**STEM Research and Bowling**

**Pre-Visit Worksheet**

Writing to Learn warmup

1. What’s the secret to a perfect strike? Be sure to go step by step for the entire action and use scientific and technical words found on the glossary sheet. After you answer, watch the video.
2. Friction Experiment Table

|  |  |  |  |
| --- | --- | --- | --- |
|  | Distance 1 – High Force | Distance 2 – Middle | Distance 3 – Low Force |
| Rough Surface |  |  |  |
| Smooth Surface |  |  |  |

1. Does the amount of force in the throw change the speed of the ball? Why or why not?
2. Why does the ball roll a different speed on the rough surface than on the smooth one? With what you know about friction and bowling technique now, why do you think bowling lanes are made of a smooth surface with added synthetic oils?
3. Speed Experiment Graph, Speed = Distance / Time

|  |  |  |  |
| --- | --- | --- | --- |
|  | Lane Distance | Time Ball Rolled | Ball Speed |
| Trial 1 |  |  |  |
| Trial 2 |  |  |  |
| Trial 3 |  |  |  |
| Average |  |  |  |

Bonus: A bowling ball’s weight should be 10% of a person’s body weight. If a person weighs 90 lbs, how much should their bowling ball weigh?

**Glossary**

**Science and Bowling**

*Speed:* The distance an object travels per unit of time. Formula: speed = distance / time

*Friction:* A push or pull that opposes motion when two touching surfaces are sliding on each other. For example: the resistant energy produced when a ball is sliding across a surface

*Force:* A push or pull exerted on an object. For example: how hard you throw a ball is considered a measurement of force. Formula: Force = mass x acceleration

*Inertia:* The resistance of an object to change in its motion.

*Momentum:* The measure of how hard it is to stop an object’s motion. More mass means more momentum.

*Acceleration:* The rate of change of velocity with respect to time.

*Center of Gravity:* The imaginary point inside a body of matter where the total weight of the body is thought to be concentrated.

*Mass*: The amount of matter an object contains.

*Matter*: What occupies a space.

*Torque*: A turning force. For example: Bowlers use torque to spin the ball so it curves into a strike at the end of the lane.