**Artificial Gravity - Movie-Mini-Lab**

Movie: Interstellar (2014) Matthew McConaughey, Anne Hathaway, Jessica Chastain.

Purpose: To what velocity a space station must turn in order to achieve artificial gravity.

Background: Astronaut’s are sent to space to find another habitable planet to call home after it is discovered Earth is dying.

Parameters To Be Used For The Analysis

|  |  |  |
| --- | --- | --- |
| **Assumption** | **Size** | **Comment** |
| **Desired artificial gravity** | 1 “g” | Assuming the astronauts would want to feel at home! |
| **Radius of the space station** | 28.2 m | The radius of the international space station is bigger then a football field! 109 m by 73 m and has a mass of over 400, 000 kg’s! |

Analysis: *Determine how fast the space station must rotate in order to achieve artificial gravity!* ***Hint: Fc is just a glorified Fnet!***

What would happen to ***gravity*** if the astronaut's move closer to the center of the space station? *Make sure to back what you are saying with a proof!*

**Spiderman Swings - Movie-Mini-Lab**

Movie: Spiderman 2 (2004) Tobey Maguire, Kirsten Dunst, and James Franco.

Purpose: To determine if it would be possible for Spiderman to swing through the streets of New York.

Background: The table below contains parameters needed to evaluate Spiderman can swing from building to building in New York City.

Parameters To Be Used For The Analysis

|  |  |  |
| --- | --- | --- |
| **Assumption** | **Size** | **Comment** |
| **Spiderman’s Max Speed** | 40 mph | It would actually be faster for him to take the subway…. |
| **Web Line's Tensile Strength** | 54 kg/mm2 | Also, according to recent volumes of [*The Official Handbook of the Marvel Universe*](https://en.wikipedia.org/wiki/The_Official_Handbook_of_the_Marvel_Universe), the tensile strength of the webbing is equivalent to 120 lb (54 kg) per square millimeter in cross-section and is comparable to nylon with extraordinary adhesive properties.  Think about this one… *What does Tensile Strength mean?* |
| **Length of Web** | 60 ft. | 300 pounds per square inch in each the web cartridge is sufficient to force a stream of web 60ft |
| **Radius of Webbing** | 1.0 mm | Let’s assume that a web shot from Spider-Man has a cylindrical shape with a radius of 1.0 mm |
| **Tobey Maguire’s weight** | 71 kg | This guy needs to buy some HGH…. |

Analysis: *Determine if it would be possible for Spiderman to swing through the streets of New York City!* ***Hint: Start with a diagram and include all forces! Remember what unit we are studying!***