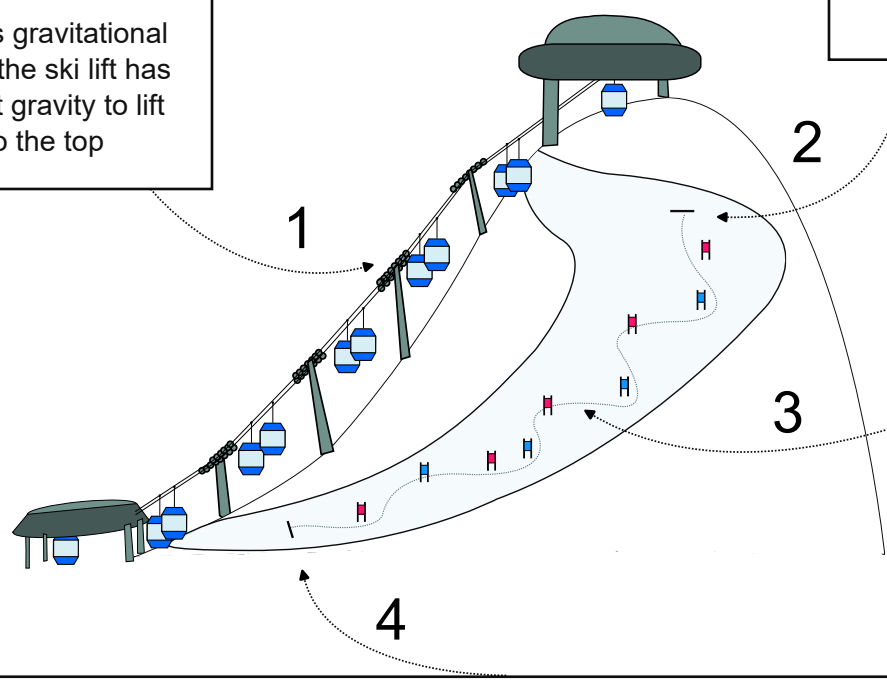
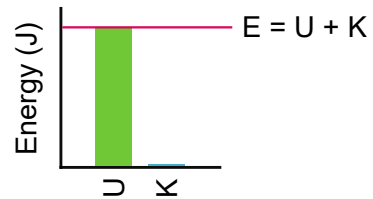
A skier accumulates gravitational potential energy as the ski lift has exerts force against gravity to lift the skiers up to the top

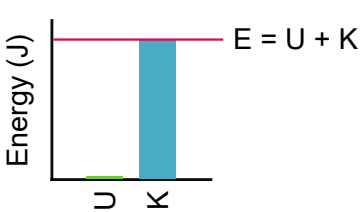


Starting at rest at the top of the course, the skiers kinetic energy (K) is 0. However, they have acquired a certain amount of potential energy (U) by taking the ski lift up.



Midway through the course, assuming gravity is the only force, potential energy is converted into kinetic energy, ensuring constant total energy (E)

At the bottom of the slalom course, assuming gravity is the only force, all the skiers' potential energy is converted to kinetic energy



In this scenario, we can use the law of conservation of mechanical energy to calculate a skier's velocity at the bottom of the hill based on the skier's potential energy at the top.

$$E = \frac{1}{2}mv^2 = mgh$$

$$v = \sqrt{2gh}$$

For example, a skier who starts at rest 50 m above the end of the slope will have a calculated velocity of 31.32 m/s at the bottom.

$$v = \sqrt{2 \text{ x } 9.81 \text{ m/s}^2 \text{ x } 50 \text{ m}} = 31.32 \text{ m/s}$$

However, a large part of the energy dissipates due to snow friction and air drag, which we can denote as D