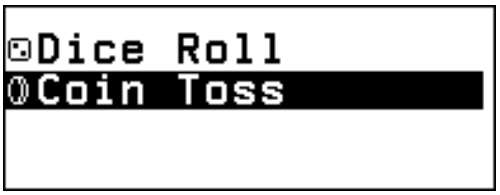
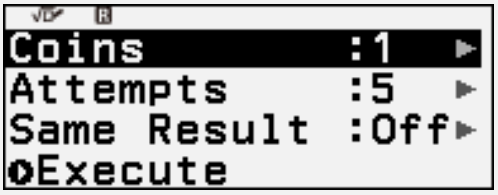
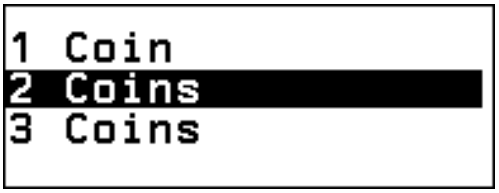
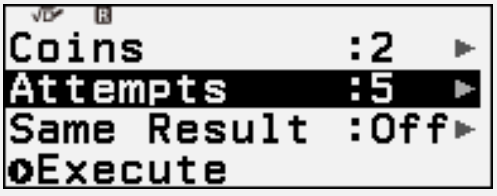
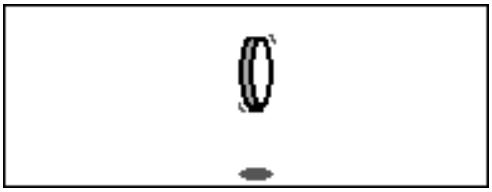
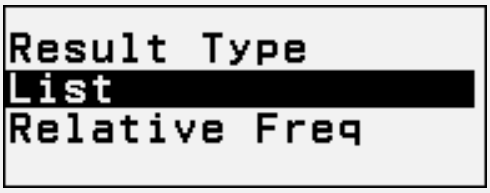
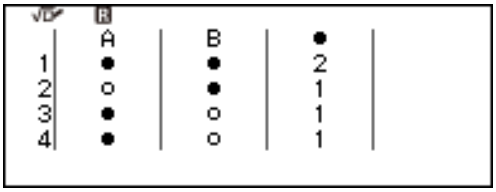
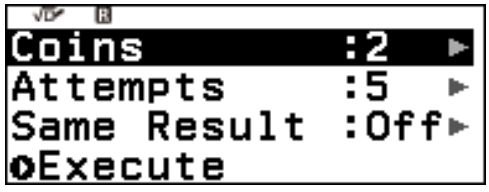
Unit 8: Lesson 10 – Designing Simulations

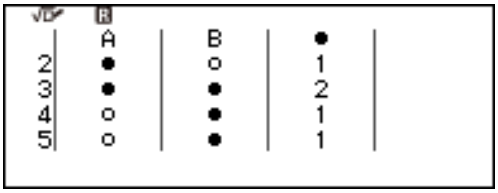
Activity 10.2: Breeding Mice

Skill: Simulate probabilities using the Math Box app's Coin Toss simulation.

Activity Summary:
This activity helps students understand how to simulate real-life situations using chance experiments. In this multi-step experiment, two coins will be flipped in a simulation to represent the offspring of a pair of mice. The Math Box app on the calculator will be used to simulate probabilities when two coins are flipped repeatedly to predict an outcome.

1. Turn on the calculator with the ⏻ **- On button**. Press ⌂ **– Home** and then use the **arrow keys** to highlight the **Math Box app** in the bottom row of apps.	
2. Press either OK or EXE to open the **Math Box app**. Press the **down arrow**, ⌄, to highlight **Coin Toss**.	
3. Press either OK or EXE to select **Coin Toss**.	
4. In this simulation, if **two coins** are both land **heads up**, it represents a mouse with **white fur**. To change the **number of coins**, press either OK, EXE, or ⌄ to open the next menu to choose the **number of coins**. Press the **down arrow**, ⌄, to highlight **2 Coins**.	
5. Press either OK or EXE and the calculator will return to the setting screen with **Attempts** highlighted. The task has **three simulations** of litters of **five mice**, so leave **attempts** set at **5**. The attempts can be changed anywhere between **1** and **250 coin tosses**.	

6. Press the **down arrow**, ⓥ, to highlight **Same Result**. The **Same Result** setting allows the **option** of selecting up to **three different simulations** which will display the **same results**. Leaving **Same Result off** will allow each student to have **different results**. Compiling the **class data together** should yield results closer to the **predicted value**.	
7. Press the **down arrow**, ⓥ, to highlight **Execute**.	
8. Press either [OK] or [EXE] to **Toss the Coins**. An **animation** will quickly play across the screen as the calculator processes the results.	
9. Now select the **Result Type**. For our activity, we want the **List** of the data. (This is highlighted by default.)	
10. Press either [OK] or [EXE] to view the **simulation results**. When tossing **two** coins, it will display **each coin** tossed along with the **sum of heads** in the **last column** on the right.	
11. Press either the **scroll down button**, ⓥⓥ, or the **down arrow**, ⓥ, to quickly view the results for the **fifth mouse** in the **litter**. In this simulation, only **the first mouse** would have **white fur**.	
12. To **repeat** the simulate for the next litter, press the **undo key twice** to return to the **setting menu**.	

13. Press either the **up arrow**, ⊙, or the **scroll down button**, ⊙, to quickly highlight **Execute**.	
14. Press either OK or EXE **twice** to view the **simulation results**. Press either the **scroll down button**, ⊙, or the **down arrow**, ⊙, to quickly view the results for the **fifth mouse** in the **litter**. In this second simulation, only the **third mouse** had **white fur**.	
15. Repeat **Steps 12 through 14** for the **third** and **final litter**. In this simulation, the **first** and **fourth** mouse had **white fur**. This result is a **successful outcome** for the experiment as there are **at least two** mice with **white fur**.