

Energia mecânica: sistemas conservativos

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Sistemas conservativos

2kg



$V=0$

E_c

E_{pg}

E_{pel}

E_{mec}

0

900J

0

900J



$V=10\text{m/s}$

100J

800J

0

900J



$V=20\text{m/s}$

400J

500J

0

900J



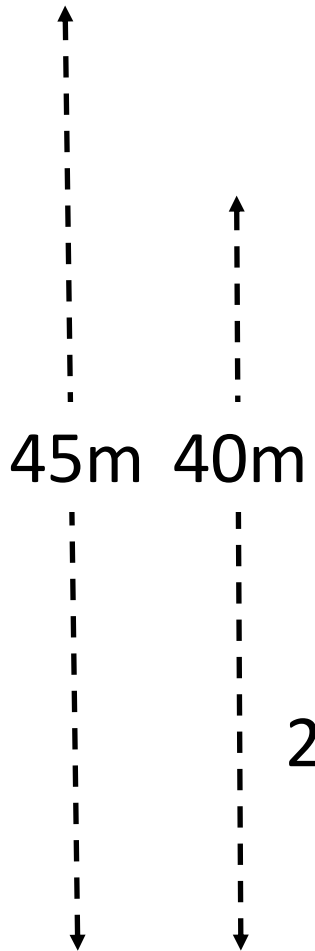
