Name: _____ **Date: _____**

Escape Velocity Interactive Activity

Visit Mr. G's website (Worksheets and Keys section) or the following website to load the interactive:
http://highered.mheducation.com/sites/007299181x/student_view0/chapter5/escape_velocity_interactive.html

Notice there are two spaceships. We'll call them "**Top Rocket**" and "**Bottom Rocket**."

1. If you decrease the mass of the Earth, but leave the initial velocity alone, does the maximum altitude of **Top Rocket** increase or decrease? Can you explain why?

2. If you decrease the radius of the Earth, but leave the initial velocity alone, does the maximum altitude of **Top Rocket** increase or decrease? Can you explain why?

3. Use the "Earth" button to reset the slider values. Watch the motion of **Bottom Rocket**. Using multiple launches, what happens to the shape of its orbit as you gradually increase its initial speed above 7.9 km/sec to higher values? What happens to its orbit if you decrease its initial speed below 7.9 km/sec?

4. Press the "Earth" button to reset the slider values. Fire the ships at a speed of 10.4 km/sec. What is the name for the shape of **Bottom Rocket's** orbit?

5. Now increase the "Velocity" slider to a value of 13 km/sec and again fire the ships. How is the shape of **Bottom Rocket's** orbit different? Is there a name for this shape?

6. Which of the four planets has the smallest escape velocity? Which has the largest escape velocity?

7. Is the escape velocity for a ship shot vertically upwards the same as the velocity for a ship shot horizontally? Do the experiment to find out.

8. Click "Earth" to reset the parameters. Launch **Top Rocket** with a velocity of 11.1 km/sec. Be patient – what happens? What does this tell you about the escape velocity of Earth?

9. In order to double the escape velocity of a planet, by what factor must you change its mass? Or, if you leave the mass alone, by what factor must you change its radius?

10. What is the escape velocity from the Earth's Moon?