

Lesson Aims:

All learners:

1. Energy transfers

Most learners:

1. Formulas for work done, GPE, kinetic Energy and power.
2. Rearrange formulas when required.

Some learners:

1. Be able to use standard form in calculations and be able to use prefixes for mega, kilo.

Starter !!

1. Power

1. $\Delta W = F \times D$

2. Kinetic Energy

2. Unit of energy

3. Work done

3. Unit of Power

4. Gravitational Potential Energy

4. Energy used every second

5. Joules

5. mgh

6. Watts

6. $mv^2/2$

Starter !!

1. Power

2. Kinetic Energy

3. Work done

4. Gravitational Potential Energy

5. Joules

6. Watts

1. $\Delta W = F \times D$

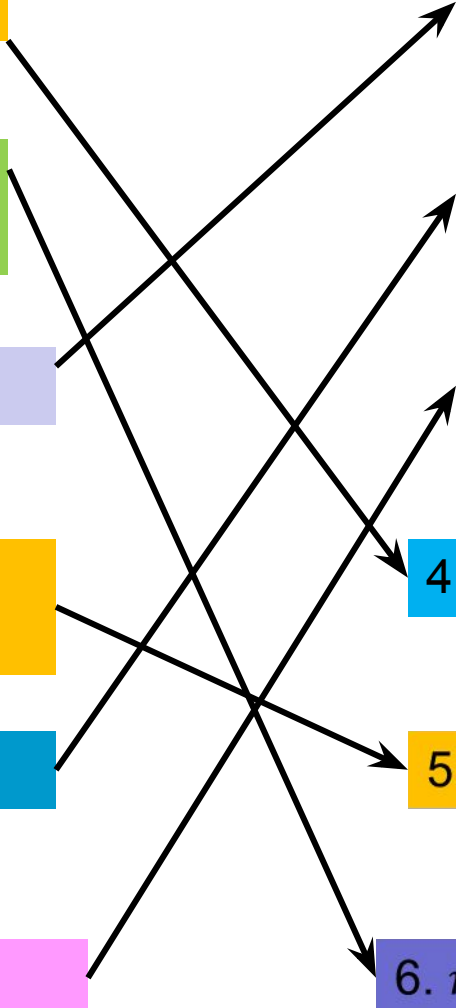
2. Unit of energy

3. Unit of Power

4. Energy used every second

5. mgh

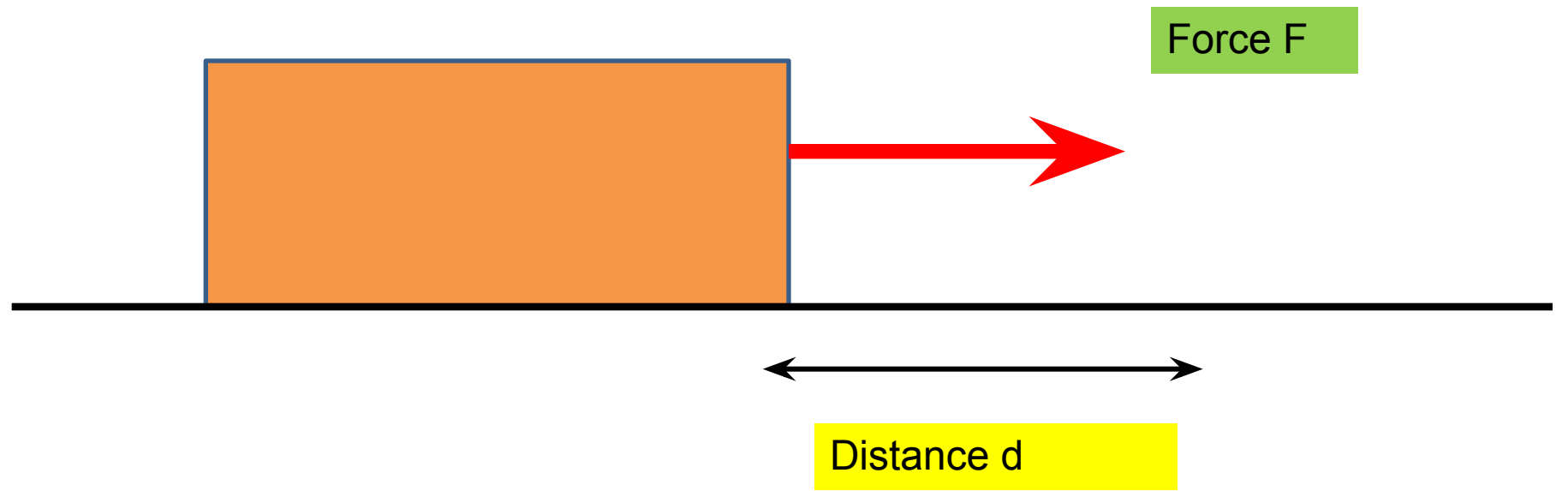
6. $mv^2/2$



Energy Transformations

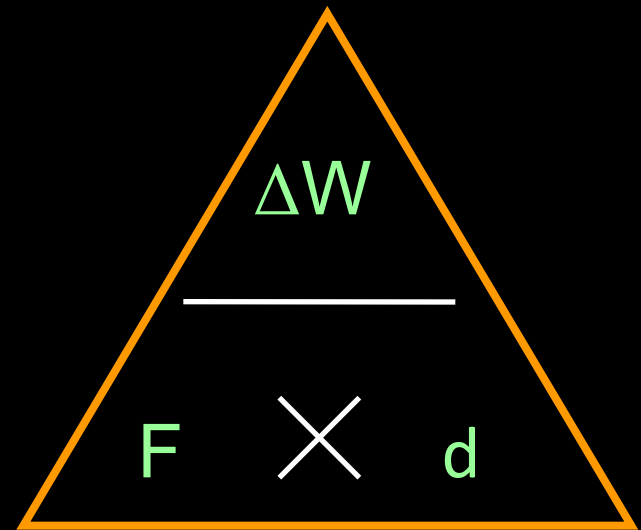
Energy is only useful if it can transform from one type to another:

https://phet.colorado.edu/sims/html/energy-forms-and-changes/latest/energy-forms-and-changes_en.html

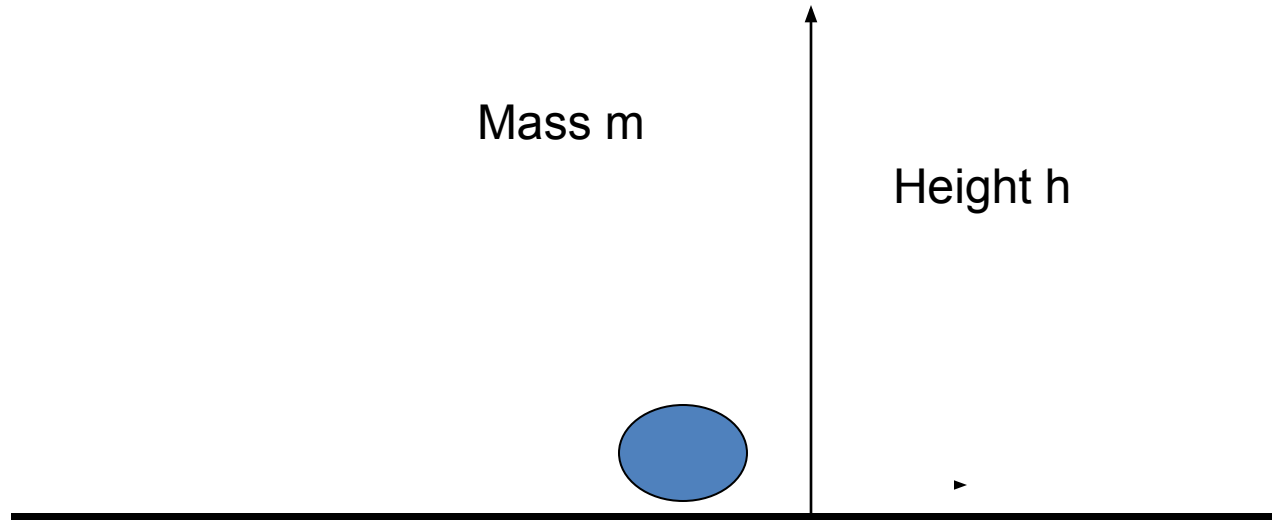


Work done (in joules) is simply the force needed to move an object multiplied by the distance moved in the direction of the force:

