

## 11.3: Biometrics Lab #3

Name: \_\_\_\_\_

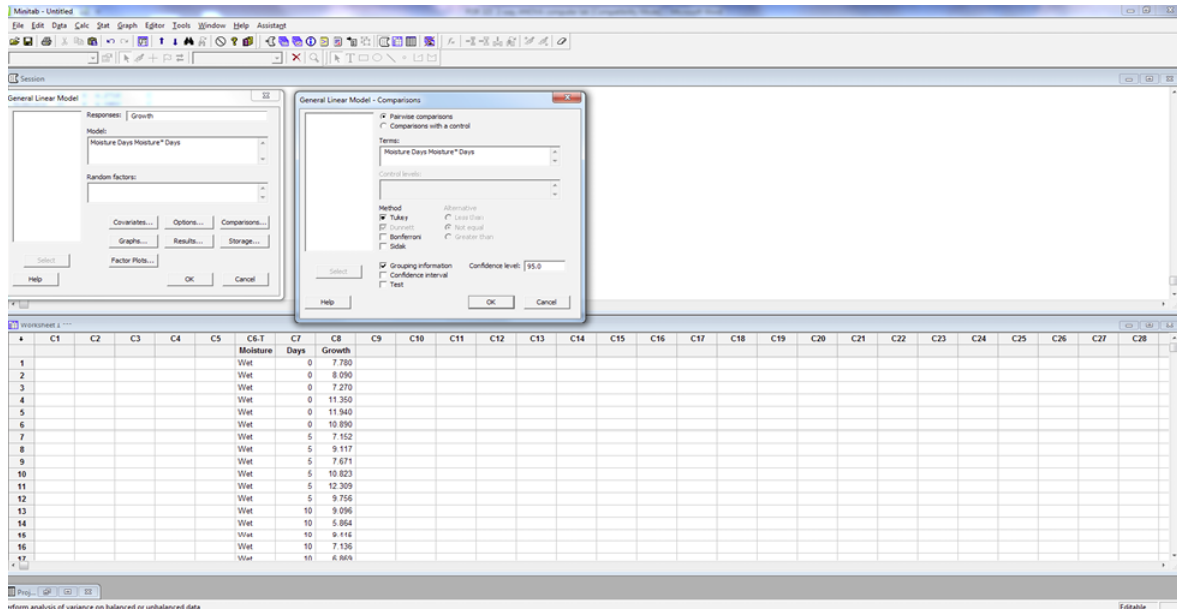
You are studying the growth of a hybrid species of Alaskan pine in three levels of soil moisture (wet, moderate, and dry) over a period of 30 days (0, 5, 10, 20, and 30). You want to determine if this species grows differently over time given different starting levels of soil moisture. Use the given data to test this claim ( $\alpha = 0.05$ ). If the interaction is significant, at what point does the difference in growth between the levels of soil moisture over time become significant? Use the factor plot and the Grouping information to specifically identify the difference in your conclusion.

Moisture	Days	Growth	Moisture	Days	Growth	Moisture	Days	Growth
Dry	0	7.78	Moderate	0	10.926	Wet	0	8.116
Dry	0	8.09	Moderate	0	9.162	Wet	0	10.473
Dry	0	7.27	Moderate	0	7.83	Wet	0	8.654
Dry	0	11.35	Moderate	0	8.604	Wet	0	6.901
Dry	0	11.94	Moderate	0	9.324	Wet	0	7.565
Dry	0	10.89	Moderate	0	6.462	Wet	0	9.169
Dry	5	7.152	Moderate	5	8.456	Wet	5	10.039
Dry	5	9.117	Moderate	5	11.012	Wet	5	9.994
Dry	5	7.671	Moderate	5	7.541	Wet	5	8.045
Dry	5	10.823	Moderate	5	9.482	Wet	5	9.445
Dry	5	12.309	Moderate	5	9.473	Wet	5	8.024
Dry	5	9.756	Moderate	5	10.2	Wet	5	7.783
Dry	10	9.096	Moderate	10	8.582	Wet	10	7.679
Dry	10	5.864	Moderate	10	9.934	Wet	10	11.671
Dry	10	9.445	Moderate	10	9.279	Wet	10	10.567
Dry	10	7.136	Moderate	10	6.651	Wet	10	9.66
Dry	10	6.869	Moderate	10	10.546	Wet	10	7.646
Dry	10	8.716	Moderate	10	7.927	Wet	10	8.953
Dry	20	4.716	Moderate	20	2.903	Wet	20	7.368
Dry	20	3.528	Moderate	20	4.91	Wet	20	6.539
Dry	20	4.964	Moderate	20	4.998	Wet	20	7.034
Dry	20	5.004	Moderate	20	4.954	Wet	20	7.258
Dry	20	3.824	Moderate	20	3.279	Wet	20	6.309
Dry	20	4.356	Moderate	20	3.528	Wet	20	7.223
Dry	30	1.053	Moderate	30	0.748	Wet	30	4.909
Dry	30	1.287	Moderate	30	0.997	Wet	30	5.891
Dry	30	1.11	Moderate	30	0.7	Wet	30	4.223
Dry	30	0.832	Moderate	30	1.018	Wet	30	3.997

