

**SCIENCE AND THE CONSUMER****● Bicycle Design and Shock Absorption**

While riding a bicycle, you have probably experienced vibrations when the wheels of the bicycle hit bumps in the road. The force of the vibrations travels up through the frame to the rider. Slight vibrations can cause discomfort. Large ones can cause you to lose control of the bike and crash.

Early bicycle designs made no attempt to dampen the shock of the vibrations moving up from the wheels before they reached the rider. Later designs incorporated air-filled rubber tires and softer seats with springs to absorb some of the vibrations.

**Shock Absorbers**

Today's bike designs provide a safer, more comfortable ride. Various new materials—titanium, for example—absorb shock better than traditional steel and aluminum. More important, designers are putting a variety of shock absorbers—devices that absorb energy—into bike designs.

Mechanical shock absorbers are basically a piston inside of a tube filled with air, oil, or another fluid. When the force from a bump reaches the shock absorber, the force pushes the piston upward. The fluid in the tube resists the piston. The resistance absorbs some of the energy from the bump and lessens the force felt by the rider.

Two usual places on bicycles for shock absorbers are the seat and the connection between the handlebars and the frame. One type of shock absorber is computer controlled. This shock absorber monitors road conditions and adjusts the shock-absorbing mechanism to provide the resistance needed. On surfaces with large bumps, a soft ride is provided. A much stiffer ride is provided on worn, bumpy “washboard” surfaces to give the rider more control over the bicycle.

**Your Turn to Think**

1. Why are the seat and the connection between the handlebars and the frame good places for shock absorbers?
2. Where else on a bicycle might shock absorbers be placed?
3. What part do bicycle helmets play in shock absorption?