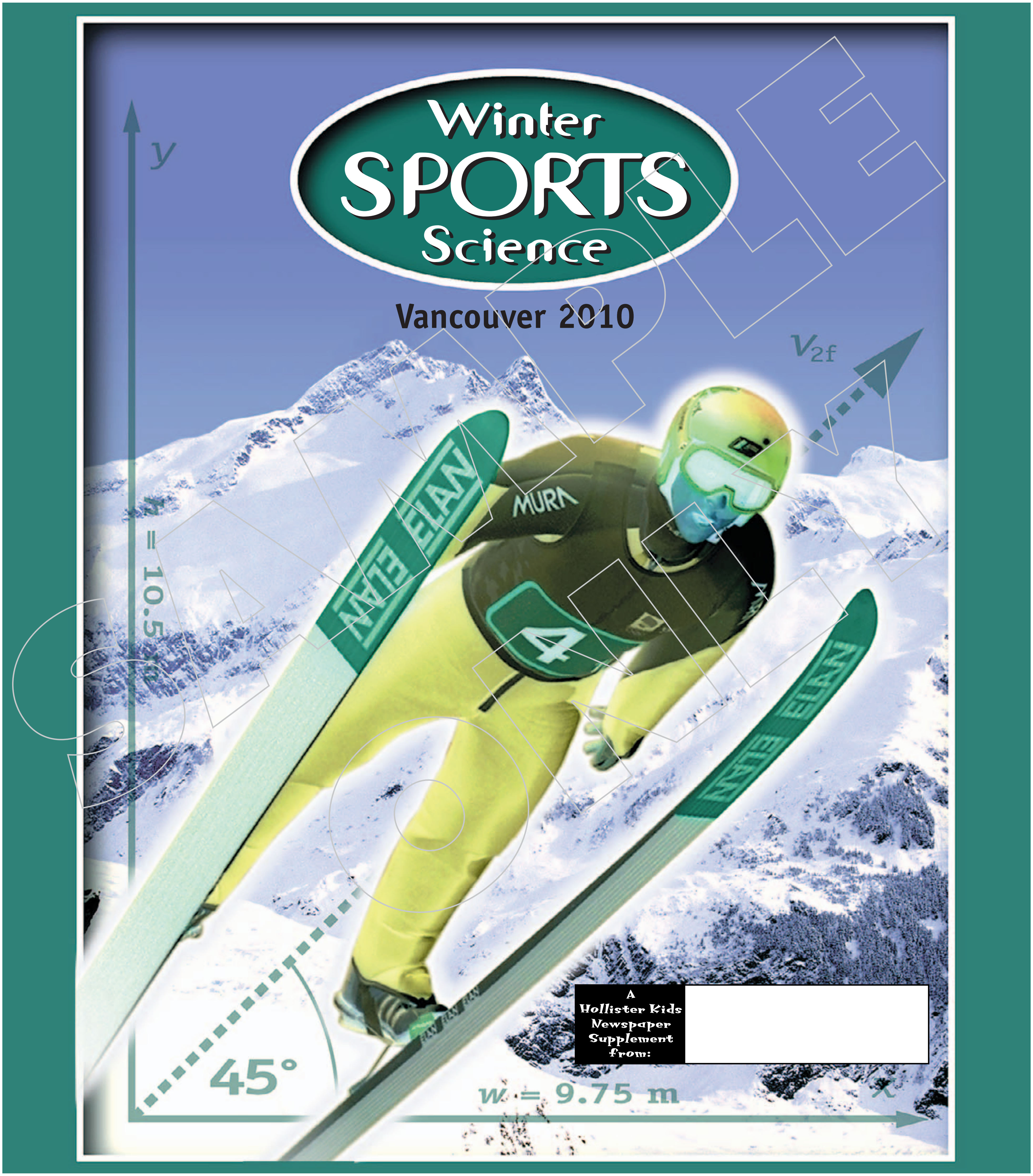
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Winter SPORTS Science

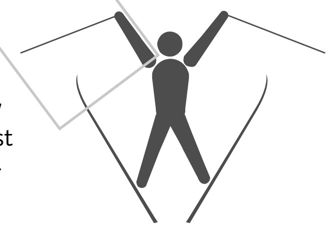
INTRODUCTION

START Mention winter sports and you think of skating, skiing, sledding and hockey — fast, active sports that keep us warm in the winter air.

Though many have now moved indoors, winter sports all got their start outdoors. They were not only a test of skill, but of ability to withstand the elements of cold, ice and snow.

Because of that, the world's best winter sports athletes originally came from countries with cold weather and hard winters—places like Sweden, Canada, Germany and Switzerland.

That has all changed today. Great winter sports athletes come from everywhere and perform everywhere. From California to Vermont, and from Idaho to Colorado, people are practicing and playing winter sports. And their talents will be on display this February when the world's best winter athletes compete in Vancouver, British Columbia.



The Hows and Whys

Rules tell us how winter sports are played. But how do winter sports work?

Why do skaters spin as they do? What lets a ski jumper hang in the air for huge distances? What controls how a hockey puck bounces? Why do bobsleds look like bullets?

The answer to these and many other questions is **Science**.

Yes, the stuff you study in school, with weights, beakers, charts, experiments and textbooks.

