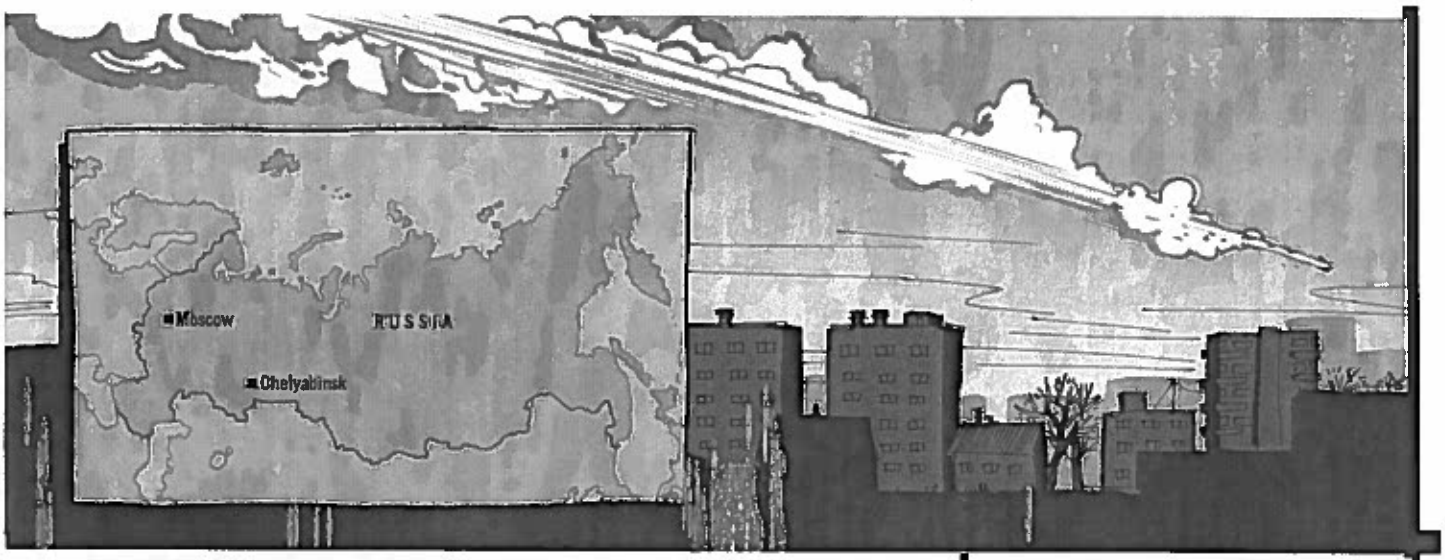
# A METEOR BLASTS RUSSIA




At 9:20 am on February 15th, a meteor streaked across Russian skies. Moments later, the space rock exploded. It created a spectacular fireball.

The gigantic shockwave that followed rocked buildings and blew out windows. More than 1,200 people were injured, mostly by flying glass.

"I saw a huge line of smoke," said an office worker. "A few minutes later the window suddenly came open. There was a huge explosion, followed by lots of little [ones]. It felt like a war zone."

## POWERFUL EXPLOSION

The meteor was about 17 metres across and roughly 10 tonnes in weight. It was travelling at least 54,000 kilometres per hour. **Friction** caused it to break up as it plunged through the Earth's atmosphere.

The explosion occurred about 30 to 50 kilometres above Chelyabinsk, a city 1,500 kilometres east of Moscow. It produced a **sonic boom** and a flash brighter than the sun. Its force was also 20 times more powerful than a World War II **atomic bomb**.

## THE EVIDENCE

Most of the meteor burned up. However, a large fragment crashed into a nearby frozen **reservoir**. It opened up a crater about eight metres wide. Other meteorites, less than a centimetre wide, rained

## NAMING SPACE ROCKS

Asteroids and comets are thought to be **remnants** of the early years of our solar system.

Comets are made of ice, rock and **organic compounds**. Their dust tails can sometimes be seen from Earth as they streak by. Asteroids are usually rock, but some are made of metal. They range in size from small boulders to objects that are hundreds of kilometres wide.

A meteoroid is small object originating from a comet or asteroid. When meteoroids enter the Earth's atmosphere they are called meteors. Most meteors burn up high above the Earth, but if they strike the ground, they are called meteorites.

