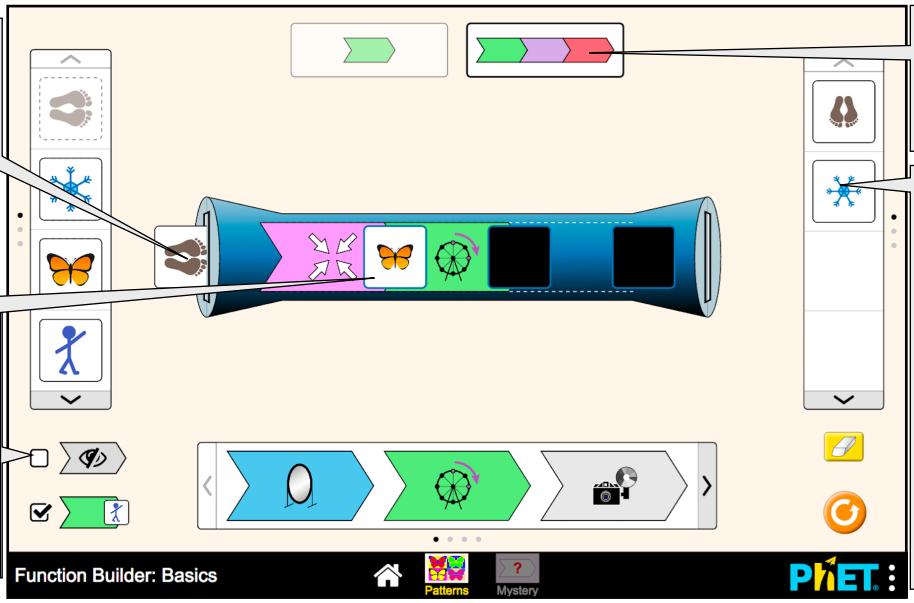
PhET Tips for Teachers

Function Builder: Basics

Patterns Screen

In the Patterns screen, students explore a variety of functions, make predictions, compose functions, and define a function.



DRAG inputs through the function builder

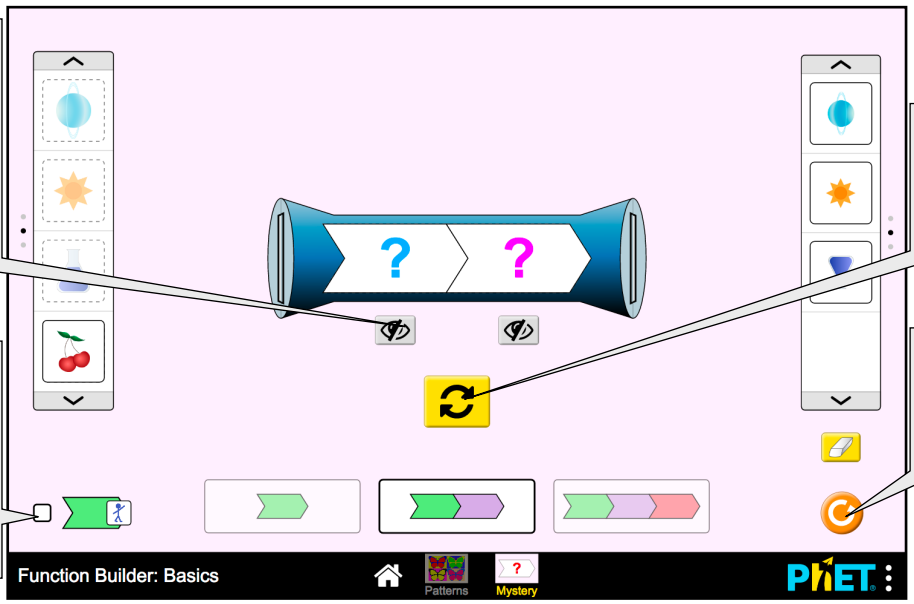
SEE INSIDE the function; **DRAG** a card past each function and watch it transform

COMPOSE more than one function

DRAG outputs backward through the function. If a function is non-invertible, get feedback:

Mystery Screen

In the Mystery screen, students can play detective to determine the hidden functions.



REVEAL the mystery functions after creating at least three input/output pairs

SEE INSIDE the function after creating at least two input/output pairs

REFRESH to get a random challenge

RESET to get the original three challenges

McGarry, June 2017

Insights into Student Use

- Students really enjoy composing multiple functions on the Patterns screen. If you have an objective around defining what a function is, you may want to use the single function scene.

Suggestions for Use

- Explore geometric transformations on the Patterns screen. Determine which functions are dilations, rotations, reflections, translations, or a combination. Determine which functions are not geometric transformations.
- Check both “hide functions” and “see inside.” Advance a card through the builder and determine which functions are in the builder.

Sample Challenge Prompts

- Choose a function for your function machine. After you drag cards through the function, discuss with your partner what you think a function is.
- Which function on the Patterns screen appears to “do nothing”? Which arithmetic functions also “do nothing”?
- Why can you drag a card backward through some functions and not others? Make up your own function that has the same quality and explain why you could not drag a card backward through it.
- Using two functions in your function machine, find an example of when the order in which you place them matters. Describe your findings. Find a different example of when the order does not matter. Summarize when the order does and does not matter.
- Create a function whose outputs appear unchanged when compared to the inputs.

See all published activities for Function Builder: Basics here.
For more tips on using PhET sims with your students, see Tips for Using PhET.

McGarry, June 2017