$V=30\text{m/s}$

900J

0

0

900J



Sistema conservativo

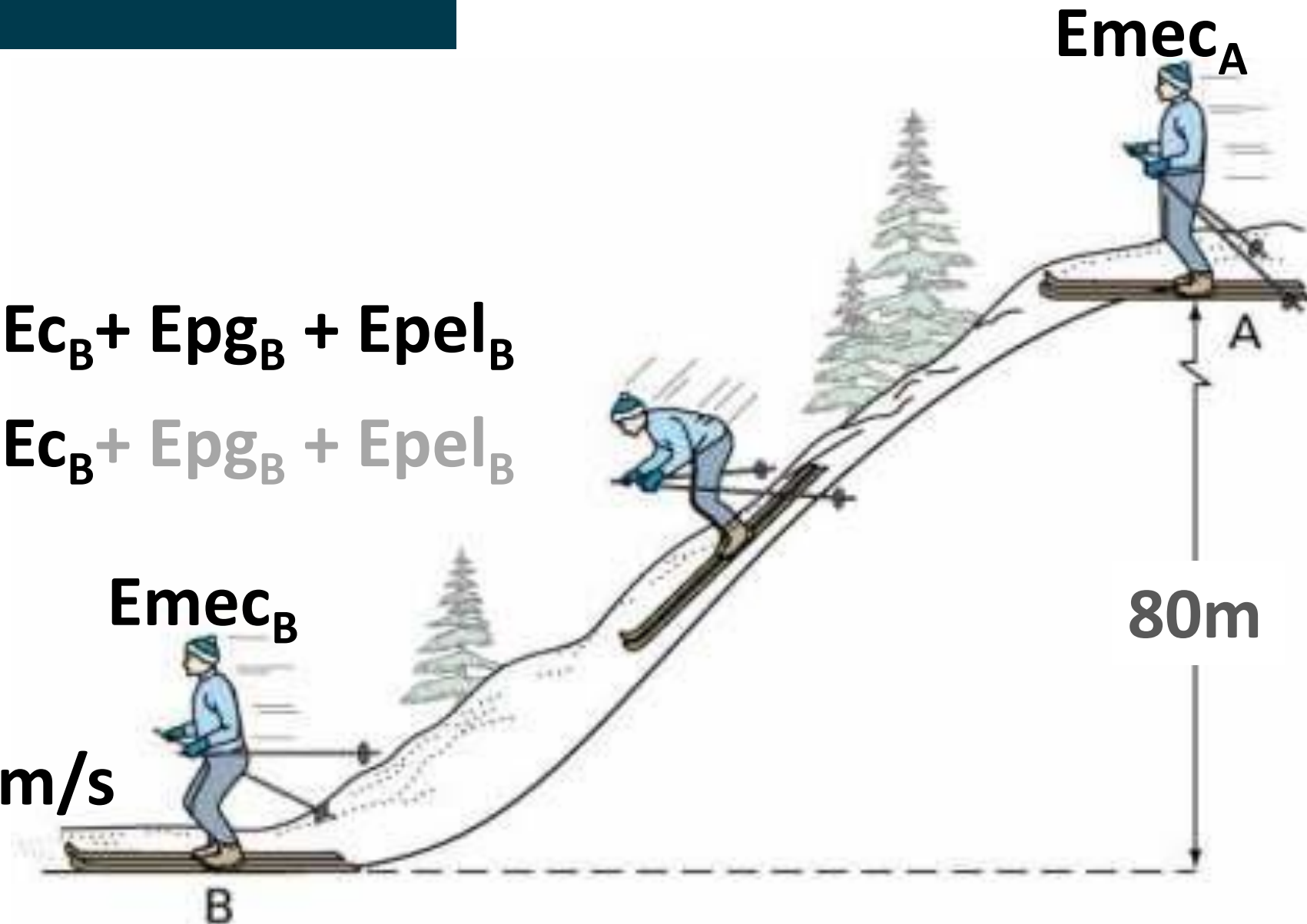
$$E_{mec_A} = E_{mec_B}$$

$$E_{c_A} + E_{pg_A} + E_{pel_A} = E_{c_B} + E_{pg_B} + E_{pel_B}$$

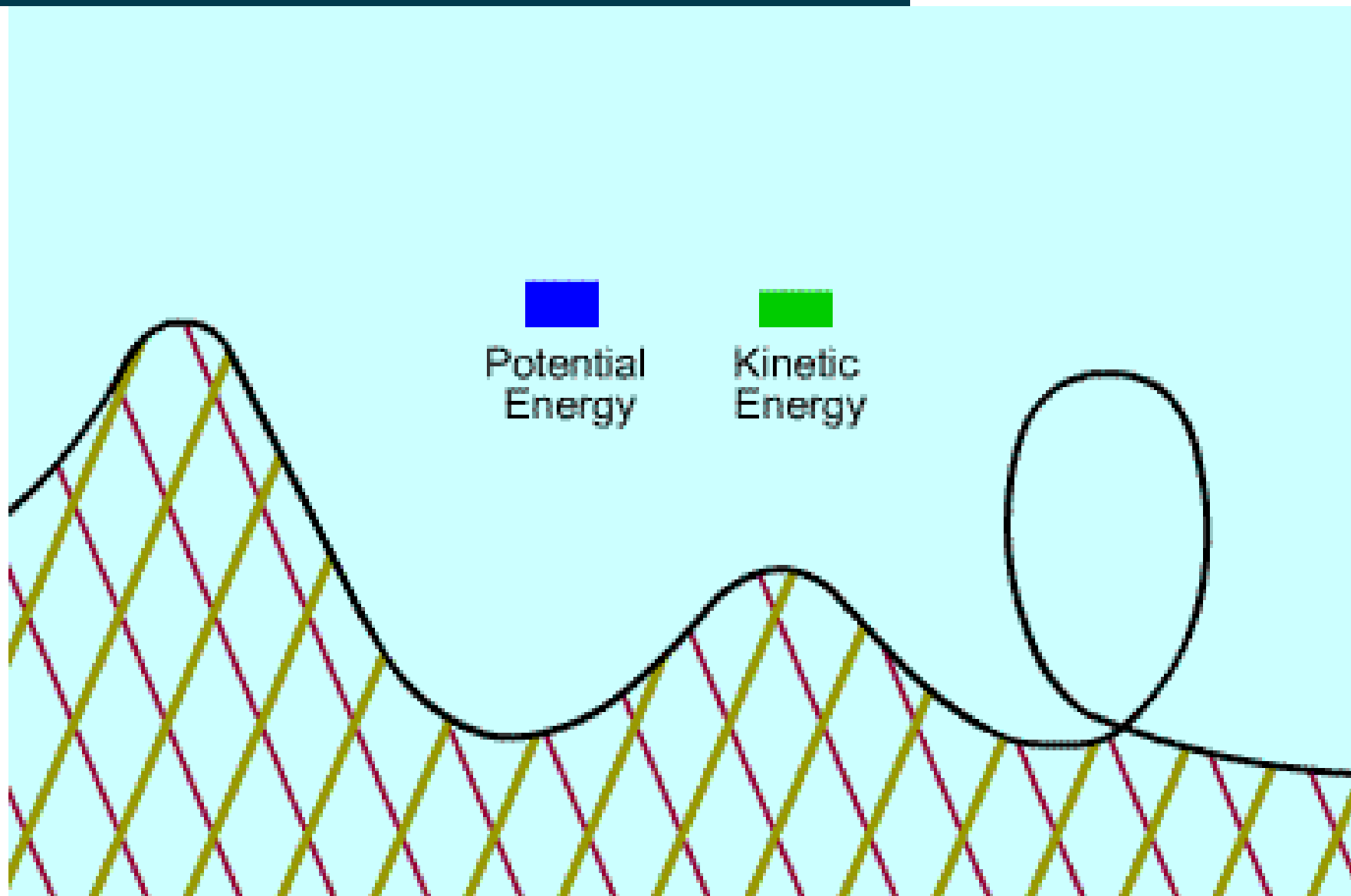
$$E_{c_A} + E_{pg_A} + E_{pel_A} = E_{c_B} + E_{pg_B} + E_{pel_B}$$

