Basketball Analysis Lab - Directions

The Basketball Analysis lab involves a set of directions which must be followed exactly to obtain appropriate results. Follow the following directions step-by-step:

1. Getting Ready

- Open the **LoggerPro** application found in the **Glenbrook Applications** folder.
- From the **Insert** menu, select **Movie …** . Navigate through the dialogue box until you find the **Basketball Shot** file; it should be located in the Sample **Movies** folder.

A movie or video should open up into the LoggerPro window.

2. Collect Data

- Observe the controls at the bottom of the movie window. Drag the slider (or click the Fast Forward button) until the basketball just barely leaves the hand of the player.

- Click on the Tools button below the movie. A Tools menu opens to the right of the movie.
- Click on the Select Point tool.
- Click on the basketball; a point will be marked on the movie window and the movie will step forward one frame; continue this process of clicking on the same point of the ball in every frame until you have reached the last frame.

- Click on the Ruler (**Set Scale** tool): use it to drag from the first brick to the second brick (shown on the gym floor) with a green horizontal line; enter 1.0 meter.

3. Analyze Data/Answer Qs

- Inspect the x-t and the y-t graphs. Note: x and y represent the horizontal and the vertical position of the basketball over the course of its trajectory. These are position-time graphs.

Sketch the graphs in your lab notebook. Be sure to label the axes. Make two notes describing the x- and the y- displacement of the projectile.

- Click on the vertical axis: select **More …** .
  - = Enable **x-velocity** and **y-velocity** only. Disable **x(m)** and **y(m)**.
  - = Select **Manual Scalin**g: Top: +10 Bottom: -10
- Click the **OK** button; the plots should change to velocity-time graphs.

Sketch the graphs in your lab notebook. Be sure to label the axes. Write 2 sentences describing the x- and y-velocity of the basketball.

4. Determination of Slopes

- Drag across the entire velocity-time graph to select it.
- From the **Analyze** menu, select **Linear Fit**. Make sure the following features are enabled: **Video Analysis|X-Velocity** and **Video Analysis|Y-Velocity**. Click the **OK** button. Statistics appear.

Record and label the slope in your lab notebook; also record the regression constant (R).

5. Create Velocity Vector Diagram

- From the **Insert** men, select **Meter** and then **Animated Display**. A new window opens.
- Double-click on the new window to open the **Animated Display Options** window. Enable the **Symmetric Space** option and set the **Horizontal Range** to go from 0 to 6. Set the **Vertical Range Min** to -2.
- Click on the **Animate the Point** button. From the **Drive Horizontal Position** pull-down menu, select **X**. From the **Drive Vertical Position** pull-down menu, select **Y**.
- Set the **Leave Footprints** option to every 3 points.

- Click on the **Vector 1** button: For the **Horizontal** component, select **X-Velocity**. For the **Vertical** component, select **Fixed Value** and set the **Fixed Value** to 0. Set the **Scale Factor** to 0.1 and set the **Name** to **Vx**. Set the color to **Blue**. Click **OK**.
- Click on the **Vector 2** button: For the **Horizontal** component, select **Fixed Value** and set the **Fixed Value** to 0. For the **Vertical** component, select **Y-Velocity**. Set the **Scale Factor** to 0.2 and set the **Name** to **Vy**. Set the color to **Red**. Click **OK**.
- Enable the **Show Names** option.
- Click **OK** to close the settings window. As the window closes, a velocity vector diagram will be constructed in the window.

Sketch the diagram into your lab notebook; your diagram should give attention to the size of the **Vx** and **Vy** vectors - clearly indicating how each is or is not changing over the course of the trajectory. Label each vector - **Vx** and **Vy**.