

Topics: Center of Mass, Balance, Motion, Inertia, Characteristics of Life

Materials List

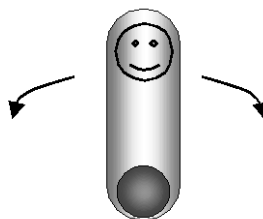
- ✓ Marble
- ✓ Wide marker (such as dry erase marker) or other cylinder, slightly larger than diameter of marble (for tube form)
- ✓ Aluminum foil 6.5 cm x 11.5 cm (2.5" x 4.5")
- ✓ Film can with lid

This activity can be used to teach:

- Life cycles (Next Generation Science Standards: Grade 3, Life Science 1-1)
- Forces & Motion (Next Generation Science Standards: Grade K, Physical Science 2-1, 2-2; Grade 3, Physical Science 2-1, 2-2; Middle School, Physical Science 2-2)
- Gravity (Next Generation Science Standards: Grade 5, Physical Science 2-1)

KIMOTO LIFE CAPSULE

It Moves! Is it Alive?



Build student curiosity about motion, the center of mass, and inertia with this fun activity! Use this activity as a starting point to discuss the characteristics of “life”.

Assembly (for teachers or students)

1. Wrap the aluminum foil around the marker to make a short, multi-layered tube. Extend the foil 1.5 cm ($\frac{1}{2}$ ") from the bottom of the marker.
2. Fold the foil inward to crimp the bottom end closed. The aluminum foil tube should be 5 cm (2") tall with a closed bottom.
3. Carefully remove the aluminum foil tube from the marker (tube form).
4. Drop the marble into the foil tube and close the opening to make a capsule.
5. Place the foil/marble capsule inside the film can and secure the film can lid.
6. Shake the film can to seal and round out both ends of the foil/marble capsule.

To Do and Notice

1. Place foil/marble capsule (“Life Capsule”) in the palm of your hand.
2. Tilt your hand back and forth and notice what happens.
3. If the capsule becomes deformed, put it back in the film canister and shake it again to reform the capsule (step 6 in the assembly section.)
4. Extend the learning with a discussion of the characteristics of living things. The “Life Capsule” seems to have a mind of its own. Why does it appear to be “alive”? What functions do living organisms exhibit that the “Life Capsule” does not exhibit?

The Science Behind the Activity

Every object has a center of mass, which is the object’s balance point. The balance point of the “Life Capsule” changes as the marble moves within the foil capsule. The irregular motion of the capsule comes from the fact the marble has much more mass than the foil capsule. Small movements of the marble will cause large movements of the foil capsule as a new balance point is created for the two combined items.

Students often have difficulty defining “life”. By definition, living organisms have functions for metabolism, growth, reproduction, and response to stimuli. Although the “Life Capsule” appears to move on its own and respond to stimuli, it does not exhibit any of the other characteristics that would classify it as “alive”.

Taking it Further

- Try rolling the capsule down an inclined flat surface (a large piece of mat board works well) from a “standing” position. Play with the capsule on a flat surface. Try to figure out the path of the marble as it moves inside the capsule.

Web Resources (Visit www.raft.net/raft-idea?isid=180 for more resources!)