$$m \cdot g \cdot h = \frac{m \cdot v^2}{2}$$

$$10 \cdot 80 = \frac{v^2}{2} \quad v = 40 \text{ m/s}$$



Sistemas conservativos



Sistema conservativo

$$E_{mec_A} = E_{mec_B}$$

$$E_{c_A} + E_{pg_A} + E_{pel_A} = E_{c_B} + E_{pg_B} + E_{pel_B}$$

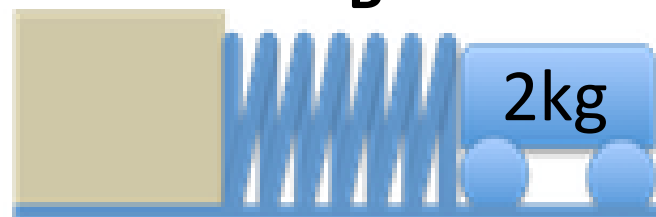
$$E_{c_A} + E_{pg_A} + E_{pel_A} = E_{c_B} + E_{pg_B} + E_{pel_B}$$

$$m \cdot g \cdot h = \frac{k \cdot x^2}{2}$$

$$2 \cdot 10 \cdot 5 = \frac{200 \cdot x^2}{2}$$

E_{mec_B}

$x = 1\text{m}$



$K = 200\text{N/m}$

E_{mec_A}



5 m

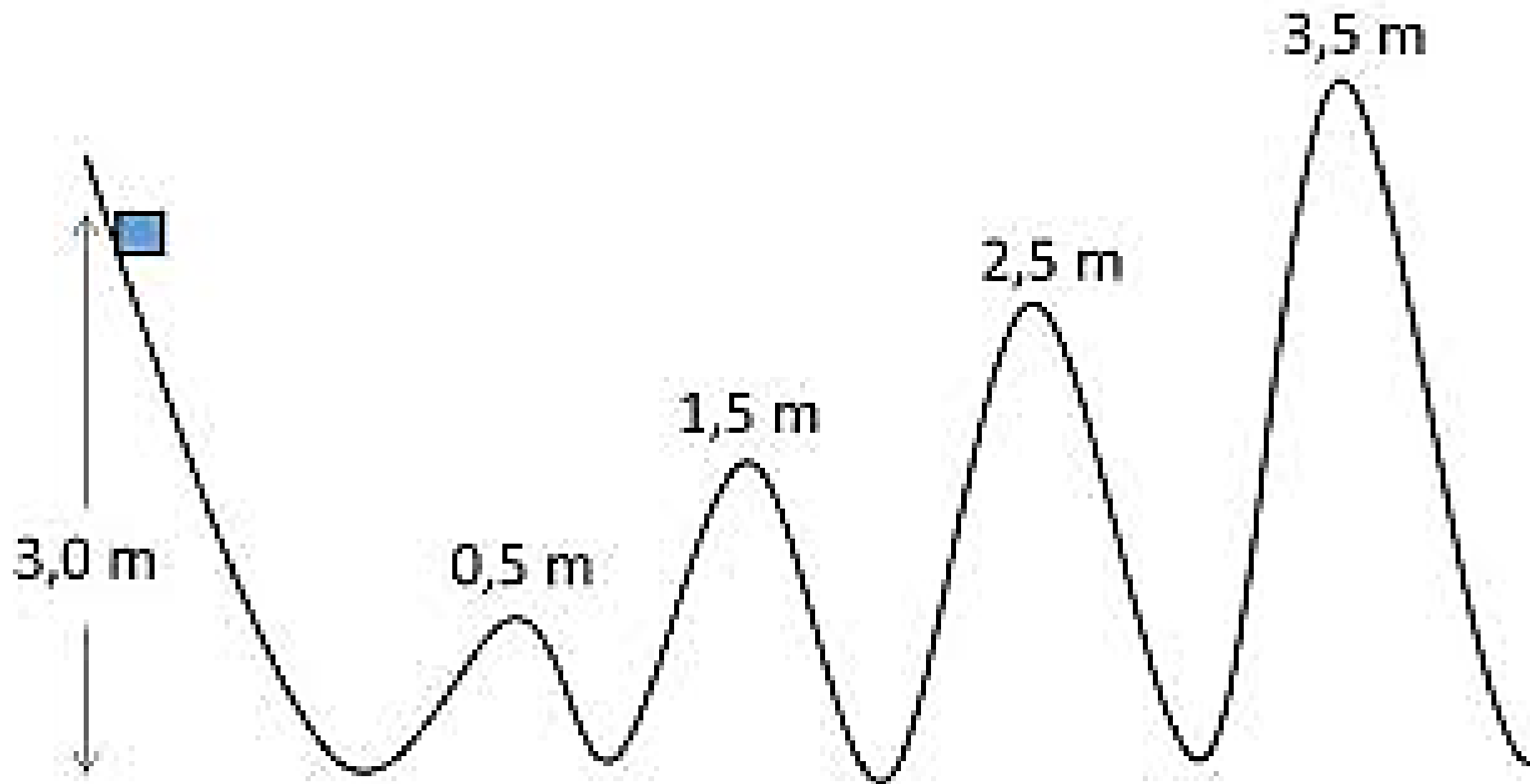
Sistemas conservativos

The image shows a PhET simulation interface for a skate park. A skateboarder is positioned on a curved ramp. The simulation includes several interactive elements:

- Energy Graph (Energia):** A vertical bar chart on the left showing energy levels for Kinetic (Cinética), Potential (Potencial), Thermal (Térmica), and Total energy. The y-axis is labeled 'Energia'.
- Mass Control (Massa):** A slider on the right labeled 'Massa' with 'Pequena' (Small) and 'Grande' (Large) settings.
- Display Options:** A panel on the right with checkboxes for 'Gráfico Setorial' (Sectorial Graph), 'Gráfico de barras' (Bar Graph - checked), 'Mostrar grade' (Show Grid), and 'Velocidade' (Velocity).
- Camera Controls:** A panel at the bottom right with buttons for 'Câmera Lenta' (Slow Camera) and 'Normal', and a 'Retornar Skateista' (Return Skater) button.
- Navigation:** A bottom bar with icons for 'Intro', 'Ajuda' (Help), 'Parque', and a home icon.

The simulation is titled 'Parque de Skate' and is part of the PhET project, as indicated by the logo in the bottom right corner.

Sistemas conservativos



Salto com vara

O atleta corre, carregando uma longa vara de material flexível

Ele produz energia cinética que se acumula na vara na forma de energia potencial elástica

