

$$E=mc^2$$



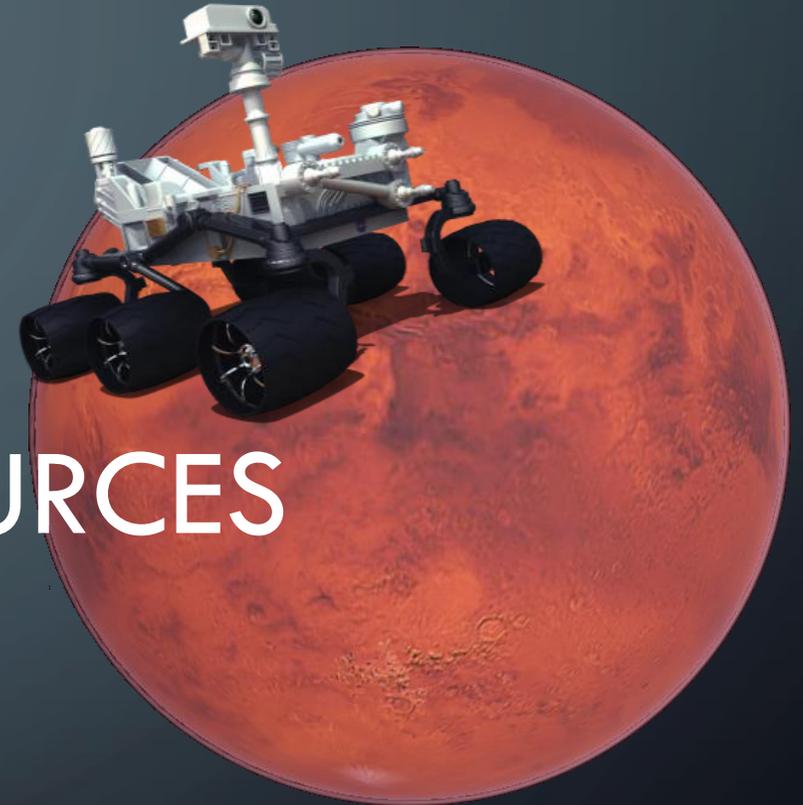
MISSION TO MARS AND NASA EDUCATOR RESOURCES

