



Oxygen Specialist Instructions

Overview

You are responsible for:

1. Receiving data from sensors in Storage Facility C and performing calculations on them.
2. Receiving data from the Investigation Specialists on five initial conditions of Storage Facility C.
3. Running the fire simulator based on the data received from the Investigations Specialists.
4. Calculating the mean, median, and mode of fire simulator results.
5. Verifying the data by reporting to the Communications Specialist.
6. Providing input on which value is the best measure of central tendency for the oxygen data.
7. Creating a box-and-whiskers plot for each run of the fire simulator.
8. Helping the Investigation Team in deciding which fire simulation run matches most closely the original data coming from the sensors.

Specialists Tasks

1. Have your Oxygen Specialist worksheet ready at your work station.

Tasks for Oxygen Specialist Member One

2. Receive the initial conditions data from the Investigation Specialists. The data will be written on a report form that looks like the image below:

Internal Report Form				
From: Investigation Specialists				
To: Communications Specialists				
Communications Specialist MUST fill in the communications specialist worksheet with this data and then MUST forward this report form to a Carbon Dioxide or Oxygen Specialist.				
Simulation Run #	Room Volume	Oxygen Percentage	Heat Rate Release	Fire Source
1				

3. Input this data into the fire simulator. The fire simulator will look like the image below:

Fire Simulator

Volume of the Room (in m³) 90 92.5 120

Oxygen Percentage 30 35 40 45 50

Heat Rate Release (in kW / m²) 1,250 to 1,750 1,750 to 2,250

Fire Source Chemical Paper Solvent Liquid Hydrogen

Run Simulation

4. After you run the fire simulator, you will view a set of data that looks like the image below:

Sample Data

Carbon Dioxide Data						
Outcome 1	Outcome 2	Outcome 3	Outcome 4	Outcome 5	Outcome 6	Outcome 7
9.667	9.193	9.478	9.572	9.478	9.478	9.478

Oxygen Data						
Outcome 1	Outcome 2	Outcome 3	Outcome 4	Outcome 5	Outcome 6	Outcome 7
0.785	0.762	0.747	0.785	0.777	0.731	0.747

5. For the oxygen data round each number to the hundredths place. For example, for Outcome 1, round 0.785 to 0.79.
6. Calculate the mean for the oxygen data:

Sample Problem

- The mean is the sum of all the data divided by the number of data points.
 - For example, to calculate the mean of the sample data above, first add all of the rounded numbers together: 0.79, 0.76, 0.75, 0.79, 0.78, 0.73, 0.75.
 - $0.79 + 0.76 + 0.75 + 0.79 + 0.78 + 0.73 + 0.75 = 5.35$
 - $5.35/7 = 0.764$
 - Round your final answer to the nearest hundredth. The mean = 0.76
 - Now calculate and record the mean for Run 1 in column C on both your Oxygen Specialist worksheet and your report form.
7. Calculate the median for the data:
- The median is the number that is in the middle of a set of data. Half the scores are above the median and half are below.
 - Using the numbers in the sample data, list the numbers in ascending numerical order (from smallest to largest number): 0.73, 0.75, 0.75, 0.76, 0.78, 0.79, 0.79.
 - Identify the number in the middle.
 - The median = 0.76
 - Now calculate and record the median for Run 1 in column D on your Oxygen Specialist worksheet and also on your report form.
8. Calculate the mode for the data:
- The mode is the number that appears most often in a set of data.
 - For example, in the sample data set of 0.79, 0.76, 0.75, 0.79, 0.78, 0.73, 0.75:
 - The mode = 0.75 and 0.79
 - Now calculate and record the mode for Run 1 in column E on your Oxygen Specialist worksheet and on your report form.

Tasks for Oxygen Specialist Member Two

9. Use the data provided by Oxygen Specialist member one to create a box-and-whiskers plot for the Run 1 data. Graph the plot in column B of your worksheet:
 - Look at the data in ascending numerical order (from smallest to largest numbers).
 - Label the median on your gridlines.
 - Identify the lower and upper quartiles and use these values to construct the box.
 - Identify the smallest and largest values and use these values to draw the whiskers part of the plot
10. Record the values for mean, median, and mode for Run 1 on your oxygen worksheet and your report form.

Tasks for Oxygen Specialist Member Three (optional member)

11. Collect the data from Oxygen Specialist members one and two. Bring the report form to the Communications Specialist.
12. The Communications Specialist will verify the data with mission control.
13. If the data is approved, begin working on Run 2.

Note: If your team has only two Oxygen Specialists, have member one report all values of Run 1 to the Communications Specialist.

Repeat this entire procedure for successive runs.