

In 1976, Paffenhofer (*Limnology and Oceanography* 21:39-50) reported carbon content (in $\mu\text{g}/\text{mm}^3$) in 3 species of algae, *Gonyaulax polyedra*, *Gymnodinium splendens*, and *Prorocentrum micans*.

The number of measurements was 10 *G. polyedra*, 5 *G. splendens*, and 11 *P. micans*.

1. Write a symbol for the response variable (_____ = $\mu\text{g}/\text{mm}^3$) [1]

and explanatory variable (_____ = *G.p.*, *G.s.*, or *P.m.*) [1]

2. Write a general linear model relating the response variable to the explanatory variable.

_____ = _____ [4]

3a. If the symbol for the true (parametric) carbon content of *G. polyedra* is μ_{Gp} then write a symbol for the true or parametric carbon content of

G. splendens _____ *P. micans* _____ [2]

3b. Using these three symbols, write an H_A/H_0 pair for testing whether or not carbon content depends on species.

H_A : _____ [2]

H_0 : _____ [2]

4a. Complete the following table. [7]

df = degrees of freedom
 SS = Sums of squares
 MS = mean square = SS/df
 F = observed F-ratio of mean squares
 p = Type I error in accepting H_0

Source	df	SS	MS	F	p
Species	_____	_____	15543.9	76.1	< 0.0001
Residual	_____	_____	_____		
total	25	_____			

4b. The total df is 25. Show how this is computed. [1]