Quanto maior a velocidade da corrida, mais alta será a subida

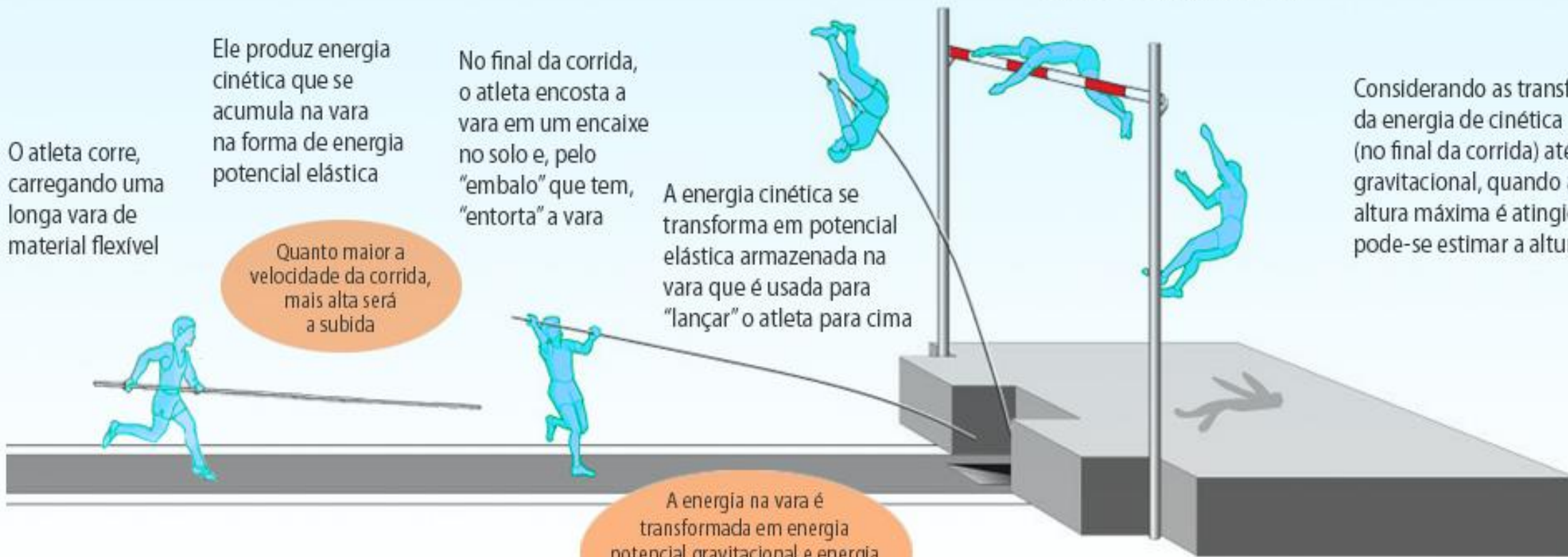
No final da corrida, o atleta encosta a vara em um encaixe no solo e, pelo "emboalo" que tem, "entorta" a vara

