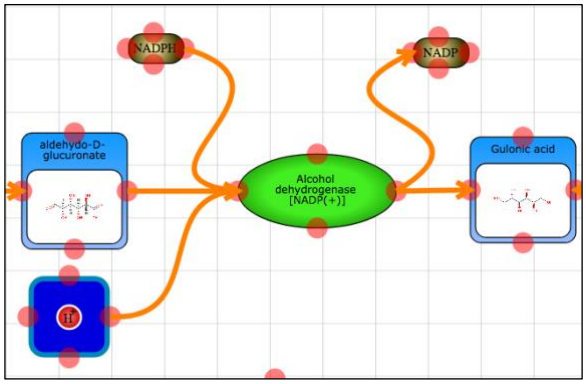
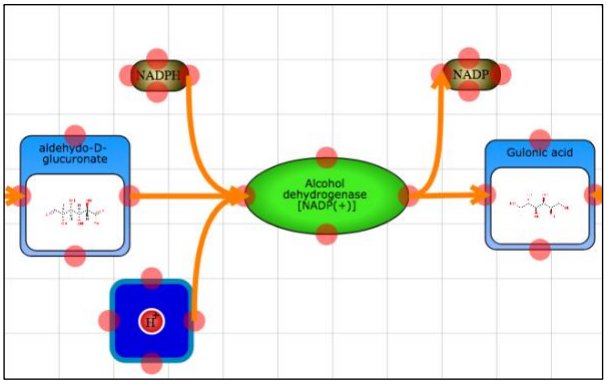
PathBank/PathWhiz Drawing Style Guide

Arrows/Edges:

- Add in any missing arrowheads
- Do not curve an edge more than once
- If the edge is short, curve the edge to branch off to the next reaction/interaction

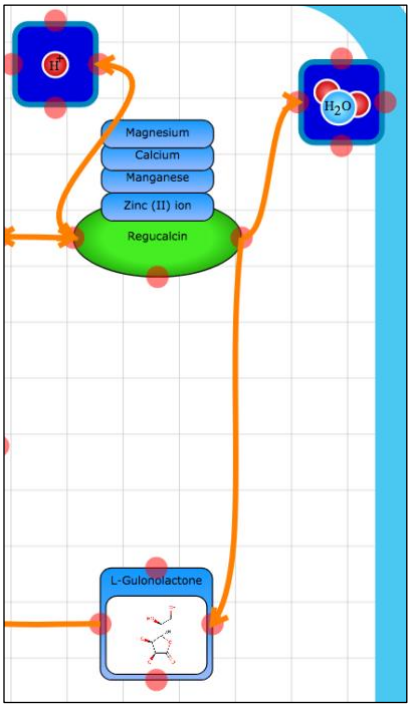


Non-Standard Arrows/Edges
The edges are too curvy.

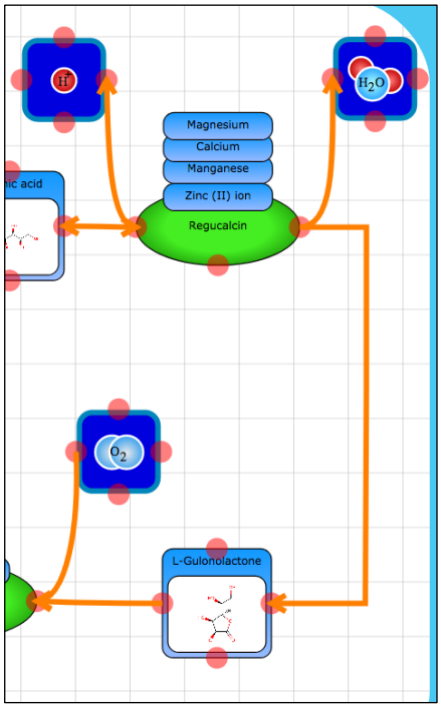


Standard Arrows/Edges
The short edges are curved only once.

- If the edge is long, introduce corners instead of a curve to branch off to another section of the pathway

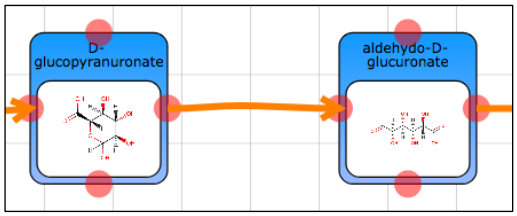


Non-Standard Arrows/Edges
The edges are too curvy.

