The Cricket World Cup 2011 did not leave anything to chance or perceptions, assumptions or doubts about the decisions against run-outs, stump-outs, leg before wickets, catches, boundaries etc. Players and Umpires were free to go through reviews of the decisions, and helping them get correct and unbiased decisions was the use of science and technology. In a fast-moving game where even a single run could make the difference between winning and losing, this was a boon indeed.

In today’s highly competitive arena of sports where a winner is not just a proud recipient of a medal but could also go on to earn moolah from endorsements, and where fractions of seconds decide winners, science and technology is truly providing sports persons with that winning edge that could fetch them glory.

All moves in sports are governed by scientific principles, and materials used in sports accessories also have a scientific basis. Then there are exercise regimens, energy-packed nutrition and specialized treatments of sports injuries that once again draw heavily from established scientific principles. Sports persons, umpires, coaches and even spectators are very often using science and technology knowingly or inadvertently.

To make them aware of the science behind sports and bring science closer to sports loving people’s heart and mind, the Pushpa Gujral Science City Kapurthala recently opened a new gallery on “Science of Sports”.

The “Science of Sports Gallery” is intended to familiarize visitors with the applications of scientific principles in sports – role of gravity, projectile motion, momentum, force, energy, impulse etc., Newton’s Law of motion, materials used in equipment and understanding and improving performance in sports. This gallery is an interactive, hands-on, activity-based and also a virtual learning center to understand science and sports through a playful and non-formal approach.

The gallery has been divided into sections for various sports.

**Cricket**

Visitors first step in to the most popular game in the country – “Cricket”. Here, the visitors are greeted by Newton and Kapil Dev, both masters in their fields. One can see a model of the Punjab Cricket Association’s (PCA) Cricket Stadium in...
Mohali showing various positions of the players and the facilities available in the stadium. This provides the visitor an overall view of the game such as:

**Be a Bowler:** One can see the various actions required to bowl a ball through half relief models of a bowler in action. Learn about aerodynamics of ball to spin or swing the ball.

**Structure of Ball:** Look at the cutout view of a large scaled ball to know about the structure and layers of the ball and various materials used to manufacture it.

**Be a Batsman:** Model of a batsman in action and knowledge of his protective gears and equipment.

**Parts of Bat:** Know about the structure of bat and various parts and spots such as the famed 'sweet spot'.

**Model of Willow Tree:** What material is used to make a bat? Have a look at the willow tree and find out why it is used to make bats?

**Be a Wicket Keeper:** Check out the stance of a wicketkeeper and how he safeguards himself from balls coming at a speed of 100-150 kmph.

**Be a Third Umpire:** Interactive exhibit where one sees real clips of run-outs from matches and gives his/her decision by running the clips at various speeds. After analyzing the clips, the visitor records his decision and compares it with the correct decision.

**Structure of Pitch:** It is not just a flattened ground but lots of technology goes into making the pitch that has various layers of gravel, sand, mud, grass etc. One can know why some pitches are favourable for fast bowlers and the others for spin bowlers.

**Protective Gears and Shoes:** The common injuries encountered in cricket and how one can protect oneself from these have been beautifully displayed. Different footwear worn by batsmen, fielders, spinners and fast bowlers are also showcased.

**Cricketer’s Body:** A revolving model of a human torso displaying anatomy of muscles, which are frequently used in this sport and are required to be developed by doing extensive exercises.

**Volley Ball**

Visitors are greeted by life-size models of players in various positions of serving, spiking, blocking, digging and bumping. These are the major actions in the game that require lots of skills. The science behind them and how to improve these skills have been explained through attractive panels and translites. Since lots of fast movements and diving is required in the game, the chances of injuries increase considerably. Information regarding how to condition for the game, prevent injuries and to protect oneself through the use of various gears is displayed. The size and dimensions of the Volley Ball court have been explained through a model.

**Badminton**

Know about the Fifth Century BC game’s evolution and its development over the centuries, now known as badminton. Understand the materials used to make the racquets and shuttles by studying their large-scale models. Also know about the physics behind various shots and serves and their trajectories shown in the model of the badminton court. Information regarding fitness, protective gears used in the sports, various competitions and
interesting facts are displayed through panels and translites.

