DAY LABORATORY EXERCISE #1:
A "Textbook Planet"

We have been tasked with rescuing our newest alien friends from their crashed spaceship. They are all unconscious you have a direct line to the ship's computer. You are in a virtual mockup of their ships cabin that simulates the planet's gravity.

Armed only with models of what the aliens have in their ship and an alien test dummy, and your innate knowledge of physics, your crew's task is to be help rescue the aliens before their limited oxygen supply is gone. Luckily the aliens breathe and respire at the same rate we do.

Your standard "book" has the same physical dimensions as the model "book" found on the alien spaceship.

So, by agreeing to **measure all quantities in units of the book height and weight**, you can describe the physical properties of the planet.

The oxygen supply is limited, so you need to describe the following as quickly as possible. Give your numerical answers as well as a brief but thorough description of the method used to determine the answer.

Oh, yes, as a result of the crash landing, **all rulers and timepieces (watches) were destroyed, as were any printed values of the weights of any boxes or pieces of equipment.**

1) What is the number of members in the alien crew? What is the height of an average alien [as measured in textbook heights]?

2) The weight of an average alien [in textbook weights].

3) If the rescue ship can lift the equivalent of 250 textbooks per trip to the planet's surface, how many aliens could be saved on the first rescue trip?

4) What is the volume of the cabin containing oxygen [in "textbook-equivalent-volumes"].

5) What is the rate at which an alien is consuming oxygen [in textbook-equivalent-volumes per heartbeat]?

6) How long (in heartbeats) will the oxygen supply in the room hold out as the aliens breathes?