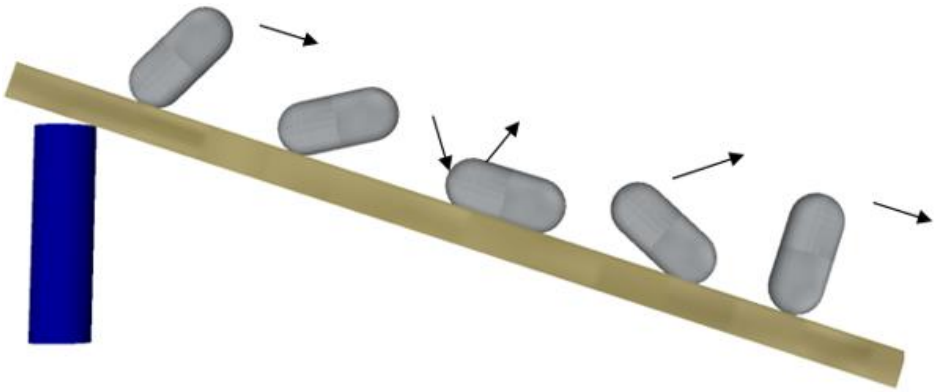
CRITTER CAPSULE

It moves! Is it alive?



Investigate motion, center of mass, inertia, and the characteristics of living organisms in this fun and intriguing project! The key to the capsule's tumbling motion is concealed by foil which adds to its mysterious nature and provides an opportunity to practice observation and other science investigation skills.



Curriculum topics

- Characteristics of Life
- Forces & Motion
- Scientific Investigations

Subjects

- Life Science
- Physical Science

Grade range: K – 2

Who we are: Resource Area for Teaching (RAFT) helps transform the learning experience by inspiring joy through hands-on learning.

Share Your feedback!
http://bit.ly/RAFTkitsurvey

Materials

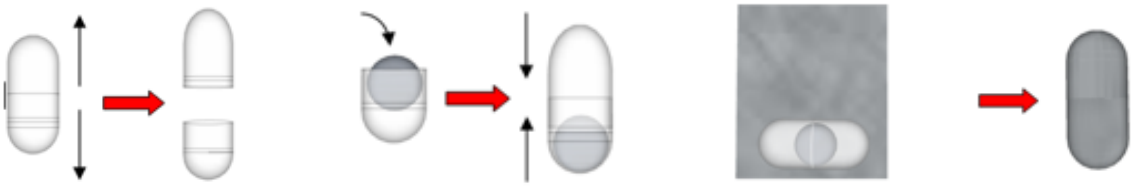
Materials in the kit may vary but generally, this kit contains the following:

- Capsule, size #11 (1)
- Steel ball or marble, 15-18 mm (1)
- Foil sheet, 3” x 3” (1)
- Plate, paper or plastic, rim wider than capsule diameter (1)

WARNING: CHOKING HAZARD
Activity uses small parts. Not for children under 3 yrs.

To Do and Notice

1 NOTE: Capsules made of gelatin are water-soluble. Keep them away from moisture. Separate the two parts of the capsule and enclose the steel ball or marble in the capsule. Push the capsule parts together securely, as shown below.



2 Wrap the foil around the capsule. Pinch the foil over the ends of the capsule, then carefully round the foil over each end (see above right).

3 Put the assembled Critter Capsule in the palm of your hand. Tilt your hand back and forth and observe the motion of the capsule.

4 Hold the plate right side up and put the Critter Capsule onto the plate. Tilt the plate back and forth and observe the capsule’s motion. Can the capsule be made to travel in a circle?

5 Turn the plate upside down and put the Critter Capsule onto the plate’s rim (see below). Can you make the capsule travel around the rim without falling out? Keep trying until you are successful!

6 Optional: Place the Critter Capsule on an incline/ramp (see page 1). If the capsule does not move give it a slight push or make the incline steeper. Observe the capsule’s motion.

7 Characteristics of living things include metabolism, reproduction, growth and development, response to the environment, and being made of cells. Does the Critter Capsule meet any of these criteria? How would you determine whether it’s a living thing without opening it up? Develop your own criteria for deciding if the Critter Capsule is alive. Use the criteria to evaluate a variety of familiar household objects.

8 **Share** your Critter Capsule exploration with RAFT! Submit photos/video via email at education@raft.net or on social media (Facebook, Twitter, Instagram).

Core Content Skills:

Science & Engineering (NGSS)

Developing and Using Models, Planning and Conducting Investigations, Analyzing and Interpreting Data, Forces and Motion, Types of Interactions, Cause and Effect, Characteristics of Living Things

Social Emotional Learning

- Self-awareness
- Self-management
- Responsible decision-making

The Content Behind the Activity

Every object has a center of mass, which is the object's balance point. The balance point of the capsule changes as the ball moves inside it. The irregular motion of the capsule occurs because the ball has much more mass than the capsule. Small movements of the marble will cause large movements of the capsule as a new balance point is created for the two combined items. Since mass is a measure of an object's inertia (its resistance to change in its motion), a shift in the center of mass causes a change in the moment of inertia, which is observed as the wobbling and jerking motion of the capsule.

Life can be difficult to define. Living organisms have systems for metabolism, growth, reproduction, and response to stimuli. Although the Critter 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 being alive.

Do all living things have all the characteristics of life? No! A real-world example of an unusual organism is a virus, which responds to its environment and moves but cannot reproduce on its own or even with other viruses. Viruses are the exception to the typical criteria used to define living things. As life scientists learn more about such anomalies, they sometimes must refine the criteria to account for these unusual organisms.

Reuse

This kit uses 100% reusable materials designed for other uses. To continue making a positive impact in reducing waste, reuse these materials in other projects. Additionally, any unused materials can be collected and delivered back to RAFT.

Feedback

Please comment on this kit by taking this short survey: http://bit.ly/RAFTkitsurvey. Let us know of any material concerns (missing, broken, or poorly fitting parts) as well as any suggestions for improvement.

Visit https://raft.net to view related activities!

Force Meter
Gravity Defying Frog
Rolling Maze
Where is the Life?

Resources

- Characteristics of life video - https://bit.ly/30CCuSU
- Information on characteristics of life - https://bit.ly/2QGgWge