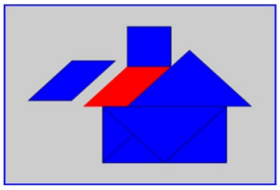
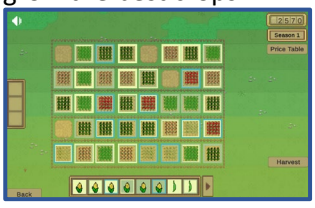
Summary of Games and Labs

If you view the game instructions for each game at https://stat2games.sites.grinnell.edu/, you will see a list of potential explanatory and response variables. This allows students to be very creative in designing their own research questions using a variety of variables. Below is a list of example labs (with links).

Each game also has a sample dataset and corresponding Shiny App/Data Visualization that you can use in your courses.

You are welcome to adapt any of the existing labs under the restrictions listed at the bottom of this document. We are looking for class testers as well as people who are willing to contribute to the repository of available labs.

GAME	Student Labs	Notes
Tangrams: Arrange the shapes on the left into a specific pattern as quickly as possible. 	**1-sample t-test**: Can students complete a particular puzzle in less than 120 seconds? **2-sample t-test**: Can student-athletes complete a particular puzzle in less time than students who are not athletes?	These two labs are designed so that students can adjust the specific research questions to fit their interests. **Outliers/Skewness:** Quite often this activity has skewed data with a few players taking a long time to complete the game. **FUN GAME!**
Shapesplosion: Place specifically shaped pegs into the appropriate locations as quickly as possible. 	**Paired t-test**: Does color influence completion time? **Regression**: Is there a relationship between the number of clicks and completion time? **Design your own research question** **Chi-Square Test**: When a 30-second time limit is given, does the matching scheme influence whether a player can win?	Can modify the hypothesis testing lab to a **one-sample t-test.** **Psychology:** The labs mention the article by Stroop, "Studies of Interference in Serial Verbal Reactions," *Journal of Experimental Psychology*, 18, 643-662. **FUN GAME!**
Greenhouse: Experiment with multiple variables to grow the best crops. 	**Regression**: Is there a relationship between the amount of water and corn yields? **Design Experiments** **(online)** What combination of crop, nitrates, and water can optimize profits?	Online labs are available here: https://dataspace.sites.grinnell.edu/greenhouse1.html Page 1 starts with **simple linear regression.** Page 2 introduces **multiple regression**. Page 3 discusses **designing experiments**.
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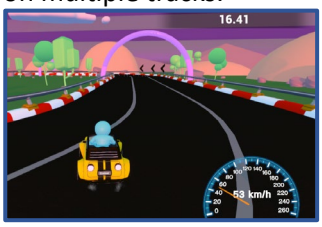
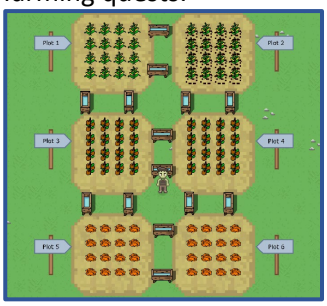
Statistically Grounded / Coffee Truck: Experiment with multiple variables to sell the most coffee. 	[2-Sample t-tests/Power]: Is there a difference between the two locations? How meaningful is a p-value? **Design experiments**: What combination of location, price, music, and time of day sells the most coffee?	The online lab is available here: https://dataspace.sites.grinnell.edu/statsgrounded1.html
RacerLite/Racer: Race cars on multiple tracks. 	[Data Visualization/Confounding]: (**online**) Which car is faster? [Paired t-test]: (**online**) Can we determine if one car is faster than another. [Designing Experiments]: (**online**) What choices are needed to properly collect data?	**RacerLite** allows only paired t-tests. First Day Activity The **Racer** game allows comparison of over 40 different combinations of cars and tracks. The track, body type, tire type, and engine type can all be considered categorical explanatory variables. **FUN GAME!**
RaceKart: Build the fastest car. 	Any of the Racer or RacerLite labs can be adapted to RaceKart.	**RaceKart** is like Racer, but the tracks are more complex, and the sandbox allows for up to nine quantitative explanatory variables to be tested. **FUN GAME!**
TigerSTAT/TigerSampling 	[Regression]: Can we estimate a tiger's age? [Sampling Bias]: Do tigers from different regions have similar traits?	Warning: As in the actual research article, players use tranquilizer guns to catch tigers.
Farmer: Complete multiple farming quests. 	Within the game, students use graphs to determine: • What amount of water is best for corn? • What crop should you plant when there are droughts? • Which crop earns the most income? • Is it economical to add insecticides to every plot?	No handouts are created yet, but there are multiple challenges and visualizations in the game that ask students to address the research questions listed based on crop type, rainfall and water added, nitrate levels, and insecticides. The database can be used to create complete more advanced analyses. The game takes most students 30 minutes to complete all the challenges. **FUN GAME!**
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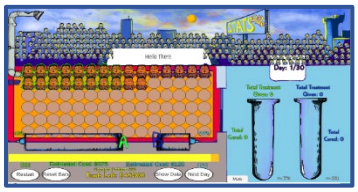
Epidemic: Choose the best turrets to stop the viruses. 	DataVisProportions: Which medicine is best? ElectionPollsDiscussion: Provides a practical application to the content discussed in the first lab.	These activities use bar charts and counts to see the importance of data visualizations. The discussion activity (make sure articles are available to students) creates a good opportunity to transfer knowledge to across contexts. First Day Activity
Defenders: Choose the best turrets to stop the viruses. 	No labs have been created yet, but the Epidemic labs could be adapted to this game. Within the game, students use graphs identify the best options. Design an experiment to determine which strategy is best.	While Level 1 is fairly easy, the game quickly gets more difficult, and it becomes more important to look at the graphs within the game. FUN GAME! Each level gets more challenging!
StatsVille: Choose the best combinations of medicines to stop the epidemic. 	No labs have been created yet. Within the game, students use graphs to determine which combination of medicines is best under various conditions.	This game follows a Susceptible Infected Recovered (SIR) model, which is a simplified version of Covid models. A more advanced explanation of these models is provided with this student lab: https://dataspace.sites.grinnell.edu/covid1.html.
Statspital: Cure patients as fast as possible. 	No labs have been created yet. Within the game, students use graphs to determine which medicine is best under various conditions. First Day Activity – students can play the game on Day 1. Class data can be saved and used later in the course.	Use the graphs and summary statistics to determine which treatment is most effective in curing different patients. Each level gets more challenging! FUN GAME!
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FUN GAME! – Students identified this game as one that is the “most fun”.