

Design 1 Grading Sheet

GRADING CRITERIA:

The **content** will demonstrate the following: 1) deals completely and creatively with the assigned topic; 2) material presented is accurate and convincing (this means that we trust your calculations); 3) major concepts are well integrated and indicative of a thorough understanding on the part of the student; 4) the paper reflects a university- level of intellectual maturation. (roughly 60%)

The **organization and structure** will include: 1) a clear and fully developed argument, 2) support for every claim/scientific statement via calculations and/or suitable references, 3) logical and concise overall organization, 4) paragraphs that are constructed to assist concise and orderly flow of ideas, 5) absence of repetition, and 6) a varied range of sentence structure. (20%)

Style and grammar: The paper should read smoothly and clearly, indicating the ability to synthesize material from a number of sources into a coherent whole. There are no, or very few, typing errors. There are no significant errors in grammar, spelling or punctuation. (10%)

Cited references are of sufficient quantity and quality for the topic covered, and are appropriately cited and referenced in text. (10%)

SPECIFICS:

Introduction/ **Background Bullet Points**

Is there sufficient background information concerning the animal's:

- ☐ environment
- ☐ physical characteristics
- ☐ closest relatives
- ☐ thermal biology (see assignment sheet)
- ☐ general biology (see assignment sheet)
- ☐ behavior - (e.g., endotherm/ectotherm, activity level? This may vary depending on your particular animal)

Did they *identify* and *clearly explain* the critical assumptions for this design project (e.g., endotherm/ectotherm, activity level? This may vary depending on your particular animal).

Analysis (calculations should be typed and will become the appendix, and this content will be used to populate the methods and results).

Physiological Assumptions

☐ Reasonable based on the amount of information that exists? Scientific facts, comparisons with extant species, or first principles? If the authors had to make major assumptions, did they convince you that the facts are actually not known?

Calculations

- ☐ Each equation stated clearly, with each variable identified (with units)?
- ☐ Calculations accurate? solid? internally consistent (in line with one another)?
- ☐ If they used iterative method, did they show convergence?
- ☐ Results of computations seem reasonable? If not, was this properly explored/explained?

Metabolic Rate

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OBMR/SMR: appropriate allometric scaling equation? Choice based on good scientific reasoning?

ORMR, AMR, MMR, and DMR: calculated based on appropriate assumptions?

Ectotherm SMR calculated correctly?

Choice of scaling factors reasonable and well-supported?

Heat Balance

This is where most of the analysis effort should have been placed.

ODid they calculate all heat balance components?

ODid they adequately explore heat balance/heat stress (see assignment)?

ODo you believe their conclusions about heat balance/heat stress?

OWas it easy to follow?

ODo the authors test their heat equation in some environmental situations? Are there any additional environmental conditions that would interesting and easy to include?

Analysis (the calculations) will be converted into the methods and results section in the paper:

Methods:

ODescribe the modeling of each major section (metabolic model and heat balance model). Subsections may be helpful.

OClearly describe the heat balance scenarios being compared (rest, daily, and heat or cold stress).

OMust state **each equation** clearly, with each variable identified (with units)? Also clearly state the values used for each parameter, with a justification (or rationale) and a citation. Like in a scientific paper.

Results:

Should present the results of the metabolic model, the heat balance model, and the scenarios.

What happened? Was it in heat balance at rest? How was heat

balance achieved over an ordinary day? What happens during heat stress? What changed the most?

*An “A” report should have pushed the analysis beyond “just the facts”, providing a creative insight. For example: which parameters are driving the system? any additional discoveries concerning the animal’s physiology?

Discussion

OBased on their findings, do the authors accurately depict the physiology of this animal?

ODo they demonstrate which physiological parameters were most important to their fossil?

ODo they demonstrate scientific reasoning? Is it believable?

OIs there any additional piece of information that you could add to the author’s interpretations.

ODo the authors provide insight on the interaction of the species with the environment?

*Did we learned something new?

Citations

OData (esp. size, phylogeny) appropriately cited in-text? (citations from scholarly peer-reviewed sources?)

OIs all the scientific information cited?

OAre the references cited from scholarly sources, with a minimal reliance on popular press/websites? (museum websites are OK)

OCitations in proper format?

Thank you for taking the time to be a great colleague. Be as specific and constructive as possible. Remember we want to point out all of the soft spots with suggestions so they can produce excellent work.