Pull-Back Car Experiment

Materials:

- Pull-Back Car
- Ruler
- Tape
- Marker
- 5 Pennies
- A large, flat, smooth surface such as a wood or tiled floor, or a big table

Instructions:

1. Set up:
    a. Find a large, flat, smooth surface where you can perform your experiment.
    b. Place a piece of tape in your work area. Mark this piece of tape "START" with your marker. Note: You will need a few feet of space on either side of this piece of tape in order to conduct the experiment.
    c. Use your ruler to measure six inches TO THE LEFT of the tape marked "START." Place another piece of tape in this spot and mark it "1."
    d. Use your ruler to measure six inches TO THE LEFT of tape "1." Place another piece of tape in this spot and mark it "2."
    e. Use your ruler to measure twelve inches TO THE LEFT of tape "2." Place another piece of tape in this spot and mark it "3."
2. Experiment Part One:
    a. Place your pull-back car at the "START" tape. Pull it back to tape "1" and release. Write down your observations in the box below. Repeat the process for a second trial.
    b. Place your pull-back car at the "START" tape. Pull it back to tape "2" and release. Write down your observations in the box below. What was different this time? Repeat the process for a second trial.
    c. Place your pull-back car at the "START" tape. Pull it back to tape "2" and release. Write down your observations in the box below. What was different this time? Repeat the process for a second trial.
3. Experiment Part Two:
    a. Tape 5 pennies to the top of your pull-back car. Place your car at the "START" tape and run more trials pulling the car back to tapes "1," "2," and "3." Compare your results to your trials without the pennies. What was different this time?

Here is some important vocabulary. Try to use some of these words in your observations!

- Energy: The ability to do work
- Potential Energy: Stored energy an object has because of its position or state
- Elastic Potential Energy: Energy that is stored when an object is stretched or squeezed (like stretching a rubber band on your fingers)
- Kinetic Energy: The energy of motion that makes an object move
- Speed: How quickly an object changes position from one place to another
- Mass: An object's weight
- Force: A push or pull on an object
- Collision: When two objects come into contact with each other
- Gravity: An invisible force that pulls things towards each other/the ground
- Friction: The resistance of motion when one object rubs against another

Observation Sheet: No Pennies

TAPE #	**TRIAL #**	**OBSERVATIONS OF MOVEMENT**
Tape "1"	Trial 1	One thing I saw is that the speed was a little bit slow and it did not go as far.
Tape "1"	Trial 2	One thing I saw is that on the second trial the speed on the car had more kinetic energy and went far.
Tape "2"	Trial 1	One thing I saw is that on tape 2 it was going so fast it went off the table.
Tape "2"	Trial 2	One thing I saw is that it was going in a circle and fell off the table.
Tape "3"	Trial 1	One thing I saw is that the speed was going fast it went off the table
Tape "3"	Trial 2	One thing I saw is that on trail 2 it was going in a curved dreshion but it still went off the table.

Observation Sheet: With Pennies

TAPE #	**TRIAL #**	**OBSERVATIONS OF MOVEMENT**
Tape "1"	Trial 1	One thing I saw is that even with mass of the pennies on the car it still went fast.
Tape "1"	Trial 2	One thing I saw on trial two is that it was going a little bit slower but it still went off the table.
Tape "2"	Trial 1	One thing I saw is that it was turning a little bit and the speed on the car was fast and went off the table.
Tape "2"	Trial 2	One thing I saw on trial two is that it went strat and it went off the table.

Tape “3”	Trial 1	One thing I saw is that the speed is not fast but not slow it did not go off the table.
Tape “3”	Trial 2	One thing I saw on trial two is that it turned so fast it turned off the table.