Kinetic Energy Activities

Aim

To perform simple activities to introduce the concept of kinetic (motion) energy.

Apparatus and materials

- *Retort stand*
- *Pulley, single, on clamp*
- *Mass hanger and slotted masses (up to 150 g)*
- *String*
- *Dynamics trolley*
- *Spring (5-20cm long)*
- *G-clamp, 10 cm*

Safety

In all of these experiments a student should act as a 'trolley catcher' to ensure no trolleys land on toes.

Procedure

PART A

Put the trolley on a bench and give it a push.

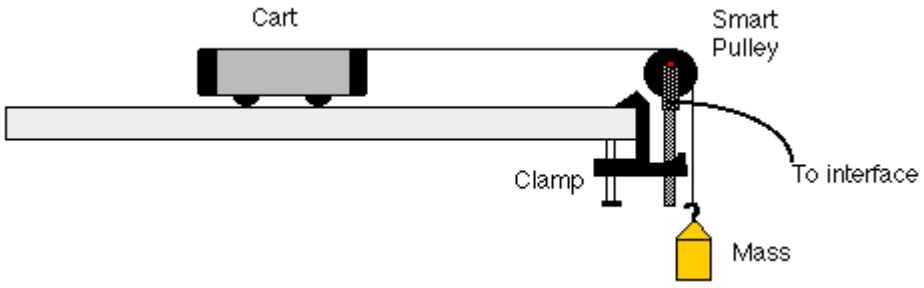
1. How can you give it more kinetic energy?

2. Where does it get the extra kinetic energy from?

3. Draw a flow chart showing the transfer of energy.

PART B

Take a piece of string that is longer than the height of your bench. Tie one end to the trolley and the other to 50 g slotted mass. Clamp the pulley to the edge of your bench and lie the string over it so it looks like the diagram below.



Let the slotted mass go (and be prepared to catch the masses and trolley)

1. How could you increase the kinetic energy of the trolley?

2. Where would it get this extra kinetic energy from?

3. Draw a flow chart showing the transfer of energy.

Repeat the activity, but in reverse. Start with the trolley held in place on the table while the masses dangle in mid air (must be off the floor). **Smoothly** push the trolley away then let go so that the masses begin to rise.

4. How do you know that the trolley was losing kinetic energy as soon as you let go?

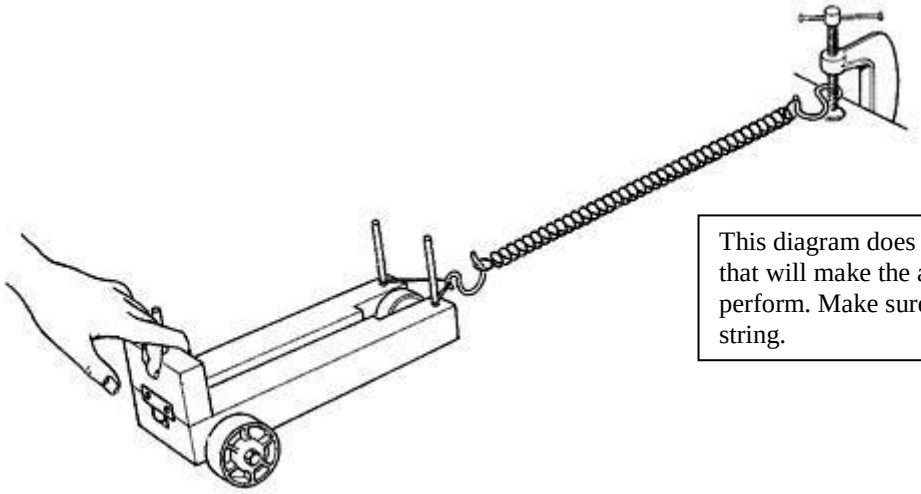
5. When did the trolley's kinetic energy start increasing again?

6. Draw a flow chart showing the transfer of energy.

PART C

This activity may be done as a teacher demonstration instead if suitably sized springs are not available in large quantities.

Take the spring and anchor one end to a retort stand pole (or clamp). Tie some string around the other end. Tie the string to the trolley. The spring might be easily stretched "too far" in this activity, so be gentle.



This diagram does **not** show the string that will make the activity easier to perform. Make sure you tie on some string.

Pull the trolley away from the retort pole until the string and spring are taut. Pull the trolley a few centimeters further so the spring **slightly** stretches . Let go of the trolley.

1. Where did the trolley get its kinetic energy from?

2. How could you increase the kinetic energy of the trolley?

3. Draw a flow chart showing the transfer of energy.

Repeat the activity but this time push the trolley (gently) away from the retort pole. The trolley should pull on the string and stretch the spring, and then return back.

4. As the trolley came to a stop, why did the trolley lose kinetic energy? Where did the energy go?

5. When the trolley returned, where did it get the kinetic energy from?

6. Draw a flow chart showing the transfer of energy.