STEMonstrations

AREA & VOLUME

1
00:00:03,410 --> 00:00:25,189
[Music]

2
00:00:31,189 --> 00:00:26,710
welcome to the international space

3
00:00:33,430 --> 00:00:31,199
station i'm astronaut aki hoshide

4
00:00:35,030 --> 00:00:33,440
i'm astronaut megan macarthur today

5
00:00:36,870 --> 00:00:35,040
we're going to discuss how engineers

6
00:00:41,110 --> 00:00:36,880
design space station modules so we can

7
00:00:48,630 --> 00:00:43,830
what is volume glad you asked let's go

8
00:00:53,189 --> 00:00:50,950
area is defined as the two-dimensional

9
00:00:56,069 --> 00:00:53,199
space occupied by a flat shape or

10
00:00:58,670 --> 00:00:56,079
surface of an object whereas volume is

11
00:01:01,270 --> 00:00:58,680
the amount of space occupied inside a

12
00:01:03,430 --> 00:01:01,280
three-dimensional object

13
00:01:05,109 --> 00:01:03,440

length times width will give you the

14
00:01:09,270 --> 00:01:05,119
area of a square

15
00:01:10,550 --> 00:01:09,280
that by its height to get the volume of

16
00:01:15,749 --> 00:01:10,560
a cube

17
00:01:17,109 --> 00:01:15,759
meters long by two meters wide by two

18
00:01:19,109 --> 00:01:17,119
meters high

19
00:01:21,350 --> 00:01:19,119
multiply those dimensions and you get

20
00:01:23,109 --> 00:01:21,360
eight cubic meters of volume

21
00:01:24,070 --> 00:01:23,119
but that's only one way to calculate

22
00:01:26,789 --> 00:01:24,080
volume

23
00:01:28,630 --> 00:01:26,799
cones cylinders and spheres all have

24
00:01:29,749 --> 00:01:28,640
different formulas to calculate their

25
00:01:32,149 --> 00:01:29,759
volumes

26
00:01:34,310 --> 00:01:32,159
to calculate the volume of a cylinder we

27
00:01:37,190 --> 00:01:34,320
take the area of the circle

28
00:01:39,270 --> 00:01:37,200
pi times the radius squared and multiply

29
00:01:41,030 --> 00:01:39,280
that by the length of the cylinder

30
00:01:44,069 --> 00:01:41,040
in the destiny module we have a

31
00:01:47,910 --> 00:01:44,079
pressurized volume of approximately 106

32
00:01:49,749 --> 00:01:47,920
cubic meters or 3 700 cubic feet

33
00:01:51,270 --> 00:01:49,759
that's a lot of space for us to live and

34
00:01:53,590 --> 00:01:51,280
work

35
00:01:56,310 --> 00:01:53,600
destiny is the primary research lab for

36
00:01:59,270 --> 00:01:56,320
us payloads supporting a wide range of

37
00:02:02,069 --> 00:01:59,280
experiments and studies contributing to

38
00:02:04,389 --> 00:02:02,079

health safety and quality of life for

39
00:02:06,789 --> 00:02:04,399
people all over the world engineers

40
00:02:08,949 --> 00:02:06,799
designed these cylindrical modules for

41
00:02:10,920 --> 00:02:08,959
astronauts to utilize the entire

42
00:02:12,150 --> 00:02:10,930
three-dimensional space

43
00:02:13,990 --> 00:02:12,160
[Music]

44
00:02:16,229 --> 00:02:14,000
so you've learned that destiny is a

45
00:02:17,910 --> 00:02:16,239
cylindrical shaped pressurized module

46
00:02:19,910 --> 00:02:17,920
but inside the space you can see that

47
00:02:22,070 --> 00:02:19,920
our interior space is a little bit more

48
00:02:25,190 --> 00:02:22,080
like a square so these racks are

49
00:02:27,750 --> 00:02:25,200
designed to fit against the walls of the

50
00:02:30,229 --> 00:02:27,760
circular cylindrical module and so the

51
00:02:32,470 --> 00:02:30,239
back of the rack is curved and the front

52
00:02:34,070 --> 00:02:32,480
of the rack is straight and so we can

53
00:02:35,830 --> 00:02:34,080
keep a variety of different kinds of

54
00:02:38,070 --> 00:02:35,840
experiments in different racks and we

55
00:02:41,430 --> 00:02:38,080
can also use the ceiling and the floor

56
00:02:42,949 --> 00:02:41,440
just as easily as if it were a wall so

57
00:02:48,869 --> 00:02:42,959
one of the places that we store some of

58
00:02:52,710 --> 00:02:50,550
you see we have these different kinds of

59
00:02:53,910 --> 00:02:52,720
bags that we store things in in these

60
00:02:55,990 --> 00:02:53,920
different

61
00:02:58,550 --> 00:02:56,000
kinds of cupboards

62
00:03:01,030 --> 00:02:58,560
we also can keep our medical kit up here

63
00:03:02,630 --> 00:03:01,040

out of the way so if anybody gets a cut

64
00:03:04,229 --> 00:03:02,640
or a scraper needs some medicine we have

65
00:03:05,670 --> 00:03:04,239
different packs in here that have all

66
00:03:08,869 --> 00:03:05,680
the different things that we might need

67
00:03:13,589 --> 00:03:11,430
i can also use space in the floor we

68
00:03:15,509 --> 00:03:13,599
actually have a window that's in our

69
00:03:31,910 --> 00:03:15,519
floor that looks straight down onto the

70
00:03:34,710 --> 00:03:33,350
i hope you learned a little bit about

71
00:03:36,470 --> 00:03:34,720
the importance of engineering and

72
00:03:38,630 --> 00:03:36,480
utilizing volume aboard the space

73
00:03:40,550 --> 00:03:38,640
station today use the corresponding

74
00:03:42,470 --> 00:03:40,560
classroom connection to learn more about

75
00:03:44,390 --> 00:03:42,480
area and volume and challenge yourself

76
00:03:47,670 --> 00:03:44,400
to redesign your own home and classroom

77
00:03:50,229 --> 00:03:47,680
for life and microgravity

78
00:03:53,190 --> 00:03:50,239
maybe one day you will be an engineer

79
00:03:56,140 --> 00:03:53,200
designing rooms for us up here in space

80
00:04:10,070 --> 00:03:56,150
see you next time

81
00:04:18,870 --> 00:04:12,650
subscribe for more space