A energia cinética se transforma em potencial elástica armazenada na vara que é usada para "lançar" o atleta para cima

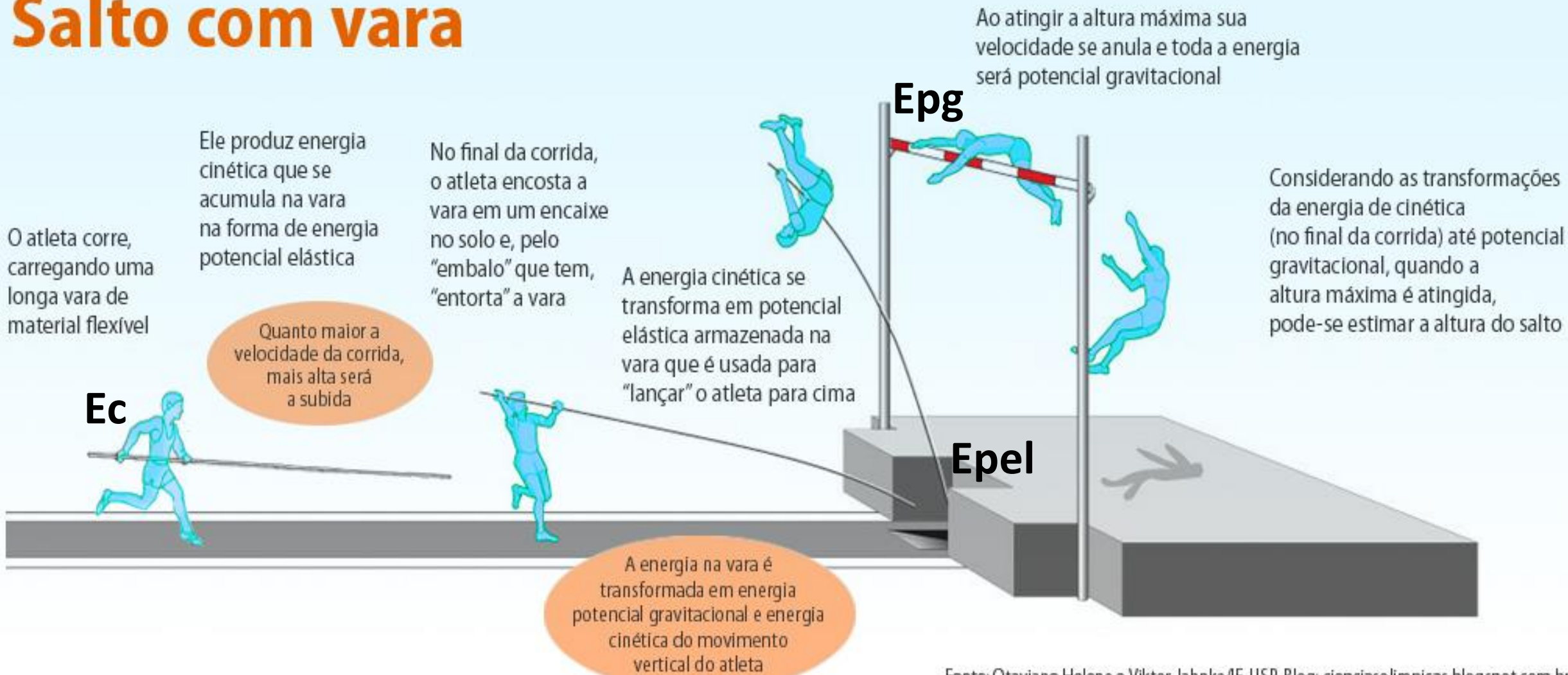
A energia na vara é transformada em energia potencial gravitacional e energia cinética do movimento vertical do atleta

