



1

00:00:00,220 --> 00:00:05,870

The Juno Spacecraft's instruments run on electricity.
But how do you power it when it's millions

2

00:00:05,870 --> 00:00:10,350

of miles from the Earth? I mean, you can't
very well run an extension cord.

3

00:00:23,040 --> 00:00:27,940

The Juno spacecraft is powered by light from the sun.

4

00:00:30,120 --> 00:00:32,500

I'm a little spacecraft.

5

00:00:33,160 --> 00:00:34,720

Sorry.

6

00:00:34,880 --> 00:00:40,800

These three solar rays take light and convert it directly into electricity.

7

00:00:41,160 --> 00:00:43,400

This little motor is powered by a solar panel also.

8

00:00:44,860 --> 00:00:48,680

When we turn it toward the light, the motor starts to run.

9

00:00:50,040 --> 00:00:53,640

The light driving this panel passes through a rectangle this big.

10

00:00:55,640 --> 00:01:01,720

But as we move farther from the source of light, there'll be less and less electricity to drive the motor.

11

00:01:02,120 --> 00:01:09,520

If we're twice as far away, that same amount of light is now spread out over four rectangles.

12

00:01:09,530 --> 00:01:16,890

So the motor only has a quarter as much energy to run it. If we go out three times as far away,

13
00:01:16,890 --> 00:01:23,760
that same amount of light is now spread out
over an area three by three. So the motor

14
00:01:23,760 --> 00:01:29,760
only has a ninth as much energy to drive it.
At four times as far away, that same amount

15
00:01:29,760 --> 00:01:36,299
of light is spread out over an area four by
four. The motor's only getting a 16th as much energy.

16
00:01:36,299 --> 00:01:39,039
So it's barely turning.

17
00:01:40,380 --> 00:01:46,960
Now in the case of the Juno spacecraft, if it's an orbit around the Earth, it has 12,000 watts of electricity.

18
00:01:48,840 --> 00:01:50,820
That's enough to run this whole studio.

19
00:01:51,040 --> 00:01:59,520
But by the time it gets way out, in orbit around Jupiter, these same solar arrays are only gonna be able to produce

20
00:02:01,100 --> 00:02:06,880
If you had a hair dryer like this, it would run fine when it's near the sun.

21
00:02:07,040 --> 00:02:13,440
But as we moved out, farther
and farther from the sun, the hair dryer would have less and less energy available to it.

22
00:02:13,640 --> 00:02:21,780
In fact, a typical hair dryer powered by the Juno spacecraft out at Jupiter wouldn't have enough energy to run a

23
00:02:21,780 --> 00:02:27,060
But because the instruments on board Juno are so efficient, it's gonna work just fine.