Module 5E Question:

Researchers are studying whether a new diet influences **Glucose12** levels in mice. They decide to use a **simulation-based hypothesis test** instead of relying on theoretical formulas.

In module 5E we defined the simulation workflow as:

1. Create and sample from an **imaginary population** whose parameters follow the **null hypothesis**
2. Use the **same sampling protocol** that produced the real data
3. Compute the **test statistic** for each simulated sample
4. **Repeat** many times to generate the **null distribution**
5. Compare the **actual test statistic** to this simulated null distribution

Explain why this simulation process lets us determine whether the observed data are unusual under the null hypothesis. In your answer, describe the role of:

- the imaginary population,
- repeating the sampling process, and
- comparing the observed test statistic to the simulated null distribution.

You may use mice, diets, or glucose levels as examples to clarify your reasoning, but no calculations are required.