



## Data Collection and Math Analysis Guide

### → **Step 1: Choose 3-4 Key Elements of Your Design**

Pick parts of your design that are visually important or repeated. These should be elements you can measure or describe mathematically.

#### **Examples:**

- The length of a tile edge.
- The distance of a spiral from center to edge.
- The angle between repeated shapes.
- The number of pattern repetitions.

### → **Step 2: Measure Them and Write the Real Values**

Use tools like a ruler, compass, or digital software (GeoGebra) to measure lengths, angles, or proportions.

#### **Examples:**

- A side measures 5.2 cm.
- Rotation angle is  $60^\circ$ .
- Spiral grows 1.6 cm per loop.
- The pattern repeats 8 times around a center.

### → **Step 3: Compare with Known Mathematical Models**

Check your measurements against well-known mathematical concepts. Are they similar or inspired by these models?

#### **Examples:**

- Golden Ratio approximately 1.618 (compare two side lengths).
- Types of symmetry (bilateral, radial, rotational).
- Fractals (self-repeating at different scales).
- Fibonacci Sequence (1, 1, 2, 3, 5...) in spacing or growth.
- Tessellations (shapes fit perfectly without gaps).

#### Step 4: Reflect on How Closely Your Design Matches the Math

Think critically about how your artistic design matches or diverges from the math model.

**Reflection prompts:**

- Do your values approximate the model?
- Did you change anything for artistic reasons?
- Can viewers see the math in your design?
- What did you discover while measuring and comparing?

**Example:**

"Our spiral doesn't exactly follow Fibonacci numbers, but the growth rate is very close to the golden ratio. We exaggerated curves slightly for visual impact."

#### Analysis Table

Element	Measurement	Math Model	Comparison/Comments