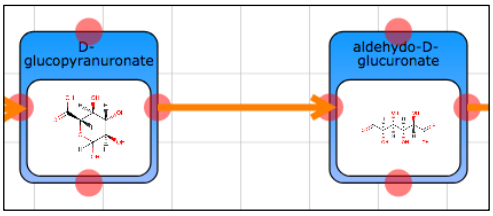


Standard Arrows/Edges
The longer edge has corners.

- For reactions, transports, and interactions without catalyzing/central protein complexes, hide one of the arrows to facilitate drawing straight lines (i.e. one edge to work with instead of two disconnected ones)

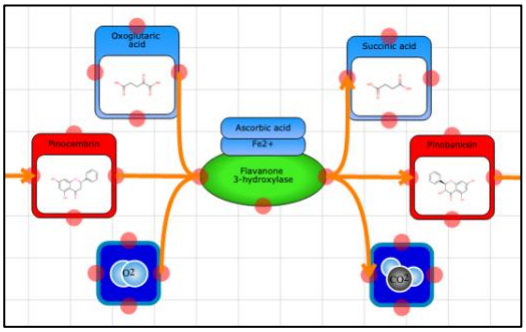


Non-Standard Arrows/Edges
Two edges without a catalyzing/central protein complex is harder to straighten.

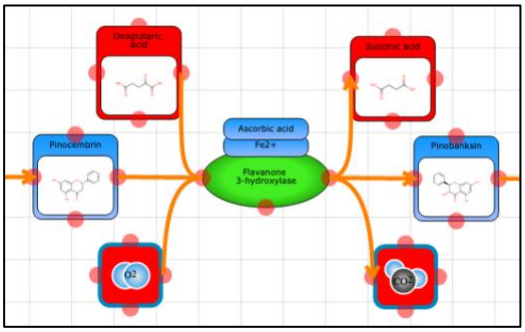


Standard Arrows/Edges
One edge is hidden. The remaining edge is much easier to work with and is easily straightened.

- Reactions generally have one "main" reactant and one "main" product that are aligned along the same plane (either horizontally or vertically)
    - The other reactants and products in the reaction are "currency" elements (e.g. ATP, NADP, H2O) and curve out perpendicularly from that plane

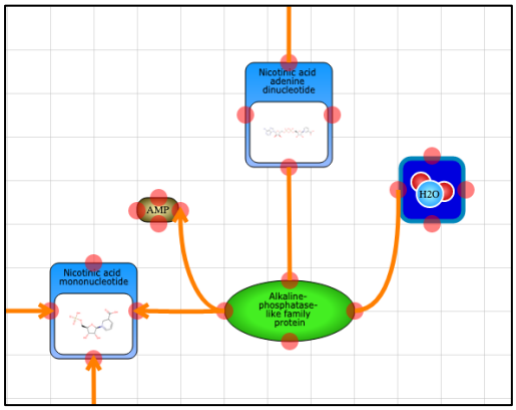


The "main" reactant and product are highlighted in red.

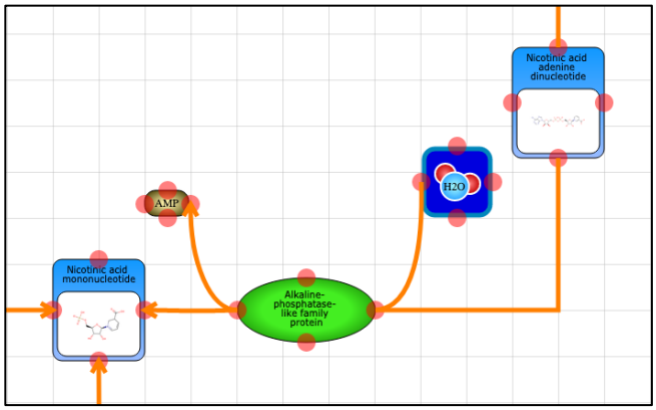


The "currency" reactants and products are highlighted in red.

