This page provides information on the analysis of repeated measures data using mixed models. The term of repeated measures refers to data with multiple measurements taken on the same subjects, often taken over a period of time.

The example below involves six animal subjects randomly selected from two species. The miles traveled by each animal were measured over time. Since this data is in a tall format (stacked), a mixed model analysis is used.

Analysis of Repeated Measures: Mixed Model

1. From an open JMP® data table, select Analyze > Fit Model.
2. Add the response: From Select Columns, select a continuous variable (continuous variables have blue triangles), and click Y.
3. Add model effects: Select variables and click Add (under Construct Model Effects). To specify an interaction term, select multiple columns, then click Cross.
4. Specify the nesting structure: Here, subject is nested within species. Select subject from Construct Model Effects, select species from Select Columns, and click Nest. (If the subject ID is uniquely valued, skip this step.)
5. Specify random effect(s): Select a model effect, then select Random from the red triangle next to Attributes. Here, “subject[species]” is specified as a random effect.
6. Accept the defaults (the REML Method with Unbounded Variance Components selected), and click Run.

By default, JMP will display the Summary of Fit table, REML Variance Components Estimates, Fixed Effect Tests and more.

Additional options are available under the top red triangle.

Interpretation:

1. Variance Components Estimates: Show the estimated variances for random effects and the residual error. In this example, the estimated variation between animals is 0.76, or 38% of the total variation.
2. Fixed Effect Tests: Show the F-test results for the fixed effects using the appropriate variance component estimate as an error term in the denominator. Here, species and season are both significant at alpha = 0.05, while the interaction is not.

Notes: For more information on mixed model analysis, refer to the Mixed Model Analysis one-page guide at jmp.com/learn. MANOVA is used for data in a “wide” (split) format. For additional details on repeated measures analysis, search for “REML” or “MANOVA” in the JMP Help or in the book Fitting Linear Models (under Help > Books).