$$\Delta W = F \times d$$



Gravitational Potential Energy



When an object is lifted up close to the Earth's surface, work is done against the gravitational force:

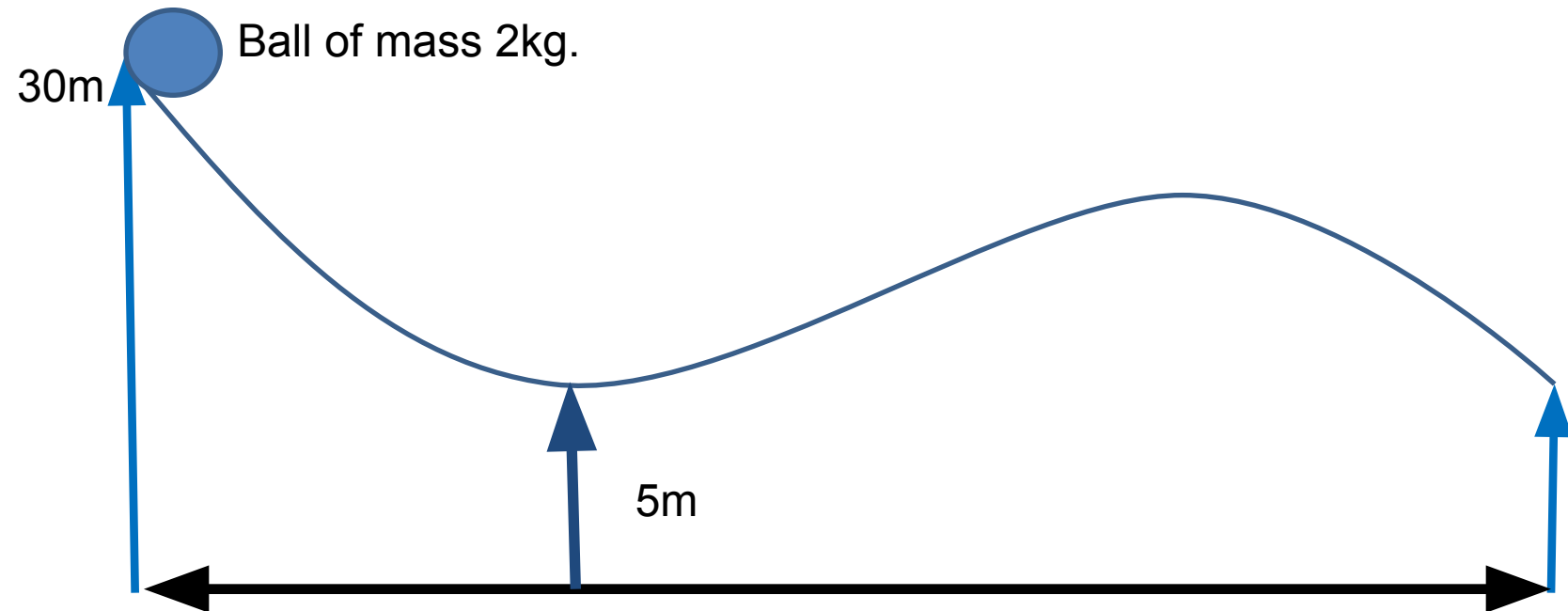
$$\text{GPE} = Fh = mgh$$

This energy is stored in the field.

