STEM Pre-Visit Lesson Plan Summary: Grade 4 through 6

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| Overview and Purpose: Students will use bowling to learn about STEM subjects such as friction and speed. | Education Standards Addressed: TEKS 112.15 (a)(3), (b)(2)(A-F), (b)(3)(A), (b)(4)(A), (b)(6)(A), (b)(6)(D), 112.16 (b)(2)(A-G), (b)(3)(A), (b)(3)(C), (b)(4)(A), (b)(6)(D), 112.17 b(3)(A), (b)(4)(A), b(8)(A-D). |

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|  | Teacher Guide | | Student Guide |  |
| Objectives | To guide students through a scientific experiment that will demonstrate the concept of friction and speed. | | To use hands on learning to understand the concepts of friction and how to calculate the speed of an object. | Materials Needed:  Worksheet  Glossary of Terms  Access to Youtube  Any type of solid spherical ball  Carpeted area  Smooth area  Stopwatch  Measuring stick/tape |
| Information | This is a 30 minute activity you will guide students through before visiting the Bowling Museum and Hall of Fame. The lessons will be reinforced in the guided tour, but not recreated. | | Students will complete a short writing assignment, watch a breif Youtube video, complete a worksheet and take part in a classroom activity before visiting the Bowling Museum. |
| Activity (More detailed instructions on separate document) | Select 2 lengthy locations: 1 with smooth surface, another with a rough/carpeted surface. Take 2 student volunteers to measure the same standard distance of each location. Perform experiment by having the 1st student volunteer roll a ball across both surfaces and the 2nd student time the tosses. Have the class record the times & distances & calculate the speed of these trials. Write conclusions of results on worksheet. | | Students will write answer to warm up science question, watch a related Youtube video, discuss the video with class, and follow teacher’s direction of the activity through volunteering and/or recording results. They will fill out graphs and answer critical thinking questions on the worksheet for a grade. | Other Resources:  Required video on “The Secret to a Perfect Strike”  <https://www.youtube.com/watch?v=0EVw8c-X1l4>  Optional video covering a part of our facility:  “Bowling Robot Shows How to Throw More Strikes”  <https://www.youtube.com/watch?v=aaFq0XLj_Y0> |
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| Tips | The locations you select should be long enough to tell a difference between trials in the data. | | Students should toss the ball underhanded, similar to a bowling ball but not very hard. Make sure it’s not bouncy. | Additional Notes  Worksheet, Glossary of Terms, and Step by Step Directions are necessary for this activity. |