REVISION ON ENERGY

kinetic energy	$E_{\mathrm{k}} = \dfrac{1}{2} \cdot m \cdot v^2$	joule J
potential energy	$E_{\mathrm{pot}} = m \cdot g \cdot h$	joule J
work	$W = F \cdot s$	joule J
efficiency	$\eta = \dfrac{E_{\mathrm{useful}}}{E_{\mathrm{consumed}}}$	percentage %
power	$P = \dfrac{W}{t}$	watt W

1. A ball is rolling down a hill. Fill the boxes in with appropriate amounts of kinetic and potential energy.
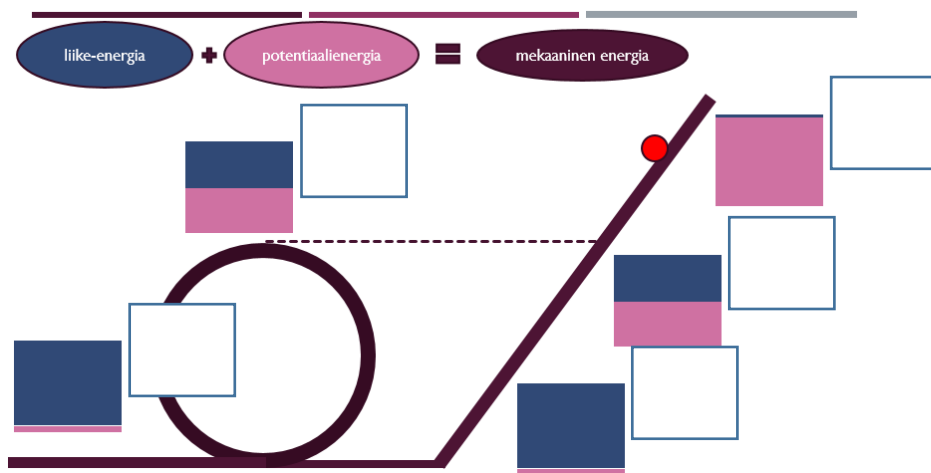
2. Calculations with mechanical energy.
    a. How much potential energy does a 30-kilogram person have afterwalking 50 m of stairs?

    b. How much kinetic energy does a 1 500-kilogram car have at 10 m/s?

    c. How much mechanical energy does a 200-kilogram bear have at the height of 10 metres and speed of 5 m/s?

3. Ven, whose mass is 80 kilograms, is walking uphill. According to his smartwatch, he has risen 100 m.
   a. How much potential energy has Ven gained during his climb?

   b. To his plight, Ven does not notice a warning sign and falls off of a ledge to a lake for 100 metres. At what speed does he hit the surface of water?

4. Elysse drives a motorcycle at 10 m/s. The combined mass of the bike and its driver is 500 kg.
   a. Find the amount of kinetic energy in Elysse and her bike.

   b. Elysse has to halt suddenly. Into which energy form is the kinetic energy transformed?

   c. If the braking distance to a halt is 200 metres, what was the average braking force?

5. A car consumes 6 000 J of chemical energy to gain 2 000 J of kinetic energy.
   a. Model the situation with an energy diagram.

   b. Find the efficiency of the car.

   c. Evaluate whether the efficiency is high or low.

6. Find the power of a car engine that accelerates a stationary two-tonne car to the speed of 100 kilometres per hour in 10 seconds. Mind that you need to convert 100 km/h ≈ 36 m/s.