Lunar Lander Design Project Name _____

Criterion B MYP Assessment

Physics 1A Hr_____

NASA is looking for safe landing sites on the moon. Once they find one, they need to design and build a spacecraft that can land there without injuring astronauts or damaging the spacecraft. Today you'll make a lander—a spacecraft that can land safely when you drop it on the floor. As you test, you'll find ways to make it work better. Improving a design based on testing is part of the engineering design process.

Day 1: design, test, evaluate, redesign, repeat.
Day 2: Lunar Lander Launch. Each team will drop their lander from 1 ft. Those that survive (land upright with astronauts remaining inside the lander) move on to the next round where the drop height increases an additional foot.

Materials

2 regular marshmallows (astronauts)	10 mini marshmallows
Plastic cup	8 straws
3 index cards	1 m of masking tape
3 rubber bands	scissors

Poster

You will be required to produce a poster that has the following elements:

- Identifies a problem or question to be tested by a scientific investigation
- Formulate a testable hypothesis and explain it using scientific reasoning
- Explain how to manipulate variables, and explain how data will be collected
- Design scientific investigations
- Diagram of your device that highlights key elements in your design
- Effectiveness of your design supported by data (strengths & weaknesses), future modification
- ON THE BACK-document your Test, Evaluate, Redesign process. This can be sketches of designs, and then comments on effectiveness.

This paper MUST be turned in with your project. Rubric is on the back!

Criterion B: Inquiring and Designing

_____ i. explain a problem or question to be tested by a scientific investigation

_____ ii. formulate a testable hypothesis and explain it using scientific reasoning

_____ iii. explain how to manipulate the variables, and explain how data will be collected

_____ iv. design scientific investigations

Criterion B: Inquiring and designing

Level 1-2

i. **state** a problem or question to be tested by a scientific investigation
ii. **outline** a testable **hypothesis**
iii. **outline** the **variables**
iv. **design** a method, **with limited success.**

Level 3-4
i. **outline** a problem or question to be tested by a scientific investigation
ii. **formulate** a testable hypothesis using scientific reasoning
iii. **outline** *how to manipulate* the variables, and **outline** *how relevant data will be collected*
iv. design a *safe* method *in which he or she selects materials and equipment.*

Level 5-6
i. **describe** a problem or question to be tested by a scientific investigation
ii. formulate *and* **explain** a testable hypothesis using scientific reasoning
iii. **describe** how to manipulate the variables, and **describe** how *sufficient*, relevant data will be collected
iv. design a *complete* and safe method in which he or she selects *appropriate* materials and equipment.

Level 7-8
i. **explain** a problem or question to be tested by a scientific investigation
ii. formulate and explain a testable hypothesis using *correct* scientific reasoning
iii. **explain** how to manipulate the variables, and **explain** how sufficient, relevant data will be collected
iv. design a *logical*, complete and safe method in which he or she selects appropriate materials and equipment.

Command Terms

Level 1-2
i. **State** Give a specific name, value or other brief answer without explanation or calculation.
ii and iii. **Outline** Give a brief account or summary.
ii. **Hypothesis** A tentative explanation for an observation or phenomenon that requires experimental confirmation; can take the form of a question or a statement
iii. Independent **variable** The variable that is selected and manipulated by the investigator in an experiment, Dependent **variable** The variable in which values are measured in the experiment
iv. **Design** Produce a plan, simulation or model.

Level 3-4
i and iii. **Outline** Give a brief account or summary.
ii. **Formulate** Express precisely and systematically the relevant concept(s) or argument(s).

Level 5-6
i. **Describe** Give a detailed account or picture of a situation, event, pattern or process.
ii. **Explain** Give a detailed account including reasons or causes.
iii. **Describe** Give a detailed account or picture of a situation, event, pattern or process.

Level 7-8
i and iii. **Explain** Give a detailed account including reasons or causes.