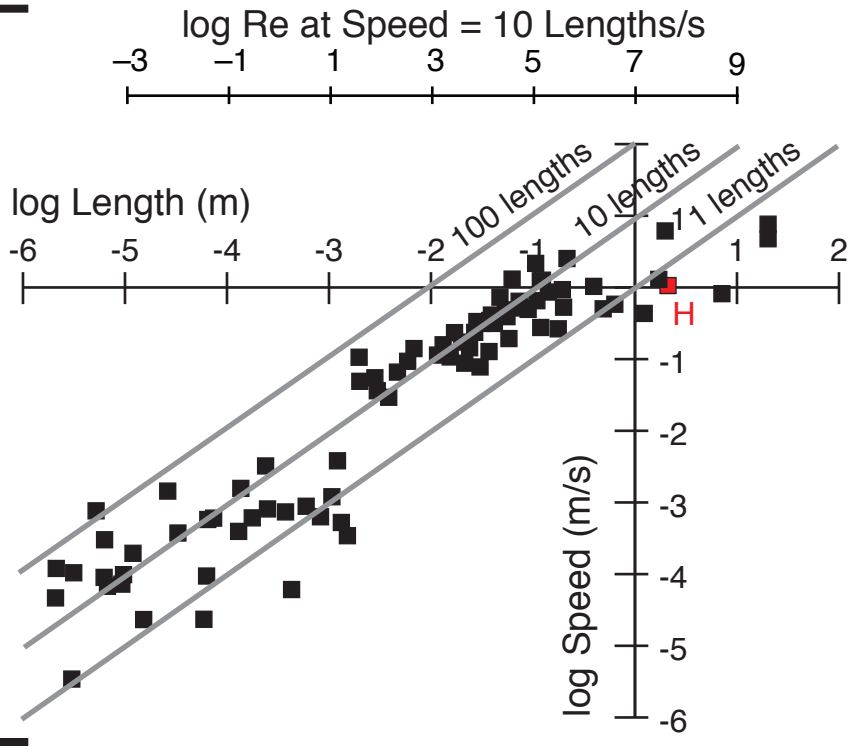
The graph below is re-drawn from a graph compiled by David B. Dusenbery in his book Living at Micro Scale. The unexpected physics of being small (Harvard University Press published 2009. pages 133–137). The plot includes very small swimmers and large ones, all in aqueous environments. Human is included (coded 'H')



Speed versus size. Note that the upper x-axis shows the calculated Reynods number for a normalized speed of 10 body lengths per second. The organisms include Gram-negative bacteria, Gram-positive bacteria, archeabacteria, spirochaetes, dinoflagellates, ciliates, rotifers, nematodes crustacea, insect, fish (top speed- and cruising speed, whale, and human (H). The lines represent swimming speeds of 1, 10 amd 100 lengths per second.

The assignment question is simple: Why do all organisms —independent of size— cluster at a swimming rate of approximately 10 body lengths per second? Explain so that even a non-physicist like Dr. Lew can understand. Hint: Be sure to account for the effect of Reynolds number on drag forces and metabolic power requirements for propulsion.