Ao atingir a altura máxima sua velocidade se anula e toda a energia será potencial gravitacional

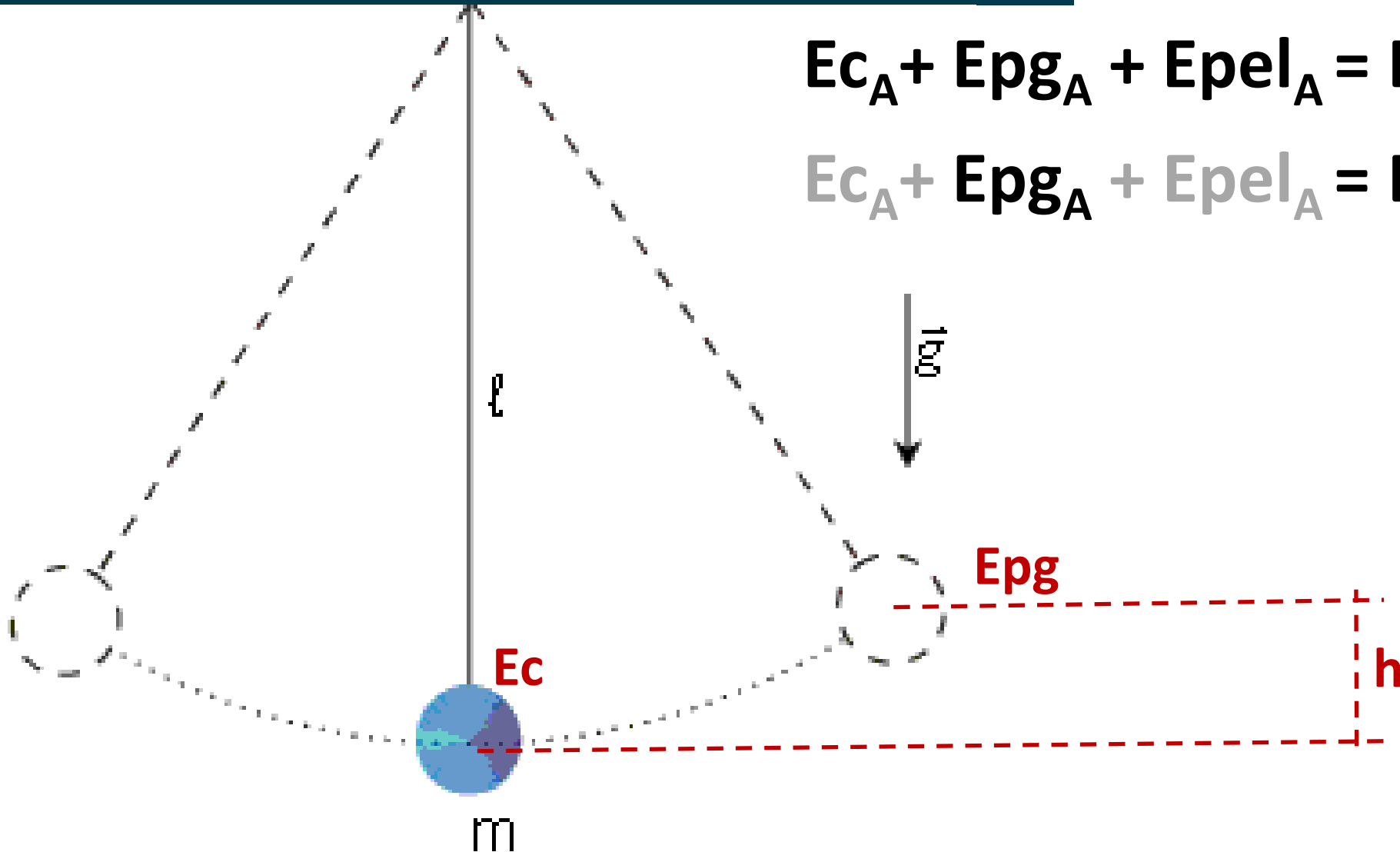
Considerando as transformações da energia de cinética (no final da corrida) até potencial gravitacional, quando a altura máxima é atingida, pode-se estimar a altura do salto



