DOE Full Factorial Design

This guide provides instructions on designing a full factorial experiment. A full factorial experiment in where every possible treatment combination will be studied. For analysis of full factorial experiments, see the **DOE Full Factorial Analysis** guide.

Create the Design (Full Factorial Design)

1. Open the platform under **DOE > Classical > Full Factorial Design**.

2. Specify the **Response(s):**

   - Double-click on **Y**, under **Response Name**, to name the response.
   - If needed, change the response **Goal** and **Upper** and **Lower Limits**.
   - Click **Add Response** to add additional responses.

3. Specify the **Factors**:

   - Click **Continuous** or **Categorical**, then the number of levels to add a factor. Click **Remove** to remove a factor.
   - Double-click to change the factor name.
   - Tab to change the values for the factor.
   - Repeat for all factors.

4. Click **Continue**.

To create a 2^3 full factorial design with one run at each of the 8 corner points and 3 runs at the center point.

5. Specify the **Run Order** (default is Randomize), the **Number of Center Points** and the **Number of Replicates** (the number of additional sets of runs for each design point).
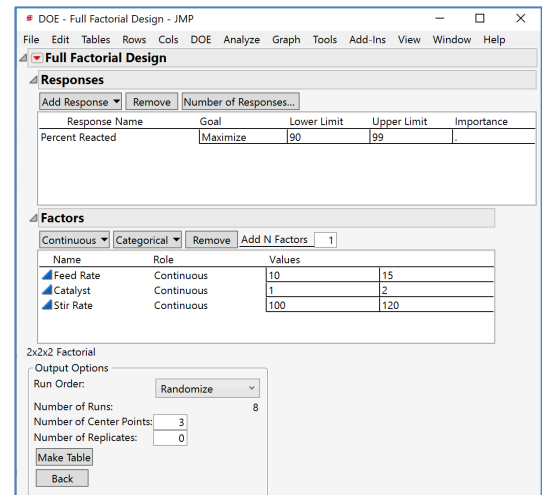
   Here, we have specified an unreplicated fully randomized 2^3 full factorial design with 3 center points, totaling 8 + 3 = 11 runs.

6. Select **Make Table** to generate the design (or **Back** to make changes). In the design table:

   - The **Pattern** column provides a key to the factor levels for each trial.
   - The factor settings are indicated in the columns for each factor.
   - The response for each trial will be recorded in the last column (here, **Percent Reacted**).
   - The **Model** script will be saved to the data table and the design specification window stays open to change or regenerate the design.

Notes:
   - Select **Evaluate Design** to view properties of the design.
   - The **Easy DOE** platform (under DOE menu) provides a guided workflow to step through the process of creating and analyzing experiments and is an alternative to the steps above for creating a design.
   - Full factorial designs can also be generated from the **Custom Design** platform.

Visit **Design of Experiments Guide** in **JMP Help** to learn more.