

## GROWTH & POWER FUNCTIONS



The LSD experiment

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## SCALING PRINCIPLES

properties can change with size

proportions (relative and absolute)

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## POWER FUNCTIONS

$$Y = a X^b$$

properties X and Y  
parameters a and b  
formulate and test hypotheses

e.g., cube:  $H = 1.0 L^{1.0} = W$

$$S = 6.0 L^{2.0}$$

$$V = 1.0 L^{3.0}$$

S-V ratios

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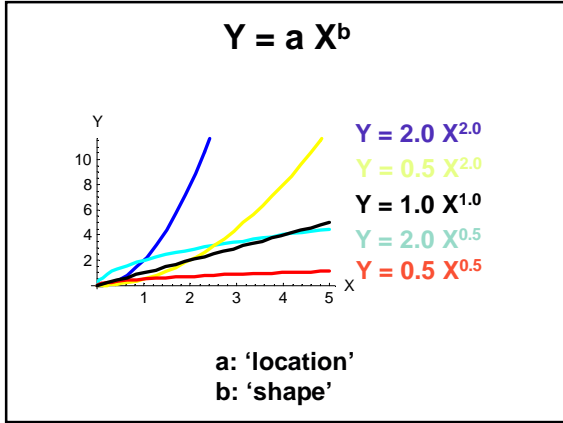
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**GEOMETRIC SIMILARITY**

similar shape

proportions invariant

e.g., regular sea urchins  
similar juvenile and adult shape  
height H, diameter D

$H = 0.5 D^{1.0}$   
 $M = \rho \pi 8 H^{3.0} / 3$   
 $= a_{HM} H^{3.0}$




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