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**The Physics of NASCAR**

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A group of racecars piloted by the best drivers in NASCAR are turning a corner. Without warning, one of the cars suddenly hits the outside wall. There were no engine failures, no flat tires, and none of the cars touched... so what happened? Understanding and being able to apply physics is a necessary (but far from sufficient) condition for winning races.[1] Every competitive race team has a technical staff involved in everything from applied engineering to basic research and development. Aerodynamicists, chemical engineers, statisticians and physicists have become important participants in the high-stakes world of motorsports. Although some drivers have engineering degrees, even those without them have developed a highly intuitive understanding of physics – you don't keep your job long without a working knowledge of Newton's Laws of Motion. The inherent science in NASCAR is of interest at many levels, from the fan who wants to understand changes made to the car at pit stops to nanomaterials researchers looking for new ways to make racing simultaneously faster and safer. This presentation will introduce some of the fascinating physics of NASCAR and give teachers some ideas to use in the classroom. I'll touch on a range of topics from: how computational fluid dynamics is used to address the aerodynamic changes that challenge the driver by making his car behave differently around every corner; how advanced materials such as energy-absorbing foams have made racing significantly safer; and how nanoparticles may be able to keep engines from overheating despite running at 9500 rpm for three or four hours. Finally, I'll explore NASCAR, its teams and its sponsors are helping address the challenge of getting people interest math and science.

[1]Diandra Leslie-Pelecky, *The Physics of NASCAR* (Dutton, New York City, 2008).