This special newspaper section will take a close look at **Winter Sports Science**. It will explain all the fabulous feats you see by tracing them back to the science that makes them work.

Science is about the forces of nature and the energy that sets them in motion. Forces and energy are what shape sports, too. Forces propel people along the ground or over the snow. Forces lift them into the air. Forces slow them down or bring them back to the ground.

These scientific forces combine with the energy stored in muscles to create the energy of movement.

Knowing how forces and energy work can make winter sports more fun. It will give you fun facts to share with your family and friends. And if you play these sports, it may give you tips that will actually make your performance better.

Winter Sports Science is fun science. If you like it, you may want to explore ways that School Science can be fun science, too!

What Sports Are We Talking About?

Here is a list of the winter sports that will be discussed. Some of the sports may be new to you. In the course of this section, we will explain how they are played, as well as how they work.

Alpine Skiing*	Curling	Luge
Biathlon	Figure Skating	Ski Jumping
Bobsledding	Freestyle Skiing	Snow-Boarding
Cross-Country Skiing	Ice Hockey	Speed Skating

* includes downhill, slalom and giant slalom

USE THE NEWS

1. The sports section of the newspaper is packed with action every day. Professional, college, high school and international sports are all covered, as well as recreational sports. As a class, make a list of all the sports mentioned in today's sports section. Have each student pick the Top 10 that interest him or her. Combine results and make a bar graph showing the Top 10 most popular sports in your class.
2. What sports get covered in the newspaper often depends on where the paper is located. Pretend your local paper is based in Norway instead of the United States. What sports do you think you would read less about? What sports might you read more about? Write a paragraph explaining why you think this way.

SKI JUMPING

Winter SPORTS Science

One of the most spectacular winter sports events is Ski Jumping.

In this event, skiers climb a 50-foot tower, hurl themselves 50 miles per hour down a steep ramp, launch themselves off an upturned lip and fly more than 400 feet through the air.

The goal is to see how far they can fly, without wiping out on the landing.

People who crash can be seriously injured, or even killed.

Ski jumping is not only one of the most exciting winter sports. It shows off many forces of science and nature as well.

Consider the speeding trip down the ramp. What pulls the skier? Gravity—the same thing that holds people on the surface of the Earth so they don't float off into space.

Gravity is something every planet has. In fact, it is something every object has. It is a force that draws things toward an object. The bigger the object, the stronger its gravity. The Earth is much bigger than people. When you jump off the Earth—or off a ski jump—the Earth's gravity pulls you back.

Everything that falls, or everything that moves from a higher position to a lower one, is affected by this gravity.

Perhaps you have run down a hill. It seems much easier than running across a flat field. You may even move faster. That's because gravity is pulling you down the hill along with your legs.

How Do They Fly?

Gravity is what eventually pulls ski jumpers back to the ground. But the way ski jumpers position their bodies can affect how far they fly. The leap off the upturned lip of a ski jump helps position the skier on a rising course that will increase distance.

Once off the ramp, all ski jumpers try to master the same position. The jumper seeks to balance in the air with the skis tilted upward, the tips apart in front to form a V, the body leaning forward and the hands by the side. If the ski jumper does this, air can actually pile up under the jumper and delay the landing.

The V form is fairly new for ski jumpers. Before 1988 most skiers were taught to keep the tips of their skis together while in the air. But in 1988 a Swedish jumper could not keep the tips together because of the way his legs were shaped. But this "accident" proved effective. The new form actually allowed more air to build up underneath because there was more surface to push against. This increased the length of jumps, so others quickly adopted this form. It can add up to 15 meters to a jump on Large Hill competitions.

USE THE NEWS

1. Gravity is part of the news every day, even if we don't realize it. A space shuttle comes back to Earth? Gravity brought it down. A man fell off a bridge? Gravity. Look through the stories and ads in today's paper and list as many examples of gravity at work as you can. Stretch your thinking!

2. The way athletes position their bodies affects how well they play. Look through today's sports section and pick out a picture of an athlete in action. Write a sentence stating how his or her body position affects play.

Increased Speed

Position is also important in getting enough speed to launch a ski jump. If you watch ski jumping on TV, you will see that once the jumpers shove off at the top of the ramp, they crouch over their skis as far as they can.

The reason they do is this is to reduce the "drag" of air against their bodies. You may not be able to see the air we breathe, but it is actually loaded with molecules and atoms of different elements. Molecules and atoms are some of the smallest bits of liquids, solids and gases.

The molecules and atoms in air may not be seen, but they have power over bigger objects. When an object moves, it pushes against the invisible molecules in the air. The molecules do not move out of the way quickly and slow down the moving object.

Ski jumpers and other athletes seeking speed try to reduce the area that air can push against. Putting their bodies in a crouch lets more air pass over them and less hold them back with "drag."

Test It Yourself

Here's a way you can test the effects of "drag."

You'll need a bicycle, a paved hill away from traffic, a friend to help you and a stopwatch (or a watch with a second hand).

First, shove off and coast down the hill, sitting straight up on the seat. Have your friend time you from top to bottom and write down the result. Next, shove off and crouch low over the handle bars. Have your friend time you from top to bottom. Was there a difference in time? How much?

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x

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