Interchange of Kinetic energy and Gravitational Energy

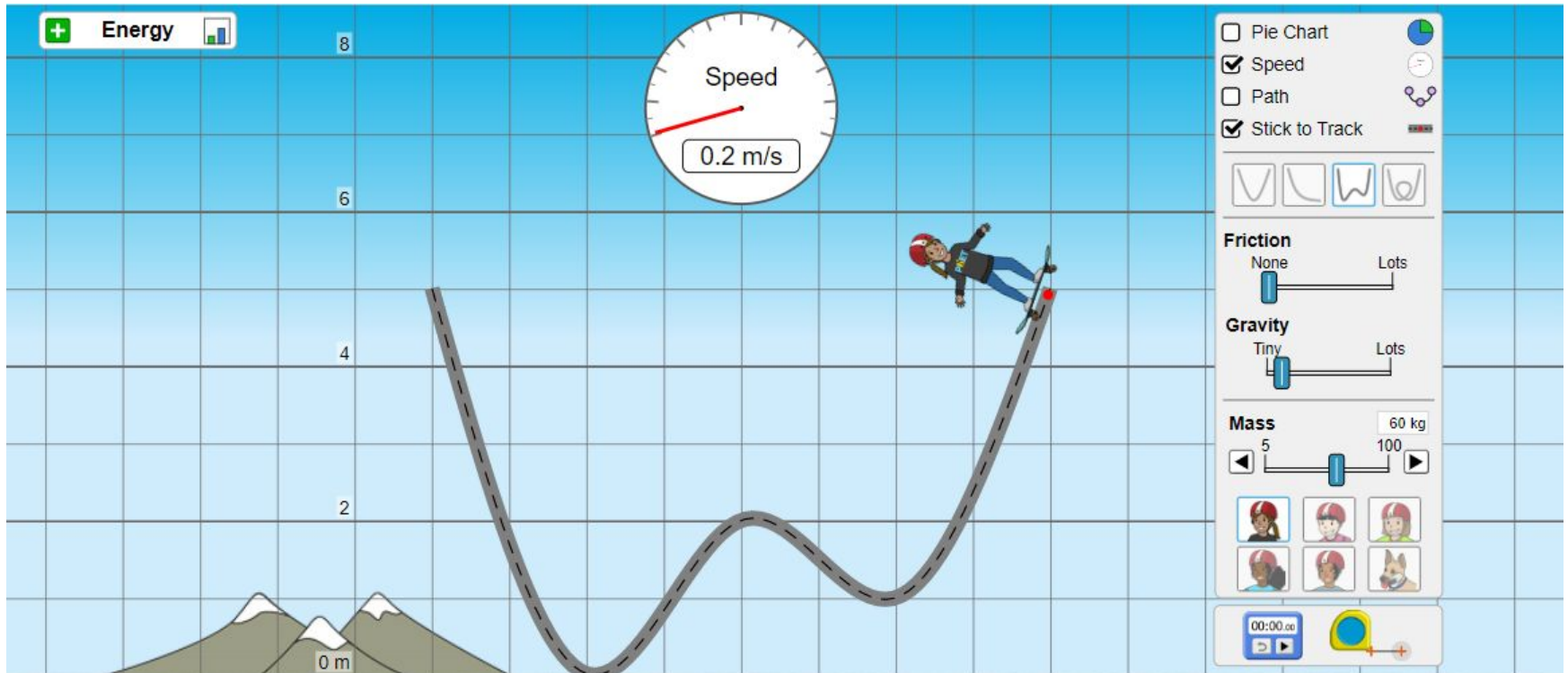
[energy-skate-park_en.jar](#)

https://phet.colorado.edu/sims/html/energy-skate-park/latest/energy-skate-park_all.html



- Calculate the GPE of the ball at the start.
- Calculate the GPE and KE when at 5m above the ground.
- Calculate the speed of the ball at this point.

Example !!



1. If $g = 10 \text{ N/kg}$ calculate the GPE at the start [mass = 60kg].
2. What is the GPE at 2m?
3. What is the kinetic energy at 2m?
4. What is the speed at 2m?

Power

Power is defined as the amount of energy used every one second.

$$Power(W) = \frac{Energy\ used(J)}{time(s)}$$

The unit of Power is the Watt(W).

