

## The Science of Spinning

The purpose of this guide is to familiarize your students with some of the terminology that will be used in the upcoming assembly. The concepts are arranged developmentally, as indicated. Furthermore, most of these concepts are part of the core science curriculum put forth by the State Board of Education. For further information you can order a copy of Michigan Essential Goals and Objectives for Science Education by calling 800-292-1606. Please use and reuse these concepts with your students within a week or two of the assembly.

### Scientific Concepts

#### Basic Science Concepts (grades K-8)

- \* **Force** .....the cause of change or stoppage of motion
- \* **Gravity** .....the force that tends to pull all bodies toward the earth
- \* **Frictions** .....the force that stops motion
- \* **Size**.....the quality of a thing which determines how much space it occupies
- \* **Shape** .....the quality of a thing that depends on the position of all points on its surface or outline
- \* **Weight** .....the amount of heaviness of an object
- \* **Matter**.....anything that has weight and takes up space
- \* **Mass**.....the quantity of matter in an object
- \* **Energy** .....the capacity for doing work
- \* **Velocity** .....the rate of motion in a particular direction (When you walk or ride your bike, you have velocity)

#### Advanced Scientific Concepts (grades 4-8)

- \* **Kinetic Energy** ..... energy derived from motion (When something is spinning, it is moving and has kinetic energy)
- \* **Potential Energy** ..... energy that is stored within an object (Gravity is one force that converts potential energy into kinetic energy)
- \* **Density**.....the ratio of the mass of an object to its volume
- \* **Acceleration** .....the rate of increase of speed with respect to time (speeding up - e.g., walking to running)
- \* **Deceleration** .....the rate of decrease of speed with respect to time (slowing down - e. g., running to walking)
- \* **Center of Gravity** ..... the point at which an object can be supported to balance it
- \* **Torque** ..... a force that produces rotation
- \* **Stability** .....the capacity of an object to return to its original position after having been displaced
- \* **Inertia**.....the tendency of matter to remain at rest or to keep moving unless acted upon by an outside force
- \* **Centrifugal Force** ..... the apparent force that makes a person feel as if they are moving away from the center of rotation
- \* **Centripetal Force** ..... the force that makes a rotating body move in an arc around the center of rotation
- \* **Gyroscopic Inertia** ... the inertia exerted by any spinning object which tends to keep the object stable about the spin axis