

Up and Down With Energy

NOTE: Numerical values used in these questions are selected at random from a list of possible values. As such, there are considerably more problems than what is displayed below. The g value is selected by the student when starting an activity.

Activity 1: Apprentice Difficulty Level

NOTE: KE_A values are randomly selected. Additionally, there are three different graphics that are randomly selected.

A projectile is launched vertically upward. See diagram. Given that $PE_A = 0.0$ J, and $KE_A = 640$ J, and $KE_C = 0.0$ J, use the background grid and energy principles to fill in all blanks.

PE_B (J): _____

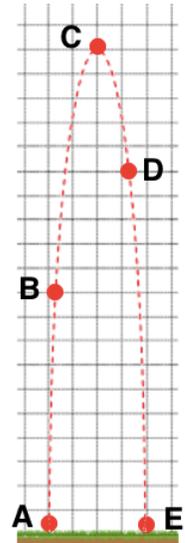
KE_B (J): _____

PE_C (J): _____

PE_D (J): _____

KE_D (J): _____

KE_E (J): _____



Activity 2: Master Difficulty Level

NOTE: mass, KE_A and h values are randomly selected. Additionally, there are four different graphics that are randomly selected.

A 4.0-kg projectile is launched vertically upward. See diagram. The $PE_A = 0.0$ J and $KE_A = 420$ J. The heights are: $h_B = 3.8$ m; $h_C = 8.4$ m; $h_D = 2.5$ m. Use $g =$ _____ **N/kg** (9.8 or 10.0 as decided by student).

PE_B (J): _____

KE_B (J): _____

PE_C (J): _____

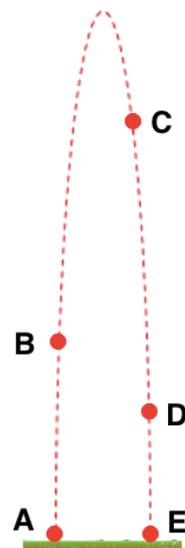
KE_C (J): _____

PE_D (J): _____

KE_D (J): _____

PE_E (J): _____

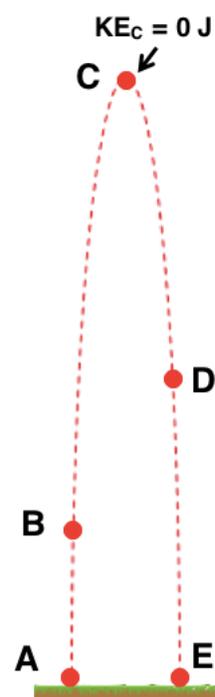
KE_E (J): _____



Activity 3: Wizard Difficulty Level

NOTE: mass and KE_A values are randomly selected. Additionally, there are four different graphics that are randomly selected.

A 4.0-kg projectile is launched vertically upward. See diagram. The $PE_A = 0.0$ J, $KE_A = 840$ J, and $KE_C = 0$ J. The value of h_B is $\frac{1}{4} \cdot h_C$ and the value of h_D is $\frac{1}{2} \cdot h_C$. Determine all missing values. Use $g =$ _____ **N/kg** (9.8 or 10.0 as decided by student).



PE_B (J): _____

KE_B (J): _____

PE_C (J): _____

PE_D (J): _____

KE_D (J): _____

KE_E (J): _____

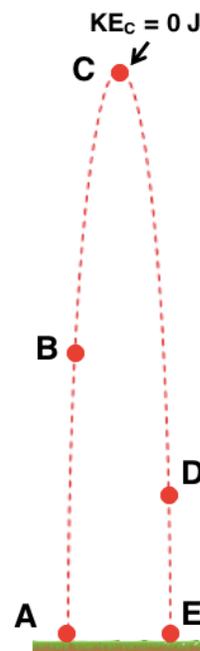
h_C (m): _____

h_D (m): _____

v_D (m/s): _____

v_E (m/s): _____

A 4.0-kg projectile is launched vertically upward. See diagram. The $PE_A = 0.0$ J, $KE_A = 840$ J, and $KE_C = 0$ J. The value of h_B is $\frac{1}{2} \cdot h_C$ and the value of h_D is $\frac{1}{4} \cdot h_C$. Determine all missing values. Use $g =$ _____ **N/kg** (9.8 or 10.0 as decided by student).



PE_B (J): _____

KE_B (J): _____

PE_C (J): _____

PE_D (J): _____

KE_D (J): _____

KE_E (J): _____

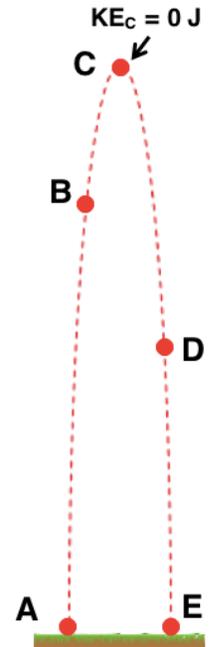
h_B (m): _____

h_C (m): _____

v_B (m/s): _____

v_E (m/s): _____

A 4.0-kg projectile is launched vertically upward. See diagram. The $PE_A = 0.0$ J, $KE_A = 840$ J, and $KE_C = 0$ J. The value of h_B is $\frac{3}{4} \cdot h_C$ and the value of h_D is $\frac{1}{2} \cdot h_C$. Determine all missing values. Use $g =$ _____ **N/kg** (9.8 or 10.0 as decided by student).



PE_B (J): _____

KE_B (J): _____

PE_C (J): _____

PE_D (J): _____

KE_D (J): _____

KE_E (J): _____

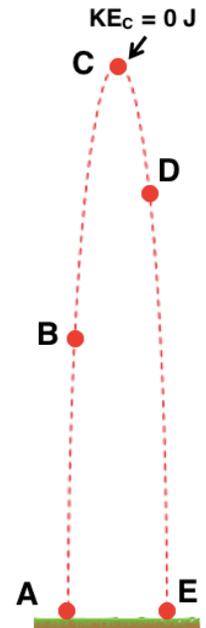
h_C (m): _____

h_D (m): _____

v_D (m/s): _____

v_E (m/s): _____

A 4.0-kg projectile is launched vertically upward. See diagram. The $PE_A = 0.0$ J, $KE_A = 840$ J, and $KE_C = 0$ J. The value of h_B is $\frac{1}{2} \cdot h_C$ and the value of h_D is $\frac{3}{4} \cdot h_C$. Determine all missing values. Use $g =$ _____ **N/kg** (9.8 or 10.0 as decided by student).



PE_B (J): _____

KE_B (J): _____

PE_C (J): _____

PE_D (J): _____

KE_D (J): _____

KE_E (J): _____

h_B (m): _____

h_C (m): _____

v_B (m/s): _____

v_E (m/s): _____