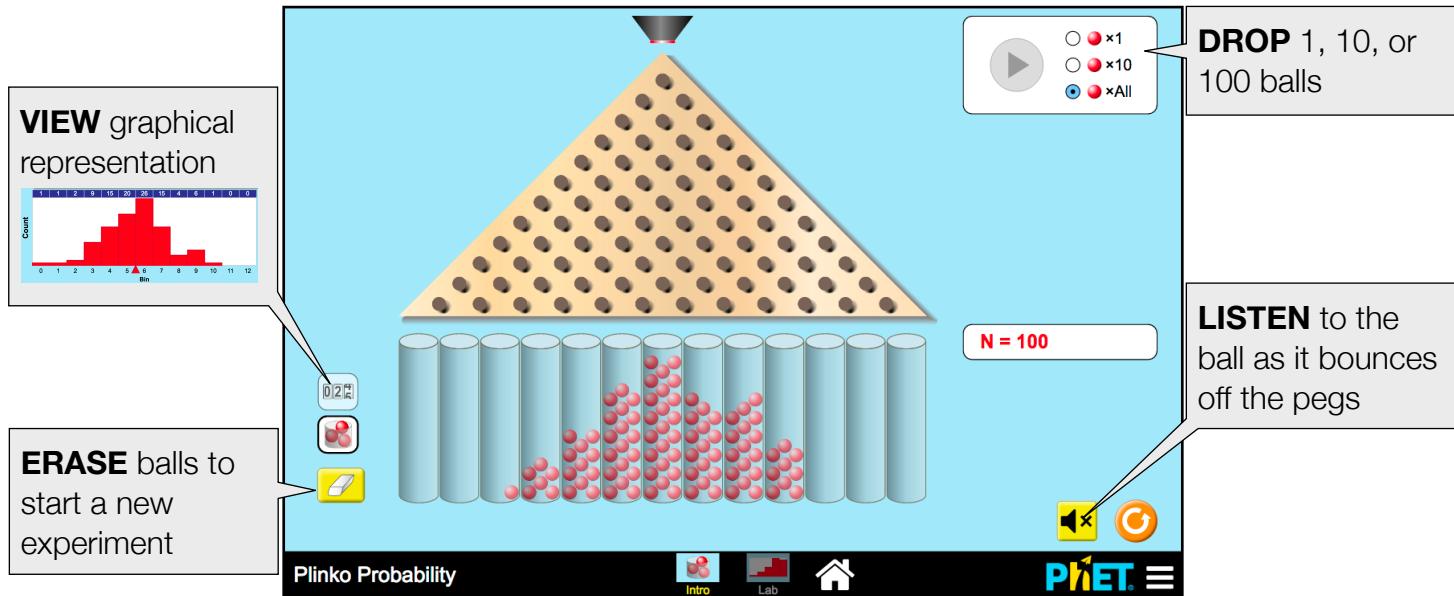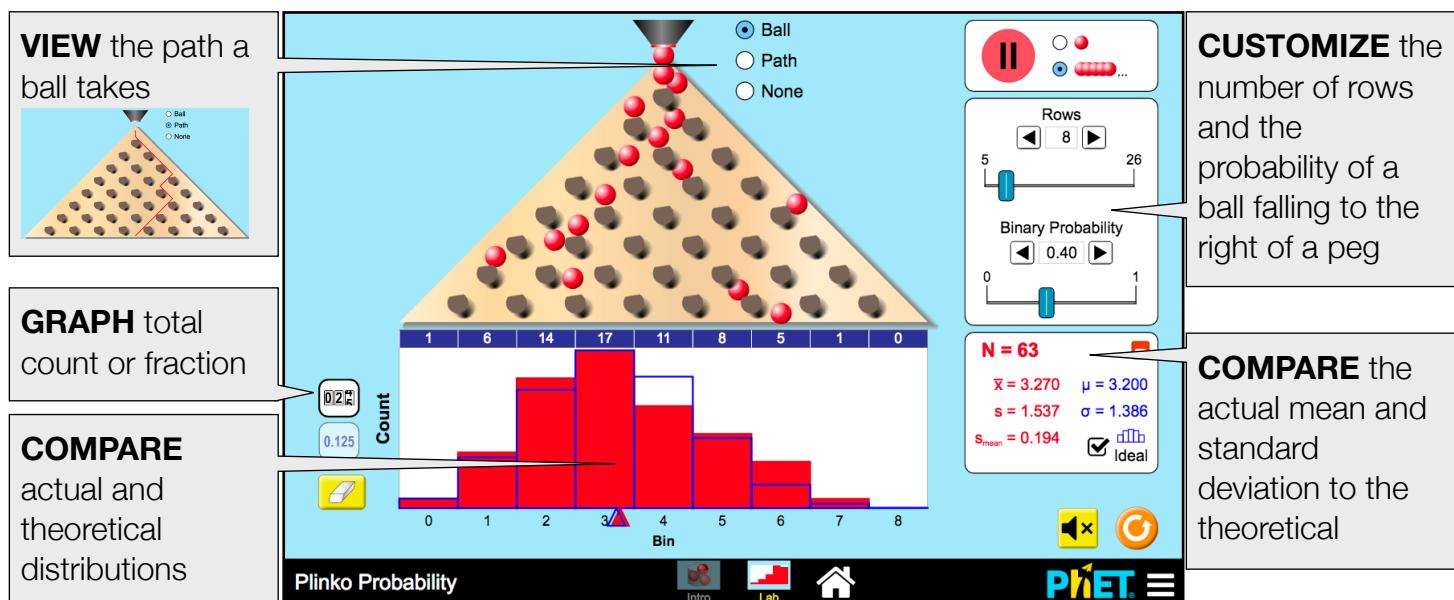## Intro Screen

