
DANGER

1
00:00:00,669 --> 00:00:05,520
I would like to tell you what we know about
this event and give you an idea of what to

2
00:00:05,520 --> 00:00:07,680
expect in the future perhaps.

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00:00:07,680 --> 00:00:10,950
So, let's get started.

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00:00:10,950 --> 00:00:12,530
First of all, some terms.

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00:00:12,530 --> 00:00:17,720
You can't have a talk without defining things,
at least not in my field.

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00:00:17,720 --> 00:00:20,130
Meteoroid, meteor, meteorite what's the difference?

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00:00:20,130 --> 00:00:23,570
Well there is a difference though people use
them interchangeably a lot.

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00:00:23,570 --> 00:00:27,690
A meteoroid is a chunk of rock or ice out
in space.

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00:00:27,690 --> 00:00:31,400
It's about the size of a boulder or smaller.

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00:00:31,400 --> 00:00:36,019
Now some people ask, "What's the difference
between a meteoroid and an asteroid?"

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00:00:36,019 --> 00:00:38,979
It's all a question of size.

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00:00:38,979 --> 00:00:41,239
There is no dividing line.

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00:00:41,239 --> 00:00:48,699
So, some people would say a rock, a meter across, a yard and a half across is an asteroid.

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00:00:48,699 --> 00:00:55,229
Others would say it's got to be about 10 meters or 10 yards across before it's an asteroid.

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00:00:55,229 --> 00:01:01,300
I prefer thinking something bigger than a garage which is 10 yards, is an asteroid.

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00:01:01,300 --> 00:01:05,640
Something the size of a beach ball, that doesn't strike me as an asteroid, I would call that

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00:01:05,640 --> 00:01:06,979
a meteoroid.

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00:01:06,979 --> 00:01:08,670
So that's the difference.

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00:01:08,670 --> 00:01:10,299
It's a question of size.

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00:01:10,299 --> 00:01:14,960
But you will get a different answer depending on which scientist you talk to.

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00:01:14,960 --> 00:01:17,240
So, I'm giving you my opinion.

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00:01:17,240 --> 00:01:18,940
There is no formal definition.

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00:01:18,940 --> 00:01:25,990

Now, when that chunk of rock and ice out in space hits our atmosphere it burns up, it

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00:01:25,990 --> 00:01:29,009
ablates because they hit the atmosphere pretty fast.

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00:01:29,009 --> 00:01:36,579
Most meteors move anywhere from 40 to 170,000 miles per hour, many times faster than the

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00:01:36,579 --> 00:01:39,079
space shuttle hitting the atmosphere.

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00:01:39,079 --> 00:01:45,119
So when they hit, they burn up, they leave that streak of light that you see as a shooting

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00:01:45,119 --> 00:01:46,829
star, or a falling star.

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00:01:46,829 --> 00:01:51,710
That streak of light is what we call a meteor.

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00:01:51,710 --> 00:01:57,289
So the meteor is not the rock or the ice itself, it's the streak of light it produces when

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00:01:57,289 --> 00:01:59,609
it burns up in the atmosphere.

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00:01:59,609 --> 00:02:10,099
And finally, any piece of that meteoroid that makes it to the ground, we call it a meteorite.

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00:02:10,099 --> 00:02:14,340
So a meteorite is something that has actually made it to the ground.

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00:02:14,340 --> 00:02:19,730
And yes, the moon and Mars have meteorites
on them too so it's not specific to the Earth.

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00:02:19,730 --> 00:02:27,069
So any piece of a meteoroid that survives
atmospheric ablation and makes it to the ground

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00:02:27,069 --> 00:02:29,739
is called a meteorite.

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00:02:29,739 --> 00:02:33,129
Any questions on that?

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00:02:33,129 --> 00:02:40,099
So, Luther now knows the difference here.

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00:02:40,099 --> 00:02:43,460
He got whacked by a meteorite.

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00:02:43,460 --> 00:02:49,280
Now when it comes to meteors there's a thing
called a fireball, which is a bright meteor.

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00:02:49,280 --> 00:02:54,410
Technically, a fireball is a meteor brighter
than the planet Venus.

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00:02:54,410 --> 00:02:56,470
That's a fireball.

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00:02:56,470 --> 00:03:01,210
And a superbolide is something that's really
bright.

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00:03:01,210 --> 00:03:03,600
It will cast shadows on the ground.

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00:03:03,600 --> 00:03:07,349

It's generally brighter than the full moon.

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00:03:07,349 --> 00:03:09,049
These are rather rare.

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00:03:09,049 --> 00:03:14,400
Superbolides don't happen very often, but
when they do they get a lot of attention if

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00:03:14,400 --> 00:03:15,860
it's over land.

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00:03:15,860 --> 00:03:20,799
So a fireball's a meteor brighter than Venus,
and a superbolide is a meteor brighter than

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00:03:20,799 --> 00:03:23,439
the full moon.

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00:03:23,439 --> 00:03:27,989
What happened over Russia was most definitely
a superbolide.

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00:03:27,989 --> 00:03:31,819
So, how does this work?

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00:03:31,819 --> 00:03:34,730
In space, you've got a hunk of rock, a meteoroid.

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00:03:34,730 --> 00:03:40,080
It hits the atmosphere, it burns up, or if
it's bigger it breaks apart into little pieces

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00:03:40,080 --> 00:03:47,830
which burn up, and when it gets down to about
10 to 30 miles above the surface of the Earth,

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00:03:47,830 --> 00:03:52,760
the atmosphere slows those things down so

low they're no longer burning up and they

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00:03:52,760 --> 00:03:55,810
stop emitting light.

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00:03:55,810 --> 00:04:00,349
So you've got something blazing through the
atmosphere and if it gets deep enough down

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00:04:00,349 --> 00:04:05,980
the atmospheric drag slows it down to the
point where they get below 3 miles a second

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00:04:05,980 --> 00:04:07,519
and stop emitting light.

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00:04:07,519 --> 00:04:14,010
At that point they no longer are ablating
and we call from that on dark flight because

62
00:04:14,010 --> 00:04:16,940
we don't see them anymore.