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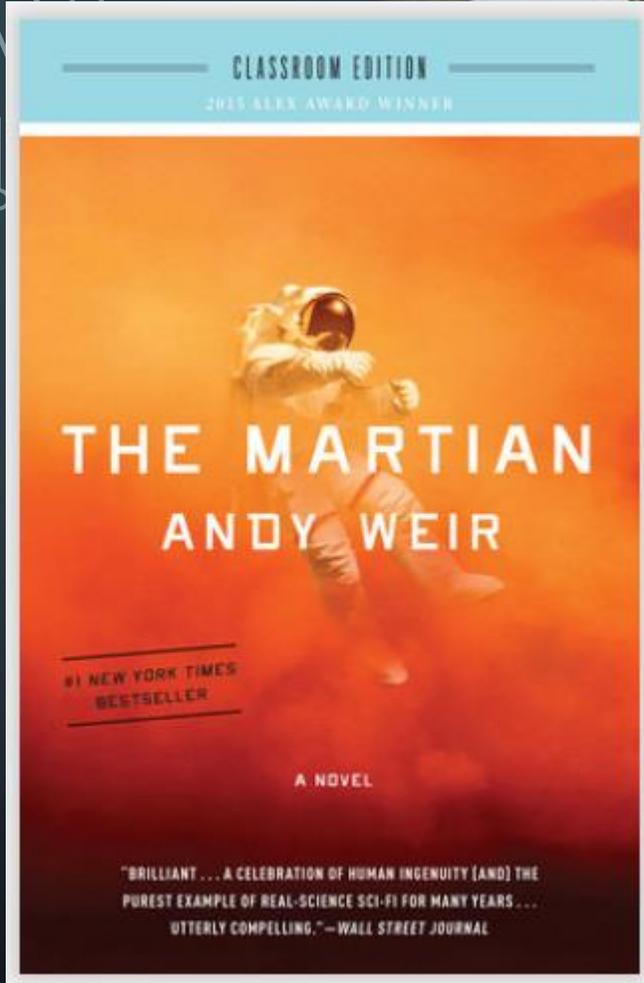
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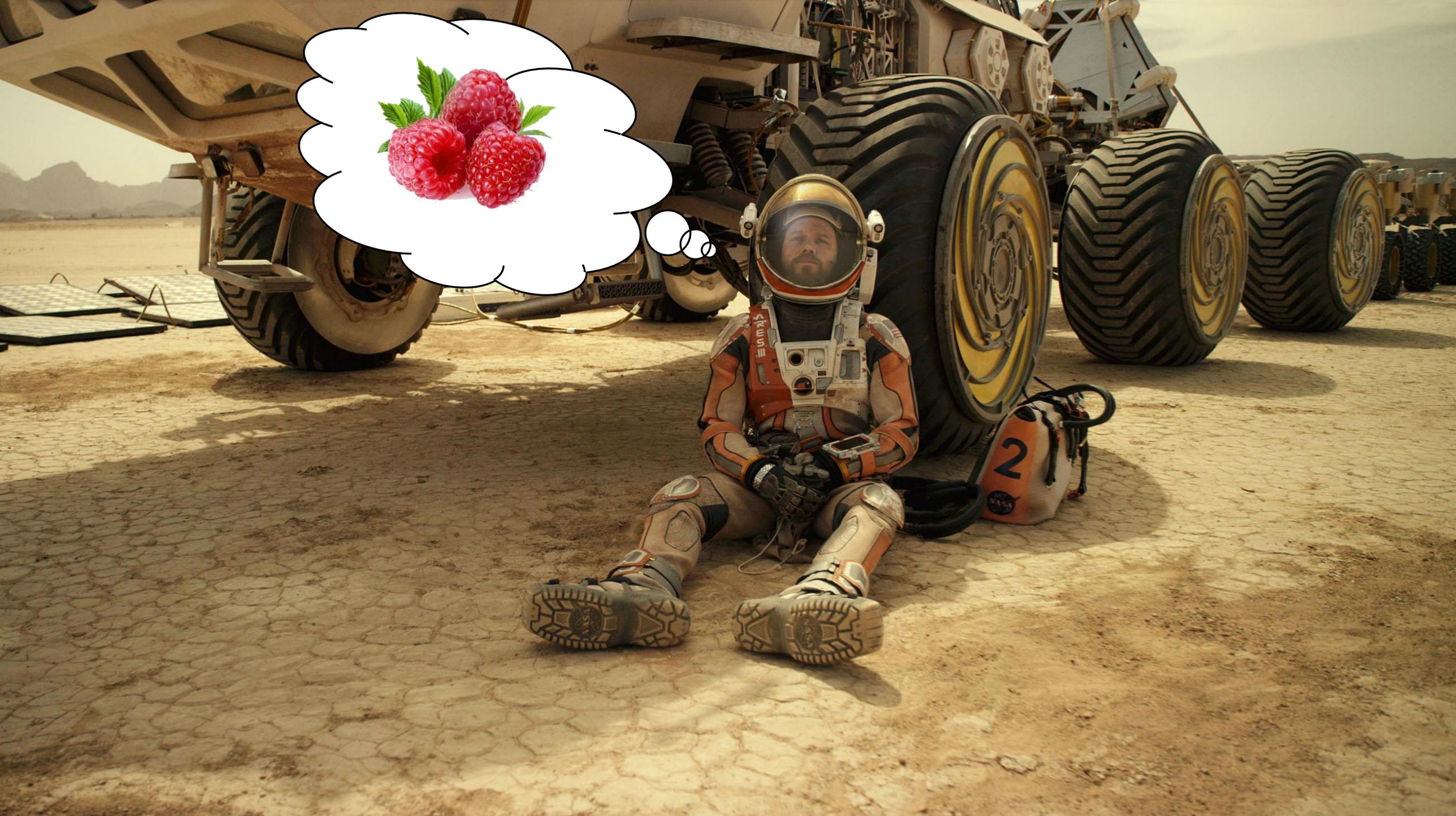




ROCKETS TO THE RESCUE!

