DATE: NAME: CLASS:

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| **TOPICS 3-5** | Mass, Weight, and Force | **BLM 4-21** |
|  |  |

**Fill in the Blanks**

Choose the best term from the list to complete each of the sentences below.

mass external deformation tension weight

shear bend compression internal

1. Forces are not visible but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an indication that the materials in a structure are being stressed.
2. Hammering results in an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force acting on a piece of furniture and an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force acting in the joints and materials of that structure..



1. A newton is a unit for measuring a structure’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

# Short Answers



Answer the following questions in the space provided.

1. Would a spring scale or a balance scale be the best choice for measuring mass? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Identify the type of internal stress (shear, bending, torsion, tension, or compression) that occurs in each situation below:  
   (a) bungee jumping   
   (b) twisting a towel   
   (c) cutting paper   
   (d) making footprints in grass
3. How can you prevent thin sheets or shell structures from bending or buckling? (P 316 figure 4.46)

1. Read page 317 and give one example of how material failure can be put to good use saving money, lives, or preventing serious damage to other parts.

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1. Express the mass of 350 g of potato chips in Kg. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



1. From the bag of chips above, how much force is that bag pushing down on the earth with in newtons? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. Draw a force diagram of a man holding a 500g baseball in his hand.

1. Give an example of a dead and live load on a staircase:
   1. Live Load \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Dead Load \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What type of strength would you need in each situation below? Tensile, compressive, torsion, or shear strength?



* 1. The cable on a tow truck \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. The springs of a 4x4 truck \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. Paper for making $20 bills \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. A bolt \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What type of structure, mass, frame, or shell, is most likely to fail because levers are unintentionally created by minor deformations of parts of the structure itself?

1. What is metal fatigue?

1. In what types of metal structures would metal fatigue be a major concern?