- When snaking reactions (i.e. changing directions) with catalyzing/central protein complexes, ensure that the edges connecting the "main" reactant and product enter and exit the complex along the same plane (horizontally or vertically)
    - This problem is easily fixed by introducing a corner on one side

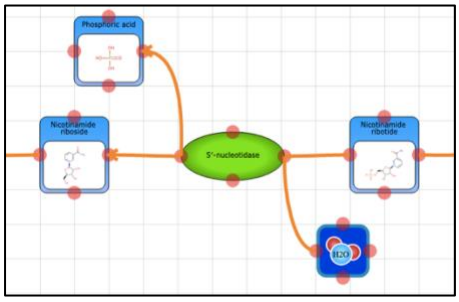


Non-Standard Arrows/Edges
One "main" edge enters the central protein complex vertically and the second exits horizontally.

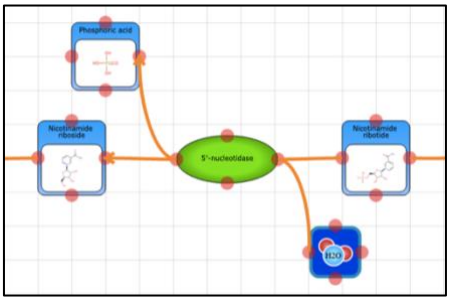


Standard Arrows/Edges
Both "main" edges enter and exit the central protein complex horizontally (along the same plane).

- Curve edges of “currency” elements towards the central protein complex



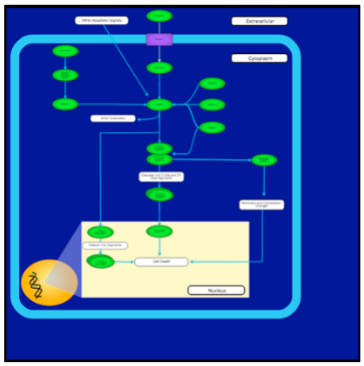
Non-Standard Arrows/Edges
Edges are curved away from the protein complex.



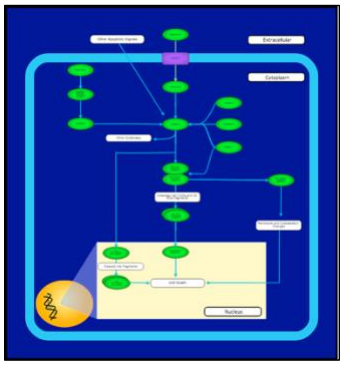
Standard Arrows/Edges
Edges are curved towards the protein complex.

Cell/Pathway Image:

- Always use membranes to enclose pathways (i.e. usually a cell membrane)
- Pathways in blood and lymph must be bounded by the appropriate icon (e.g. blood vessel cross-section icon)
- When pathway is completed use **Other > Change Canvas Size** to manually fit the canvas snugly around the pathway (**NOTE:** 1 grid square = 50px)

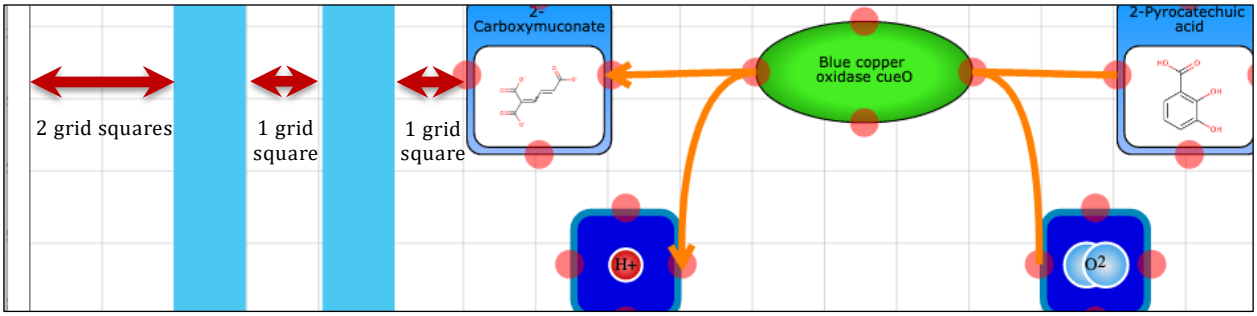


Canvas Not Fit to Pathway



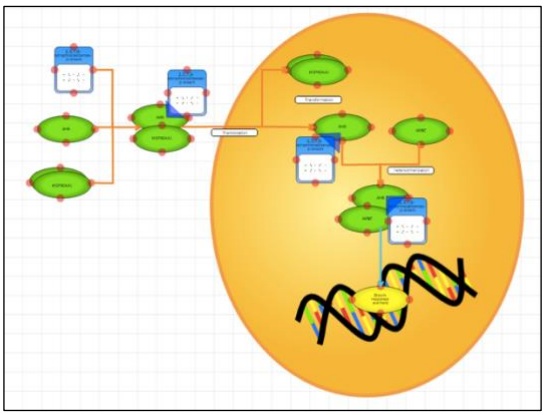
Canvas Fit to Pathway

- Put two grid squares between the canvas edge and the cell membrane
- Put 1 grid square between the cell membrane and the closest interior elements

