

# **Fraction Representations & Constructs**

Created by Nicole Rigelman (2025)

# Egg Carton Fractions

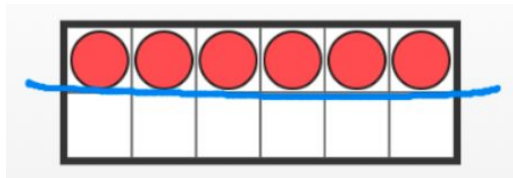
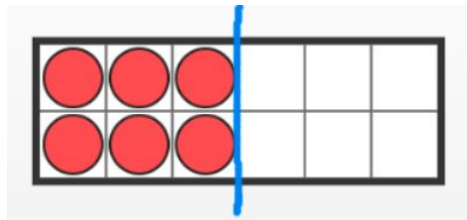
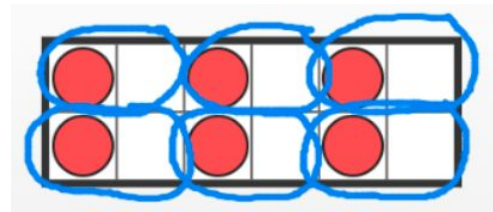
$\frac{1}{2}$

**Use** the egg carton, “eggs,” and yarn **to show** how you think about the meaning of *one-half*.

# Egg Carton Fractions

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**Use** the egg carton, “eggs,” and yarn **to show** how you think about the meaning of *one-half*.



# Egg Carton Fractions

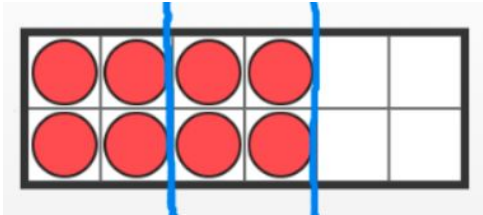
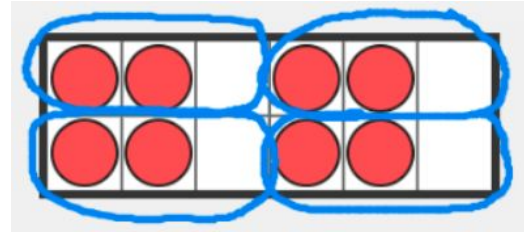
$$\frac{2}{3}$$

**Subdivide** and **fill** an egg carton to show *two-thirds*.

# Egg Carton Fractions

$$\frac{2}{3}$$

**Subdivide** and **fill** an egg carton to show *two-thirds*.



# Egg Carton Fractions

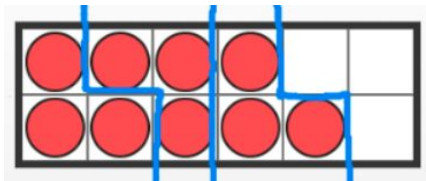
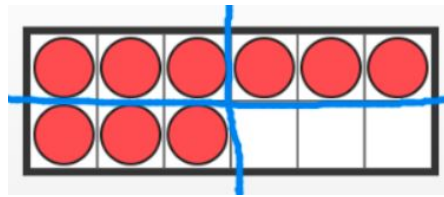
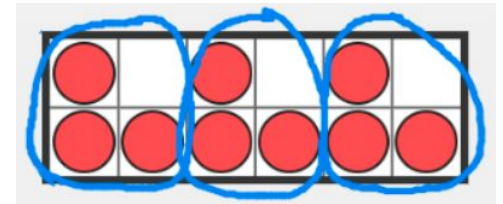
$$\frac{3}{4}$$

**Subdivide** and **fill** an egg carton to show *three-fourths*.

# Egg Carton Fractions

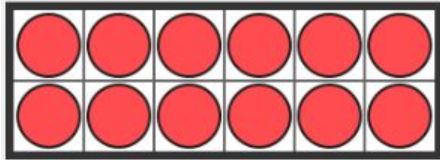
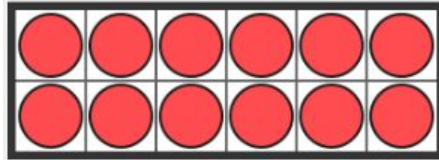
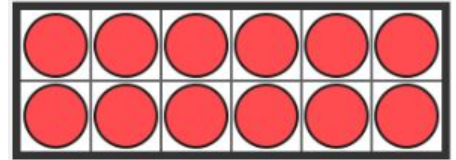
$$\frac{3}{4}$$