Salto com vara



Sistemas conservativos



$$E_{c_A} + E_{pg_A} + E_{pel_A} = E_{c_B} + E_{pg_B} + E_{pel_B}$$

$$E_{c_A} + E_{pg_A} + E_{pel_A} = E_{c_B} + E_{pg_B} + E_{pel_B}$$

$$m \cdot g \cdot h = \frac{m \cdot v^2}{2}$$

Looping

$$V_0 = 0$$

A

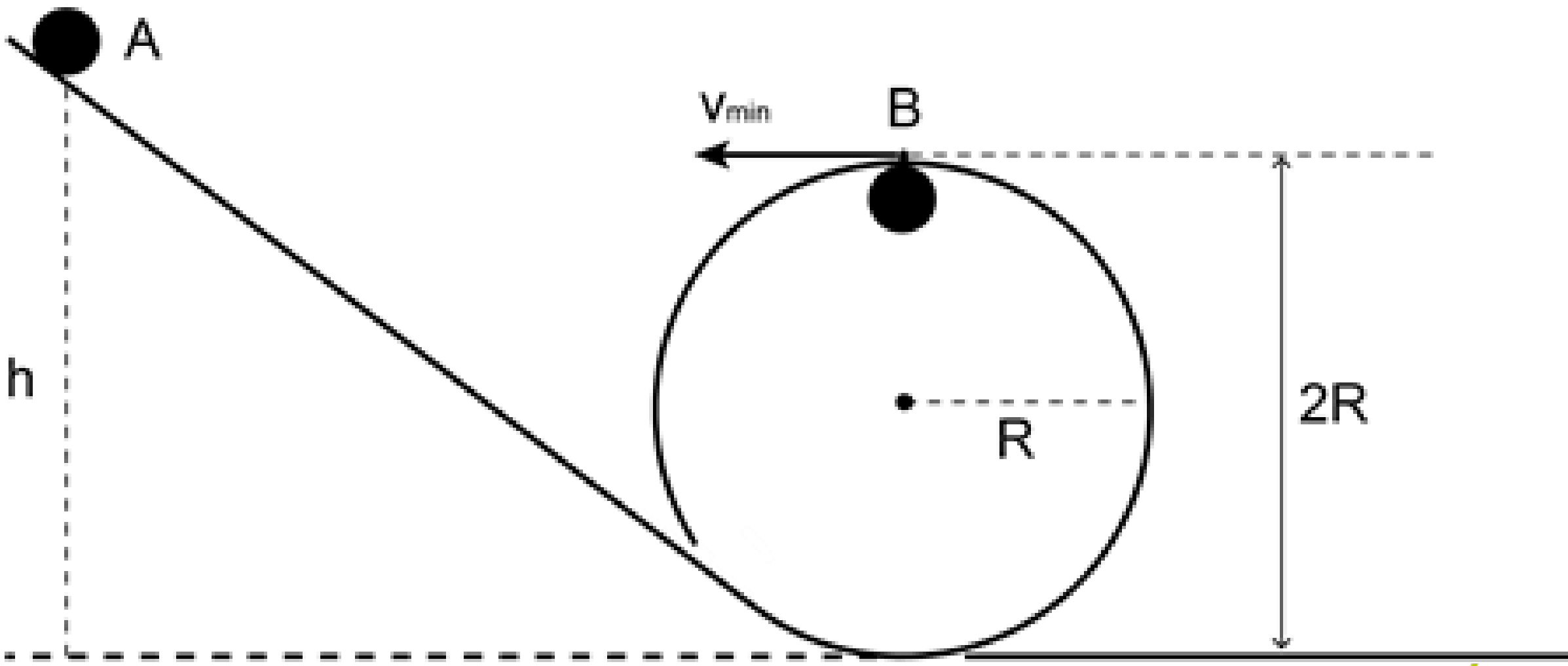
h

V_{min}

B

R

