Biology 4605/7220/ST4581 Name_____
Quiz 8b 27 November 1996

A marine biologist measures the following variables once a day on 300 successive days at a site where harbour seals *Phoca vitulina* haul out at low tide. Assign a symbol to each variable.

_____ Number of seals hauled out

_____ Wind chill (Watt m^{-2})

_____ Wind speed (knots)

_____ Air temperature (degrees C)

_____ Wave intensity (0 = calm, 1 = slight, 2 = moderate, 3 = heavy)

_____ Disturbance by people (presence/absence)

_____ Disturbance by dogs (presence/ absence)

1. Draw a box and arrow diagram for expressing a preliminary model of the relation of these 7 variables. Use one box for each variable.
Arrows should go from explanatory to response variable.

2. Compute the number of potential arrows in your diagram. The formula for number of arrows connecting n boxes:

$$\text{arrows} = \frac{n!}{(n-2)!}\ \frac{1}{2} \qquad \text{where } 3! = 3 \cdot 2 \cdot 1$$

arrows = _____

3. What is the degree of reduction in your preliminary model, relative to the potential number of arrows ? Express this as a ratio, the number of arrows in the diagram, relative to the potential number.

reduction = _____

4. How might you further simplify your preliminary model ?