**Subdivide** and **fill** an egg carton to show *three-fourths*.

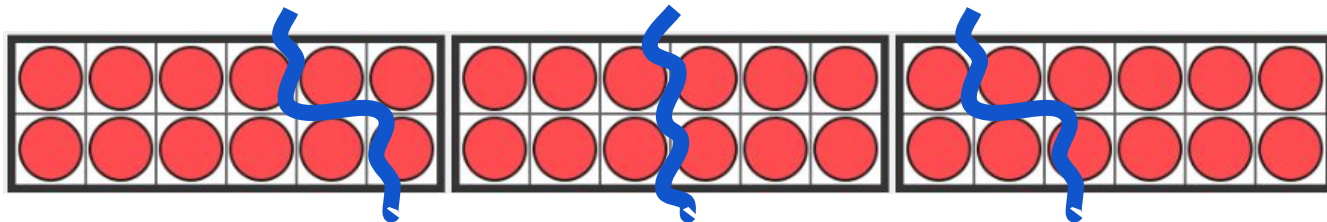
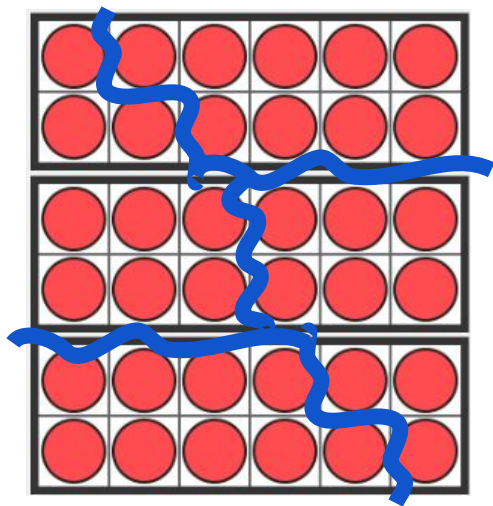
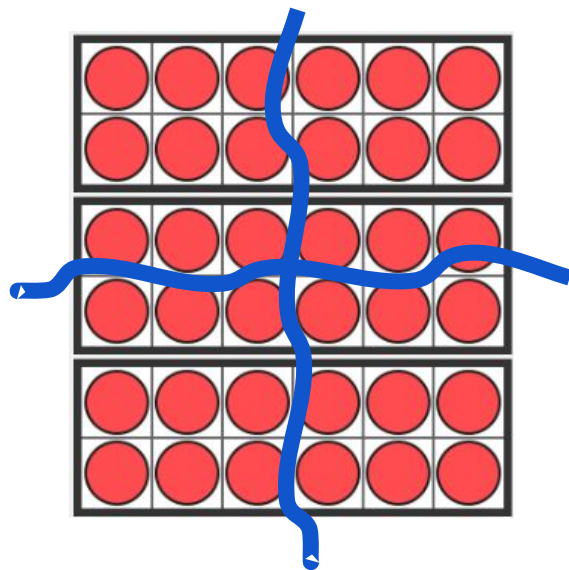


# Division Concept of a Fraction

**Fill** 3 whole egg cartons and **divide** this amount into 4 equal parts.



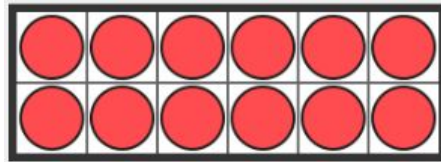
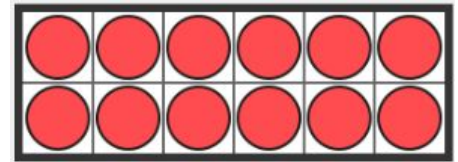
**Determine** the number of cartons and/or parts of a carton in *one* of the 4 parts.



