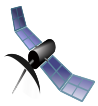
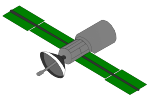
Name: _____
Teacher: _____
Date: _____



CubeSat Speed and Energy



SCI.4.1.1, 4.1.2

Big AI™ has noticed that the CubeSat he is building is going through some unusual phases. NASA has asked that he report back and let them know what sort of energy the CubeSat is experiencing before launch. Help Big AI™ identify the phases of his CubeSat. Choose the best type of energy from the word bank in the rectangle to describe each scenario. One is not used! See the picture of Big AI™'s CubeSat (to the right) before he left the lab yesterday for reference.

Thermal Energy	Chemical Energy	Elastic Energy	Nuclear Energy
Mechanical Energy	Gravitational Energy	Magnetic Energy	Electrical Energy

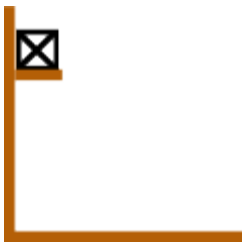
1. Big AI™ comes into the lab in the morning and notices that his CubeSat is stretched. What energy did the CubeSat experience when he was gone? Is that kinetic or potential energy?

_____

2. The next day, after fixing the CubeSat, Big AI™ comes into the lab and picks up his CubeSat only to find that it is extremely hot! What energy did the CubeSat experience when he was gone? Is that kinetic or potential energy?

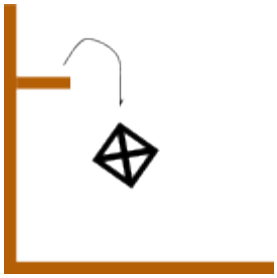
_____

3. To try and cool down the CubeSat, Big AI™ put the CubeSat up high next to the air conditioning unit. What energy did the CubeSat have when it was up high off of the ground? Is that kinetic or potential energy?



_____

4. Unfortunately, when Big Al™ came into the lab the next morning, he noticed that the CubeSat fell onto the floor and broke. When the CubeSat was falling in motion, what energy was it experiencing? Is this kinetic or potential energy?



5. Big Al™ knew that his CubeSat was metal and he didn't want to have to bend over to pick up the pieces, so he held a magnet over them that they all attached to. When the pieces were being pulled to the magnet, what energy were they experiencing? Is this kinetic of potential energy?

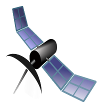
6. Next, Big Al™ attaches the piece to two pieces of wire with a battery operated switch on one side and a light bulb on the other. The metal should connect the wires and the light should turn on when the switch turns on. Thankfully, it works. What energy is the metal piece of the CubeSat experiencing when the light is on? Is this kinetic or potential energy?

7. After a lot of work, Big Al™ gets his CubeSat put back together and lets NASA know all of the phases you found that it went through. He sits down for dinner and eats a big, crunchy peanut butter sandwich. What kind of energy is stored in his sandwich that gives him energy for the day? Is that kinetic or potential energy?

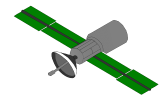
Name: ______________________

Teacher: ____________________

Date: _______________________



CubeSat Collisions



SCI.4.3.1, 4.3.2, 4.3.3

Supplies:

- 2 balls or spheres of roughly the same size and weight
- Chalk
- Ruler
- Flat, outdoor driveway or sidewalk
- A buddy

Steps:

1. On the sidewalk, measure out ten feet. Mark a spot on each side, one at zero feet where you started, and one at ten feet.

   0 - - -> - <- - - - - - - - 10

2. You take one ball and have your buddy take the other. One of you places the ball at zero feet marker, and one of you places the ball at the ten feet marker.
3. Roll the balls at each other, at the same time, very slowly. They should hit each other in the middle of the distance between each other. Record what happens to each of your balls.

   ____

   ____

   ____

   ____

4. Next, make a prediction of what will happen when you roll the ball quickly and your buddy stays at the same speed as the previous roll.

   ____

   ____

   ____

   ____

5. Test and see if you roll your ball quickly and your buddy rolls their ball slowly what happens. Record what happens below.

6. Now what do you think will happen if you switch and you go slowly but your buddy rolls quickly?

7. Test what happens and record your results below.

8. Now what happens if you both roll your balls quickly? What energy is being generated?

9. What do you think would happen if two CubeSats collided in space?

10. Draw what it would look like if this happened in the space below:

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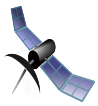
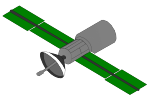


KEY: CubeSat Speed and Energy



SCI.4.1.1, 4.1.2

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Thermal Energy	Chemical Energy	Elastic Energy	Nuclear Energy
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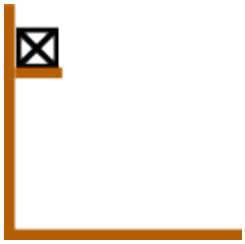
1. Big AI™ comes into the lab in the morning and notices that his CubeSat is stretched. What energy did the CubeSat experience when he was gone? Is that kinetic or potential energy?

___ elastic energy, potential energy _____

2. The next day, after fixing the CubeSat, Big AI™ comes into the lab and picks up his CubeSat only to find that it is extremely hot! What energy did the CubeSat experience when he was gone? Is that kinetic or potential energy?

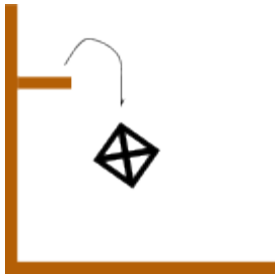
___ thermal energy, kinetic energy _____

3. To try and cool down the CubeSat, Big AI™ put the CubeSat up high next to the air conditioning unit. What energy did the CubeSat have when it was up high off of the ground? Is that kinetic or potential energy?



___ gravitational energy, potential energy__

4. Unfortunately, when Big AI™ came into the lab the next morning, he noticed that the CubeSat fell onto the floor and broke. When the CubeSat was falling in motion, what energy was it experiencing? Is this kinetic or potential energy?



_____ mechanical energy, kinetic energy ___

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_____ magnetic energy, potential energy ___

6. Next, Big AI™ attaches the piece to two pieces of wire with a battery operated switch on one side and a light bulb on the other. The metal should connect the wires and the light should turn on when the switch turns on. Thankfully, it works. What energy is the metal piece of the CubeSat experiencing when the light is on? Is this kinetic or potential energy?

_____ electrical energy, kinetic energy _____

7. After a lot of work, Big AI™ gets his CubeSat put back together and lets NASA know all of the phases you found that it went through. He sits down for dinner and eats a big, crunchy peanut butter sandwich. What kind of energy is stored in his sandwich that gives him energy for the day? Is that kinetic or potential energy?

_____ chemical energy, potential energy __