Elastic Band Car

Topic	Motors and Kinetic Energy
Subject	Science, Physics
Grade Level	7-9
Recommended Time	60 minutes
Curriculum Alignment	Science 7, Unit D, 1: Describe and interpret different types of structures encountered in everyday objects, buildings, plants and animals; and identify materials from which they are made Science 7, Unit D, 2: Investigate and analyze forces within structures, and forces applied to them Science 8, Science Unit D, 2: Analyze machines by describing the structures and functions of the overall system, the subsystems and the component parts Science 8, Science Unit D, 2: Investigate and describe the transmission of force and energy between parts of a mechanical system

Hook:	**Notes:**
Show Ex-Alta 1 3D Model Video	https://m.youtube.com/watch?v=Ew2N9OqL-F4

Introduction:	**Notes:**
What is AlbertaSat? ● AlbertaSat is a student group at the University of Alberta that builds CubeSats ● CubeSats are small (like a loaf of bread) satellites made up of standardized cubes. These cubes (known as units) are 10cm x 10cm 10cm ● Ex-Alta 1 (Experimental Albertan 1) is a 3U (3 unit/3 cube) CubeSat. It was the first satellite built by AlbertaSat. ● Ex-Alta 1 was built as part of an international project, QB50. This	Ex-Alta 1 Deployment: https://www.youtube.com/watch?v=l2sMkNNGVCM

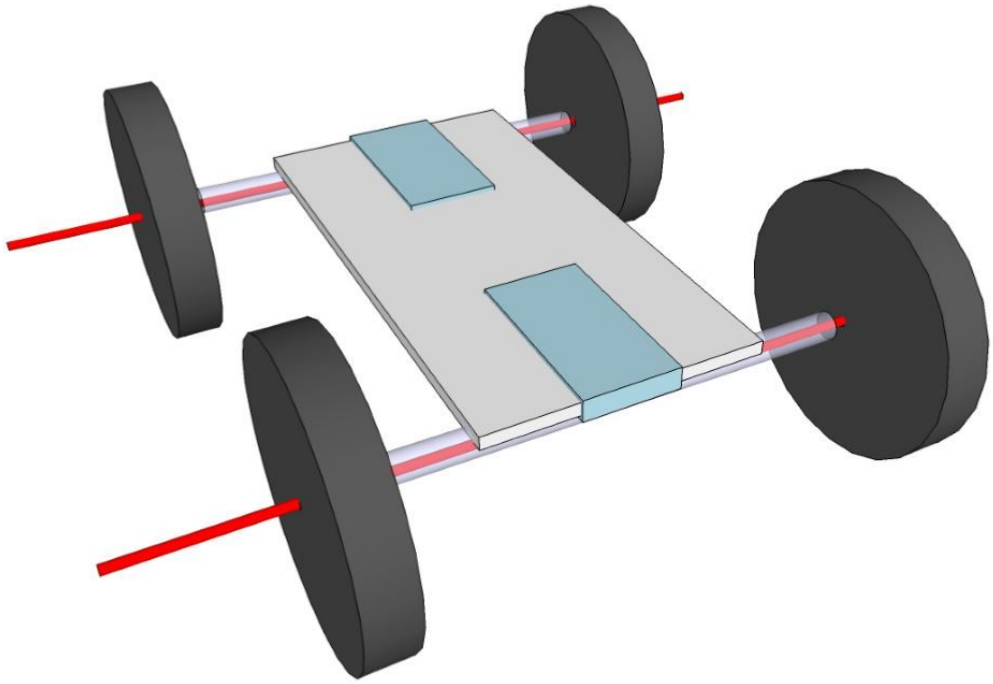
project was lead by the European Space Agency (ESA) to study space weather. ● Ex-Alta 1 was launched to the International Space Station (ISS) in April of 2017 and into orbit in May of 2017. ● Show Map of QB50 Satellites ● Ex-Alta 1 includes the following payloads: MNLP (Langmuir Probes), Dosimeter (studies radiation), Athena On-board Computer, Magnetometer	

Background Information:	**Notes:**
● Review of potential and kinetic energy ○ Potential energy is the energy contained by an object before an action ○ Kinetic is the energy of motion ● Have students brainstorm the components of a car (axle, body, power source, wheels) ○ What could the students use as materials to replace these components to make their own ● Elastic band stores elastic potential energy (energy stored when material is deformed) ○ Once rubber band is released it converts to kinetic energy ● Gas powered cars use chemical energy and electrically charged cars use electrical energy ○ The rubber band in this model will be your source of energy	● Example of potential energy ○ Before you throw a baseball, the muscles in your arm contain potential energy ● Example of kinetic energy ○ The energy once you release the baseball and the ball keeps going ● What part is the rubber band on a real car? ● How does a car move? ● Stored potential energy can be demonstrated by shooting an elastic band

Explanation of Activity	**Notes:**
Making the body 1. Cut a rectangle out of cardboard. Students can decide the length/width, but it should be longer than it is wide. 2. Tape or glue two straws to the bottom of the cardboard, one at either end.	1. It is important that the axel can rotate. 2. If the rubber band doesn't unwind at all, wind it more tightly. 3. If the rubber band unwound but the wheels didn't spin the rubber band may not be properly attached to the skewer.

These will hold the 'axles'. 3. Cut a small rectangular notch in the cardboard at the front end of the 'car', be sure to also cut the straw at the front. 4. Insert a wooden skewer or similar material through each straw. These will be your car's axles. You should be able to see part of one wooden skewer because of the notch. 5. Attach the wheels. 6. Have students check in once they have completed the body of the car. Ensure it can move smoothly. **Powering the Car** 7. Attach one part of a rubber band to the visible part of the front axle. Tape the rubber band to the skewer to prevent it from sliding—when the skewer rotates, the rubber band should rotate with it. 8. Tape the other end of the rubber band to the body of the car. 9. Turn the front wheels to tighten the rubber band, creating potential energy. 10. Put the car down and release the wheels.	Try adding more tape or using glue to secure the band. 4. Extension Activity/Potential Assessment: a. Have students create a short report on their car. Have students consider the size of the car, material used, and how far it travelled. Was it a success? Why or why not? 5. Extension Activity: a. Have students consider the"fuel economy" of their car. Students could test different materials to determine what is the most effective.

Question Period
● Answer any potential questions students might have

Example of Elastic Band Car


Materials Required (per car)
• 4 compact discs (CDs), foam wheels, wooden wheels, or similar • rubber bands • scissors • cardboard or a similar material • tape • 2 thin wooden skewers or similar materials • 2 straws or beads