# Division Concept of a Fraction

**Use** the division concept of a fraction to **model** the meaning of  $\frac{2}{6}$ .

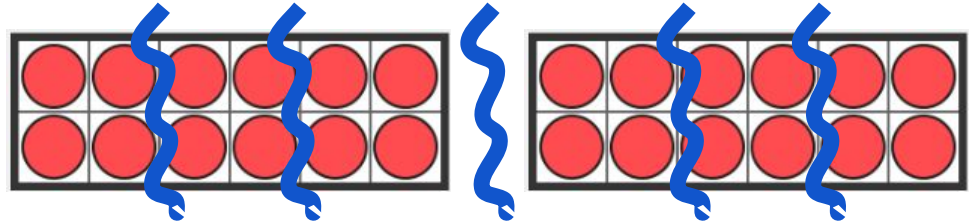
$$2 \div 6 = \frac{2}{6}$$



# Division Concept of a Fraction

**Use** the division concept of a fraction to **model** the meaning of  $\frac{2}{6}$ .

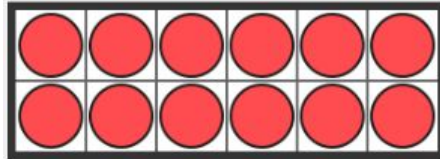
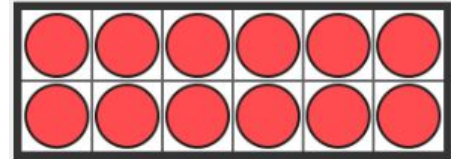
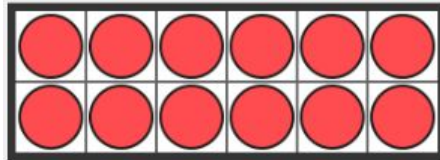
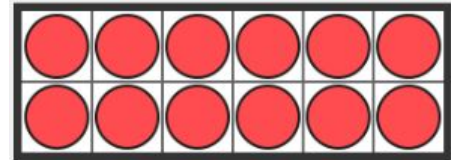
$$2 \div 6 = \frac{2}{6}$$



# Division Concept of a Fraction

**Use** the division concept of a fraction to **model** the meaning of  $\frac{4}{3}$ .

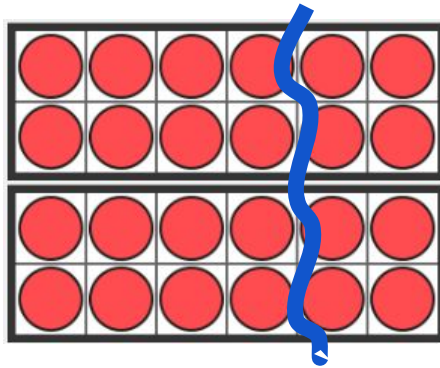
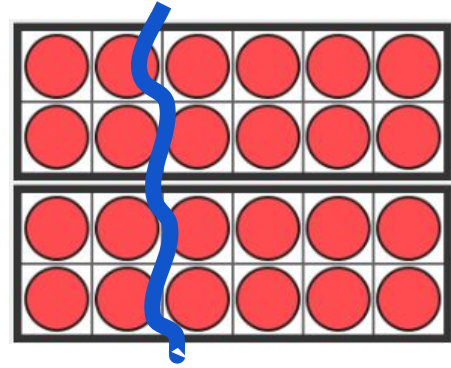
$$4 \div 3 = \frac{4}{3}$$



# Division Concept of a Fraction

**Use** the division concept of a fraction to **model** the meaning of  $\frac{4}{3}$ .

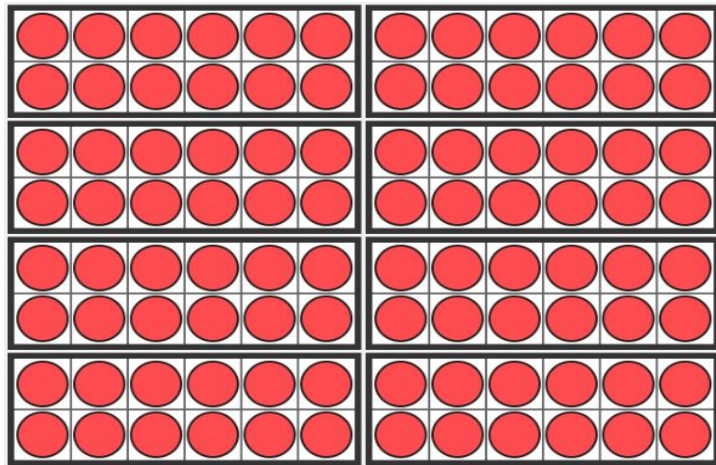
$$4 \div 3 = \frac{4}{3}$$



# The Brownie Sharing Problem Revisited

Carolyn's mom brought 8 brownies to Carolyn's dance group. That day 6 girls were there. If they share the brownies equally, how much does each girl get?

