1
00:00:01,319 --> 00:00:10,690
Hello, my name is Sanjeev Gupta and I am a
longterm planner for the Mars Curiosity rover.

2
00:00:10,690 --> 00:00:12,990
This is your Curiosity rover update.

3
00:00:12,990 --> 00:00:17,679
We've now been on Mars for almost 2 months
and we have been witnessing the amazing new

4
00:00:17,679 --> 00:00:22,429
vistas of the never-before-seen Gale landscape
taken with our wonderful cameras.

5
00:00:22,429 --> 00:00:27,359
However, much of the science team have had
their eyes and the rover's eyes firmly focused

6
00:00:27,359 --> 00:00:28,840
on the ground.

7
00:00:28,840 --> 00:00:33,260
On the drive from the Bradbury landing site
to our current location we have been analyzing

8
00:00:33,260 --> 00:00:39,320
three really interesting outcrops that we
have called Goulbourn, Link, and Hottah.

9
00:00:39,320 --> 00:00:42,471
If we look at the Hottah outcrop, we can see
a distinct layer that has been tilted and

10
00:00:42,471 --> 00:00:46,829
eroded and this allows us to look at a cross-section
through the layer.

11
00:00:46,829 --> 00:00:50,980

When we looked at the layer with our high-resolution Mastcam camera we found that it was comprised

12
00:00:50,980 --> 00:00:56,160
of sand grains and small pebbles that had become cemented to form a hard layer.

13
00:00:56,160 --> 00:01:01,160
Here you can see a pebble that is 3 cm in diameter; so smaller than a ping pong ball.

14
00:01:01,160 --> 00:01:04,840
This suggests that this layer is an ancient gravel deposit.

15
00:01:04,840 --> 00:01:08,640
The surprising thing is that when we looked at the pebbles closely, we discovered that

16
00:01:08,640 --> 00:01:11,040
many of them were quite well rounded.

17
00:01:11,040 --> 00:01:15,310
This is very different to the many angular clasts that litter the surface.

18
00:01:15,310 --> 00:01:19,460
Here, you can see a rounded pebble from a riverbed on Earth.

19
00:01:19,460 --> 00:01:23,210
On Earth rounded pebbles are a common tell tale sign of rocks that have been transported

20
00:01:23,210 --> 00:01:24,299
by water.

21
00:01:24,299 --> 00:01:28,799
For example, in a river or stream, as water flows over a riverbed, if the flow strength

22
00:01:28,799 --> 00:01:33,200
is great enough, the pebbles are lifted up
into the flow or rolled along the riverbed

23
00:01:33,200 --> 00:01:37,230
and they become pounded and battered against
each other and this causes them to become

24
00:01:37,230 --> 00:01:39,450
rounded through time.

25
00:01:39,450 --> 00:01:43,150
So what we think we might be seeing here on
Mars is an ancient riverbed with the pebble

26
00:01:43,150 --> 00:01:45,649
beds representing old stream deposits.

27
00:01:45,649 --> 00:01:49,710
The size of the pebbles tells us that these
rocks could not have been transported by wind,

28
00:01:49,710 --> 00:01:52,869
so it seems clear they must have been transported
by water.

29
00:01:52,869 --> 00:01:55,409
So how does a pebble deposit get to be here?

30
00:01:55,409 --> 00:01:59,119
If we look more broadly in Gale Crater, we
can see that there is a prominent feature

31
00:01:59,119 --> 00:02:01,950
that geologists call an alluvial fan.

32
00:02:01,950 --> 00:02:06,399
Alluvial fans are cone-shaped deposits of

gravel and sand that accumulate where streams

33
00:02:06,399 --> 00:02:07,960
exit mountains.

34
00:02:07,960 --> 00:02:13,290
In Gale crater, there is a 10 km long fan
formed at the mouth of 30 m deep canyon that

35
00:02:13,290 --> 00:02:15,940
is derived from the crater rim.

36
00:02:15,940 --> 00:02:20,060
On the fan itself we can see evidence for
multiple channels suggesting that the streambed

37
00:02:20,060 --> 00:02:22,270
direction changed through time.

38
00:02:22,270 --> 00:02:25,580
When we look at the location of the Curiosity
landing site with respect to the alluvial

39
00:02:25,580 --> 00:02:29,850
fan we can see that the rover landed downstream
of the fan.

40
00:02:29,850 --> 00:02:34,580
The rounded pebbles likely represent long
distance transport down the alluvial fan.

41
00:02:34,580 --> 00:02:38,680
So this is really exciting news for the science
team because this is the first time we're

42
00:02:38,680 --> 00:02:42,760
seeing gravel transported by water on the
surface of Mars.

43

00:02:42,760 --> 00:02:46,180
This has been another exhilarating week for
Curiosity on Mars and for the science team

44
00:02:46,180 --> 00:02:47,900
here in Pasadena.