

## **NM MESA Buddies Curriculum List 2021-2022**

### **Virtual/Hybrid Curriculum**

#### **ACTIVITY 1: BUILDING BRIDGES**

Build a bridge and test its structural limits. See where the bridge fails and design ways to improve the bridge, test the design, and make the best possible bridge.

#### **ACTIVITY 2: CREATING CATAPULTS**

Use the design process to create a catapult. How far does your catapult throw? Can you make it throw further? Try different designs to meet the challenge objectives.

#### **ACTIVITY 3: STRUCTURE BUILDING CHALLENGES**

In a series of timed challenges, students use set materials to try to build the tallest or the largest structure. Add to the challenge by giving the students a budget and cost sheets.

#### **ACTIVITY 4: STRUCTURE STRENGTH CHALLENGES**

In a series of timed challenges, students use set materials to try to build a structure that will hold up to tests that simulate earthquakes or tornadoes. Add to the challenge by giving the students a budget and cost sheets.

#### **ACTIVITY 5: THE POWER OF PAPER**

Explore architectural elements using paper and test the strength of your paper structures.

#### **ACTIVITY 6: STAR STORIES**

Civilizations the world over use stars for navigation, telling-time, and mythologies. Using star maps create your own star stories and constellations and become an astro-mythologist.

#### **ACTIVITY 7: JUMP ROPE MATH**

Does the length of the jump rope that someone uses depend on their height? Students will collect data on different jump rope lengths and people of different heights. Create and use graphs to look for patterns in the data and make predictions.

#### **ACTIVITY 8: PAPER AIRPLANE CHALLENGES**

Try to make a paper plane fly 10 feet, do a loop, or even carry cargo.

#### **ACTIVITY 9: EXPLORING PAPER GLIDERS**

How can paper fly? Explore the basic principles of flight and create the ultimate glider. Add to the glider designs to improve it's flight distance, perform acrobatics, and accuracy.

#### **ACTIVITY 10: MAKING MOBILES**

Investigate balance and how adding weights affects the center of gravity. Use this knowledge to design and build a mobile.

### **In Person/Live Curriculum**

#### **ACTIVITY 1: Sound Off!**

Students explore the relationship between pitch and length as they engineer pitch pipes, kazoos, and sound tubes.

#### **ACTIVITY 2: Perfecting Parachutes**

Students apply aerodynamic principles to plan, design and refine a parachute design.

#### **ACTIVITY 3: Magnetic Marble Mazes**

After playing with mazes and magnets, students integrate them into a magnetic marble maze using a magnet to move through the puzzle.

#### ACTIVITY 4: Set Sail

Students plan, design and create a “car” body that can be propelled forward with wind. Students test various sails to capture the wind, comparing sail designs and wind sources to make their cars go far and fast.

#### ACTIVITY 5: Crash Test

Students experiment with inertia and momentum as they use different safety devices to protect a plastic egg from breaking.

#### ACTIVITY 6: Blast Off

Students discover the relationship between angle and distance as they design and launch a rocket.

#### ACTIVITY 7: Map Making

Applying proportion, scale and observation, students map out their space from a new perspective.

#### ACTIVITY 8: Amazing Marble Runs

Students use the engineering design process to create a free-standing marble run.

#### ACTIVITY 9: Engineering a Crane

Students leverage their knowledge to engineer a working crane to lift through several different challenging loads. Students will explore pulleys and how they can make work easier.

#### ACTIVITY 10: Robot Hand

Using everyday materials, students construct a hand that mimics the motion of a human hand.

### **Bonus Activities**

#### BONUS ACTIVITY 1: Seed Bombs

Students investigate the contents of a seed and create new ways of dispersing them.

#### BONUS ACTIVITY 2: Designing Ears

Students use the Engineering Design Process to create ears which solve a unique problem

#### BONUS ACTIVITY 3: Floating Folds, Foiled!

Students experiment with buoyancy and weight as they engineer boats out of aluminum foil.

#### BONUS ACTIVITY 4: Paper Helicopters

Students apply engineering principles to test different helicopter types and discover which type is the ideal helicopter. Activity includes predicting and measuring the distance and rate of fall.

#### BONUS ACTIVITY 5: Math Games

Students play a variety of puzzles and games that incorporate different mathematical concepts. Some games are individual, some are against an opponent, but all will have you learning math without even knowing it.