

A2 ACTIVITY 1: THROWING PEBBLES

Background

An effective introduction to **gravitational potential** and **kinetic energies** can be made through simply lifting and dropping pebbles onto an empty can. Some questions should be posed to the students: Which is easier to lift and to drop? Which pebble might make the greater dent?

The students may come to the conclusion that because a large pebble makes a greater dent than a small pebble when dropped from the same height, the large pebble must have a greater store of energy than the small one.

The activity can be expanded quantitatively by using force meters to calculate the **gravitational potential energy** involved, dropping the pebbles from different heights and comparing the resultant dents.

Equipment required:

- Selection of large and small pebbles
- Empty soft drink cans
- Tongs suitable for holding both large and small pebbles (optional)
- Newton meter with pan attached
- Metre stick/measuring tape

What to do:

1. Gather a variety of stones ranging from small pebbles to rocks (but no bigger than the can). If possible, have two similar collections, enabling one group to drop stones from one height and a second group from a different height.
2. Lift a little pebble and a large stone from the floor and place each on a table.
3. Lay an empty can on the floor near the table.
4. Drop the pebble so that it strikes the can.
5. Observe and record what happens.
6. Replace this can with another empty one.
7. Drop the large stone so that it strikes the can.
8. Observe and record what happens.
9. Compare both observations and comment.

EXTENSION ACTIVITY:

It may be appropriate to show the students that potential energy can be calculated using the following formula:

Potential Energy = mass x acceleration of gravity x height.

1. Lay an empty can on the floor.
2. Using the Newton meter find the weight of the pebble.
3. Holding the pebble in the tongs, measure and record its height above the floor.
4. Release the pebble and observe the result.
5. Calculate the potential energy using the formula above.
6. Using different pebbles repeat steps 1 – 5, measuring and logging the height from which the pebble is dropped and how it relates to the impact on the can.

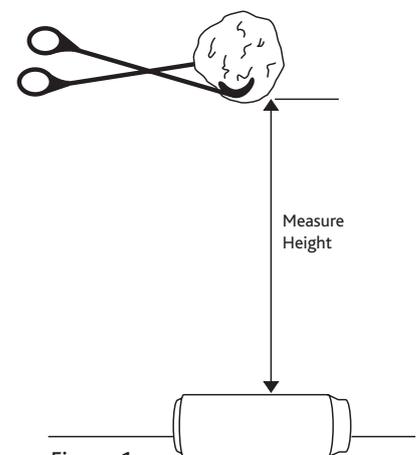


Figure 1

Using both the observation of the impact of the pebble on the can and its corresponding potential energy, what conclusion might you arrive at?