

BUMBLE BEANS



Materials

Each student will need:

- 3 or 4 soybeans
- 11" clear balloon (found in party stores)

DIRECTIONS

What happens when you put soybeans inside an inflated balloon?

Place soybeans in the balloon. Inflate the balloon $\frac{2}{3}$ full and knot it. Hold the balloon by the knot and twirl it to get the beans moving inside the balloon.

Ask students what they observe. What do they see, hear and feel? What creates the noises they hear?

What's Going On?

Many forces act on the beans as they move inside the balloon.

Frictional forces slow the movement of the beans. The force of gravity slows them on their ascent to the top of the

balloon, and speeds them on their descent to the bottom of the balloon.

Centripetal force is supplied by the surface of the balloon pushing the beans toward the center and it keeps the beans moving in a circular motion around the inside of the balloon.

The buzzing noise is produced as the beans roll along the inside surface of the balloon, causing the balloon to vibrate. The beans' speed determines the pitch. As the beans move faster, they vibrate more quickly, which our ears distinguish as a rise in pitch.

The clicking noises are the beans running in to each other.

Further Exploration

Have students rub their balloons against their pants leg or hair for 20 seconds. As the beans settle in their balloon, what do they observe? Do the beans come close together or push apart?

Rubbing the balloon generates static electricity. As positive and negative charges build up on the beans, similarly charged beans repel each other and oppositely charged beans attract.