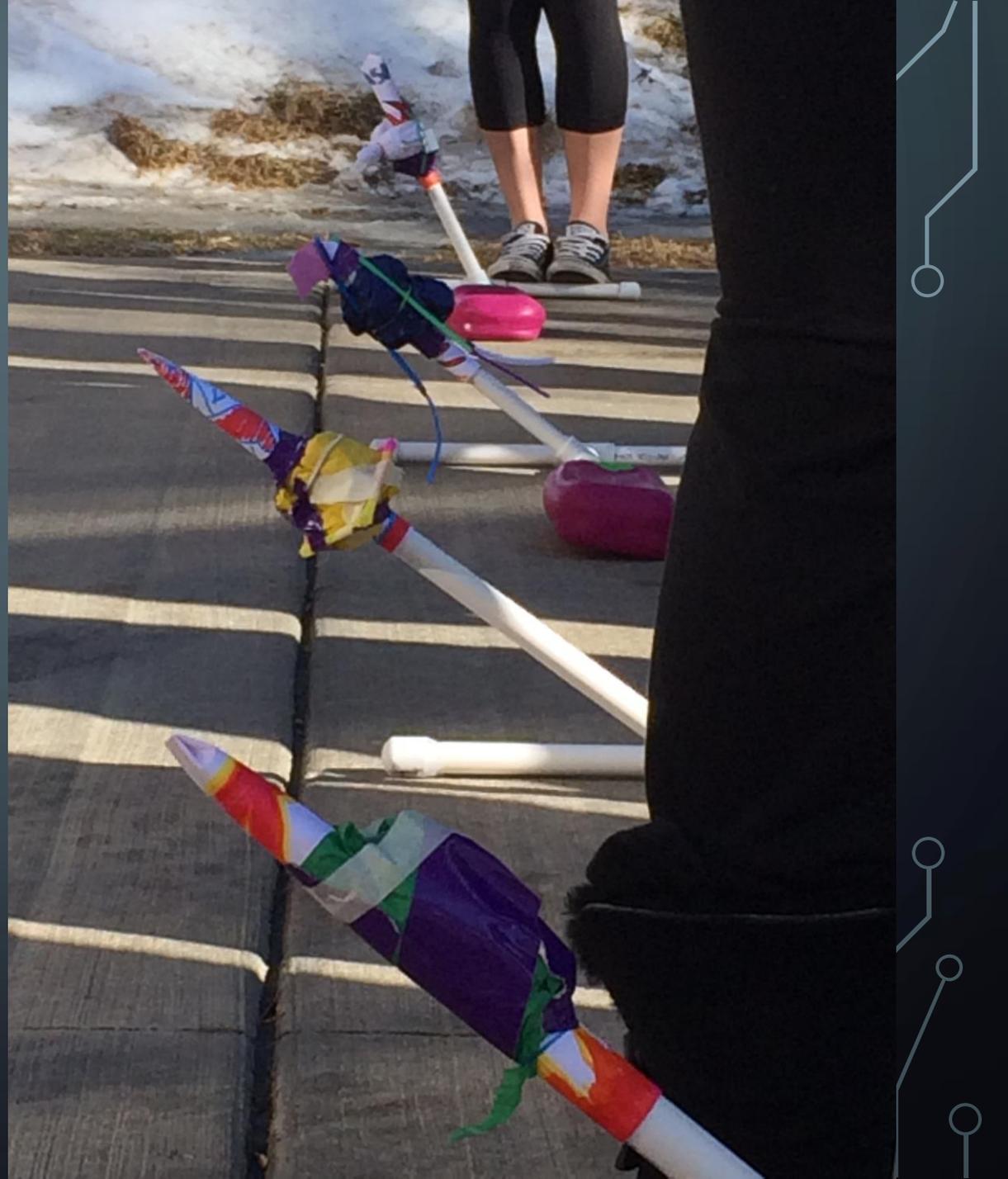






Students will work on:

- Communication
- Teamwork
- Creativity
- Engineering Design Process with raspberries (*and redesign!*)