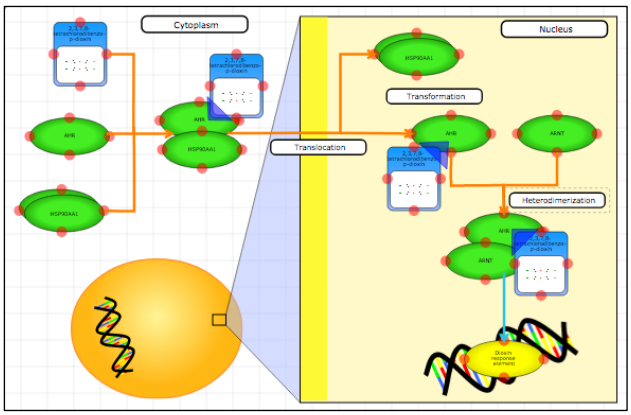


Cellular Locations:

- Always provide cellular locations for processes if known
- Label cellular locations to aid users (use larger labels to facilitate reading)
- Use images of organelles and organs when applicable to provide pathway context
    - These visualizations must be sufficiently large (e.g. at least the size of two compound visualizations placed side-by-side)
- Add a zoom box for an organelle if three or more processes occur there



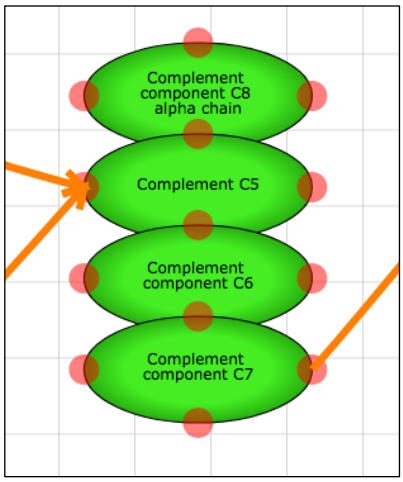
Non-Standard Visualization
A large organelle visualization should not be used when three or more processes occur in the organelle.



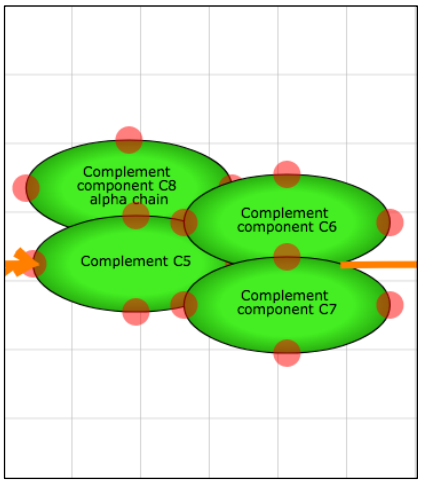
Standard Visualization
If three or more processes occur in an organelle, a zoom box originating from the organelle visualization should be used.

Elements:

- Classes of compounds and proteins are best represented by element collections
- The default colour for proteins is green - use the other colours provided to convey clarity as needed
- Protein complexes should be stacked in shorter columns whenever possible (preferred over one large column)
    - e.g. 2 by 2 for a complex of four; 3 by 2 for a complex of 5

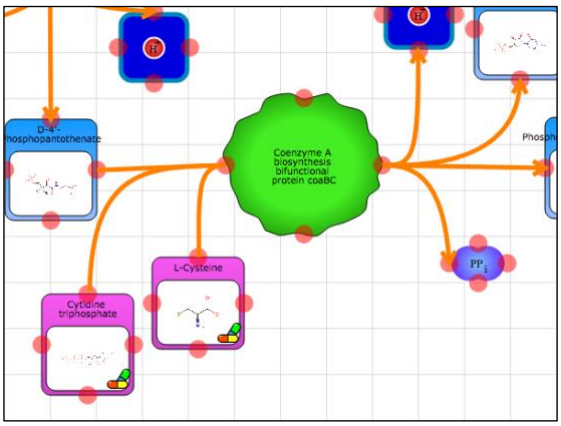


Non-Standard Protein Complex
Protein complexes should not be arranged in one tall stack.

