



Energy comes in many different forms.

A body in motion has Kinetic energy. The amount of Kinetic Energy a body possesses can be found by the equation

$$\text{Kinetic Energy} = \frac{1}{2} \text{ mass} \times \text{velocity}^2$$

The quantity of chemical energy held by a carrot and an éclair [in Joules] has been directly equated to kinetic energy. In order to find out the relative velocities at which they would travel.

The chemical energy of a carrot of mass 0.2kg is 312000 J

The chemical energy of an éclair of mass 0.1kg is 1778000 J

The assumption has been made that all energy is perfectly converted at a constant rate from chemical to kinetic. The energy content of the food is so large that it is assumed that this conversion happens over a period of 10,000 hours [36000000 seconds] giving power outputs [Joules/second] of:

0.0086 J/s for a carrot

0.0490 J/s for an éclair

To find their velocities the equation is rearranged.

$$\text{Velocity} = \sqrt{\frac{2 \times \text{Kinetic Energy converted/second}}{\text{Mass}}}$$

For a carrot

$$\text{Velocity} = \sqrt{\frac{2 \times 0.0086}{0.2}} = 0.29 \text{ m/s for 10,000 hours}$$

For an éclair

$$\text{Velocity} = \sqrt{\frac{2 \times 0.0490}{0.1}} = 0.99 \text{ m/s for 10,000 hours}$$

The electrical energy required to move the foods and the forces of friction and gravity acting against them are ignored.