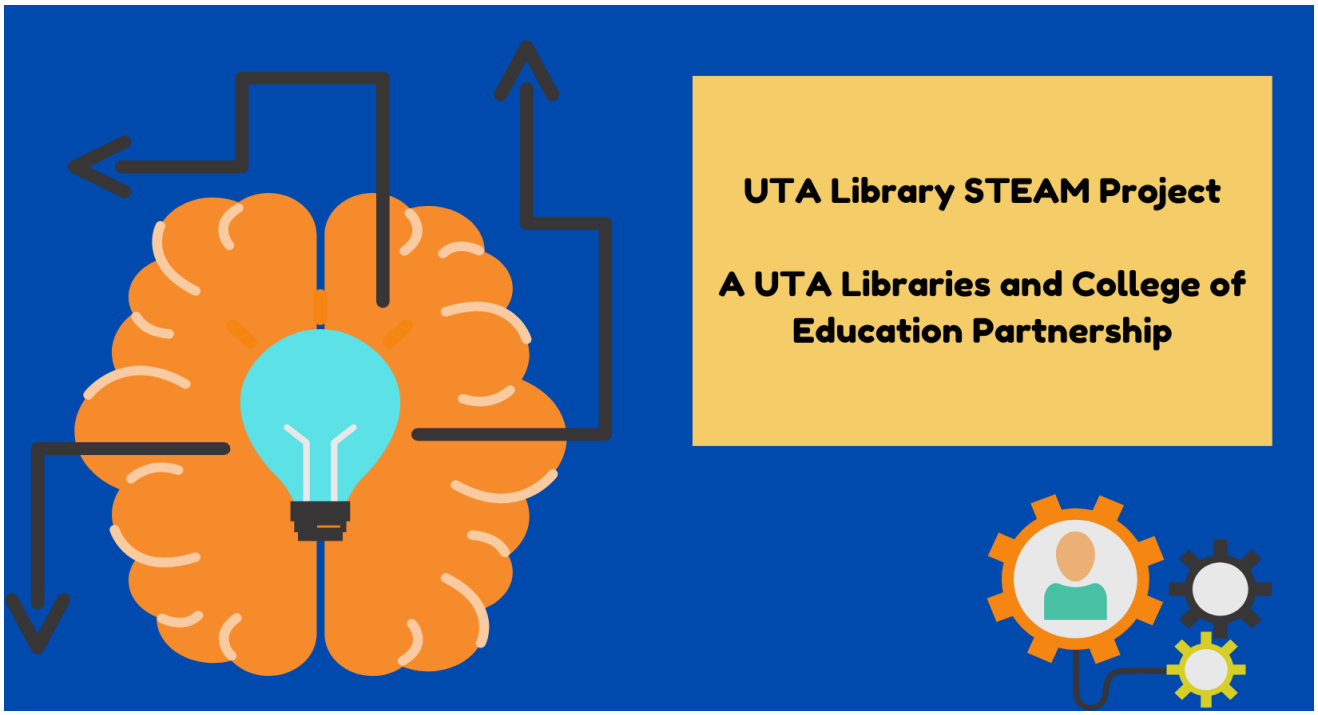


Lesson Plan Authors: Vanessa Carachure-Aguirre, Daisy Jara, Jennifer Lopez-Sanchez, and Ronnie Wills **Lesson Date:** April 7, 2023 **Number of Minutes:** 90	
Enduring Understanding	Students will gain an understanding of an object's position, direction, and speed when acted by unbalanced forces, as well as create a visual representation of the data collected.
Content Standards (TEKS)	6.2 Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations. The student is expected to: (C) collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers (D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns; and (E) analyze data to formulate reasonable explain 6.8 Force, motion, and energy. The student knows force and motion are related to potential and kinetic energy. The student is expected to: (A) Compare and contrast potential and kinetic energy (B) identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces; calculate average speed using distance and time measurements

English Language Proficiency Standards (ELPS)	Texas ELPS C3G: Express opinions, ideas and feelings.

Prior Learning/Prior Thinking	5.6 Force, motion, and energy. The student knows that energy occurs in many forms and can be observed in cycles, patterns, and systems. The student is expected to: (D) design a simple experimental investigation that tests the effect of force on an object **Prior Knowledge/Thinking:** -The lesson builds on force, motion, and energy by introducing natural energy while the students calculate the velocity of the Lego Balloon car. **Connections to Real Life:** -One connection to real life will be the speed everyone travels at in a moving vehicle. **Misconceptions:** -One misconception that students may have is that speed and velocity are two different things which are found with two different equations.

Learning Objectives and Aligned Assessments

Objectives	Pre-Lesson Assessment	During-Lesson Assessment	Post-Lesson Assessment
Students will be able to identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces in order to create a visual representation.	We will ask students to share their experience with races, prior building experiences, and forces to acknowledge and activate prior knowledge.	Students will collect and input data on a chart accurately and answer questions throughout the lesson. We will provide feedback when observing their worksheet and after listening to their responses.	Students will share and explain their graphs and observations by describing the changes in position, direction, and speed of an object when acted upon by unbalanced forces.

