



MATH WITH MR DJ

GRADE 7 · GEOMETRY

# SCALE DRAWINGS

**Today's goal:** I can compute actual lengths from a scale drawing (using proportional reasoning), compute actual areas from a scale drawing (using proportional reasoning) and reproduce a scale drawing at a different scale (using proportional reasoning).



Tan



Digit



Blaze



Pi



**WARM-UP**

**Turn & talk · 1 min**

**A shape has area  $6 \text{ cm}^2$ . Every length is doubled.**

**1** What is the new area?

**TURN & TALK**

**$12 \text{ cm}^2$  or  $24 \text{ cm}^2$ ?**



# Lengths first

- 1 Scale 1 : 50  $\rightarrow$  every 1 cm on paper is 50 cm real.
- 2 Drawing  $\rightarrow$  real: MULTIPLY. Real  $\rightarrow$  drawing: DIVIDE.



## BIG IDEA 2

# Area doubles TWICE

- 1 A 2 by 3 rectangle has area 6.
- 2 Doubled: 4 by 6  $\rightarrow$  area 24. Both dimensions grew.

### REMEMBER

**Lengths  $\times k \rightarrow$  area  $\times k^2$ . Here  $2^2 = 4$ .**



### BIG IDEA 3

# Check it by dimensions

- 1 3 by 8, scaled by 4  $\rightarrow$  12 by 32  $\rightarrow$  384 cm<sup>2</sup>
- 2 Each dimension picked up a 4, so the product picked up 16.

#### REMEMBER

**The square isn't an extra rule. It's what happens.**



## BIG IDEA 4

# Backwards too

- 1 Area 36 times bigger  $\rightarrow$  lengths 6 times bigger, since  $6^2 = 36$ .
- 2 Halving lengths  $\rightarrow$  area  $\times \frac{1}{4}$ , not  $\times \frac{1}{2}$ .

### REMEMBER

**Lengths grow 6x. Area grows 36x. That gap is the lesson.**



**SPOT THE SLIP!**

**Turn & talk**

# Something went wrong here...

## THE PROBLEM

Every length of a shape is multiplied by 2.  
By what factor is the area multiplied?

## WHAT A STUDENT DID

Answered 2.

## YOUR MISSION

**What went wrong? What's the right answer?**



Every length of a shape is multiplied by 2. By what factor is the area multiplied?

1  $2^2 = 4.$

Answer:

4



# Pick your pepper!



MILD

A path is 5 cm on a 1 : 20 drawing. How long is it really, in centimetres?

#1 on your practice sheet



MEDIUM

A field is 12 cm on a 1 : 200 drawing. How long is it in metres?

#2 on your practice sheet



SPICY

Every length is halved. By what factor is the area multiplied?

#6 on your practice sheet

# How's it going?



**3 • Got it!**

I could teach it



**2 • Almost**

One more example, please



**1 • Not yet**

I need some help

# NOW YOU!

**Practice sheet:** everyone does Mild & Medium, then climb the peppers.

**Stuck?** Look back at Mr DJ's example at the top of the sheet.

**Need it again?** Step-by-step videos on YouTube @MathWithMrDJ

**Brain break:** 3 new daily puzzles at [puzzles.mathwithmrdj.com](https://puzzles.mathwithmrdj.com)

