FINDING THE DIAMETER OF AN OBJECT INDIRECTLY

Objective:

An experimental technique using a method to measure the diameter of an object without actually measuring the object

Procedure:

1. Use a copy of a page of objects that are like pennies or circles the size of pennies and place it on the floor on a piece of newspaper or other discard paper to eliminate cleaning the floor

2. Hold a marker or coloring stick of some type that will leave a spot on the page when dropped so the marking end is about one meter above the page, the marker should be dropped randomly and not specifically aimed to hit the objects

3. Drop the marker forty to fifty times to provide some degree of accuracy count the spots that hit an object on the paper and neglect all spots that miss the paper

4. A standard size sheet of paper is 8 ½ by 11 inches which is an area of 93.5 square inches or 603.22 square centimeters so the probability that the marker spot will hit the objects is proportional to the ratio of the area of the objects to the size of the paper

5. If you use A for area of the object and use O for the number of objects the total area is OA so if the total number of times the marker was dropped is T and the number of drops that hit an object is N a calculated value can be determined by

N/T =OA/603.22 and the area of one object is A = 603.22 cm2/OT

6. The area of a penny is .44 in2 or 2.835 cm2 if the calculated value from your experimentation is somewhat near this actual measurement that means it is possible to determine the size of an object without using a measuring device.

Questions:

1. If the experimental data was not completely accurate provide reasons as to why the method may not be as reliable as necessary and explain how the method could be modified.

2. List and explain two other ways this method would be useful in measurement.

3. How could this method be expanded and modified to measure even smaller objects?

4. Explain how the method would change if other sizes of coins or circles were used.

5. Compare the results of this method with others that used Indirect Measurement for object sizes with dominoes, marbles, straws, and/or the height of objects.