Assessment and Instruction Accommodations for Students with IEP/504 plans
• Pictures will be provided with instruction • Sentence stems will be provided on worksheet • An example will be provided on data chart • Graph will be labeled

Academic Language	
Language Function	**Vocabulary**
Students will express opinions, ideas and feelings about their Lego cars using the required vocabulary.	• Potential energy • Kinetic energy • Velocity • Distance • Time

Instructional Procedures
Materials
1. Legos 2. Balloons 3. Straws 4. Tape 5. Butcher paper 6. Writing utensil or markers 7. Stopwatch 8. Measuring tool 9. Calculators 10. Worksheet

Lesson Component	Activities/ Teacher Actions	Student Engagement	Instructional Support (Individuals/ Groups)

Engage 10 minutes We will show students a model car to show them what they are going to be building, followed by a discussion of their prior experiences and sharing of ideas of their designs.	To activate prior knowledge, we will ask students about their experiences with races, prior building experiences, and force.	How to Engage: Explain that we are going to be using Legos. Opportunities to engage with each other: They can get into the competitive spirit and compete with each other to see which Lego balloon car goes the furthest.	We will ask questions such as, have you ever built something at home, at a camp, or at school? We will pass the model around so students can observe and touch.

Explore Constraints 1. Build a car in 5 minutes. 2. Build a car using 6 wheels.	The students will build a Lego car which will be propelled forward using the air from a balloon. As the students are building their cars, ask the students what about their car will make them succeed in the races. To transition from one segment to the next, after the students are done building their Lego car and doing the trials, we will explain the ideas using a PowerPoint.	The students will be encouraged to experiment and try out different design ideas, giving them the freedom to explore their creativity. Students will also be challenged with different constraints. They will then compete for prizes.	Students will be assisted by providing instruction by group members along with demos and Q&A before every activity.

Closure: Explain Elaborate Evaluate	To evaluate, the teacher will provide a handout to students to reflect on the day's lab. To explain, the teacher will go over a PowerPoint. To elaborate, the teacher will ask how the lab relates to the real world.	Students will be engaged in the last activity by completing the handout with their assigned group. Students will discuss related questions that apply to the real world.	Students will be supported during the closing sharing what they have learned from the class activities. They will have an opportunity to ask questions about things they are still unclear about?

Additional Lesson Plan Components	
Equipment Needs	A teacher should construct a model Lego car to show the students the idea of what they are building.
Safety Precautions	Review potential safety issues, including: -blowing up the balloon too much. -keeping Legos away from their mouths.

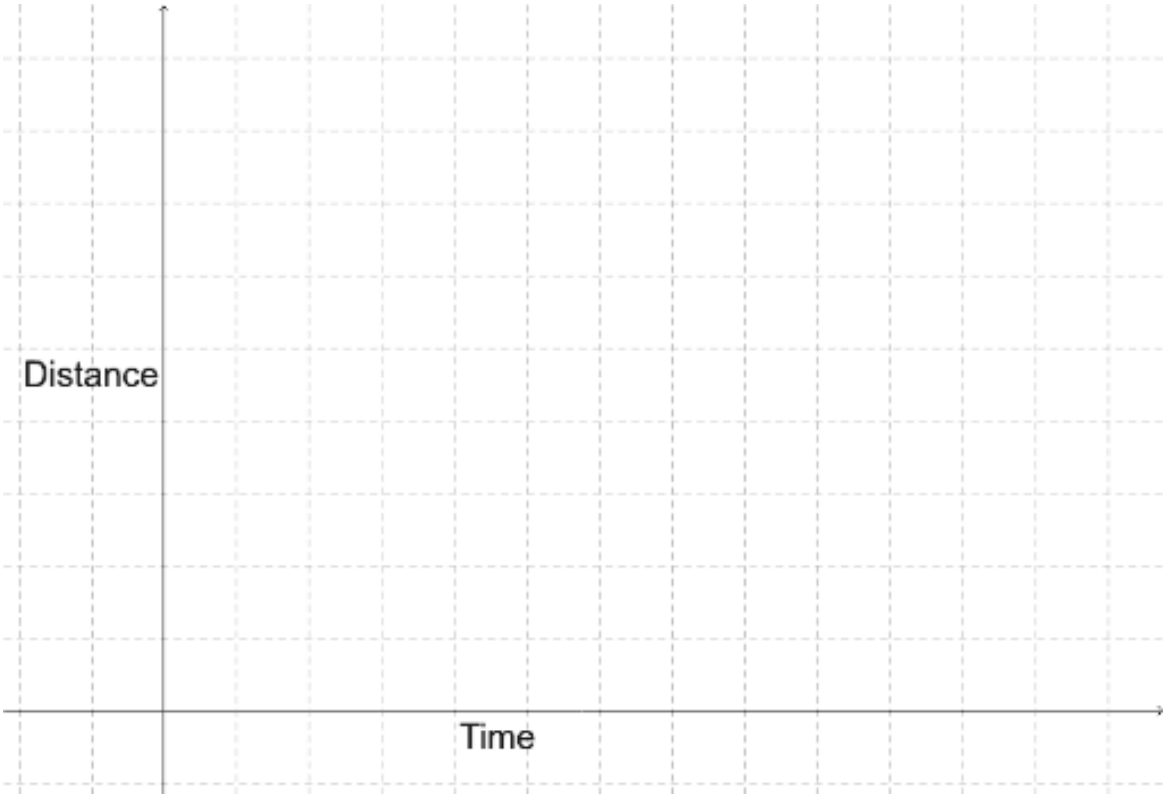
Handout

1. Share experiences you have had with building, races, and forces.

2. Record your data

Trial	Distance	Time	Speed
1			
2			
3			
4			
5			

3. Graph your data



4. Calculate the average velocity.