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Losing Your Marbles Activity

Introduction to circular motion

You will have the chance to push a marble around on a flat, smooth, level tabletop using a small ruler. Take a moment to fill in your guess for the linear (meaning straight line) portion of the worksheet before gathering your materials and proceeding.

ACTIVITY #1 – LINEAR

Indicate how you would need to push on a marble using nothing but a ruler for it to exhibit the following behaviors. Draw the position of the ruler and also draw the force vector required. Imagine that we are looking down at the marble from above the tabletop.

|  |  |
| --- | --- |
| SPEED UP TO THE RIGHT | |
| Your guess | What was actually required |
|  |  |
| MOVE AT A CONSTANT SPEED TO THE RIGHT | |
| Your guess | What was actually required |
|  |  |

What is the relationship between the orientation of the ruler and the direction of the force exerted on the marble?ACTIVITY #2 – CIRCULAR MOTION

Indicate how you would need to push on a marble using nothing but a ruler for it to move around in a circle so that it does not speed up or slow down, but maintains a constant speed. Draw the position of the ruler and also draw the force vector required for the force as it would be exerted on the marble for the one moment indicated in the diagram. The path of the circle is provided on the paper on the table and is indicated on the diagrams.

|  |  |
| --- | --- |
| MOVE IN A CIRCLE AT A CONSTANT SPEED | |
| Your guess | What was actually required |
| Assume the marble is moving in a counter-clockwise direction |  |

If the marble were moving in the circle indicated and it was at the top of the circular path, what would be the direction of the force exerted on it (if any?)

In general terms, what is the direction of the force required for an object to maintain a circular path at a constant speed?

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