⭐ 3rd Grade G/T Science Choice Board: Force, Motion & Launchers

Aligned NGSS Standards:

- **3-PS2-1:** Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- **3-PS2-2:** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Choice Board Activities:

Analyze & Explain	Create & Innovate	Investigate & Engineer
Draw a comic or timeline that shows how a launcher uses force to move an object.	Design a mini launcher using craft sticks, straws, or rubber bands. Label the forces involved.	Investigate how changing the angle or mass affects your launcher's distance. Record results in a chart.

⭐ 4th Grade G/T Science Choice Board: Energy & Forces in Launchers

Aligned NGSS Standards:

- **4-PS3-1:** Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- **4-PS3-3:** Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- **4-PS3-4:** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Choice Board Activities:

Observe & Describe	Create & Demonstrate	Explain & Reflect
Describe how energy transfers from the launcher to the projectile. Use labeled diagrams.	Build a simple launcher and explain how it changes stored energy to motion.	Reflect on how energy changed form (potential to kinetic). How can you improve your launcher?

⭐ 5th Grade G/T Science Choice Board: Force, Motion & Energy Transfer

Aligned NGSS Standards:

- **5-PS2-1:** Support an argument that the gravitational force exerted by Earth on objects is directed down.
- **3-5-ETS1-1 to 3:** Define a simple design problem, generate and compare solutions, and plan to carry out fair tests.

Choice Board Activities:

Analyze & Model	Engineer & Explore	Compare & Predict
Use arrows and diagrams to model how mass and force affect motion in a launcher.	Engineer a new launcher system. Test how changing the mass affects the launch distance.	Compare gravitational effects on different projectiles. Predict future motion based on past data.

⭐ 6th Grade G/T Science Choice Board: Newton's Laws & Systems

Aligned NGSS Standards:

- **MS-PS2-2:** Plan an investigation to provide evidence that the change in motion depends on the sum of the forces and the mass of the object.
- **MS-PS3-5:** Present arguments to support that changes in kinetic energy involve energy transfer.

Choice Board Activities:

Apply & Explain	Engineer & Test	Analyze & Predict
Apply Newton's 2nd Law to explain why different projectiles behave differently in launchers.	Design a launcher that uses potential and kinetic energy. Test force and mass variables.	Predict how force and mass will impact motion in new designs. Use evidence from your experiments.

⭐ 7th Grade G/T Science Choice Board: Systems, Acceleration & Force

Aligned NGSS Standards:

- **MS-PS2-1:** Apply Newton's Third Law to design a solution to a problem involving forces during interaction.
- **MS-PS2-2:** Investigate how changes in mass and force affect motion.

Choice Board Activities:

Compare & Argue	Engineer & Modify	Investigate & Communicate
Argue how Newton's Laws apply to real-world launch systems (e.g., air cannons, spring launchers).	Modify a previous launcher design to improve efficiency. Describe the forces involved.	Collect motion data using your launcher and communicate how mass, force, and acceleration are related.

⭐ 8th Grade G/T Science Choice Board: Advanced Forces, Motion & Energy Systems

Aligned NGSS Standards:

- **MS-PS2-2:** Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces and the mass of the object.
- **MS-PS3-5:** Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
- **Science and Engineering Practices:** Planning and carrying out investigations; constructing explanations and designing solutions; engaging in argument from evidence.
- **Crosscutting Concepts:** Cause and effect; systems and system models; energy and matter.

🔍 Analyze & Apply

Option A	Option B	Option C
Compare two different launcher systems (e.g., trebuchet vs. pneumatic) and analyze which variables (force, mass) have greater impact on acceleration.	Calculate and graph acceleration for various launch angles and masses in projectile motion. Explain patterns observed.	Use energy equations to explain why kinetic energy is not solely dependent on speed. Support with labeled diagrams.

✏️ Create & Innovate

Option A	Option B	Option C
Design a two-stage launcher (e.g., spring + compressed air) showing energy transformations and forces in each stage.	Create a scientific comic or animation explaining Newton's Second Law using real-life launch scenarios (e.g., sports, rockets).	Develop a "myth-busting" poster that corrects common misconceptions about force or energy (e.g., "heavier objects fall faster"), including visuals and examples.