Future Suggestions:

These suggestions are ideas for what could be added to the product in the future based on our talks with Professor Bryant, Dr. Watson and our development experience.

1. Create interface for a professor to add new models.
   1. Currently, a professor has to create/update a CSV file corresponding to each table in the database and import those files in order to add a new Model to the database. A possible improvement would be allowing a professor access to a webpage that allows them to enter all of the reactions in the Model they would like to add. The interface may be a variation of the ModelEdit screen and the ModuleEdit screen, except instead of having checkboxes and radio buttons to select enzymes, products and substrates, there would be text boxes.
2. Give hints to the user if they are struggling to find the correct reaction.
   1. On the moduleEdit screen the user enters data to create a reaction and then gets feedback on whether or not the reaction they enter is correct. A potential improvement would be to determine how close the user is to finding the correct reaction and give them hints for what they are missing or what is incorrect. For example, if the user has the enzyme, products and substrates correct but they say the reaction is reversible when it should be irreversible, a snackbar could pop up letting them know the reaction is irreversible.
   2. Alternatively, if you don’t want a hint to appear everytime they get the reaction wrong, you could implement a hint button so that the hints only appear when the button is clicked.
3. Allow users to create their own custom models.
   1. Currently a user can only work on models that exist in the database. A potential improvement would be to allow users to create their own custom models. This would be similar to #1 above, however a standard user’s custom model would remain private and would not be available to everyone.
4. Search function on ModuleEdit screen
   1. Currently on the module edit screen there is a list of products, substrates and enzymes for the user to scroll through and pick from. A potential improvement could be to display a text box above the product, substrate and enzyme lists that would allow a user to filter and search through each of the lists. This may make it easier for a user to find a specific product, enzyme or substrate they are looking for.
5. Have 2 molecules (blue dots) appear parallel on the canvas on the ModelEdit screen
   1. Currently on the ModelEdit screen you can see molecules flowing through the pathway. As the molecules traverse the pathway and the rates of each reaction change, the molecules sometimes end up going back up the pathway. This is only possible for reversible reactions. However it may be beneficial to display to the user when the molecules go backwards by showing a parallel path of molecules going the opposite direction. This would signify to the user a more accurate representation of the simultaneous reactions occuring.
6. Improve the math
   1. In our website we have provided a simplified implementation of how the molecules travel through a pathway. However there are different calculations that could be made behind the scenes to more accurately reflect what is going on.
7. Link pathways
   1. Inside the cell there are thousands of pathways for molecule to traverse. These pathways are linked and they interact with each other. Our website has implemented an isolated Model of pathways. One route for improvement could be to link pathways together. This could give a user a more accurate representation of how the pathways interact.
8. Add a comment for when the pathway is complete
   1. Once a user finishes building a complete pathway, a box pops up informing the user that the pathway is complete.