Task Control Team Instructions

Overview

You need six people on the task control team. Each of you is responsible for one astronaut, so you'll work in pairs. Here is what your team does:

1. Organize and coordinate the astronaut task timeline.
2. Calculate how much oxygen is needed for the next five minutes of the mission. You'll use respiration rate data from the life support team, proportions, and cross-multiplication.
3. Predict how much oxygen will be used in the next five minutes of the mission.
4. Report your predictions to the mission commander.
5. Confirm or correct predictions. Use an online gauge to graph how much oxygen is left in the astronauts' tanks.

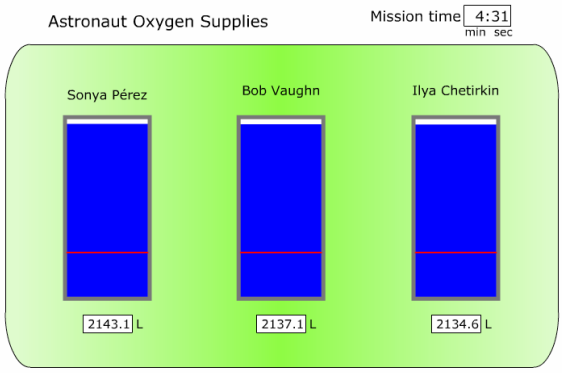
Mission Preparation

1. Go to this web site:
   www3.cet.edu/flashcom/satellite

   Select "Control Tasks" from the dropdown menu. The mission commander will give you the password to log in.
2. The mission commander will start the oxygen gauges for each astronaut.
3. At first, your team needs to take a baseline reading from the astronaut oxygen gauges. Graph this data on your graphing worksheet.
4. Report the baseline readings to the mission commander verbally.
5. The life support team will send respiration data to you.
6. Use the astronauts' respiration rates to calculate how much oxygen you think each astronaut will need for the next five minutes of the mission.
7. You and your specialist teammate should mark an "X" on your graph to show how much oxygen you think your astronaut will use in the next five minutes.
8. Write your predictions on the report forms you get from the life support team. Send them to the mission commander through communications officer 2.
9. Check the oxygen gauge to see if your prediction was correct at the mission time. Graph the actual amount of oxygen in the astronaut's tank and connect the points.
10. Repeat steps 5 through 9.
11. Based on reports from the special operations team, you might need to rearrange the astronaut task timeline and report any changes to the mission commander.

Reading the Oxygen Gauges

During the mission you use a gauge to help you monitor how much oxygen is left in each astronaut's tank. Each astronaut starts with 2,200 liters of oxygen.



At the end of the mission, each astronaut must have at least 550 liters of oxygen left to return to the airlock. The red line on each gauge represents how much oxygen is needed to return to the airlock. Throughout the mission you must monitor your astronaut's oxygen usage and make sure he or she has this much oxygen in reserve.

Take a reading for your astronaut about every five minutes and enter that information on your graphing worksheet.

Calculating Oxygen Usage

During the mission you receive the respiration rates of your astronaut from the life support team. Use this information to calculate how much oxygen is needed for the next five minutes of the mission.

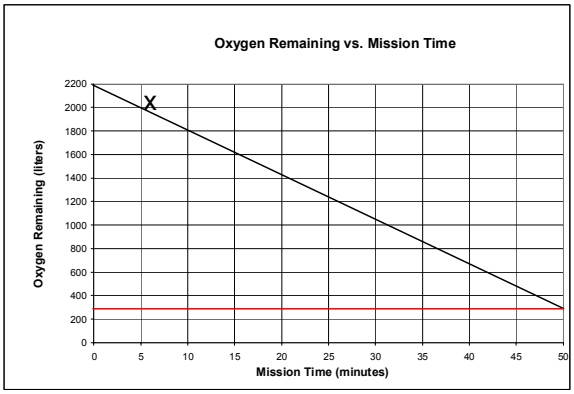
You will receive a respiration rate like the one below.

Respiration rate: $\frac{42\ \text{L}}{1\ \text{minute}}$

Use this respiration rate to make a proportion. Use this proportion to predict how much oxygen is needed for the next five minutes of the mission.

$$\frac{42\text{ L}}{1\text{ minute}} = \frac{X\text{ L}}{5\text{ minutes}}$$

Mark an "X" on your graph to show how much oxygen you predict your astronaut will use in the next five minutes (look at the example in the following graph). The diagonal line shows the average amount of oxygen your astronaut will use during the mission.

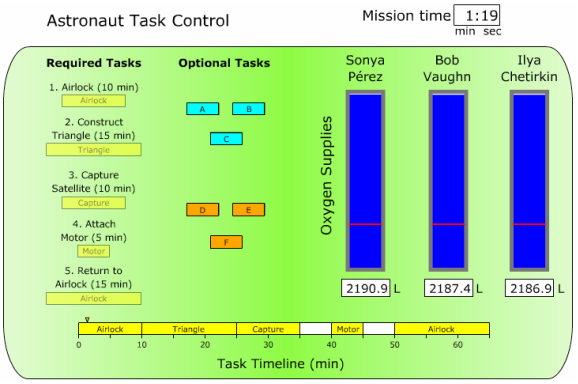


At the mission time of your prediction, use the oxygen gauge to see if your prediction was right. Graph the actual amount of oxygen in your astronaut's tank and connect the points.

Note whether your astronaut's actual oxygen usage is above or below the average line. If the actual oxygen usage is above the line on your graph, the astronaut is using less than the average. If the actual oxygen usage is below the line, the astronaut is using more than the average. Use this graph to decide whether your astronaut is using oxygen too quickly.

Creating the Task Timeline

At the start of the mission, you will see a timeline of astronaut tasks on your monitor. These tasks are important to the success of the mission. As the mission progresses, you might need to add or remove tasks to the timeline based on the progress of the special operations team.



The astronauts can perform three types of tasks:

Yellow = required task

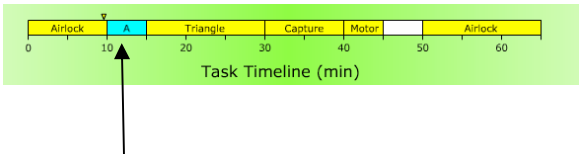
Blue = optional tasks before satellite capture

Red = optional tasks after satellite capture

When the mission starts, you will see all yellow required tasks on the timeline.

While the astronauts work on the tasks you have assigned, the special operations team will complete problems that correlate to each yellow astronaut task. For example, the special operations team should solve its first problem by the time the astronauts complete their first yellow task.

Each time the special operations team correctly solves all steps of a problem, it should inform your team. If the special operations team has not reported to you before the astronauts finish the task you have assigned, place an optional task on the timeline to keep the astronauts working.



Task added to timelin

If the team took longer to solve its problem than the amount of time allotted on the astronaut task timeline for that task, slide the remaining required tasks to the right and insert optional tasks by clicking and dragging the task into the timeline.

Blue optional tasks can be added before the satellite is captured, and red optional tasks can be added after the satellite is captured.