

Random Walk - Vectors

In this activity you will learn more about vectors; displacement, distance, average velocity and average speed using a random walk activity.

Materials

- Meter Stick, protractor, large sheet of graph paper (1 inch size), markers, internet connection

Random Number Generator

<http://www.roll-dice-online.com/>

Procedure

Things to note: each iteration (roll of the dice) will be represented by 1 minute of time. Each unit or block on the grid paper is 2.5 cm. So, your final results will have units of cm (for distance and displacement) and units of cm/min (for average speed and velocity)

1. Draw a point near the centre of the graph paper on the line. This is your starting position (origin or reference point).
2. Set the dice generator to a 10 sided dice, one dice and one roll (applet above).
3. For each of the 10 directions listed below, roll the dice and move that many units in that direction. Be sure to label each motion with subscripts...ie. for iteration one: $\overline{\Delta d}_1$. Don't forget to include the arrow tips on your vectors.

North, East, East, South, West, South, West, North, East, North

4. Once you have completed the 10 time intervals draw in your resultant vector line, label it and measure the length in cm. Also, measure the angle. Label the vector with the size and direction.
5. On a clean space on the graph paper clearly display the total resultant displacement and distance travelled in centimeters (1 unit = 2.5cm). Write the scale clearly on the graph chart as well.
6. Now, calculate the average speed and velocity and display this clearly on the graph sheet.
7. Include the title: Random Walk – Vectors on the sheet near the top of the page.
8. On the bottom of the page write your names clearly and the date.
9. Using markers colour your vectors one colour and your resultant vector a different colour. Touch up your work to make it look nice...
10. Submit the sheet to your teacher.

Examples:

