

Work and Energy: Energy Conservation (or not) Videos

Explanation of The Table:

The table below describes the conditions for 12 different real-life events. During each event, some object experiences a change in its energy. In the table the middle three columns tell us whether each type of energy (Spring potential, gravitational potential, and/or kinetic) is increasing, decreasing, or remaining constant. The final column tells us whether any non-conservative work is being done on the object, and whether that work is positive or negative.

Event Number	$\Delta PE_{\text{Spring}}$	$\Delta PE_{\text{Gravitational}}$	ΔKE	$W_{\text{Non-conservative}}$
1	0	-	0	-
2	+	-	-	0
3	+	+	-	0
4	-	0	?	0
5	0	?	0	+
6	+	+	+	+
7	0	+	?	0
8	0	-	-	-
9	+	0	0	?
10	0	+	-	-
11	-	+	+	-
12	0	-	+	+

Your Immediate Tasks:

- Get a strip of paper with a uniquely shuffled list of event numbers and letter identifiers. The strip of paper determines the order in which you must create videos. Most groups will not have time for all 12 events, but this way the class will produce several videos for each event.
- Make a short video for at least 8 events, but try to complete as many as possible. Do NOT strive for perfection! Keep in mind that your main goal should be to enable a viewer to correctly match your video to its number in the table above – without “cheating” by directly telling what is happening to the quantities in the table.
 - In your video, identify the object whose energy is changing in the manner described in the table.
 - Identify the starting and ending point of the event. You can do this before or after the event has taken place.
 - Identify any portions of the event where you would like the viewer to ignore friction.
 - Point out any pushes or pulls that you would like to call to the viewer’s attention.
 - Edit your video to make it as short as possible. It’s much easier to share that way.
 - Upload your video to your Google Drive. To stay organized, it would be a great idea to **include the identifying letter in the file name**. Do not include the event number in the file name.
 - Set the share settings to “anyone with a link.”
- When you’re done with all of your videos, fill out the provided form. For each event, you will be asked to type the identifying letter in caps and then paste the video link. Make sure that your share settings are “anyone with a link.”

Tasks to come (tentative):

- Trade videos with another group (Mr. Stapleton will facilitate this.). Try to correctly match each video to an event in the table above, while they try to match yours. Point out any errors that you think they made, and listen to their assertions about your errors.
- Write an equation for each event, using the energy conservation formula with non-conservative work ($PE_{S0} + PE_{G0} + KE_0 + W_{NC} = PE_S + PE_G + KE$).
- As a class, watch some videos and turn them into “test problems” to solve.