Kai Wang
8th Grade Science
Law of Conservation of Energy: Kinetic and Potential Energy

AGENDA: Students should be able to understand the concepts of the law of conservation of energy and the principles of kinetic and potential energy, including understanding the principles behind the law and it's various applications**.** Differentiate between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.

STANDARD 1: Recognize, interpret, and be able to apply their knowledge of the law of conservation of energy to real life surroundings.

STANDARD 2: Recognize, interpret and understand the concepts of kinetic and potential energy, how they are related, and how they apply to real life surroundings

STANDARD 3: Present and explain data findings. Record their observations on kinetic and potential energy

Time Frame: 1 class period (45 min)

Materials: Tennis Balls, StopWatches

1) Activator: Question/Answer session on what students think conservation of energy is - Provide examples of energy. Describe what kinetic and potential energy is and how they may be transformed into one another.

(No more than 10 minutes)

2) Instruction/Interaction:

a) Form teams. Choose 3 different heights to drop the tennis balls from. Heights should be measured in units of Meters

b) For each height, record the time it takes the ball to drop to the ground (Note: record the time from when you let go of the tennis ball to *right before* the tennis ball hits the ground). Repeat the procedure 5 times to obtain 5 data times.

c) Average your 5 time results to account for errors in your time measurements.

(ideally approx 20 min)

3) Discussion/Results: Discuss how the two energies were transformed and how they were conserved
(approx 10min)

4) Wrap Up / Assessment: Complete Worksheet
(approx 5min)

5) Worksheet Questions:

1) What were the three different heights that you used?

2) What were the 3 time averages that you measured for the ball dropping to the ground?

3) Calculate the potential energy of the ball for the three different heights. Use 9.8 m/s^2 for the value of gravity.

4) Calculate the kinetic energy of the ball for the three different heights. (Hint: Use $v^2 = (g \times t)^2$ where g is gravity which is given above in part 3, and t are the average times that you calculated in part 3 of your data worksheet).

5) What do you notice about your answers for questions 3 and 4? (Basically, are your answers pretty close or not?). Explain Why.