

For the Teacher

Understanding the Density of the Solar Wind

If you would prefer to skip the calculation aspect of this activity, the final result can be presented to the class and the questions used to promote discussion.

Calculation Answers:

Step 1 – 0.52 cm^3

Step 2 – $1.3 \times 10^{19} \text{ cm}^3$

Step 3 – 7.5×10^{16}

Step 4 – 173 cm (1.73 m, 5 ft 8 in.)

The question concerning the solar wind not moving hair can be further analyzed by considering collisions and impulse. Physics teachers could have students calculate the total momentum of solar wind particles which would hit a square cm surface each second. Compare this to the total momentum of air particles hitting the same surface each second.

Students may ask if even the small amount of protons moving at 300 km/s in the solar wind could be harmful (even if they don't move hair). The answer is no. Their energy is not significant enough to do biological damage. However, the proton blasts associated with flares and CME's can be moving at 1/3 the speed of light, or approximately 100,000 km/s. At these speeds, protons contain enough energy to cause chemical changes at the atomic level within human cells.

Further aides to help students visualize the size of molecules can be found at <http://www.trivia-library.com/b/science-lessons-size-of-molecules.htm>