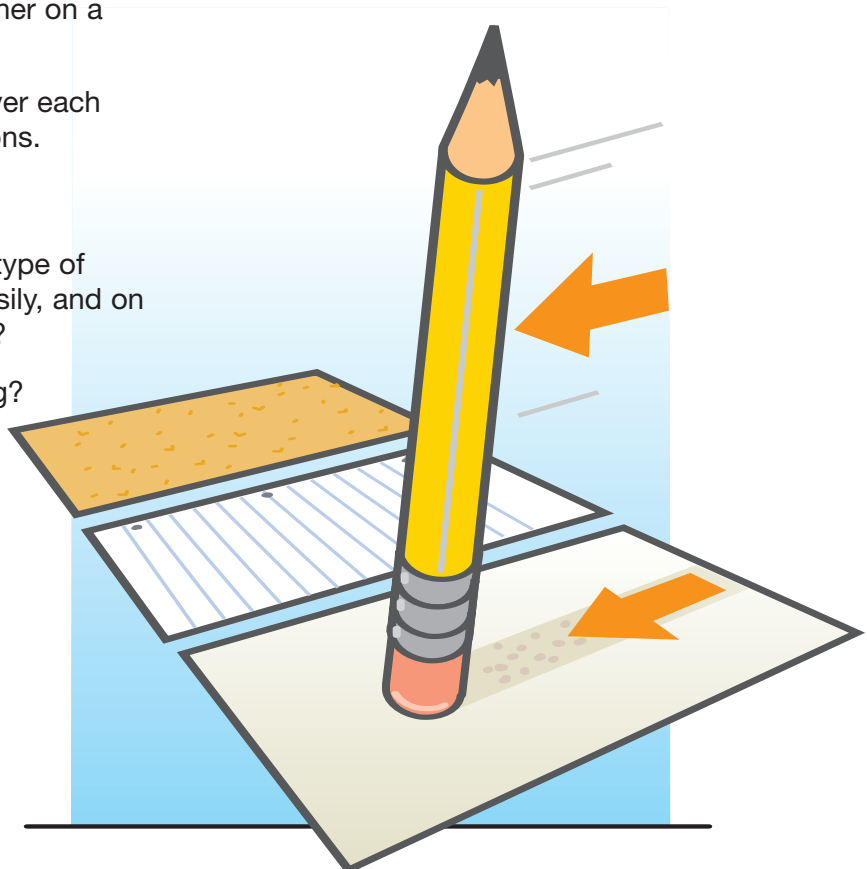
1. Ask each member of your group which paper surface they think will be easiest to run an eraser over. Record their answers.
2. Place the pieces of paper (wax, writing, and sandpaper) next to each other on a desk or table.
3. Gently slide the pencil eraser over each surface. Record your observations.

Questions

What were your results? On which type of paper did the eraser move most easily, and on which was it most difficult to move?

How does this illustrate friction drag?

How could you apply your findings to aircraft design?



Drag

Getting Your Bearings

Supplies

Tall glass vase or beaker
(clear glass, 24 inches or taller)

Five ball bearings

Colored clay

Procedure

1. Cut five pieces of colored clay into equally sized and equally weighted flat squares.
2. Place a ball bearing into the center of each square and mold different shapes. (See illustration for suggested shapes.)
3. Fill the container with water.
4. Drop the shapes into the water, one at a time, and record the time it takes for each shape to reach the bottom.

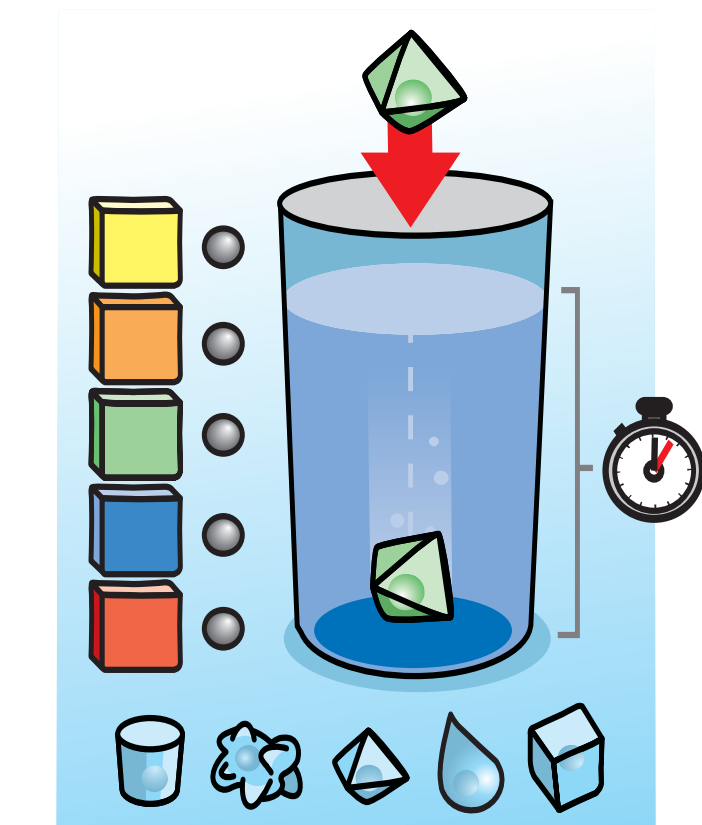
Questions

Which shape is fastest?

Which is slowest?

How does the shape of the object affect its speed?

How does this illustrate form drag?



Drag

Design Challenge

Procedure

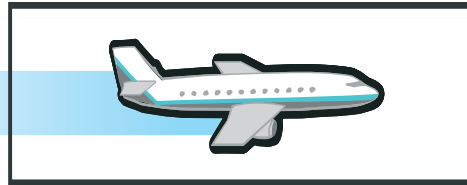
Airplanes are designed to minimize drag. Identify four other objects that are designed to minimize drag.

Questions

What similarities do you see between these objects?

What differences?

Why do you think they are different?



1. airplane

2. _____

3. _____

4. _____

5. _____
