



The Secrets of Hail

- 1 Hailstones are bullets of ice that smash out of the sky. Hail occurs when these fall out of the sky in large numbers.

Larger hailstones are hard pellets of ice that can be as small as a pea or as large as a grapefruit. They are usually round or cone-shaped, though they can also look like apples, disks or even daggers. Hailstones often consist of several layers of ice, like the layers of an onion. A large hailstone may have 20 to 25 layers.

- 2 Hail starts out as falling snow, frozen raindrops, or dust particles several kilometres up in large storm clouds. As a young hailstone

falls through the warmer mid-section of the cloud, it starts to evaporate and become lighter. Wind may blow this frozen drop back up into the cloud to be frozen again. Then drops of supercooled liquid water (really cold, but not frozen) hit the pellet of ice and freeze on. It starts to fall again. The hailstone is still not heavy enough, so it gets thrown up into the cloud a second time. This cycle continues until the hailstone is heavy enough to overcome the wind and fall to the ground. Small stones fall at about five metres per second, while larger stones can fall at perhaps forty metres per second.

- 3 A hailstone needs over **ten billion** supercooled droplets to grow to the size of

a golf ball! In order for a hailstone to gather all those droplets, it must stay in the cloud for five to ten minutes.

The stronger and faster the wind is, the larger the hail can be. It takes wind gusts of 90+ km per hour to create hail the size of a golf ball, and an updraft of 150+ km per hour to create hail the size of a baseball. The larger the hailstones, the fewer of them there will be.

- 4 Hail usually occurs during severe summer thunderstorms, and it never occurs when the ground is below freezing. This is because warm air is needed to throw the hail back up into the clouds.

Large damaging hail falls most frequently on continents in the middle latitudes, such as the Nebraska-Wyoming-Colorado area of the United States (known as "Hail Alley"), in South Africa, and in northern India.

- 5 Of all the hail that lands in India, one stone out of every four is greater than 2½ cm in diameter. The largest hailstone ever recorded in the USA occurred in 2003 in Aurora, Nebraska. It had a diameter of 17.8 centimetres.

Especially in Hail Alley, enthusiasts chase hailstorms, listening closely to weather reports. They often do a great deal of damage to their cars at the same time. They enjoy the thrill of the chase, the danger, and the actual experience of being in or near hailstorms. Storm-chasing companies in the USA now take tourists following storms.

- 6 Even though hailstorms don't last long, they can cause enormous damage. They can kill and injure people and livestock, damage buildings, cars and aircraft, and devastate crops. It usually takes hail the size of a hen's egg to dent a car, but hail the size of baseballs can kill animals who can't find a sheltering tree.

Farmers sometimes call hail the "white terror" as it can destroy an entire crop within five minutes. Hail accounts for the destruction of one percent of the world's crops every year. The most deadly hailstorm was in Moradabad in India in 1888, killing 230 people and 1,600 farm animals.

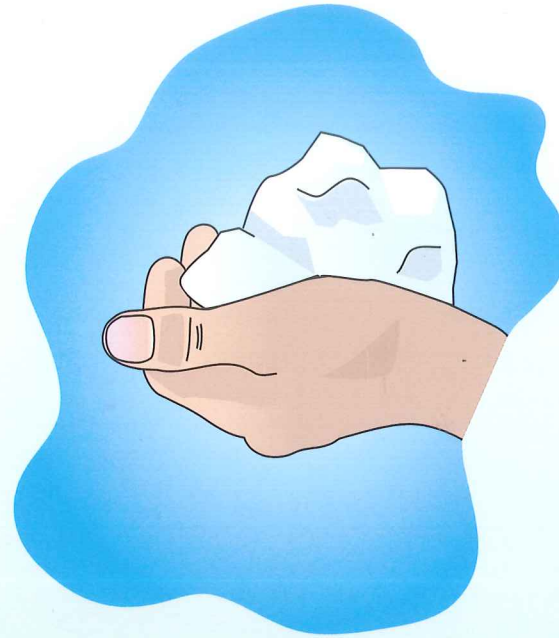
- 7 In China in April, 1989, 157 people were killed, 7,500 injured, and 160,000 homes destroyed by an intense hailstorm. Thankfully, such fatal occurrences of hail are not too common.

For over a hundred years, humans have tried to lessen the damage caused by hail. One curious method was the hail cannon, which was fired at storms to suppress hail. In 1900, three-storey-high, megaphone-shaped cannons were common sights in vineyards in Italy and nearby countries. That year alone, nine-and-a-half-million cannon firings boomed through the sky over Europe!

- 8 More recently scientists have tried seeding clouds with silver nitrate to produce more numerous but smaller hailstones. The results of these experiments are not clear as yet. Some growers instead use nylon

covers that protect crops from hail but let sunlight through.

What is still certain is that hailstorms will create sudden havoc for farmers, delight for storm chasers, and, wonder for everyone who has ever held a hailstone in their hand.



Questions

- | | |
|---|---|
| <p>1 A really large hailstone could be the size of</p> <p>a a grapefruit.
b a pumpkin.
c a golf ball.</p> <p>2 How fast do winds have to be to create a hailstone the size of a golfball?</p> <p>a 90 km per hour at the most.
b 90 km per hour at the least.
c Exactly 90 km per hour</p> <p>3 Hail Alley is found in</p> <p>a India.
b China.
c the United States of America.</p> | <p>4 When was the deadliest hailstorm?</p> <p>a 1888
b 1989
c 2003</p> <p>5 Hail cannons were intended to</p> <p>a suppress hail.
b make it rain.
c make more hail.</p> <p>6 Hail is generally regarded as</p> <p>a something great to chase.
b essential to the water supply.
c a potentially destructive force.</p> |
|---|---|

Vocabulary

Find words in the text that match the meanings below. The word is in the section shown in brackets.

- 7 Small ball like shapes (1)
- 8 A repeated series of events (2)
- 9 A circle's width (5)
- 10 Shielding or protecting (6)
- 11 Places where wine is grown (7)

Grammar

The words in **BLUE** appear in the text. Match them by writing the correct antonym shown in **RED**.

E.g. *under / over*

- | | |
|------------|---------|
| 12 small | always |
| 13 lighter | large |
| 14 gather | heavier |
| 15 never | scatter |

Back To The Text...

- 16 Another good name for this text would be
 - a Ice Bullets
 - b Hail Alley
- 17 Key words are important words that help you understand the main ideas. Which of the following is a key word in section 6?
 - a animals
 - b damage

18 The illustration on the front cover is described in section

- a four.
- b five.

Cloze

Clouds

Choose **five** of the following words to complete this cloze passage.

storm rain clouds city

altitudes droplets planet high

Hail forms in large storm clouds 19

above the Earth. These 20 clouds or

Cumulonimbus clouds are the tallest clouds,

base to peak, that we find circling our

21. We commonly find the streaky

Cirrus and Cirrostratus clouds high above the

other 22. These are often called flat

clouds as opposed to the fluffy Cumulus,

Nimbostratus or Stratus that we find at lower

23.

Challenge Option

Research: This text mentions Hail Alley. Where is Tornado Alley?

