**GENERAL INTEGRATED SCIENCE– UNIT 4**

**TASK 10 – Physics in life**

**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ WEIGHTING: 7.5 %**

**DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MARK: / = %**

The world of physics is complicated, but is used in many areas of our lives. Your task is to choose one of the below topics, research the science behind it, and design a product that meets the design goal.

**Choose one of the below goals:**

* Gun that has the fastest muzzle velocity (bullet speed)
* Sport shoe (soccer or football) that helps the player run faster
* Trebuchet or cannon that has the fastest and heaviest projectile
* Roller coaster that is the fastest possible while also being safe to ride
* Aeroplane that is the fastest possible while also able to hold lots of people

**Part A – Research**

1. List Newton’s laws of motion
2. Explain how these laws of motion are relevant to your product design
3. Explain whether each of the below factors will impact your product design:
   1. Weight
   2. Aerodynamics
   3. Friction
   4. Propulsion
   5. Gravity
4. Choose two design elements to focus on (e.g. material, weight, angle of wing, fuel)
5. Describe how your two design elements will impact your goal
6. Something else about physics calculations

**Part B**

Draw a diagram labelled of design

Explain reason for elements included

Explain how elements will impact aerodynamics/speed or whatever

Needs some rewording to get the students to research what is in existence and how do they work. Then they need to work out what they will need to change to improve what already exists so that it meets the specifications they have come up with. This would involve highlighting the science behind the element eg smoother barrel will mean less friction so bullet come out faster. Then research which materials could be used to make that kind of surface and then incorporate them in a design. I am not sure how this should be worded. Need so that one mark scheme can be designed for a multitude of concepts.