Hands-On Activity #1:

Designing a simple computational biology experiment

Objective:

Design a simple computational biology experiment. I encourage you to think about data and research questions from your current research project.

In *word processing software* (e.g., MS Word, google docs) follow the instructions:

Instructions:

1. **Describe your data:**
    - What is your dataset?
    - From what system or experiment does your data originate?
    - What type of data are you working with (e.g., gene expression, proteomics, imaging, etc.)?
2. **Formulate your hypothesis:**
    - What is the primary question or hypothesis you aim to test?
    - Why is this question significant to your research?
3. **Determine controls:**
    - Identify your negative controls (samples expected to show no effect).
    - Identify your positive controls (samples expected to show a known effect).
4. **Select your analysis approach:**
    - What statistical test or analysis method will you use (e.g., t-test, ANOVA, machine learning algorithm)?
    - Justify your choice of analysis method.
5. **Plan how you will interpret your findings:**
    - How will you analyze and interpret the results of your experiment?
    - What will be your criteria for determining whether your hypothesis is supported or refuted?
6. **Plan next steps:**
    - Based on your potential findings, outline the next steps for your research.
    - Consider further experiments, additional analyses, or new hypotheses to explore.

Deliverables:

- A 1-2 page written report covering each of the above points.

Tips:

- Be specific and detailed in your descriptions and justifications.
- Use visuals (e.g., diagrams, charts) to enhance your explanations where possible.
- Consider discussing your ideas with peers or mentors for feedback.