1
00:00:00,000 --> 00:00:04,030
Now this is a familiar scene.

2
00:00:04,050 --> 00:00:08,050
The Sun's heat causes water

3
00:00:08,070 --> 00:00:12,070
from plants, lakes and oceans to turn from a liquid to a vapor.

4
00:00:12,090 --> 00:00:16,080
High in the atmosphere

5
00:00:16,100 --> 00:00:20,090
the water vapor then cools down and condenses from a gas

6
00:00:20,110 --> 00:00:24,150
back into a liquid. The liquid

7
00:00:24,170 --> 00:00:28,190
water then falls back to the surface in the form of rain, snow, ice,

8
00:00:28,210 --> 00:00:32,240
or hail. Water

9
00:00:32,260 --> 00:00:36,270
runs off into streams, lakes and oceans or is stored in the ground or

10
00:00:36,290 --> 00:00:40,300
in snowpack.

11
00:00:40,320 --> 00:00:44,320
This is the water cycle, and it describes

12
00:00:44,340 --> 00:00:48,340
how our most vital resource moves through the whole Earth system.

13
00:00:48,360 --> 00:00:52,360

But like most things in our world, when we

14
00:00:52,380 --> 00:00:56,370
look at the tiny parts that make up the whole, we can learn a lot more about the

15
00:00:56,390 --> 00:01:00,420
phenomena. Take

16
00:01:00,440 --> 00:01:04,440
the shape of a single raindrop. Small droplets of

17
00:01:04,460 --> 00:01:08,450
water in the atmosphere are spherical in shape due to the surface tension, or

18
00:01:08,470 --> 00:01:12,470
"skin," of the water molecules. As these droplets grow

19
00:01:12,490 --> 00:01:16,490
they become heavier and start to fall through the air.

20
00:01:16,510 --> 00:01:20,500
As they fall, the raindrop collides with other drops and continues to get

21
00:01:20,520 --> 00:01:24,510
bigger. These larger raindrops fall through the air faster.

22
00:01:24,530 --> 00:01:28,520
The wind resistance on the underside of the drop causes the bottom

23
00:01:28,540 --> 00:01:32,580
of the drop to flatten, resulting in a drop looking like a hamburger bun.

24
00:01:32,600 --> 00:01:36,630
As the drop continues to fall and grow, at some point, it becomes too

25
00:01:36,650 --> 00:01:40,670
large for the surface tension to hold it together, so the raindrop breaks

26
00:01:40,690 --> 00:01:44,710
apart into smaller spherical drops. Investigating the proceses

27
00:01:44,730 --> 00:01:48,740
we can't see with the naked eye is nothing new. Science and technology

28
00:01:48,760 --> 00:01:52,760
drive each other forward and often lead to insights and discoveries along the way.

29
00:01:52,780 --> 00:01:56,780
With the invention of high-speed photography, we finally saw

30
00:01:56,800 --> 00:02:00,800
the most basic elements of our watery planet in action.

31
00:02:00,820 --> 00:02:04,810
Understanding how a tiny

32
00:02:04,830 --> 00:02:08,860
raindrop falls through the atmosphere does more than debunk the myth that a

33
00:02:08,880 --> 00:02:12,960
raindrop falls like a teardrop. It actually makes a difference when it comes to

34
00:02:12,980 --> 00:02:17,000
measuring precipitation, in particular, for ground radars.

35
00:02:17,020 --> 00:02:21,040
Ground radars look at the sides of the raindrops and then estimate

36
00:02:21,060 --> 00:02:25,070
the vertical and horizontal size. A heavier flatter drop allows

37
00:02:25,090 --> 00:02:29,100
radars to identify heavier precipitation. In fact the two

38
00:02:29,120 --> 00:02:33,130

radars on board the GPM satellite can also measure drop sizes

39
00:02:33,150 --> 00:02:37,140
from space and so a more accurate look at raindrops gives us a more