In the Intro screen, students can guess which bin a ball will fall into, compare multiple trials, switch between a concrete and abstract representation, and begin to explore binary probability.

VIEW graphical representation

ERASE balls to start a new experiment

DROP 1, 10, or 100 balls

LISTEN to the ball as it bounces off the pegs

Lab Screen

In the Lab screen, dive deeper into the exploration of binary probability in the context of a quincunx board.

VIEW the path a ball takes

GRAPH total count or fraction

COMPARE actual and theoretical distributions

CUSTOMIZE the number of rows and the probability of a ball falling to the right of a peg

COMPARE the actual mean and standard deviation to the theoretical

Design Notes

- In the Intro screen, the play button drops 1, 10, or 100 balls onto the board, up to a maximum of 100 balls. Once 100 have been dropped, it will appear inactive until the user clicks refresh or erases the bins.
- In the Lab screen, when the binary probability is adjusted, the pegs tilt as a visual cue that the likelihood of a ball falling to one side is affected. Teachers can help students make sense of the value for the probability by asking what a probability of 0 or 1 means in this context.
- The graphical views auto-scale so that the tallest bar always represents the largest value of any bin.

Suggestions for Use

- Using the Intro screen, conduct multiple trials and compare the outcomes when 100 balls are successively dropped.
- On the Lab screen, showing the path of the ball can be useful for demonstrating a random walk. Students can count how many times the ball turned left or right and verify the final bin the ball lands in.

Customization Options

Query parameters allow for customization of the simulation, and can be added by appending a '`?`' to the sim URL, and separating each query parameter with a '`&`'. The general URL pattern is:

`…html?queryParameter1&queryParameter2&queryParameter3`

For example, in Plinko Probability, if you want to change the screen order (`screens=2,1`), with the 2nd screen open by default (`initialScreen=2`) use:

https://phet.colorado.edu/sims/html/plinko-probability/latest/plinko-probability_all.html?screens=2,1&initialScreen=2

To run this in Spanish (`locale=es`), the URL would become:

https://phet.colorado.edu/sims/html/plinko-probability/latest/plinko-probability_all.html?locale=es&screens=2,1&initialScreen=2

Query Parameter and Description	Example Links

`screens` - specifies which screens are included in the sim and their order. Each screen should be separated by a comma. For more information, visit the Help Center.	`screens=1`
	
	`screens=2,1`

`initialScreen` - opens the sim directly to the specified screen, bypassing the home screen.	`initialScreen=1` `initialScreen=2`
`locale` - specify the language of the simulation using ISO 639-1 codes. Available locales can be found on the simulation page on the Translations tab. Note: this only works if the simulation URL ends in "_all.html".	`locale=es` (Spanish) `locale=fr` (French)
`allowLinks` - when `false`, disables links that take students to an external URL. Default is `true`.	`allowLinks=false`

See all published activities for Plinko Probability here.

For more tips on using PhET sims with your students, see Tips for Using PhET.