



**Lunar
Explorer
Neutron
Detector**

1
00:00:08,170 --> 00:00:04,110
[silence]

2
00:00:08,190 --> 00:00:12,260
[music] Narrator: If you were to go looking for water on

3
00:00:12,280 --> 00:00:16,350
the Moon, how would you find a good place to start digging? NASA's Lunar Reconnaissance

4
00:00:16,370 --> 00:00:20,440
Orbiter has a pretty unique answer: Count the neutrons coming from the Moon!

5
00:00:20,460 --> 00:00:24,510
LRO's LEND instrument, or Lunar Explorer Neutron Detector,

6
00:00:24,530 --> 00:00:28,570
is specifically designed to do just this. But how does counting neutrons help you find water?

7
00:00:28,590 --> 00:00:32,610
The answer lies in hydrogen--the smallest atom--and how those neutrons

8
00:00:32,630 --> 00:00:36,630
interact with it. So where do those neutrons come from, and what do they do?

9
00:00:36,650 --> 00:00:40,650
The Moon is constantly bombarded by cosmic rays. Sometimes, these

10
00:00:40,670 --> 00:00:44,800
rays hit atoms in the Moon's soil and knock off a neutron or two. These neutrons then

11
00:00:44,820 --> 00:00:48,900
go bouncing across other atoms before heading off into space. In soil that doesn't

12
00:00:48,920 --> 00:00:52,990
contain much hydrogen, the neutrons are much smaller than the surrounding atoms they crash into,

13
00:00:53,010 --> 00:00:57,100

so they don't slow down too much. However, in soil containing larger amounts of hydrogen,

14

00:00:57,120 --> 00:01:01,200

some of the neutrons hit the similarly-sized hydrogen atoms, which absorb a good

15

00:01:01,220 --> 00:01:05,260

deal of the neutrons' energy and slow them down. By measuring the varying amounts of slow

16

00:01:05,280 --> 00:01:09,330

and fast neutrons, LEND can effectively measure the likely amount of hydrogen in different

17

00:01:09,350 --> 00:01:13,390

areas of the Moon. And that being said, scientists think that where there's hydrogen,

18

00:01:13,410 --> 00:01:17,430

there's a good chance there's water. So LEND will keep counting neutrons,

19

00:01:17,450 --> 00:01:21,440

and LRO will keep looking for water on the Moon.

20

00:01:29,580 --> 00:01:25,450

[music, beeping]