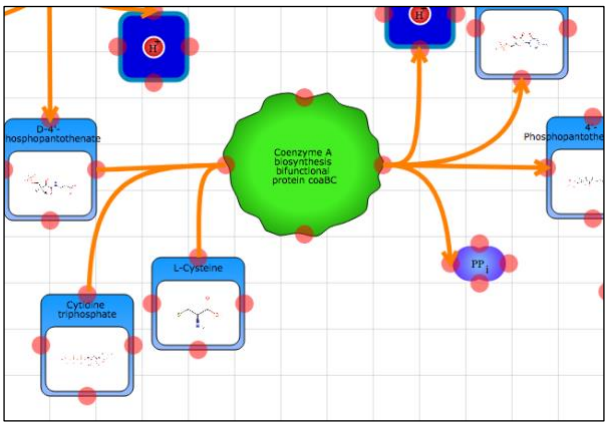


Standard Protein Complex
Protein complexes should be stacked in columns whenever possible.

- Do not use the drug visualization (i.e. pink compound visualization) for non-drug compounds

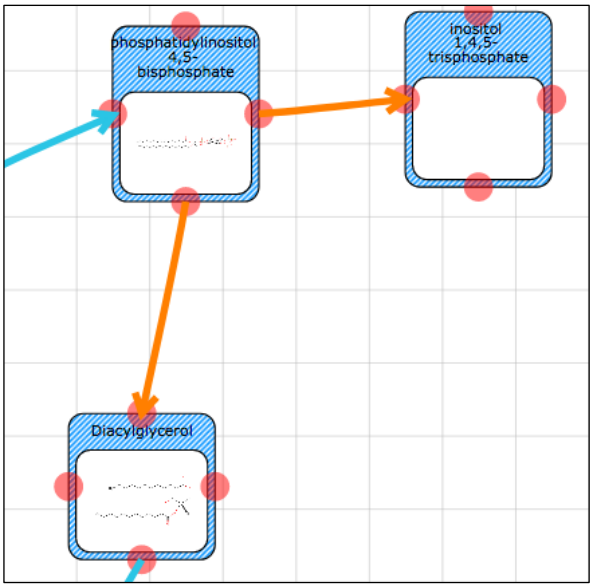


Non-Standard Compound Visualization
The elements should not use the pink drug visualization because they are not drugs.

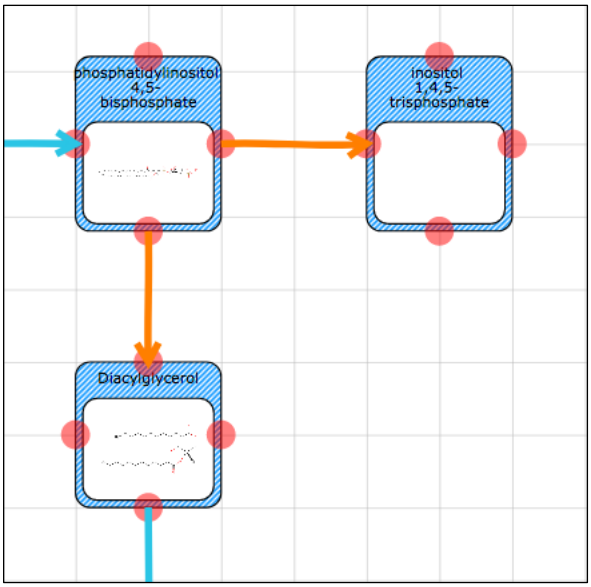


Standard Compound Visualization
The elements use the regular blue compound visualization because they are not drugs.

- Line up elements so that edges are not diagonal



Non-Standard Element Placement
The elements are not aligned and thus their edges become diagonal.



Standard Element Placement
The elements are aligned and thus their elements can be strictly horizontal and vertical.

