



## Scoring on Science

By Kerri Savage

There's nothing quite like the familiar sound of a puck. The satisfying crack it makes when it hits a stick. The sharp thud as it bounces off the boards. And the heart wrenching clink as it hits the crossbar.

This one inch thick disk made of rubber has been the source of video replays, stitches, triumph and tears. It is also an object that has been manufactured with science.

The rubber used to make pucks is specially treated or vulcanized. This process adds sulphur to rubber which makes it much harder and more resilient when exposed to extreme temperatures. This same process is used for tires.

But vulcanization can't stop a rubber puck from bouncing. Pucks are frozen before use as cold pucks bounce less than warm pucks. During games, a supply of frozen pucks is kept in the officials' area. Freezing also allows the puck to slide better on the ice. Try bouncing two pucks off the ground: one that's been in the freezer for a few hours and one that's been a room temperature and see the difference. The puck's outside edge also has a series of dimples and bumps on it, known as the knurl. This rougher edge helps keep the puck on a taped hockey stick.

Standard game pucks for ice hockey must be less than 170 grams (5.5 - 6 ounces) and measure 75 mm (3 inches) in diameter and be 25 mm (1 inch) thick. These dimensions did not become official in the National Hockey League until the 1990-1991 season, but were used for decades prior. Many players use a heavier puck to practise with. Heavier pucks require more force to move them, helping the player increase strength when practising shots and passes. Minor hockey players use a lighter puck as they develop both their skills and physical strength.

Players must also mentally calculate conditions that affect the puck and how it will affect their shot. Factors include air drag and puck drop. Players have to consider how much the puck will drop from its intended target when the shot lifts the puck off the ice. A puck will fly in an arch. One can easily calculate the amount with a calculator and a physics equation factoring in velocity, distance travelled, angle and gravity. But most players subconsciously know, with practice, to aim higher to compensate for the drop of the puck as it travels toward its target.

Friction of air passing around a puck causes air drag. This slows a puck down. A new puck design that is already used in the International Inline Hockey League may help solve this problem. The new design has oval holes that allow for air to pass through the puck, therefore reducing drag.

Presently, pucks are manufactured in Canada, Russia, the Czech Republic and China. Pucks manufactured for professional leagues differ from those intended for souvenirs and practice pucks. Regulation pucks are made with granular rubber and cold compressed molds that are filled by hand. Other pucks are made from rubber cording and molded with heat and filled via machines, allowing for mass production.

A new stand-alone exhibit, called Slap Shot, is available to display in your community. This interactive, digital exhibit can be placed in arenas, libraries and malls. Contact Science Alberta Foundation at 403.220.0077 to reserve Slap Shot today.