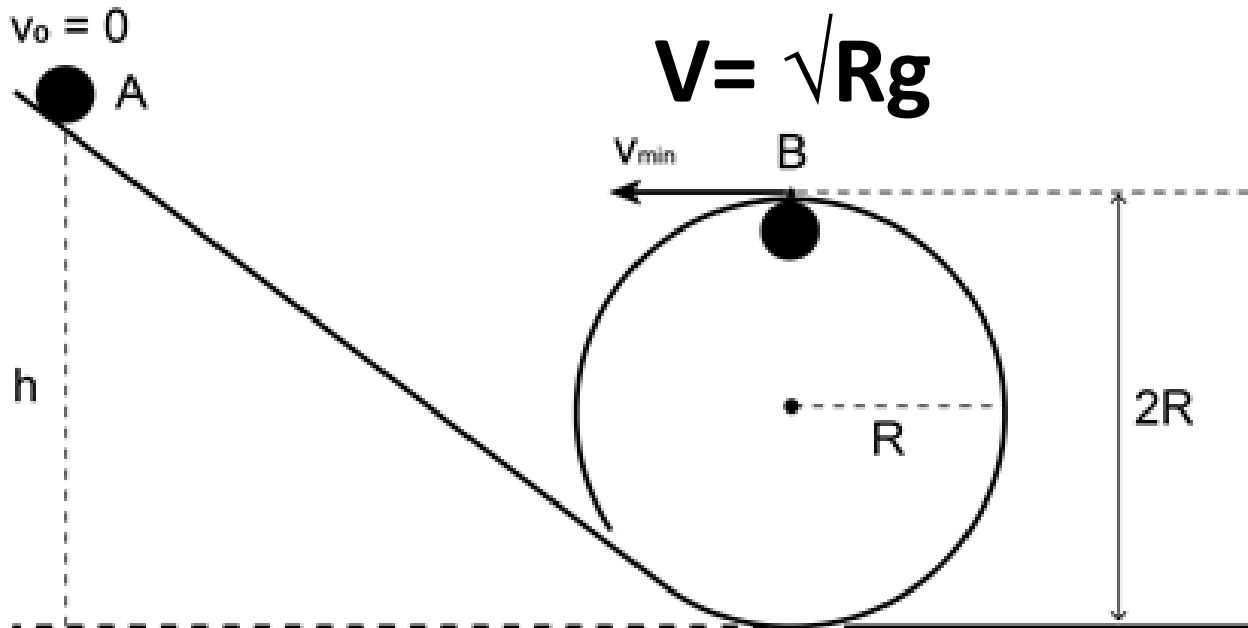
$2R$



Looping

$$Ec_A + Epg_A + Epel_A = Ec_B + Epg_B + Epel_B$$

$$Ec_A + Epg_A + Epel_A = Ec_B + Epg_B + Epel_B$$



$$m.g.h = \frac{m.v^2}{2} + m.g.h'$$

$$g.h = \frac{R.g}{2} + g.2R$$

$$h = \frac{R}{2} + 2R$$

$$h = 2,5R$$

Energia mecânica

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