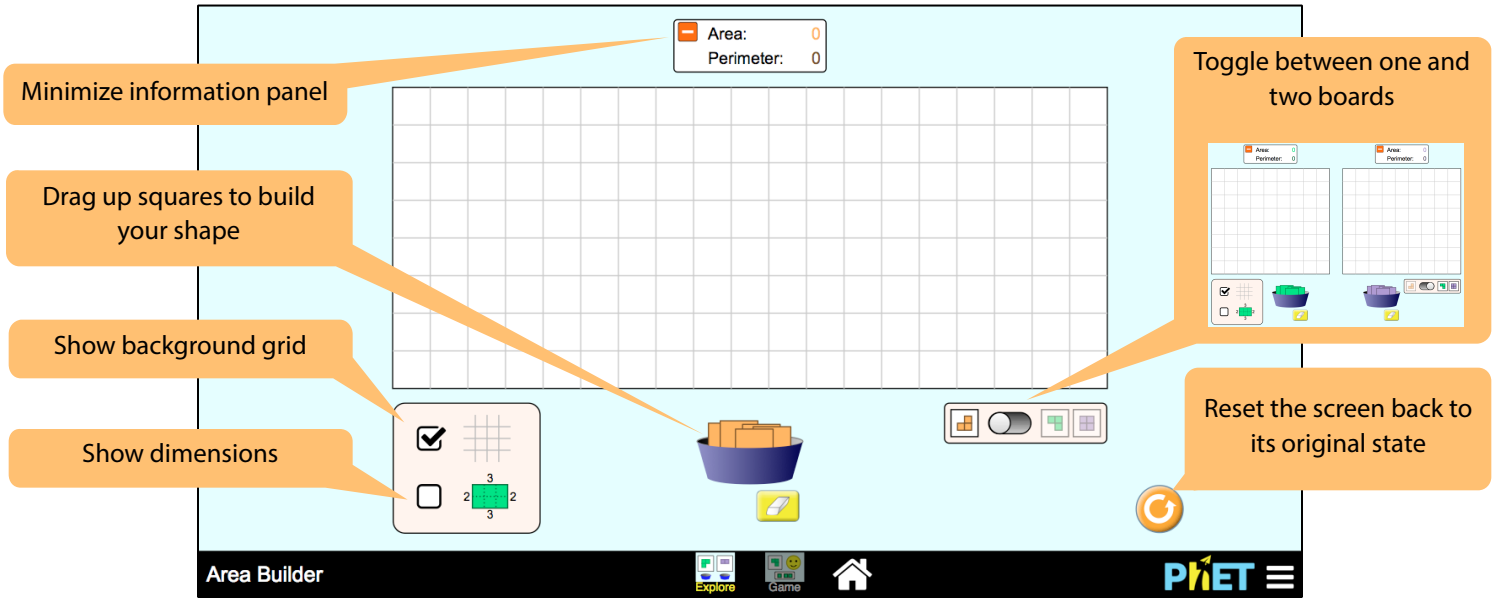
PhET Tips for Teachers — Area Builder

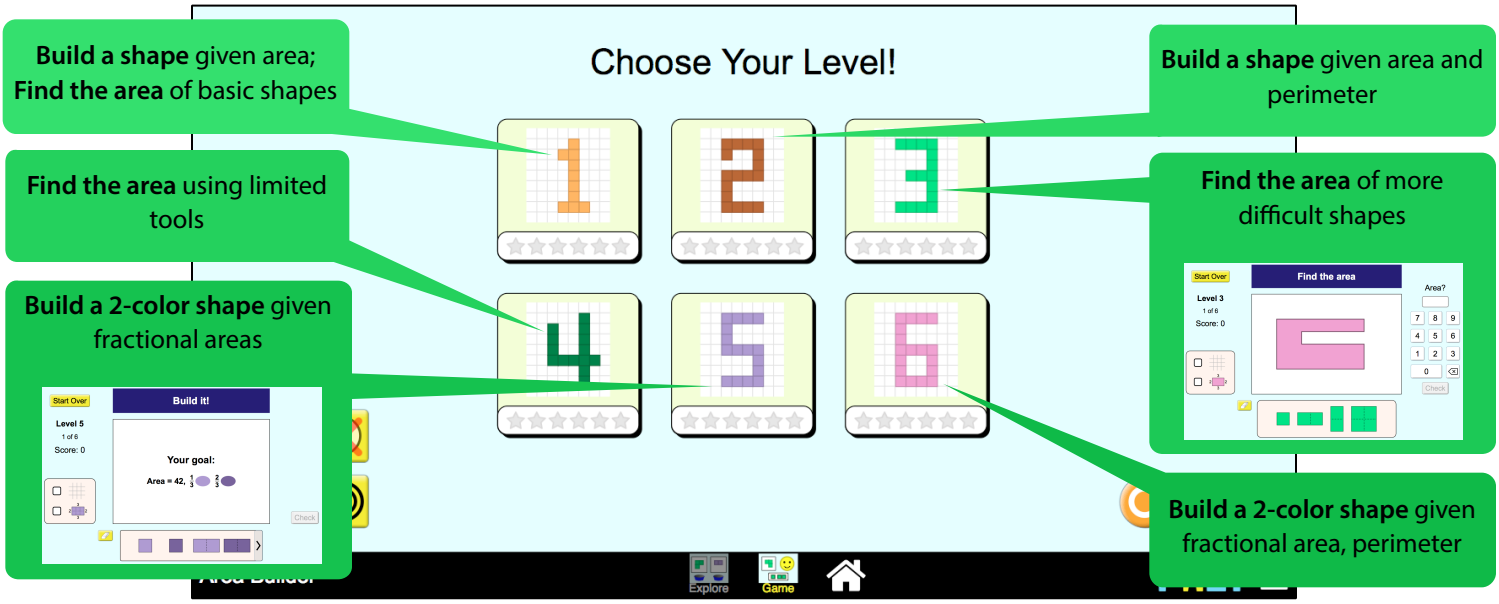
Explore Screen

In this screen students can build any shape and explore the relationship between area and perimeter.



Game Screen

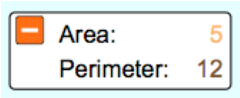
There are two kinds of challenges: Build a Shape and Find the Area. Each level contains challenges of increasing difficulty.



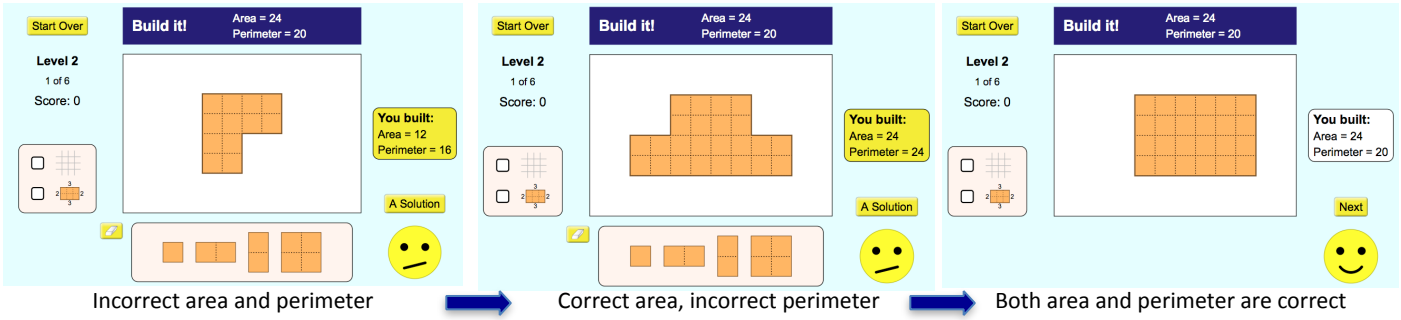
Authors: McGarry, Hensberry, October 2014

Insights Into Student Use / Thinking

- The information panel may go unnoticed by students until they are prompted to use it in a task (see below for a sample task).



- In the game screen, after two incorrect answers on Build It! challenges, a "You built" panel appears to help students compare their solution to the goal (still stated in the prompt). Students can *continue working* to achieve the correct solution and watch the banner update.



Incorrect area and perimeter → Correct area, incorrect perimeter → Both area and perimeter are correct

Suggestions for Sim Use

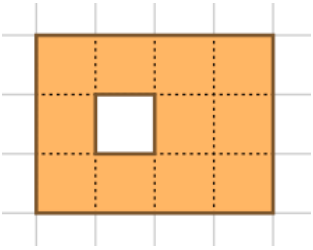
Area Builder is ideal for guided exploration in an elementary or middle school classroom. Students can work individually with a sim, in pairs, or with it projected in front of the class.

Activity Ideas

- *Individual exploration*: Have students explore the sim for 5 minutes. They will notice the game screen quickly, so providing a guided inquiry activity for the Explore Screen that prompts students to compare the area and perimeter of a shape they build will allow for richer use of the sim. Use the dual board mode to create two shapes with the same area and different perimeter.

- *In pairs*: Using the Explore Screen, have students build a shape and minimize the information panel at the top. Then have their partner calculate the area and perimeter; they can check their answers by expanding the panel.

- *Class demo*: Minimize the information panel and create an irregular shape. Elicit different methods for finding the area of the shape (ex: breaking into smaller shapes, finding the area and subtracting the "missing" area, etc.). Similarly, facilitate a discussion about the perimeter of the shape (ex: Does the internal border count? What is the most efficient way of calculating it?).



Sample Challenge Prompts

- What is area? How is it calculated?
- What is perimeter? How is it calculated?
- How might you use the dimensions tool to calculate area and/or perimeter?
- Without adding/removing blocks, can you rearrange the blocks in a shape to form a different area? Can you form a different perimeter? What kind of shapes have a bigger perimeter? What kind of shapes have a smaller perimeter?

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