COLLISION IN TWO DIMENSIONS - pssc

Cat: MF1000-001 Collision in 2 dimensions, with kit

DESCRIPTION:

The IEC **Collision in Two Dimensions** is an old PSSC design. It is a simple device to clamp to the edge of a workbench to provide a ramp for launching balls. Balls of various sizes and masses are provided in the kit. The parts required for the measuring the distance travelled by the balls whilst falling is included. An adjustable ball support is provided at the base of the ramp, so it can be arranged for launched ball and the stationary ball to collide as the ball flies from the ramp.

A 'G' clamp, some sheets of carbon paper and a measuring tape are the only extra items required for performing experiments.

MF1000-001 Collision in 2 dimensions - with kit

Physical size: 310x76x26mm LxWxTh **Weight: 0.4 kg**

KIT CONTENTS:

- 1 pce Steel base with ball support device to clamp to table. Carries plastic track.
- 1 pce Plastic track to curve and to fit into steel base.
- 2 pcs Steel ball 16mm diam.
- 1 pce Glass ball 16mm diam.
- 1 pce Plumb line, 2metres, to find position on floor directly below ball support.
- 1 pce Screw eye to hang from Plumb line.

PREPARATION FOR AN EXPERIMENT:

1. Take the steel base and bend it about 15 to 20 degrees as shown in the illustration. When bending upwards, be sure the tabs at each end of the steel base are facing up.

2. Take the plastic ramp material, curve it with the fingers and force it into the steel base so that the two ends of the plastic ramp are held captive between the end tabs of the steel base so that the plastic ramp remains curved.

3. Screw or clamp the base to the table top so that the ball support overhangs the edge of the table. Note that a dimple is provided in the head of a screw to permit a ball to rest on the screw head. The position of the screw head is adjustable both laterally and vertically. Adjust the ball support in all directions so that a ball running down the ramp strikes a stationary ball at exactly its centre point.

4. Tie the Plumb line to the small hole through the screw and tie the Hook eye so that the point of the Hook eye is just above the floor. When it stops swinging, mark the point on a piece of paper taped to the floor directly below the ball resting point.

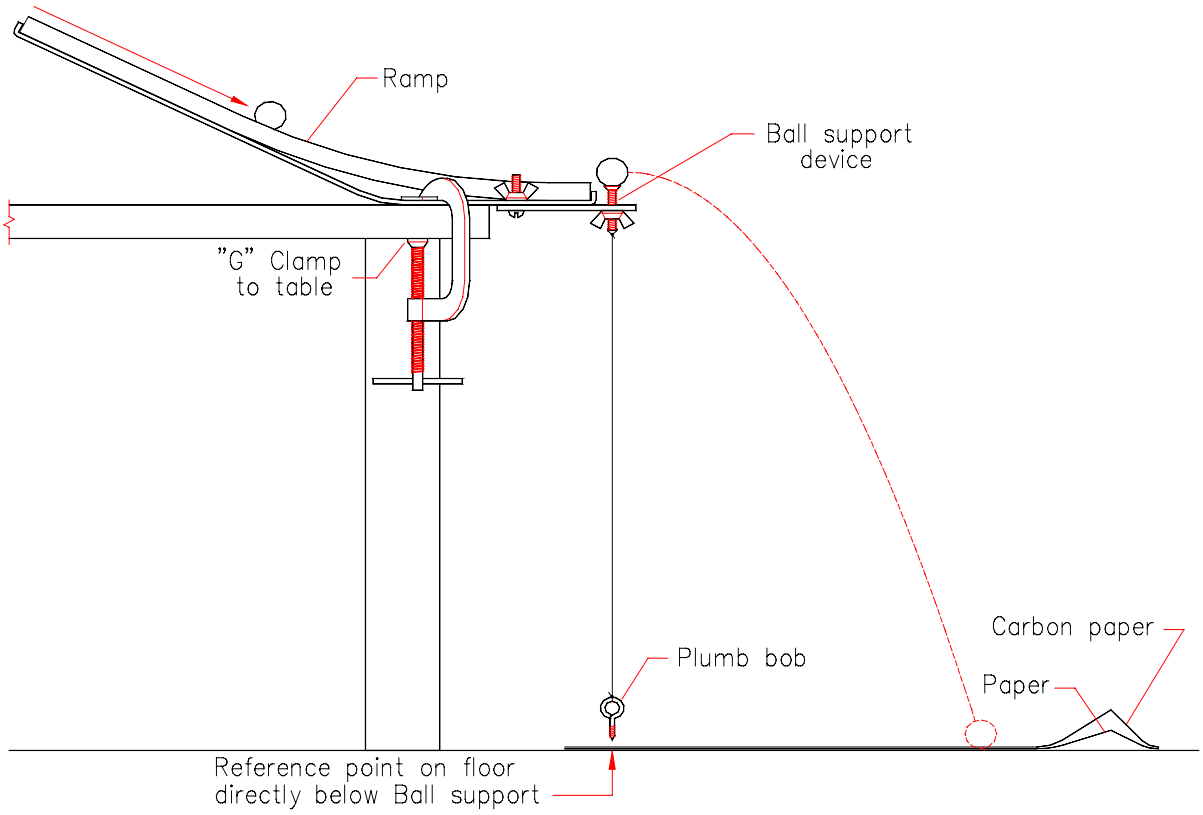
5. Place white sheets of paper on the floor with carbon paper on top of them. Take a ball and roll it down the ramp. Be sure it strikes a carbon paper to make a dot on the white paper.

6. Measure carefully the vertical distance from the underside of the ball to the floor and note this for future use in calculations.

GENERAL EXPERIMENT NOTES:

These experiment notes are for general assistance and are not intended to replace the experiment information in your text books.

- If a ball is released horizontally at the same time as a ball is released to fall vertically, both will strike the floor at the same time. The time taken can be calculated from the distance fallen and acceleration due to gravity.
- If a ball is rolled down the ramp so that it leaves the ramp in the horizontal direction, the distance it travels horizontally before it strikes the floor is a measure of its initial horizontal velocity as it leaves the ramp.
- If a ball is rolled down the ramp so that it strikes another ball of the same mass on the centre point, all energy will be transferred from one ball to the other. The first ball will stop and the second ball will travel at the same speed as the first.
- If a ball is rolled down the ramp so that it strikes another ball of a lower mass on the centre point, some energy will be transferred from one ball to the other and both balls will continue to move after the collision. The points where they strike the floor can be established and calculations performed.
- The velocity of the rolling ball is known as it just leaves the ramp. If the rolling ball strikes the stationary ball off-centre (glance from one another), both balls are deflected and the energy is shared between them. Calculations using vectors can be performed to check the laws of Conservation of Momentum etc.



Designed and manufactured in Australia