Space rocks on a collision course with Earth are called meteoroids. When a meteoroid enters the atmosphere, friction causes it to heat up and glow. We call it a shooting star or a meteor. Small meteors burn up completely as they pass through the atmosphere. Larger ones end up on Earth as a meteorite. Impact craters are formed when a large meteoroid or comet crashes into a planet.

Although meteoroid strikes are frequent, atmospheric incineration protects against all but the really serious strikes. One such massive impact left its imprint on Mexico’s Yucatan Peninsula as it struck Earth with an explosive energy equivalent to 100 trillion tonnes of TNT. Thankfully, there were no human beings round when the event occurred—only dinosaurs.

**Crash Consequences**

Today, 65 million years later, all that remains as a reminder of this deadly impact is a crater about 180 km in diameter and 900 metres deep. It is surrounded by a circular fault about 240 km in diameter. It was the view from space that provided the first clues to this crater buried under almost a kilometre or so of new rock and sediments. Without satellite images we would never have been able to name Chicxulub as the impact site.

A study reported in March 2010 has gathered powerful evidence that this single cosmic strike 65 million years ago led to the sudden extinction of more than half of all species on the planet, including the dinosaurs, bird-like pterosaurs and large marine reptiles.

**Contemporary Contact**

Admittedly, an event that happened 65 million years ago does tend to make Earthlings rather complacent. It is fitting therefore to remember that 30 June 2008 marked the 100th anniversary of what is called the Tunguska event. According to Don Yeomans, manager of the Near-Earth Object Office at NASA’s Jet Propulsion Laboratory, “It is the only entry of a large meteoroid we have in the modern era with first-hand accounts.”

It is estimated that the 99 million kg space rock entered Earth’s atmosphere travelling at a speed of about 53193 km per hour. It was sizzling hot and it heated the air surrounding it to over 24700 degrees Celsius. At a height of about 8534 metres, the enormous pressure and tremendous heat caused the asteroid to fragment and burn up. This resulted in a fireball and released energy equivalent to about 185 Hiroshima bombs. The resulting seismic shockwave was recorded as far away as England.

The actual impact levelled 1335 square km of Siberian forest. The uprooted trees lay in a radial pattern like matchsticks pointing away from the epicentre of the strike, their braches and bark stripped bare. In 2008, scientists announced that it was likely that a comet had crashed into Earth at this remote location. In retrospect it is scary to think what might have been the catastrophic collisions.
consequences on human lives if the impact had occurred in a heavily populated megacity instead of in a remote forest.

**Colossal Collisions**
- The **Barringer Crater** (Meteor Crater, Canyon Diablo, Arizona Crater) in Arizona, USA is the result of an impact event that happened ~20,000-50,000 years ago and is the first confirmed asteroid crater on Earth. It is named after Daniel M. Barringer who was the first to suggest that it was the result of an impact. The size of the crater is huge: over a kilometre across.

- Although well known to the Aborigines, **Wolfe Creek Crater** was formally identified in 1947. It is considered the second largest crater in the world from which meteorite fragments have been collected. Wolfe Creek Crater measures roughly 880 meters in diameter. According to NASA, it is estimated that the crater formed some 300,000 years ago when a meteorite weighing more than 50,000 metric tons struck the Earth at an estimated 15 kilometres per second. Not only did it blast out the massive crater, it shattered rocks well below the ground surface.

- The **Aorounga Crater** has a diameter of about 17 km. Scientists think that it was formed as part of a multiple-impact event that scarred northern Chad several hundred million years ago.

- The **Roter Kamm** impact crater in Namibia was formed by a meteorite that collided with Earth approximately 5 million years ago. It is 2.5 km in diameter and is 130 m deep.

- It is estimated that impacts such as the one in Mexico occur (on average) about once every 100 million years. Earth has already faced about five such events.

**Country’s Chronicle**

Although mentioned in ancient texts, India’s **Lonar Crater (Maharashtra)** was formally identified in 1823 by a British officer named C.J.E. Alexander. It is the result of a meteorite impact that occurred between 35,000 and 50,000 years ago. Lonar Crater is approximately 150 m deep and has a diameter of 1,830 m. The crater rim rises about 20 m above the surrounding land. A lake occupies the crater. That it is an impact crater became clear when Maskelynite, a kind of naturally occurring glass that is only formed by extremely high-velocity impacts, was found here.

**Chances of Crash**

Scientists keep a close eye on what they call PHA or Potentially Hazardous Asteroids, which are space rocks larger than ~100m that can come closer to Earth than 0.05 AU (~7,480,000 km). On 11 May 2010 there were 1116 PHAs under observation. Some of these asteroids have names, for example, Apophis; all have numbers, for example, Asteroid 2003QQ47 or Asteroid (29075)1950DA.

PHA-Earth close-approach tables are maintained and monitored regularly. Scientists use a risk-assessment scale (from 0 to 10) to assess the possibility of collision. An object with a value of zero or one has virtually no chance of causing damage on Earth; a 10 means a certain global climatic catastrophe…probably the only time getting a ten on ten is not something to cheer about! Scientists reassure us that the word “Potential” in PHA does not indicate that the impact will happen; rather, it denotes Possibility.

However, this does not mean that a smaller strike cannot happen even as you are reading this. Ask Dr. Frank Ciampi whose office in Virginia, USA was hit by a tennis-ball-sized meteorite on 21 January 2010. It was simply chance that nobody was hurt. The meteorite was travelling at a speed of 350 km/h when it struck. It penetrated the roof; passed through one wall partition and then a particle board ceiling before finally breaking into three pieces on the floor of an examination room, which had been occupied by patients just a brief while earlier.