Moisture	Days	Growth	Moisture	Days	Growth	Moisture	Days	Growth
Dry	30	1.082	Moderate	30	1.007	Wet	30	2.616
Dry	30	1.095	Moderate	30	1.083	Wet	30	3.995

Open Minitab and enter the data into a spreadsheet. Select **STAT>ANOVA>General Linear Model**.

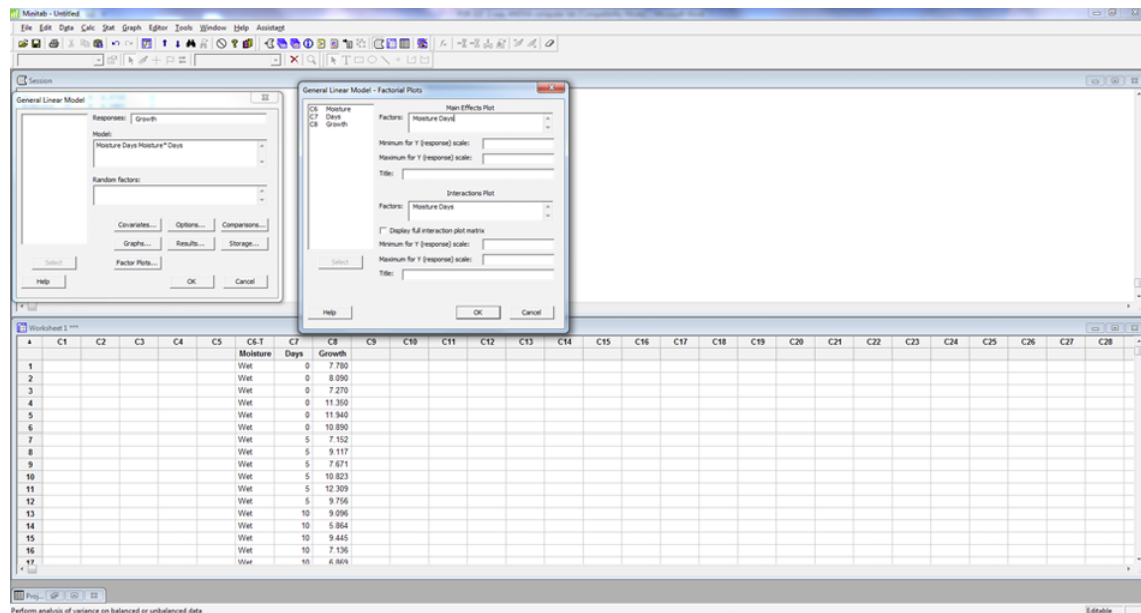
Click in the **Response** box and select GROWTH for the Response box, and enter MOISTURE, DAYS, and MOISTURE\*DAYS (interaction term) in the **Model** box, as shown.



Under **OPTIONS**, select “Adjusted (Type III)” under **Sums of Squares**. Click OK.

Under **COMPARISONS**, select “Pairwise comparisons” using “**Tukey**” method and enter the two main effects and interaction (MOISTURE, DAYS, and MOISTURE\*DAYS) in the terms box (click in the box first to select).

Check the **Grouping Information** box. Click OK.



Under **RESULTS**, select “Analysis of Variance Table” for **Display of Results**. Click OK.

Under **FACTOR PLOTS**, enter MOISTURE and DAYS in both the main effects and interaction plot box. Click OK. Click OK.

Is the interaction term significant? \_\_\_\_\_

Write the p-value \_\_\_\_\_

Use the third Grouping Information Using Tukey Method (for the interaction) and the Factor plot to determine where the differences are for each treatment.

Attach a complete conclusion describing the differences in growth for this species over the 30 days for the 3 different levels of soil moisture.

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