

## LEARNING MATERIALS

### Sand Pendulum

Pendulums are one of the simplest tools in physics, nevertheless we can learn a lot about the fundamental laws of physics and Earth's gravity by studying a simple pendulum. The simple oscillation of a pendulum can turn to a more sophisticated motion if we change the initial configuration. This complicated behavior is easier to see if we can record the path of a pendulum while oscillating.

In this experiment we use sand to record the oscillation path and we try different initial configurations for different patterns. You can also use painting color instead, but the sand is much easier to clean after the experiment.

#### Questions for testing comprehension:

- (1) What happens if we do this experiment on Mars? Do we see similar patterns using a similar configuration?
- (2) The mass of the pendulum is decreasing (sand), how do you think this will affect the oscillation?

#### Further reading and materials:

- (1) <https://en.wikipedia.org/wiki/Pendulum>
- (2) <https://en.wikipedia.org/wiki/Harmonograph>
- (3) <https://youtu.be/uPbzhxYTioM>