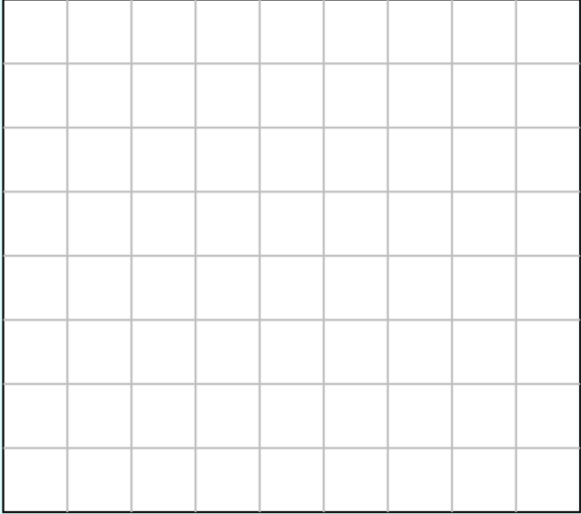Name: _____ Class: _____ Date: _____

Scaling Shapes

Objective: Generalize how scale factors affect the area and perimeter of any shape.
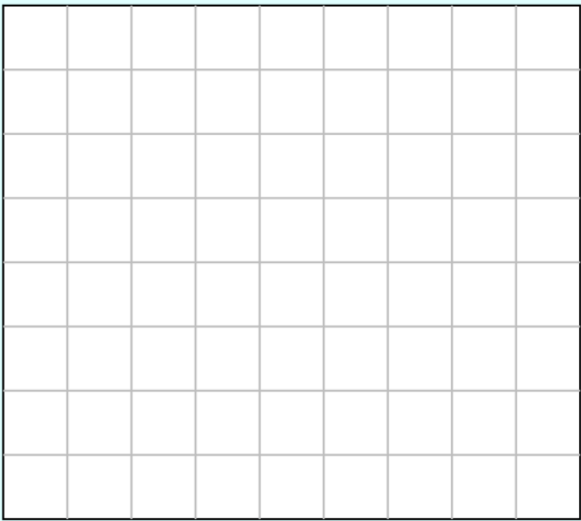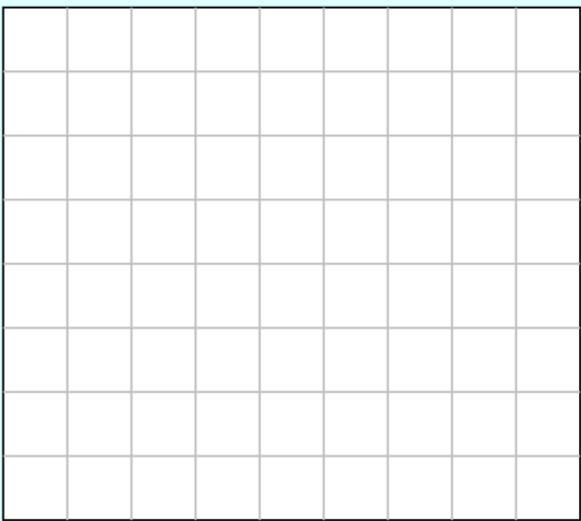
Part I. Scale factor of 2

1. **Explore**: Take 5 minutes to explore the Area Builder sim before beginning this worksheet.

2. **Build a Shape**: Click the toggle so that you can view two boards at a time. Build a shape no larger than 4 unit wide or tall, sketch it below, and use the information panel to record the area and perimeter. **Minimize the information panel**.

3. **Predict**: Trade computers with your partner. Ask them to write down their predictions for the area and perimeter of the scaled shape.

4. **Verify**: On the second board, have your partner build a *similar shape* that is scaled by a factor of 2. Sketch it below and maximize the information panel to compare the results with your prediction.

Shape #1		
Original		Area = Perimeter =
Scaled ×2		*Predict…* Area = Perimeter = *Actual* Area = Perimeter =

There's more!

Part II. Scale factor of 3

5. **Build a Shape**: Click the toggle so that you can view two boards at a time. Build a shape no larger than 3 unit wide or 2 units tall, sketch it below, and use the information panel to record the area and perimeter. **Minimize the information panel**.

6. **Predict**: Trade computers with your partner. Ask them to write down their predictions for the area and perimeter of the scaled shape.

7. **Verify**: On the second board, have your partner build a *similar shape* that is scaled by a factor of 3. Sketch it below and maximize the information panel to compare the results with your prediction.

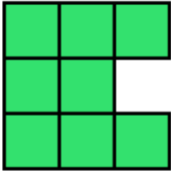| **Shape #2**		
Original		Area = Perimeter =
Scaled ×3		*Predict…* Area = Perimeter = *Actual* Area = Perimeter =

Part III. Group Share

Compare your predictions and actual results for Parts I and II.

- Perimeter: What patterns do you observe between Part I and Part II? What differences do you notice? If you can agree on a rule for how perimeter changes with scaling, write it on a pink post-it note.

- Area: What patterns do you observe between Part I and Part II? What differences do you notice? If you can agree on a rule for how perimeter changes with scaling, write it on a blue post-it note.

Part IV. Apply

8. What are the new area and perimeter of this shape if it is scaled by a factor of 4? Justify your answer.

9. A shape has an original area of 5 and perimeter of 12. What are the new area and perimeter if it has been scaled by a factor of 2.5? Justify your answer.

10. **Generalize**: Explain to someone how to calculate the new area and perimeter of a scaled shape if they know the original area and the scale factor.

11. **Challenge**: A shape has an original area of a and a perimeter of p. What are the new area and perimeter if it has been scaled by a factor of s?