Adaptations

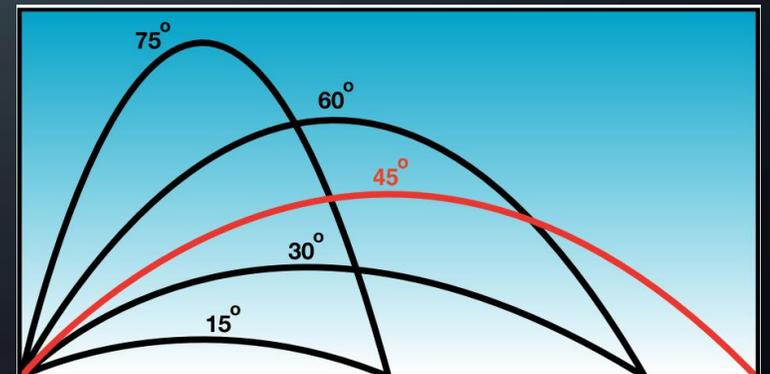
Protractors

Angles

Variables

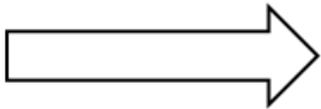
Repetition/Redesign

*Extra ideas provided in the
online link!*

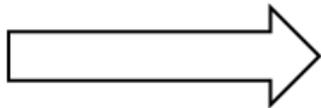


Printable Rocket Template

Start ROLLING from this side
THIS SIDE DOWN



Color or decorate
over there



Rockets to the Rescue!

Elementary/Middle School

Hey rocket scientists! We need to write down our results whenever we perform science experiments!

Use your protractor:	Did it reach Mars? Circle one	How far did it go? (Use the tape on the floor)
Let's launch it at 20 degrees.	Yes or No	_____ feet
Let's launch it at 30 degrees.	Yes or No	_____ feet
Let's launch it at 45 degrees.	Yes or No	_____ feet
Let's launch it at 60 degrees.	Yes or No	_____ feet
Let's launch it at 70 degrees.	Yes or No	_____ feet
Let's launch it at 90 degrees.	Yes or No	_____ feet

Try to launch your rocket with the same force!

What angle launched your rocket the farthest? _____

What angle launched your rocket straight upwards? _____

Did you reach Mars and save Mark Watney? _____

If you reached Mars, which launch angle worked the best? _____

Rockets to the Rescue!

Middle School

Hey rocket scientists! We need to write down our results whenever we perform science experiments!

Use your protractor:	Did it reach Mars? Circle one	How far did it go? (Use the tape on the floor)
Let's launch it at 20 degrees.	Yes or No	_____ feet
Let's launch it at 30 degrees.	Yes or No	_____ feet
Let's launch it at 45 degrees.	Yes or No	_____ feet
Let's launch it at 60 degrees.	Yes or No	_____ feet
Let's launch it at 70 degrees.	Yes or No	_____ feet
Let's launch it at 90 degrees.	Yes or No	_____ feet

What is your rocket's velocity?

(You will need a ruler and a stopwatch for this section).

- How did you find the average velocity of your rocket?
- Measure the length of your rocket _____ mm
- Measure the mass of your rocket _____ mg
- How many fins does your rocket have? _____
 - Where did you place them? Why?
 - How does the placement of the fins affect the stability of the flight?
- Fill out the table, below. Launch your rocket four times and record your data.

		Trial 1	Trial 2	Trial 3	Trial 4	Averages
20 degrees	Time (seconds)					
	Distance (meters)					
45 degrees	Time (seconds)					
	Distance (meters)					
80 degrees	Time (seconds)					
	Distance (meters)					

- What is the average velocity of your rocket? Please show your math.
 - 20 degrees:
 - 45 degrees:
 - 80 degrees:

- Your rocket has been selected to carry three astronauts in the capsule of your rocket. How would the trajectory change?
- With the astronauts onboard, would the rocket's velocity change? Why or why not?

Relating Velocity, Distance, Altitude, and Time

- Which launch angle had the:
 - Longest time of flight? _____
 - Shortest time of flight? _____
- What launch angle propelled your rocket the:
 - Farthest distance?
 - Shortest distance?
- Did your rocket's design contribute to a successful or unsuccessful mission?
- How would you improve your rocket's design?
- Draw a sketch of your rocket, including the placement of the fins.

Example K-12 Worksheets