STEMonstrations

SIMPLE MACHINES

1
00:00:03,490 --> 00:00:24,870
[Music]

2
00:00:28,550 --> 00:00:26,390
hello and welcome to the international

3
00:00:30,230 --> 00:00:28,560
space station my name is shane kimbrough

4
00:00:33,190 --> 00:00:30,240
and i'm an astronaut living and working

5
00:00:34,709 --> 00:00:33,200
here 250 miles above the earth

6
00:00:36,630 --> 00:00:34,719
today we're going to be learning about

7
00:00:38,150 --> 00:00:36,640
what a simple machine is and exploring

8
00:00:41,190 --> 00:00:38,160
the different ways we're using simple

9
00:00:43,110 --> 00:00:41,200
machines up here in low earth orbit

10
00:00:45,190 --> 00:00:43,120
a simple machine is an object that helps

11
00:00:47,029 --> 00:00:45,200
us to easily accomplish a task by

12
00:00:48,069 --> 00:00:47,039
changing the direction or amount of a

13
00:00:49,750 --> 00:00:48,079

force

14
00:00:53,270 --> 00:00:49,760
there are six different types of simple

15
00:00:54,950 --> 00:00:53,280
machines a screw inclined plane

16
00:00:57,350 --> 00:00:54,960
wedge lever

17
00:00:58,869 --> 00:00:57,360
wheel and axle and pulley

18
00:01:00,869 --> 00:00:58,879
when we combine two or more of these

19
00:01:02,470 --> 00:01:00,879
simple machines together they are called

20
00:01:04,070 --> 00:01:02,480
compound machines

21
00:01:06,149 --> 00:01:04,080
let's dive into the purpose of each of

22
00:01:08,870 --> 00:01:06,159
these devices and how we are using them

23
00:01:10,870 --> 00:01:08,880
up here on the station

24
00:01:13,190 --> 00:01:10,880
a screw is a simple machine that helps

25
00:01:14,950 --> 00:01:13,200
to fasten two objects together

26
00:01:17,109 --> 00:01:14,960
up here we use a variety of screws in

27
00:01:19,030 --> 00:01:17,119
order to keep our station intact

28
00:01:21,270 --> 00:01:19,040
especially as we deal with microgravity

29
00:01:23,270 --> 00:01:21,280
causing objects to drift around

30
00:01:27,110 --> 00:01:23,280
here's an example of a screw that we may

31
00:01:31,190 --> 00:01:29,270
[Music]

32
00:01:33,350 --> 00:01:31,200
inclined planes are a broad range of

33
00:01:35,670 --> 00:01:33,360
simple machines that use an angled plane

34
00:01:37,590 --> 00:01:35,680
to accomplish different tests

35
00:01:39,590 --> 00:01:37,600
down on earth you use inclined planes to

36
00:01:41,270 --> 00:01:39,600
move things easily but here in

37
00:01:43,429 --> 00:01:41,280
microgravity we don't need incline

38
00:01:45,590 --> 00:01:43,439

planes to help us move objects

39
00:01:47,510 --> 00:01:45,600
if you look closely at a screw you will

40
00:01:50,230 --> 00:01:47,520
see that it is made up of a rod with an

41
00:01:52,069 --> 00:01:50,240
inclined plane that spirals around it

42
00:01:57,030 --> 00:01:52,079
this incline plane helps the screw to

43
00:02:00,789 --> 00:01:58,950
another simple machine using inclined

44
00:02:03,429 --> 00:02:00,799
planes to accomplish something is a

45
00:02:05,910 --> 00:02:03,439
wedge the wedge consists of two inclined

46
00:02:07,030 --> 00:02:05,920
planes combined to split or separate

47
00:02:13,430 --> 00:02:07,040
objects

48
00:02:17,910 --> 00:02:15,589
a wheel and axle is exactly what it

49
00:02:19,990 --> 00:02:17,920
sounds like a wheel is attached to an

50
00:02:22,869 --> 00:02:20,000
axle helping it to rotate and move

51
00:02:24,710 --> 00:02:22,879
easily without friction we sometimes use

52
00:02:26,470 --> 00:02:24,720
wheels to help move items that we need

53
00:02:27,430 --> 00:02:26,480
to be able to travel without floating

54
00:02:29,670 --> 00:02:27,440
away

55
00:02:31,670 --> 00:02:29,680
an example of this would be the wheels

56
00:02:32,790 --> 00:02:31,680
on our crew equipment and translation

57
00:02:34,710 --> 00:02:32,800
aid cart

58
00:02:36,390 --> 00:02:34,720
it is attached to a track using wheel

59
00:02:37,910 --> 00:02:36,400
and axles for movement

60
00:02:39,589 --> 00:02:37,920
so we were able to use it on our space

61
00:02:44,869 --> 00:02:39,599
hawks without the possibility of it

62
00:02:49,830 --> 00:02:47,350
i mentioned compound machines before in

63
00:02:52,949 --> 00:02:49,840

our advanced resistive exercise device

64
00:02:55,589 --> 00:02:52,959
or a-red is a great example of that

65
00:02:57,670 --> 00:02:55,599
it combines the simple machines levers

66
00:03:00,630 --> 00:02:57,680
and pulleys to help us maintain muscle

67
00:03:02,390 --> 00:03:00,640
and bone density in micro-g

68
00:03:04,790 --> 00:03:02,400
levers use a surface situated on a

69
00:03:06,070 --> 00:03:04,800
fulcrum or pivoting point to move an

70
00:03:07,750 --> 00:03:06,080
object

71
00:03:09,830 --> 00:03:07,760
pulleys are simple machines that use a

72
00:03:11,830 --> 00:03:09,840
wheel and axle to change the direction

73
00:03:14,309 --> 00:03:11,840
of an object

74
00:03:22,390 --> 00:03:14,319
the pulleys inside a red allow us to set

75
00:03:25,750 --> 00:03:23,670
thank you for learning about simple

76
00:03:27,350 --> 00:03:25,760
machines with me today now i'm going to

77
00:03:29,509 --> 00:03:27,360
send you back to earth to design a

78
00:03:30,869 --> 00:03:29,519
compound machine you think we could use

79
00:03:38,380 --> 00:03:30,879
up here on the international space

80
00:03:38,390 --> 00:03:51,190
[Music]