Name Date Class

SECTION 3 Enrichment

Crumple Zones

A car crash demonstrates Newton's first law of motion. Many people are injured or even die in car crashes. The need for lighter and more fuel-efficient cars has caused automobile makers to build cars that are not as sturdy or heavy as they once were. However, new and improved ideas about how to build a car have helped make these new cars safer.

Crumple Zone

One recent improvement has been to design areas in the car called crumple zones. Crumple zones are made to absorb some of the energy from the impact of a crash. These areas are especially important in the front of the car where people receive the most injuries from a crash. In a crash, a car suddenly stops, causing the people inside the car to be hurled through the windshield. Now the fronts of new cars are made so they absorb some of the energy of the crash and reduce the effect of inertia on the people inside.

Some crumple zone designs use specially made metal in the body of the car. In older cars the metal was strong and straight, which pushed it back onto the passengers in a crash. The new metal is pleated like an accordion along the front and cabin of the car. On impact the metal easily bends and shortens the length of the car. This means an impact from the front or back will crumple the car but probably not hurt the passengers. The idea is to spread the energy of the crash throughout the car.

Side Impact Safety

Another improvement is found on the sides of the car. When a side impact occurs, the bars that make the "cage" of the car interior are now designed to break. In the old designs, the car would be forced out of its path and to the side, but the inertia of the people would keep them moving in the same path. This type of crash can be deadly since it often forces the head of the driver against the side window.

The new designs of cars, including airbags and crumple zones, have been possible with the study of motion and force. These designs are helping many people to survive and walk away from serious accidents.

1. How does Newton's first law of motion affect people in a car crash?

2. How do the passengers in a moving car get inertia in the first place?

3. What are crumple zones designed to do?

Meeting Individual Needs