**Lawn Tennis**

How old is the game? Which are the various courts on which the game is played? What is the racquet made up of and where are the various spots on it? How to grip the racquet and its various styles? Why the ball is so elastic? What are tennis injuries and how to prevent and protect from them?

Which are the international events? One can find out about all this in this section through models and panels.

**Basketball**

Enter the arena of the basketball court, face the dribbler or prevent the shooter from shooting the ball to the basket. Be a part of the game as you move along the life-size models of the players in action. Want each shot to score, spin the ball, glide the ball and then know the scientific principles behind them. Know all about the science behind actions, construction of ball, what are the common injuries and what are the protective gears available for them. Check the various positions of the players on the model of the basketball court.

**Football/Soccer**

Appreciate the evolution of the present high-tech aerodynamic grooved Jabulani FIFA 2010 football from bladders and skulls. Why are there 12 regular pentagons and 20 regular hexagonal panels to make a circular football? Look at some of the breakthrough designs of the football such as Buckminster, Fever nova and Jabulani Balls.

Understand the mystery of the Banana Kick and the answer lies in the Bernoulli’s principle. Check out the real gadgets and gears worn by the players and goalkeeper. Get acquainted with common injuries of the sport and how the players protect themselves. See the underlying technology of the mind boggling 3D television coverage of the FIFA 2010 Cup from South Africa.

**Hockey**

Long back hockey was played on the earthy grounds or land. But today it is played on artificial turfs providing a highly reflexive, accelerating and thrilling game. A replica of the portion of Astroturf has been created showing detailed structure of the turf.

Changes in the designs of the hockey sticks are show cased through original old sticks. Inspect a model of the goalkeeper with protective gears and how he is safeguarded while facing the ball coming at the speed of a bullet. Also, look into the various designs and materials used to make a hockey ball.

Scrutinize the model of the hockey playground where the players are positioned with markings and dimensions so as to make your own strategy for attacks and defenses. Peep into the anatomy of the player to understand which muscles are required more to be developed for this sport and how to prevent common injuries.

**Rural Sports**

A pictorial accolade to Rural Olympics held every year at Kila Raipur, Punjab. This section highlights the strength, vigour, and enthusiasm of the rural people. Pictures of
bull cart race, dancing horses, lifting weights by teeth, kabaddi and wrestling etc. have been displayed through colorful panels.

**Walk-thru Pictograms of Various Olympic Events**

Walk through the various events of Olympics exhibited through cutout pictograms of events such as judo, fencing, pole vaulting, shot put, discus throw, hammer throw, javelin throw, weightlifting, boxing, sprint, hurdle race, long jump, artistic gymnastics, parallel bar gymnastics, cycling, equestrian, shooting, sailing and swimming. These pictograms are complemented with panels featuring the detailed basic scientific principles behind the sport.

**Activity-based Stations**

This is a hands-on space where the visitors can check their mental as well as physical fitness through various enduring activities.

- **Rock Climbing:** An 8-10 feet high rock wall has been erected where one can test his or her climbing skills.
- **Virtual Game Stations:** The Virtual Game Station enables participants to be placed in a variety of entertaining and engaging computer-generated realities. The system creates a virtual scene with objects to block or courses to navigate, and displays this on a large screen monitor that the players can see in front of them. A single video camera captures the image of the player and superimposes the player’s image into the virtual scene. One can check his/her mental as well as motor skills.
- **Hang Time:** One hangs up on the bars and realizes his or her strength by keeping his chin up the bar.
- **Balance Beam:** Walk on a beam and find out how strong and efficient are your organs of Corte (organs responsible for balancing present in the ear).
- **Reaction Test:** Check your response to stimulus. Here the visitor, on seeing the red light, pushes the break paddle and the counter displays the reaction time. Find out how fast were you to react to the stimulus. Compare the results with your buddies.
- **Measure Yourself:** Interesting exhibit where one measures one’s height without any one’s help.

**Doping**

Finally, there’s a section on doping. Beware of using steroids, drugs and prohibited substances in sports as they can spoil your sporting career as well as health. Information regarding doping and prohibited drugs and their effects on various parts of the body has been displayed.

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