# Activity 4: Impact Events

| Object | Radius (m) | Density ($kg/m^3$) | Mass (kg) | Impact Velocity (m/s) | Energy (J) | Richter Scale Magnitude Equivalent |
|---|---|---|---|---|---|---|
| Asclepius | 100 | 3000 | $1.26x10^{10}$ | 30,000 | $5.67x10^{18}$ | 6.69 |
| Comet Swift-Tuttle | 1000 | 1000 | $4.19x10^{12}$ | 60,000 | $7.54x10^{21}$ | 8.79 |
| Chicxulub impactor | 5000 | 3000 | $1.57x10^{15}$ | 32,000 | $8.04x10^{23}$ | 10.15 |
| SL9 Fragment Q | 2150 | 1000 | $4.16x10^{13}$ | 60,000 | $7.49x10^{22}$ | 9.46 |
| Meteor Crater | 20 | 7800 | $2.61x10^{8}$ | 20,000 | $5.22x10^{16}$ | 5.33 |
| (2008 BT18) | 500 | (3000) | $1.57x10^{12}$ | 13,000 | $1.33x10^{20}$ | 7.61 |

**Copy the table above into your notes, and answer the following questions:**

1. What two things determine the energy released at impact of an object colliding with the Earth?

2. Which of these makes the biggest difference?

3. If an object colliding with the Earth had ten times the mass of another object hitting the Earth, how much more energy would it have when it hit?

   If an object colliding with the Earth had ten times the velocity of another object hitting the Earth, how much more energy would it have when it hit?

4. For each of the items above, how many atom bombs (energy = $10^{13}$ J) would it take to equal the energy released for that item listed in the chart above?