

# ASTROLYMPICS

# ACCELERATION

## COSMIC EXAMPLE

**B1509: The gravitational acceleration on the surface of a neutron star is about a trillion times that on Earth. About three trillion  $m/s^2$**

At the center of this image from NASA's Chandra X-ray Observatory is a very young, rapidly spinning neutron star which is spewing energy out into the space around it.

**DEFINITION:** the change of velocity of an object over time

When we hear 'acceleration,' we often think of something that is moving very quickly. In fact, the concept of acceleration doesn't rely on how fast an object is moving. Rather, acceleration is defined as the change in speed or the direction it is going. (The combination of speed and direction is known as "velocity.") Therefore, an object moving at any rate can accelerate by speeding up, slowing down, or turning. The ability to do this quickly is important in many aspects of life, from driving an automobile, to performing in sports. It also dictates many characteristics of phenomena in space.

**Units:** meters/seconds<sup>2</sup> ( $m/s^2$ ), miles/hour/second (mi/hr/s), kilometers/hour/second (km/hr/s)

## PARALYMPIC EXAMPLE

**Elite wheelchair tennis players can accelerate very quickly during sprints.  $17 m/s^2$**

## EVERYDAY EXPERIENCE

**Porsche 918 Spyder: Performance of cars is often measured in their ability to accelerate from 0 to 60 mph.  $12.3 m/s^2$**

