1
00:00:00,590 --> 00:00:02,150
DON PETTIT

2
00:00:02,150 --> 00:00:04,810
>> It's kind of cool
just to watch it move.

3
00:00:11,460 --> 00:00:13,130
Okay, there.

4
00:00:14,340 --> 00:00:21,010
Okay I'm going to put a puff of
air into this side very good.

5
00:00:24,790 --> 00:00:28,390
Wow. Cool.

6
00:00:28,390 --> 00:00:32,500
Wow, I just love
those oscillations.

7
00:00:32,500 --> 00:00:32,960
Here we go.

8
00:00:32,960 --> 00:00:39,600
Okay, let's switch it
to a black background.

9
00:00:44,600 --> 00:00:47,990
Yeah, so that's about 800 mils.

10
00:00:47,990 --> 00:00:51,450
So this should put it right
around 1,100 milliliters.

11
00:00:51,450 --> 00:00:52,680
Let's see what happens here.

12

00:00:52,680 --> 00:01:01,130
Oh ho, just love that.

13
00:01:01,130 --> 00:01:02,610
Look at that.

14
00:01:02,610 --> 00:01:06,990
Amazing. Just one of these
jaw-dropping moments.

15
00:01:12,560 --> 00:01:15,770
Okay, here we go to do it
again, looking into the camera.

16
00:01:15,770 --> 00:01:19,090
Big puff, here we go.

17
00:01:19,090 --> 00:01:20,880
Oh, right at the lens.

18
00:01:20,880 --> 00:01:22,770
I saved the lens.

19
00:01:24,770 --> 00:01:28,800
What I'm planning to, after this
whole series of experiments,

20
00:01:28,800 --> 00:01:31,390
I'll suck all this water up with
the syringe, I'll put it back

21
00:01:31,390 --> 00:01:35,100
and bags, and I'll use
it to make tea with,

22
00:01:35,100 --> 00:01:38,540
so I'll end up drinking
my experiment.

23

00:01:38,540 --> 00:01:40,130
You've got to conserve
your resources

24
00:01:40,130 --> 00:01:40,910
when you're in a frontier.

25
00:01:40,910 --> 00:01:44,970
You don't get to
see this as common,

26
00:01:44,970 --> 00:01:48,200
intuitive observables
on the Earth.

27
00:01:48,200 --> 00:01:51,450
And so when we go
into a frontier,

28
00:01:51,450 --> 00:01:53,870
our normal Earth-honed
intuition no longer applies.

29
00:01:53,870 --> 00:01:59,130
And this rule works when you
go the bottom of the ocean,

30
00:01:59,130 --> 00:02:03,180
or into the stratosphere, or
wherever you find your frontier,

31
00:02:03,180 --> 00:02:06,030
under the stage of an
electron microscope,

32
00:02:06,030 --> 00:02:11,100
Your normal everyday life
intuition no longer applies.

33
00:02:11,100 --> 00:02:15,500

And that's why frontiers
are rich in discovery.

34
00:02:15,500 --> 00:02:17,530
Because things aren't
the normal.

35
00:02:17,530 --> 00:02:20,560
They aren't the usual.

36
00:02:20,560 --> 00:02:23,850
Ah, Joe, come take
a peek at this.

37
00:02:23,850 --> 00:02:28,420
Get my towel ready to
catch the satellite drop.

38
00:02:28,420 --> 00:02:30,130
Here we go.

39
00:02:31,800 --> 00:02:33,490
Isn't that wild?

40
00:02:33,490 --> 00:02:33,800
JOE ACABA

41
00:02:33,800 --> 00:02:34,140
>> That's great.

42
00:02:34,140 --> 00:02:35,220
PETTIT

43
00:02:35,220 --> 00:02:37,790
>> It's a superposition
of surface waves that go

44
00:02:37,790 --> 00:02:41,670
around the outside of the

sphere, and body-centered waves,

45
00:02:41,670 --> 00:02:44,740
inertial waves, that
go through the middle.

46
00:02:44,740 --> 00:02:46,530
I'm going to give
it another puff,

47
00:02:46,530 --> 00:02:49,080
just because I'm
in space and I can.

48
00:02:49,080 --> 00:02:50,340
And instead of putting
a puff of air on it,

49
00:02:50,340 --> 00:02:52,140
I'm going to put
a puff of water.

50
00:02:52,140 --> 00:02:56,850
This is going to have a lot more
momentum in it than the air.

51
00:02:56,850 --> 00:02:59,180
Whoa! I was afraid...

52
00:02:59,180 --> 00:03:00,370
Look at that!

53
00:03:00,370 --> 00:03:03,470
Cool! I squirted water through.

54
00:03:03,470 --> 00:03:05,670
Oh, isn't that cool?

55
00:03:05,670 --> 00:03:08,170

The water in the sphere
went around the air cavity

56
00:03:08,170 --> 00:03:09,690
and formed a huge bubble.

57
00:03:09,690 --> 00:03:15,480
Wow! Oh, that is so cool.

58
00:03:15,480 --> 00:03:18,160
Let's see what my
hand looks like.

59
00:03:18,160 --> 00:03:23,170
Oh, look at that.

60
00:03:23,170 --> 00:03:24,910
Yeah. There we go.

61
00:03:24,910 --> 00:03:26,270
Yeah. That's...

62
00:03:26,270 --> 00:03:27,250
that's good.

63
00:03:27,250 --> 00:03:28,430
That's good.

64
00:03:28,430 --> 00:03:31,550
Shows that optics works.

65
00:03:31,550 --> 00:03:39,280
And let's see what
my mug looks like.

66
00:03:41,430 --> 00:03:47,200
Oh. I can be a human pendulum.

67

00:03:47,200 --> 00:03:51,120
This shows the lens law.

68
00:03:51,120 --> 00:03:53,260
Motion is in the
opposite direction

69
00:03:53,260 --> 00:03:56,920
and the image is
inverted or upside down.

70
00:03:58,050 --> 00:04:02,650
And there I am, and I'm going
to come up here with my eyeball.

71
00:04:14,570 --> 00:04:16,480
Now I'm going to do the
same thing with my nose,

72
00:04:16,480 --> 00:04:19,100
and this is going to get ugly,
and I apologize in advance.

73
00:04:19,100 --> 00:04:37,880
Oh it looks like I
have a floating head.

74
00:04:37,880 --> 00:04:40,380
I have a black shirt
on, and it blends

75
00:04:40,380 --> 00:04:41,890
with the black background.

76
00:04:41,890 --> 00:04:44,980
So I'm just a floating head.

77
00:04:47,290 --> 00:04:50,110
Okay, enough of that.

78
00:04:50,110 --> 00:04:55,050
Let's get back to
doing some science.