## DEFINITIONS

**ATOMIC BOMB:** a nuclear weapon that releases enormous energy
**FRICTION:** resistance that one surface or object meets while moving over another
**ORGANIC COMPOUNDS:** compounds that contain carbon, an element found in all living things
**REMNANTS:** small pieces that remain after the main part no longer exists
**RESERVOIR:** a large natural or artificial lake supplying water
**SONIC BOOM:** the noise made when an object breaks the sound barrier

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down onto the snowy ground. Scientists and treasure seekers quickly swooped in to find the stony black objects.

These meteorites give scientists a glimpse into the origins of matter. That's because they have remained largely unchanged for billions of years.

### DID YOU KNOW?

In January 2000, a meteor four metres wide fell in northwestern B.C. The fireball was seen for hundreds of kilometres. Some 500 meteorites were later found on the frozen surface of the lake.

## COSMIC INTRUDERS

Meteors shower our planet all the time. They are the 'shooting stars' we see in the night sky. Most break up before hitting the ground. Even so, their explosions can cause terrible air bursts on the Earth's surface. And sometimes, larger and denser meteors do score a direct hit.

Smaller meteor strikes happen five to ten times a year. Large impacts, such as the one in Russia, are rarer.

"An event [like this] occurs once every 100 years on average," said Paul Chodas of NASA.

What about strikes by even bigger objects? Experts say asteroids larger than a kilometre wide collide with our planet every few hundred thousand years, on average.

## HUNTING FOR SPACE ROCKS

That's worrisome, because these bigger and denser space objects are more dangerous. The reason? They are less likely to break up before landing. And if a large meteor hit Earth at up to 30,000 kilometres an hour, the energy released could level a city.

No wonder scientists around the world have begun to catalogue and track meteors and asteroids orbiting nearby. NASA's Near Earth Objects (NEO) program is logging objects as small as 140 metres wide. So far, they've found 9,721 NEOs. Some 862 of them are at least a kilometre wide.

Meanwhile, on February 25, Canada launched the Near-Earth Object Surveillance Satellite. It's the world's first space telescope dedicated to detecting and tracking asteroids and satellites. This small, suitcase-sized device circles the globe every 100 minutes. It scans space near the Sun to find asteroids that may someday pass near our planet.

## METEOR AVOIDANCE STRATEGIES

If necessary, how would we nudge an asteroid out of our path? We could slam a spacecraft into the object. We could destroy it with a nuclear weapon. We could even fire light-coloured paintballs at it. The pressure of this light bouncing off could divert the rock from its path.

All ideas are now being considered because the meteor over Russia was a reminder of the threat these rocks pose.

"They've always been there, they always will be there," says scientist Richard Binzel "But now we're paying attention." ★

### THE BIG HITS

In 1908, the biggest meteor strike ever recorded hit in Siberia, Russia. It measured tens of metres across and flattened some 80 million trees over an area 2,000 square kilometres in size. It also killed two people.

Scientists believe that the biggest meteor strike ever took place about 65 million years ago. An object 10 to 15 kilometres wide struck off Mexico's Yucatan Peninsula. It left a crater 180 kilometres wide. The dust created by the impact blanketed the sky for decades. That caused global and long-lasting changes on Earth – possibly including the extinction of dinosaurs.

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## ON THE LINES

**Answer the following in complete sentences:**

1. Explain what a **meteoroid** is.

2. What information can scientists obtain from meteors?

3. Describe the meteor that entered the Earth's atmosphere in mid-February.

4. What happened after the meteor entered the Earth's atmosphere? Explain.

5. Describe the effects of this explosion on the people below.

6. Where and when did the largest recorded meteor strike occur?

7. Where and when do scientists believe the biggest meteor strike ever occurred?

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**Write the letter that corresponds to the best answer on the line beside each question:**

_____ 1. A space rock that enters the Earth's atmosphere and strikes the ground is called a:

a) meteor b) comet
c) meteoroid d) meteorite

_____ 2. Near which Russian city did a large space rock explode?

a) Moscow b) Chelyabinsk
c) St.Petersburg d) Berlin

_____ 3. Which of the following did this space rock NOT produce?

a) a large dust cloud that covered the sun b) a flash brighter than the sun
c) a force stronger than an atom bomb d) a sonic boom

_____ 4. True or False? The meteor that streaked over Russia was travelling about 54,000 kilometres per hour.

_____ 5. True or False? The largest meteor strike ever occurred in Brazil.

**Meteor debris on Earth is very difficult to find. Do you think we should continue to look for meteor debris on Earth? In the space below, write a paragraph explaining why or why not? Please make sure you give at least two reason why (or why not) with examples or evidence.**