

# RAFT IDEAS

**Topics:** Measurements, Time, Tools, Investigation & Experimentation

## Materials List

- ✓ 2 identical plastic vials ~50 ml (~¼ cup)
- ✓ Circle cut from Matte board or corrugated plastic [slightly larger than vial opening, about 2.5 cm (1")]
- ✓ Masking tape or sticker strip
- ✓ Sand or salt
- ✓ Stop watch or clock with a second hand.

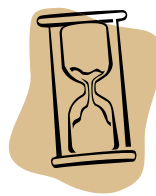
This activity can be used to teach:

- Tell and write time (Common Core Math Standards: Measurement and Data, Grade 1, 3, 3.1; Grade 3, 1)
- Science & Engineering Practices (Next Generation Science Standards: Grades K-6)



# Sand Timer Primer

Watching the Time Go By... literally



Explore properties of flowing sand with this simplified sand timer.

## Assembly

1. Fill 1 vial with sand or salt.
2. Use a standard hole punch to create a hole in the center of the matte board circle.
3. Place the punched circle atop the filled vial, and then invert the second (empty) vial on the circle. Take care to align the vials well.
4. Use masking tape or sticker strip to secure the 2 vials into this configuration.

## To Do and Notice

1. Invert the apparatus and notice the sand fall into the bottom vial.
2. Use a stop watch or clock with a second hand to measure the passing time. Repeat the measurement 2 or 3 times. How long does it take for the sand to fall? How consistent is the sand timer? What might you use this timer to measure?
3. Optional: what variables could make your timer track a shorter or longer time period? What changes would you make in the design to improve your timer?

## The Science Behind the Activity

The earliest known record of sand timers, also known as hourglasses or sandglasses, dates from the 14th century. These first devices to measure time (clocks) that did not rely on water or celestial objects appeared relatively soon after the development and perfection of strong, transparent glass-making techniques and the establishment of large-scale glass production and trade from Venice. Hour glasses were commonly used as timers in early factories, for aspects of church services, and widely used on sailing vessels where they aided in timekeeping for navigation. Although now rare for official purposes, some government traditions around the world still use sand timers as the timekeeping method. Today, sand timers are commonly used in kitchens and board games to measure time when approximation works well. Very soon after their invention, people began using sand timers in everything from pirate flags to burial traditions as a symbol that life, and our time on Earth, is fleeting.

Several factors affect the flow of sand and the time measured by a sandglass, including the volume and quality of the sand, the diameter of the neck, and the shape of the bulbs.

## Taking it Further

Try constructing several timers with slightly different designs (smaller or larger hole, different grain size) and determine how these variables affect measured time.

**Web Resources** (Visit [www.raft.net/raft-idea?isid=366](http://www.raft.net/raft-idea?isid=366) for more resources!)

For more information on sand timers, go to: <http://en.wikipedia.org/wiki/Hourglass>

- Teacher designed math courses – <https://njctl.org/courses/math>