

NAME: _____

1. According to our current understanding of the Universe, what is the *best* explanation for why the Moon stays in orbit around the Earth? (Gravity, yes. But describe how gravity works.)
2. Describe the structure of a helium atom as completely as you can. (Note that helium contains two protons, two neutrons and two electrons.)
3. Give an example of each of the four fundamental forces in action.
4. How are *electric charge* and *mass* similar? How are they different?
5. Boiling water *feels* hotter than the air inside a pizza oven. Why?
6. Describe what each of the terms in $E = mc^2$ stands for. What does the equation tell us?

(OVER →)

7. Use $E = mc^2$ to determine how much energy would be released if your body was converted into pure energy. To find your mass in *kg* just take your weight in pounds and divide it by 2.2; and remember that the speed of light is $c = 3 \times 10^8$ *m/s*. Show the steps in your calculation below:

$$m = \underline{\hspace{2cm}} \text{ pounds} \div 2.2 = \underline{\hspace{2cm}} \text{ kg}$$

$$E = m \times c^2$$

$$= (\underline{\hspace{2cm}} \text{ kg}) \times (3 \times 10^8 \text{ m/s})^2$$

$$E = \underline{\hspace{2cm}} \text{ Joules}$$