Processes/Sub Pathways:

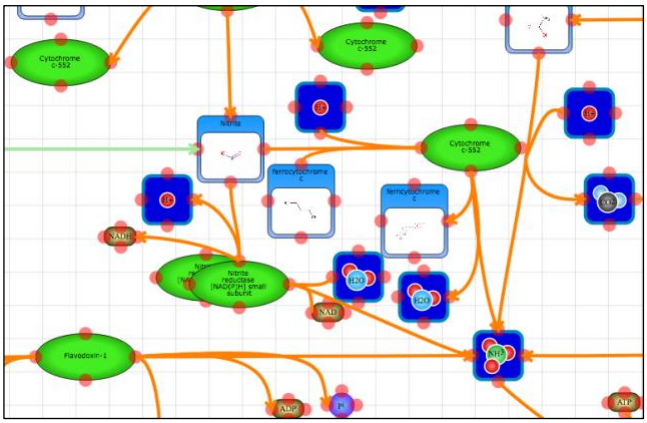
- Pathway must have at least 5 processes (e.g. reactions, transports, interactions)
- Every input element should be part of a sub pathway, transport, or receptor interaction (aim for one sub pathway per pathway)

Connectivity:

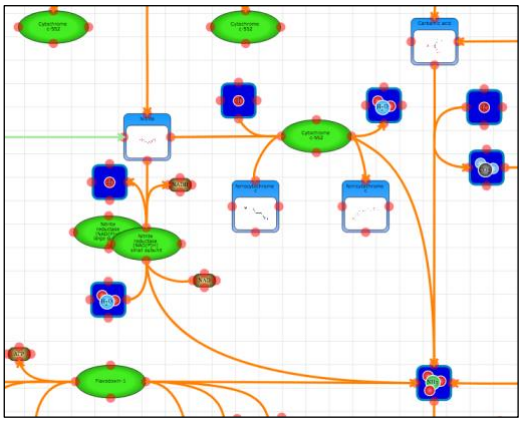
- Every process (e.g. reaction, transport, interaction) in a pathway must be connected
    - Should not use vacuous elements to draw processes
    - Should not have to stack or hide duplicate elements
- To connect processes on the drawing canvas, given two reactions (1) A + B -> C and reaction (2) C + D -> E, be sure to select element C in the first reaction before adding the second reaction

Spacing:

- Provide sufficient spacing between elements so that they do not appear cluttered

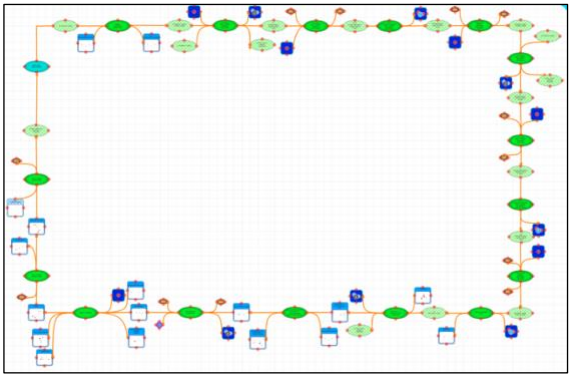


Non-Standard Spacing
The elements do not have sufficient spacing from each other and appear cluttered.

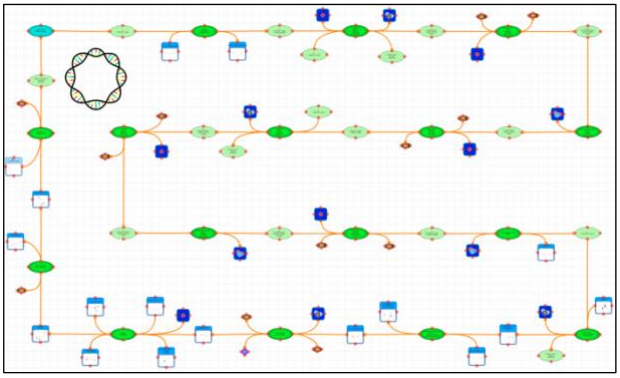


Standard Spacing
The elements are sufficiently spaced from each other.

