Model Based Statistics in Biology.
Part III. The General Linear Model.
Chapter 9.6 Power Laws. Non linear Regression

ReCap. Part I (Chapters 1,2,3,4)
ReCap Part II (Ch 5, 6, 7)
ReCap Part III
9.1 Explanatory Variable Fixed by Experiment
9.2 Explanatory Variable Fixed into Classes
9.3 Explanatory Variable Measured with Error
9.4 Exponential Functions
9.5 Power Laws. Linear Regression
9.6 Power Laws. Non linear Regression
9.7 Model Revision

on chalk board

ReCap Part I (Chapters 1,2,3,4)
Quantitative reasoning: Example of scallops,
which combined models (what is the relation of scallop density to substrate?)
with statistics (how certain can we be?)
ReCap Part II (Chapters 5,6,7)
Data equations summarize pattern in data as a series of parameters (means, slopes).
Frequency distributions, a key concept in statistics, are used to quantify uncertainty.
Hypothesis testing uses the logic of the null hypothesis to make a decision about an unknown population parameter.
Estimation is concerned with the specific value of an unknown population parameter.
ReCap (Ch 9) The General Linear Model is more useful and flexible than a collection of special cases.
Regression is a special case of the GLM. We have seen an example with the explanatory variable X fixed, an example with the explanatory measured with error, and an example for a non-linear (exponential) relation of response to explanatory variable.

Today:
Power Laws via Non-linear Regression

Wrap-up
Power laws are common in biology.
- Number of species in relation to area
- Metabolic rate in relation to body size
- Perimeter of a convoluted object (shoreline, leaf edge, etc).

Power laws are usually analyzed taking logarithms, to linearize the equation
They can also be analyzed via non-linear regression.