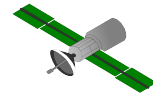# Satellites and CubeSats
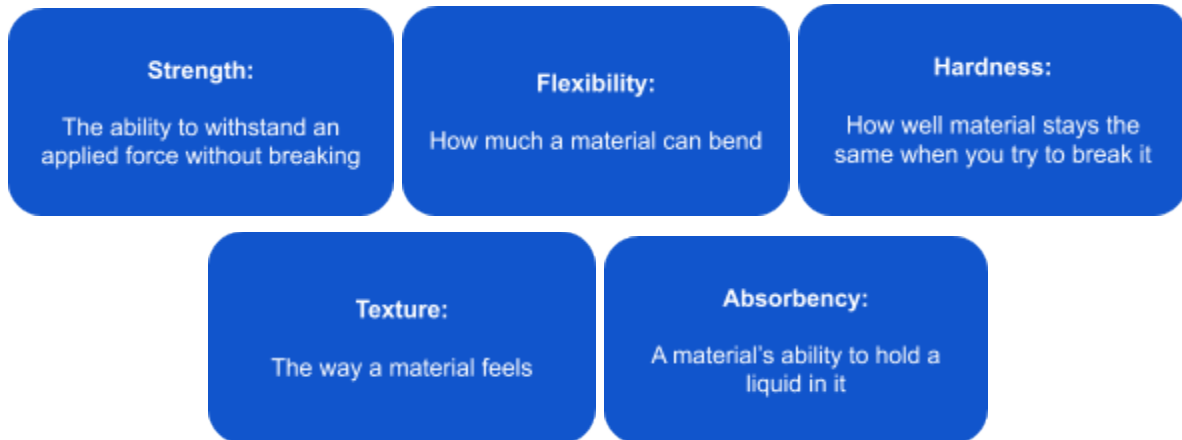# Teacher/Parent Guide

SCI.2.2.1, 2.2.2, 2.2.3

What is a satellite? A **satellite** is an object that orbits, revloves, or flies around a larger object. The moon is a satellite because it flies around the Earth! And Earth is a satellite because it flies around the sun! But we can make satellites, too!

So what is a CubeSat? A **CubeSat** is a very small satellite. A single-unit CubeSat is only **10x10x10 centimeters**. However, many of these "units" can be **put together** to make one larger CubeSat. Common United States standard configurations range from one unit (or "1U") to a **54U**!
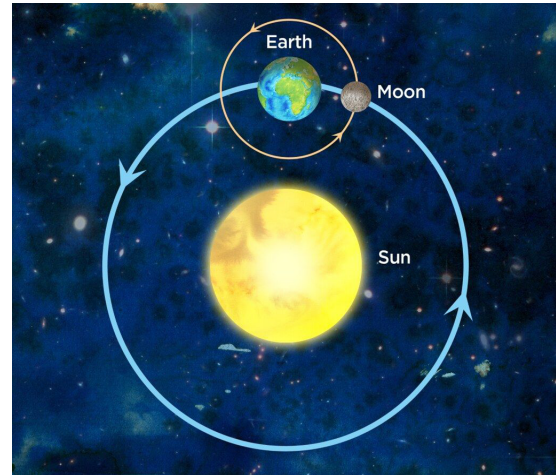
SCI.2.2.1-3:
CubeSat structures are typically made of materials that are strong but have low melting points so that they will burn up in the atmosphere upon reentry. Some of these materials include aluminum and steel. Go over some of these words which are used to describe different materials:

Strength:

The ability to withstand an applied force without breaking

Flexibility:

How much a material can bend

Hardness:

How well material stays the same when you try to break it

Texture:

The way a material feels

Absorbency:

A material's ability to hold a liquid in it

Now let's take a look at these words closer with some examples! Do a **mini-project** with the student(s) and have them bring you (or bring pictures of) 5 items, one for each of the five words above (strength, flexibility, hadness, texture, absorbency). Ask them why they brought each item for each of the designated words and go over what they mean and if they were right or not. Next, have your student(s) do **Worksheet Second Grade SCI.2.2.1 by UASPACE.** There is a key on pages 3 and 4.
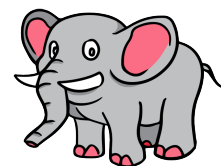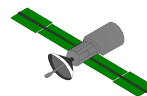
CubeSat Equations!