- Reduce the amount of white space wherever possible to make more compact pathways (e.g. can "snake" chained reactions)

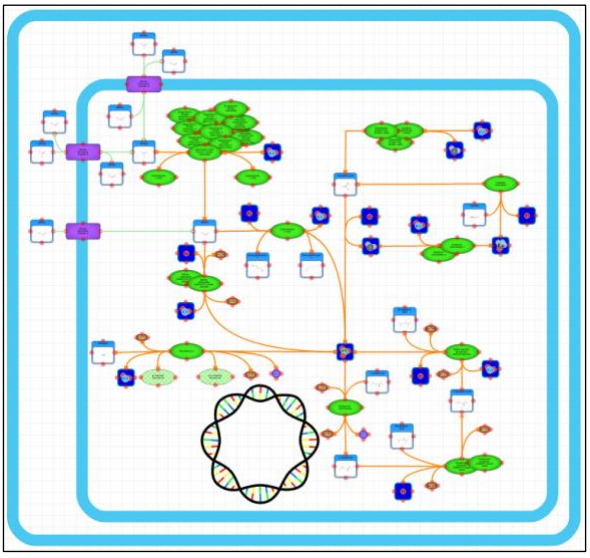


Non-Standard Spacing
The pathway arrangement leaves a large area of empty white space in the center that could be better utilized.

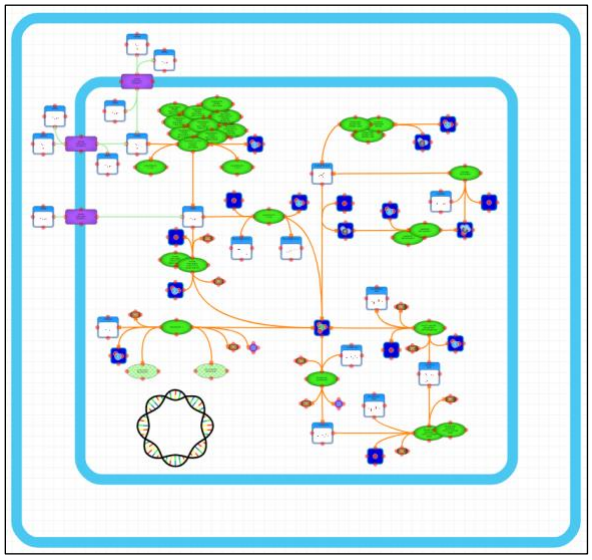


Standard Spacing
The pathway's reactions are "snaked" to better utilize the space and to create a more compact pathway.

- For pathways depicting a periplasmic space, provide consistent spacing (i.e. the same number of grid spaces) between the outer and inner membranes for all four sides of the cell



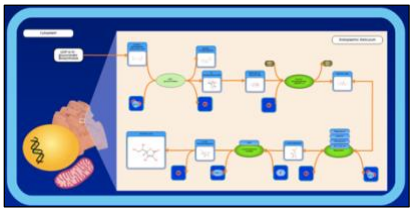
Non-Standard Spacing
The number of grid spaces between the outer and inner membranes is not identical for all four sides of the cell.



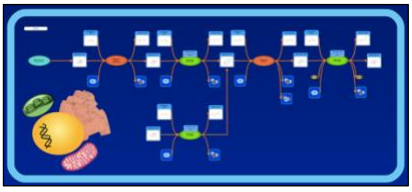
Standard Spacing
The number of grid spaces between the outer and inner membranes is identical for all four sides of the cell.

Species-Specific Requirements:

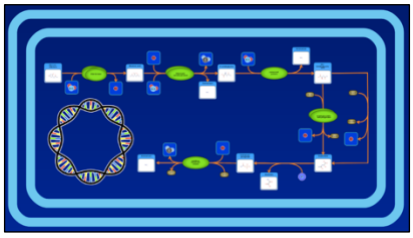
- Every pathway image that depicts a eukaryotic cell must have a visualization of a nucleus, a mitochondrion, and an endoplasmic reticulum
    - Pathway images that depict a plant eukaryotic cell must also have a visualization of a chloroplast
- Every pathway image that depicts a prokaryotic cell must have a visualization of free DNA



Eukaryotic Animal Cell



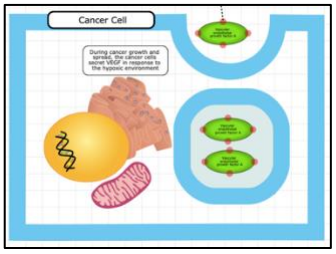
Eukaryotic Plant Cell



Prokaryotic Cell

Endocytosis/Exocytosis:

- Draw endocytic and exocytic vesicles with plasma membranes and with a vacuole zoom box as a teal background (hiding the zoom box's "triangle")



Synaptic Clefts:

- Replicate the "Synaptic Cleft Template" (PW122347) pathway to avoid having to draw the synaptic cleft from scratch
- Dimensions for drawing the synaptic cleft are below (based on the axon width)