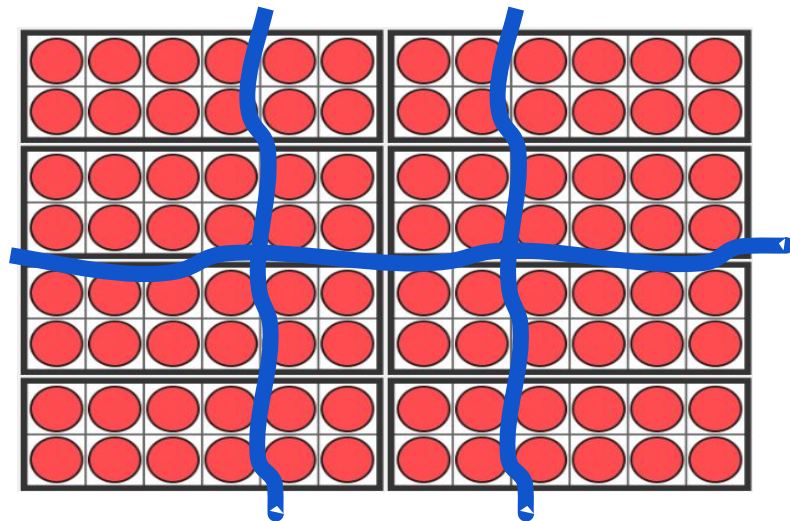
$$8 \div 6 = \frac{8}{6}$$



# The Brownie Sharing Problem Revisited

Carolyn's mom brought 8 brownies to Carolyn's dance group. That day 6 girls were there. If they share the brownies equally, how much does each girl get?

$$8 \div 6 = \frac{8}{6}$$



# Various Meanings of Fractions

**Draw** a diagram and/or **build** a model to show the meaning of  $\frac{3}{6}$  based on

- a) the part-whole concept of a fraction,
- b) the ratio concept of a fraction, and
- c) the division concept of a fraction.

# Extending to a Real World Context

Once the differences among these fraction constructs is established, explore the following fraction problem stems on the next slide. These are intended to draw out use of particular fraction constructs through a “friendship bracelets” context. For each build or sketch a model; record observations about relationships; write corresponding equations; and then examine the meaning of the numerator and denominator in this context.

# Situations to Model

Complete the following for each fraction problem stem:

- a. build or sketch a model for the situation
- b. record observations about the mathematical relationships you see
- c. write equations to describe the relationships
- d. examine the meaning of the numerator and denominator in the context

1. Chaz has a long piece of thread to make friendship bracelets. Each bracelet requires  $\frac{2}{4}$  of a meter of thread.
2. Lydia found 2 meters of leftover thread and made 4 bracelets.
3. Emma is following a heart pattern to make some new friendship bracelets. She needs 2 red or pink threads for every 4 threads.



# Friendship Bracelet Modeling Task

The friendship bracelets context is culturally relevant and mathematically rich, supporting exploration of the meaning of the numerator and the denominator. It also connects across the elementary curriculum, discussing topics connected to healthy relationships (e.g., being yourself, making and keeping friends) and friendship boundaries. In addition, from a mathematical perspective this context could be further opened to engage in the mathematical modeling process while applying multiplicative thinking (Rigelman, 2025) with the following prompt:

Alex, Briana, and Clay are making two-color paracord friendship bracelets for each other and some friends.

This version of the friendship bracelet task encourages problem posing and genuine problem solving with no one mathematical approach perceived as the “correct” way to solve the program and no single mathematics domain leveraged to answer varied questions.

# Friendship Bracelets

Do you have a friendship bracelet?

Have you ever made a friendship bracelet? What did you need to make the bracelet?

