Hierarchical models Exercises

Exercise 1 Modeling Diversity and Temperature

Using the **ITEX diversity dataset** , explore the relationship between **plant diversity** and **temperature** across different sites.

Your Tasks:

1. **Model Planning**:
    - What is your **response variable**?
    - Which variables make sense as **fixed effects**?
    - Which variable(s) should be treated as **random effects** (e.g., site, year)?
2. **Fit the Model**:
    - Use `lmer()` to fit a model to the data and look at the output with `summary()`.
3. **Reflect**:
    - Does the model structure reflect **how the data was collected**?

Exercise 2 (optional)

What is the relationship between diversity and temperature **within sites**?

Now that you've explored overall patterns, focus your model on how **temperature affects diversity within each site**.

Your Tasks:

1.
    - What changes when we ask about relationships *within sites* instead of *across* them?
    - Should you adjust the way `site` is treated in your model?
2. **Model Check**:
3. **Fit a New Model (if needed)**:

- Update your `lmer()` call to reflect this new focus.
- Reinterpret the output