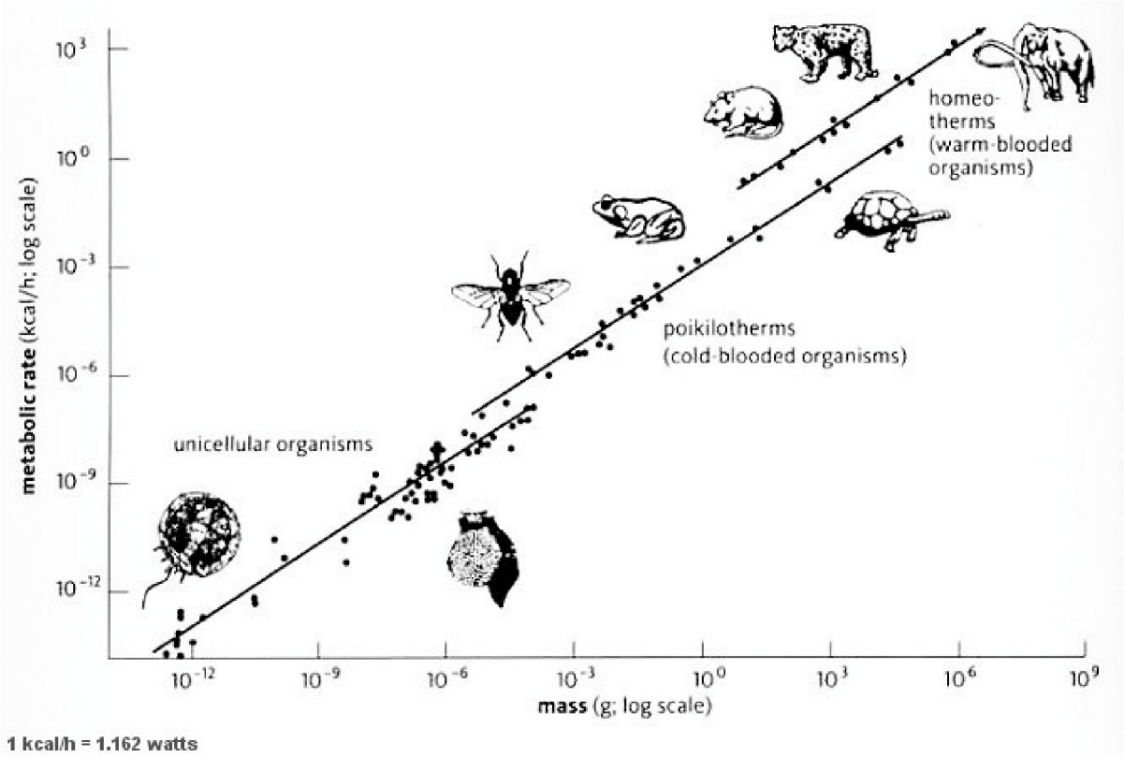
Metabolism and Body Size Analysis



1. The graph above shows the relationship between body mass (note this is a log scale) and metabolic rate (again, in a log scale). Without doing any mathematical analysis, what appears the general relationship between body mass and metabolic rate?
2. Select an organism from each category above: a unicellular organism; a poikilotherm; and a homeotherm. For each, calculate the ratio between metabolic rate and body mass. Please note the exponents on the scale! What trend do you notice about the ratio between metabolic rate and body mass for each category of animal?
3. Compare two homeotherms' ratio of metabolic rate to body mass. What do you notice about the ratio between metabolic rate and body mass for each?
4. From your observations above, predict which of the following organisms would have a higher metabolic rate: a blue whale; a house cat; a field mouse. Justify your response using data from the graph above and/or your calculations.

Read the attached article. Reading questions are below:

1. Who was Max Kleiber? What did he study? What was Kleiber's conclusion concerning the relationship between BMR and body mass?
2. Why does the article emphasize the abundance of data available to support Kleiber's conclusion?
3. How do the BMRs of endotherms compare to ectotherms? How do the BMRs of marsupials compare to placental mammals? How do the BMRs of passerian birds compare to non-passerian birds?
4. How does BMR vary with animal adaptation for seals, sloths, and desert animals?
5. Compare the various explanations for the ¾ rule: muscles, transport, and evolutionary byproduct. What evidence would need to be collected/analyzed to support each of these explanations?