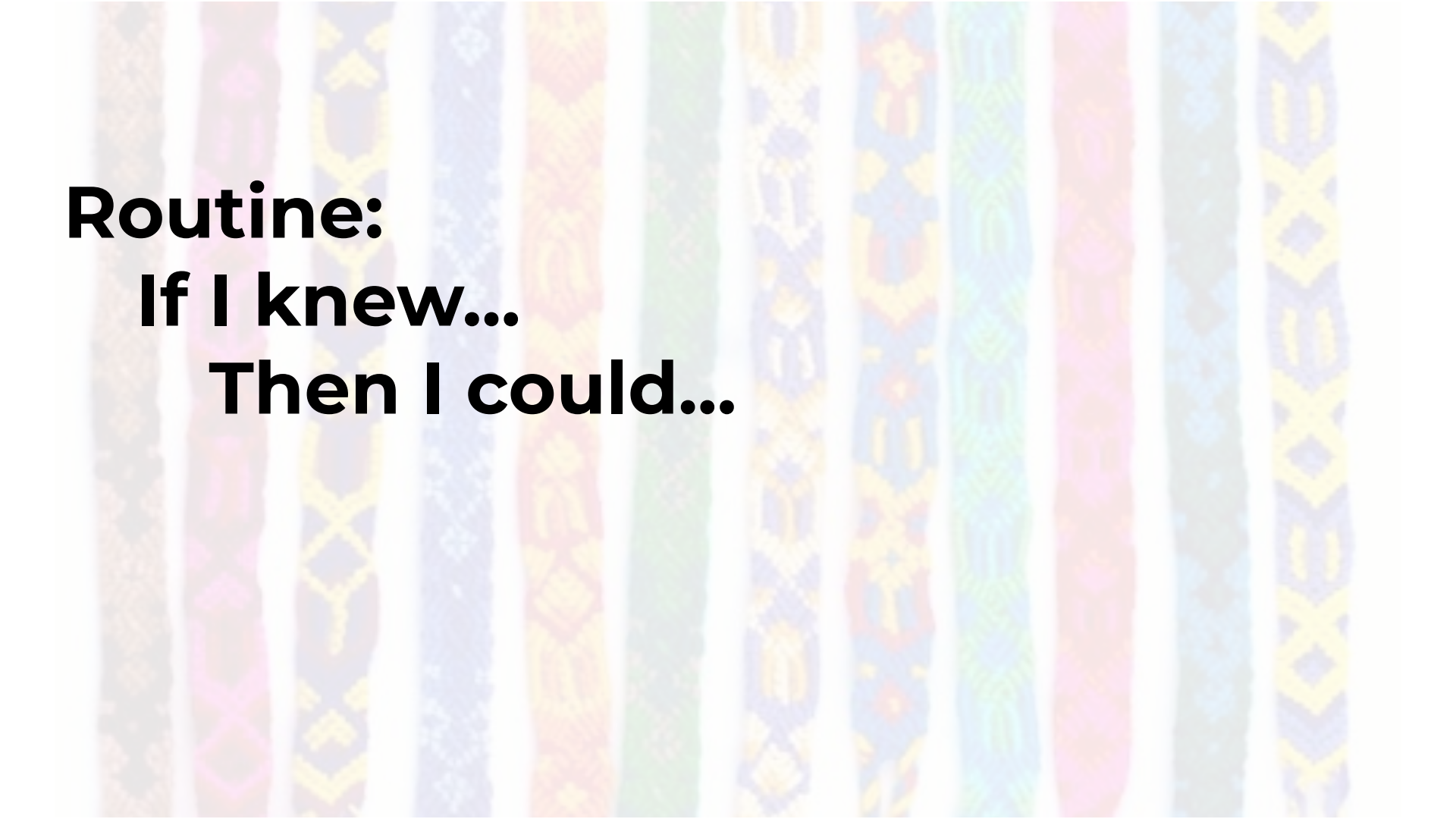
# Paracord Friendship Bracelets

Alex, Briana, and Clay are making two-color paracord friendship bracelets for each other and some friends.



# 9 Ways a Paracord Bracelet Can Save Your Life

- 
9. Make a Shelter
  8. Go Fishin'
  7. Trap Food
  6. Start a Fire
  5. Make a Tourniquet
  4. Mark a Trail
  3. Repair a Backpack
  2. Floss
  1. Repair Shoelaces



**Routine:  
If I knew...  
Then I could...**

# Here Are Some Facts You May Need

**One foot** of paracord makes about **one inch** of a bracelet

Paracord comes in packages of **50 feet**

**Two-color bracelets** require

- the length of the wrist plus **2 inches** of one color, and
- **ten times** the length of the wrist-color for the second color

An average 10-year-old's bracelet size is about **6 ½ inches**

# Questions

- 

# Assumptions

- 



# Small Group Work

As you work with your group, consider the following guiding questions:

- What question are you answering?
- What models and representations are you using to help you explore the task?
- How are the assumptions impacting your thinking and results?

# Small Group Work, continued

As you work with your group, consider the following guiding questions:

- What question are you answering?
- What models and representations are you using to help you explore the task?
- How are the assumptions impacting your thinking and results?
- At what point(s) are your models requiring revision?

# Preparing to Share Our Work

As you collaborate with your group, discuss:

- The question you answered
- The models and representations you used to explore the task
- Your assumptions and how your assumptions impacted your results
- Any point(s) where your model required revision

# Sharing Our Work

- One person from each group will present to the whole group.
  - Each group will have 5 minutes to share.
  - The person who lives the farthest from school gets to decide who will present for your group.
- The question you answered.
  - The models and representations you used to explore the task.
  - Your assumptions and how your assumptions impacted your results.
  - Any point(s) where your model required revision.

# New Information about Paracord Packaging

The paracord manufacturers' typical packaging ranges from 10 to 1000 feet (approximately 32 to 3280 meters) of cording, leaving leftover cording in some cases. To not waste any cording, investigate both different paracord bracelet patterns and projects which include key chains, belts, lanyards, and zipper pulls.

In what ways, if any, would this change your initial work?