M.2.2.1, 2.1.2, 2.1.3, 2.1.4, 2.1.7, 2.1.8

NASA has a project for Big AI™ and he needs to know how many CubeSat satellites are in space today. Use your addition and subtraction skills to answer the problems below and help!

1. One year ago, Big AI™ counted **65** CubeSats in space. He reads online and finds out that NASA has put **13 more** CubeSats in space since he last counted. How many CubeSats are in space now? Show your work.

   Answer: _____

2. You remind Big AI™ that some CubeSats have fallen out of space since last year, too. You look up online and find out that **24** CubeSats have fallen out of space, or "de-orbited", since last year. Using what you know from number 1, how many CubeSats are in space now? Show your work.

   Answer: _____

NASA gave Big AI™ some equations from their files that they need help solving. Can you find out what each CubeSat (the colored cubes) need to be equal to solve the problem correctly?

3. $17 + 34 = $ 🟥   🟥 $ = $ _____

4. $4 + 63 = $ 🟧   🟧 $ = $ _____

5. $45 - $ 🟨 $ = 5$ 🟨 $ = $ _____

6. 🟩 $ + 18 = 97$ 🟩 $ = $ _____

7.

$100 - 3 =$ ◼   ◼ = _____

8.

$23 +$ ◼ $= 54$ ◼ = _____

9.

$100 - 63 +$ ◼ $= 48$ ◼ = _____

Now Big AI™ needs help to find the missing sign (+, - or =) in these NASA equations. Write in which sign belongs in the square to make the equation correct.
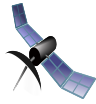
10.

$17 + 54$ ☐ 71
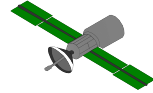
11.

100 ☐ $18 = 82$

12.

38 ☐ $14 = 24$

13.

38 ☐ $14 = 52$

14.

$8 + 80 - 32$ ☐ 56

15.

4 ☐ 20 ☐ $15 = 9$

NASA has a project for Big AI™ and he needs to know how many CubeSat satellites are in space today. Use your addition and subtraction skills to answer the problems below and help!

8. One year ago, Big AI™ counted **65** CubeSats in space. He reads online and finds out that NASA has put **13 more** CubeSats in space since he last counted. How many CubeSats are in space now? Show your work.

    65 + 13 = 78

    Answer: ___78 CubeSats___

9. You remind Big AI™ that some CubeSats have fallen out of space since last year, too. You look up online and find out that **24** CubeSats have fallen out of space, or "de-orbited", since last year. Using what you know from number 1, how many CubeSats are in space now? Show your work.

    65 + 13 = 78
    78 - 24 = 54

    Answer: __54 CubeSats___

NASA gave Big AI™ some equations from their files that they need help solving. Can you find out what each CubeSat (the colored cubes) need to be equal to solve the problem correctly?

10. 17 + 34 = 🟥   🟥 = __51_____

11. 4 + 63 = 🟧   🟧 = __63_____

12. 45 - 🟨 = 5   🟨 = __40_____

13. 🟩 + 18 = 97   🟩 = __79_____

14.

$100 - 3 = $ ⬛   ⬛ $= $ __97____

8.

$23 + $ ⬛ $= 54$ ⬛ $= $ __31____

9.

$100 - 63 + $ ⬛ $= 48$ ⬛ $= $ __11____

Now Big AI™ needs help to find the missing sign (+, - or =) in these NASA equations. Write in which sign belongs in the square to make the equation correct.

10.

$17 + 54 \boxed{=} 71$

11.

$100 \boxed{-} 18 = 82$

12.

$38 \boxed{-} 14 = 24$

13.

$38 \boxed{+} 14 = 52$

14.

$8 + 80 - 32 \boxed{=} 56$

15.

$4 \boxed{+} 20 \boxed{-} 15 = 9$

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