

# The “Rainbow Connection” Worksheet

## Discussion Questions

1. Draw a diagram of the set-up. Include the chemicals that were added to the beakers. For each beaker, list the original color of the first solution, the color change after the second solution was added, and the final color after the third solution was added.

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2. Given that the two chemicals added to the beakers were an acid and a base, what kind of chemical must have already been present in the beakers to produce the color changes?
3. Three indicators are used in this demonstration: phenolphthalein, thymolphthalein, and *p*-nitrophenol. Phenolphthalein is an indicator that is colorless in an acidic solution but pink-red in a basic solution. Thymolphthalein is also colorless in an acid, but blue in a base. and *p*-nitrophenol is colorless in an acid and yellow in a base. What indicator or combination of indicators was responsible for the color change in each beaker?