- **Oscillations / Vibration of objects from its equilibrium position/ Recoiling of object.**

Limitations

1.) 2 sets of readings are not sufficient to draw valid conclusion.
2.) Hard to judge the maximum / highest / lowest position with reference to movement (Object moved too fast / only stationary for short time.)
3.) Parallax error because of … elaborate…
4.) Difficult to release to object consistently from rest. (with reference to force)
5.) Motion of object affected by air movement.
6.) Difficult to measure the length, L because it is hard to judge the position of the centre of the ball.
7.) Difficult to locate the centre of the object. (when reading ruler)

Improvement

1.) Take more sets of readings and plot appropriate graph.
2.) Use camera / video to capture the motion and play back frame by frame. / slow motion.
OR place a motion / position sensor above / below the object.
3.) Place rule / protractor as close as possible to object and take measurement at eye level or use shadow projection.
4.) Use remote controlled clamp / Place a ruler to allow object to come to rest before releasing. (any appropriate mechanism)
5.) Turn off fans / air cond or shield the experiments from draughts (air current)
6.) Measure length, L to top and bottom of ball and find the average.
7.) Place ruler as close as possible to the centre of object with marker use at bottom / top of object.

- **Electricity. (Wire in straight line or coil)**

Limitations

1.) 2 sets of readings are not sufficient to draw valid conclusion.
2.) Wire have kinked or loosely wound / not straight.
3.) Contact resistance / circuit resistance / lead resistance fluctuating or changing readings.
4.) Tube not circular.
5.) Parallax error.

Improvement

1.) Take more sets of readings and plot appropriate graph.
2.) Straight wire by using wooden roller.
3.) Measure lead resistance and subtract from R. Use shorter leads.
4.) Repeat measurements of diameter in different directions.

5.) Take reading when the pointer is exactly positioned above the image on the reflective strip.

- # Motion of 2 masses connected to string over a pulley

Limitations

1.) 2 sets of readings are not sufficient to draw valid conclusion.
2.) Masses hit each other.
3.) Difficult to measure time as time short / reaction time large compared with time.
4.) Friction at pulley.
5.) Retort stand moves.

Improvement

1.) Take more sets of readings and plot appropriate graph.
2.) Use larger pulley.
3.) Drop through greater height. Use motion sensor with data logger.
4.) Lubricate pulley before starting experiment.
5.) Fixed the retort stand to the table by using G- clamp / add weights.

- # Measuring focal length of lens

Limitations

1.) 2 sets of readings are not sufficient to draw valid conclusion.
2.) Image seen of screen is not sharp.
3.) Focus point cannot be clearly seen.
4.) Centre of light bulb not align horizontally to centre of lens

Improvement

1.) Take more sets of readings and plot appropriate graph.
2.) Replace bulb with LED.
3.) Conduct experiment in darken room.
4.) Use ruler to measure the height of centre of bulb and centre of lens from the table and ensure they are the same.