



project.org

STUDENT HANDOUT

YELLOW LEVEL
GRADE LEVEL

Math vs. Your Eyes

Grades 5-8 · Math

ADMIT ONE

NAME

DATE

CLASS

Measuring illusions. Optical illusions exploit how your brain interprets geometric relationships. By measuring carefully, you can quantify exactly how much your perception differs from reality.

PART 1

01

Measurement challenge

For each illusion, predict which element is larger, then measure to find the truth.

ILLUSION	YOUR PREDICTION	ACTUAL MEASUREMENT	DIFFERENCE
Müller-Lyer Line A	Longer / Shorter	_____ cm	_____ cm
Müller-Lyer Line B	Longer / Shorter	_____ cm	
Ponzo Top Line	Longer / Shorter	_____ cm	_____ cm
Ponzo Bottom Line	Longer / Shorter	_____ cm	

Analysis: In both illusions, the lines were _____ (equal/different).

My perception was off by approximately _____ cm in the Müller-Lyer illusion.

PART 2

02

Angle investigation

The strength of the Müller-Lyer illusion depends on the angle of the arrows.

Use a protractor to measure the angle of the arrows in your illusion: _____°

Hypothesis: Would the illusion be stronger or weaker with sharper (smaller) angles? Explain:

PART 3

03

One-point perspective

On graph paper (or below), create a one-point perspective drawing of a hallway or road. Include:

- Horizon line
- Vanishing point
- At least 4 lines converging to the vanishing point
- Objects that get smaller toward the vanishing point

DRAW YOUR PERSPECTIVE SCENE HERE

04

PART 4

Check your drawing

Math check: Use a ruler to verify that your converging lines actually meet at the vanishing point.

Do all lines converge correctly? Yes / No

If not, which line(s) need adjustment?

05

PART 5

Mathematical analysis

In your perspective drawing, measure the width of an object (like a doorway) at two points:

Width near the bottom of the drawing:

_____ cm

Width near the vanishing point: _____ cm

Calculate the ratio: _____ ÷ _____ = _____

This ratio represents how much objects “shrink” as they appear farther away!

MINI MUSEUM CONNECTION

The stereoscope cards were photographed from two positions exactly 6.5 cm apart (average human eye spacing).

Calculate: If your eyes are 6 cm apart, what percentage difference is that from the standard cards?

Show your work: $(6.5 - 6) \div 6.5 \times 100 = \text{_____} \%$

Visit: minimuseumproject.org/exhibitions/seeing-is-deceiving/illusions

06

PART 6

Real-world connections

List three professions where understanding perspective and measurement is essential:

1. _____

2. _____

3. _____

SHARE WITH YOUR FAMILY

Challenge: Find examples of one-point perspective in your home or neighborhood (hallways, roads, fences). Take photos and identify the vanishing point!