LEARNING OBJECTIVES

1. **Given an empirical problem and data, the student can perform a hypothesis test.**

2. **Given an empirical problem, the student can interpret what rejecting or retaining the null hypothesis means for that particular problem.**

The world of Potions! is populated with a wide variety of mythical creatures, and magic is a real force. Students take the role of an intern receiving wizardly responsibilities for the first time. It is the intern's job—with the help of a mentor—to protect the creatures of their region from magical threats. Presently, many local creatures have fallen ill to a mysterious curse. In theory, they can be cured with the right potions, but determining which potions are best for which creatures will take some experimentation. By conducting controlled trials on the affected populations, the intern will surely be able to determine (with a reasonable degree of certainty) which potions work best.

Potions! is intended to be used in college-level introduction statistics classes across multiple disciplines. By playing through the game, students will be introduced to concepts of inferential logic and hypothesis testing.

Students select populations, choose potions to test, and run t-tests. T-tests are used to compare the means of two groups on a single measure. T-tests can be one-sample or two-sample. Two-sample t-tests can be dependent for paired samples or independent. This game focuses on independent, two-sample t-tests. These tests are used when comparing the means of two independently measured samples.

Through Potions!, students will organize experiments to compare the effects of two potions, choose relevant parameters such as sample size and confidence interval, and interpret authentic results of their experiment. Potions! provides just-in-time feedback, allowing students to correct and learn from their mistakes as they make them. After completing all five levels, students will have a more practical understanding of hypothesis tests and will be better equipped to overcome the common misconceptions associated with inferential reasoning.

The fictional world of the game provides a low-risk, safe environment to aid in mitigating statistics anxiety and to allow students to learn from mistakes and failures without the threat of real-world consequences.

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