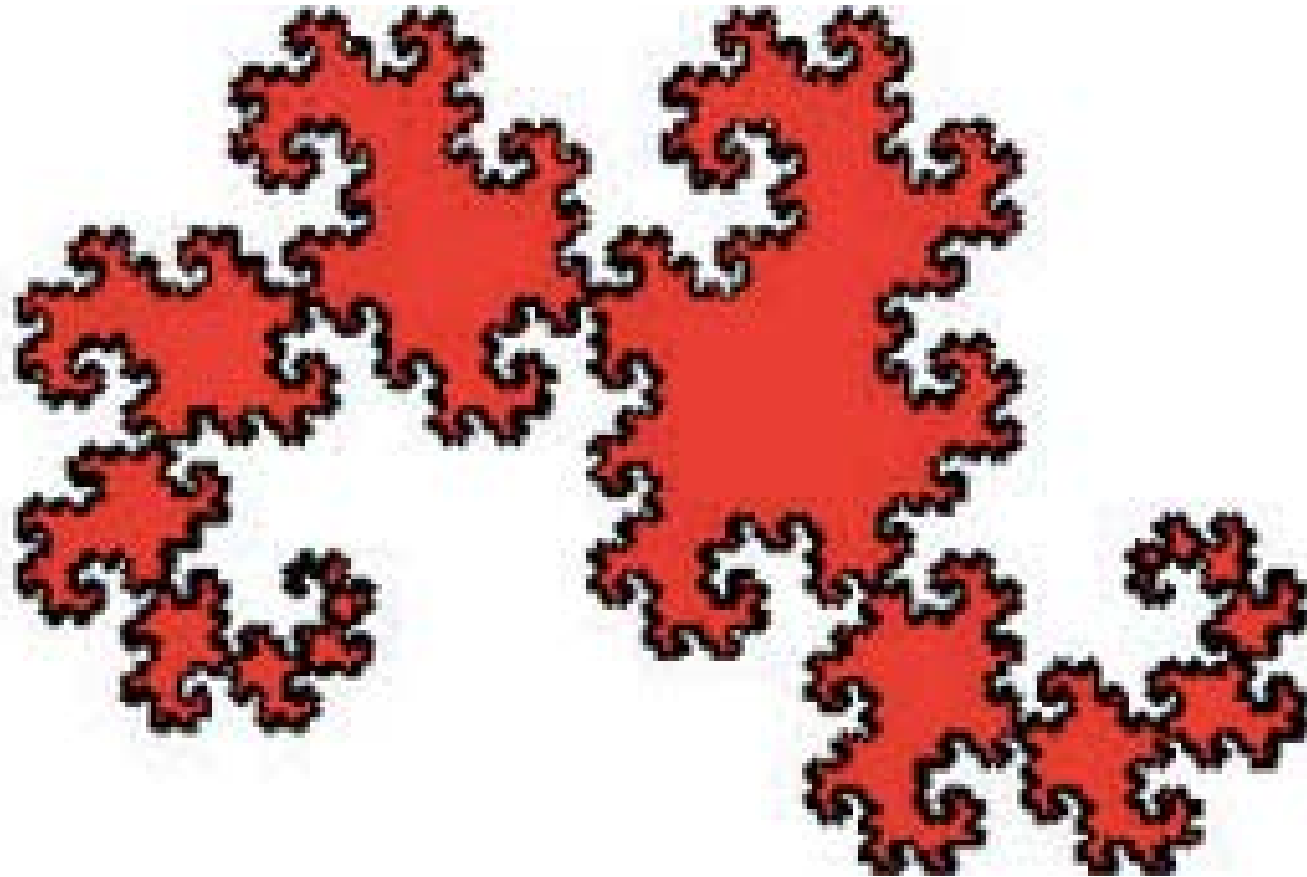


# James Tanton's Remarkable Paper Folding

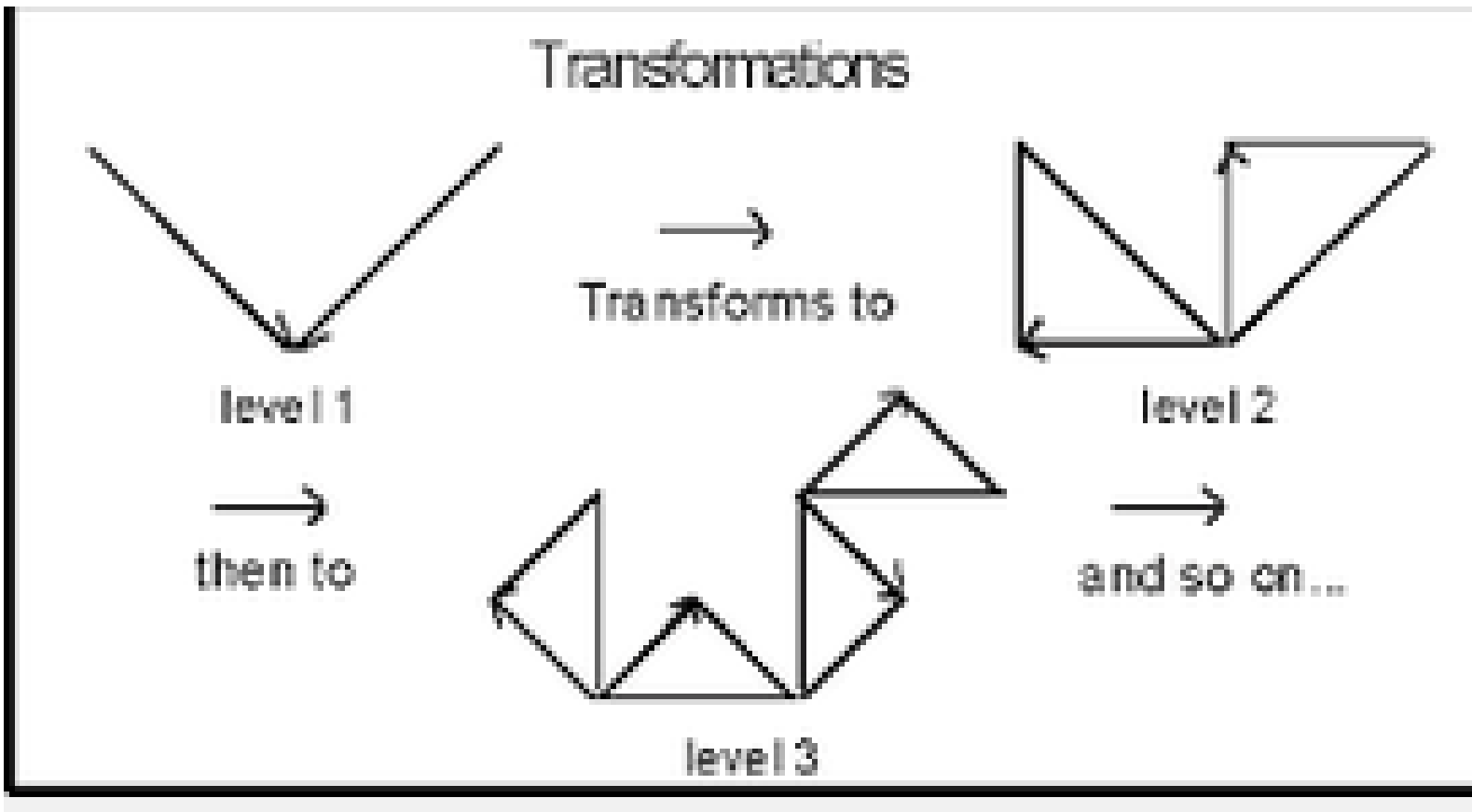
Katie Soto Grand Island Public Schools

Anne Schmidt Culler Middle School, Lincoln  
Ne

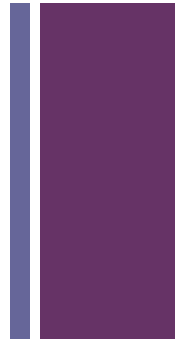
+ Have you seen this before?



+ This Fractal Starts from this...



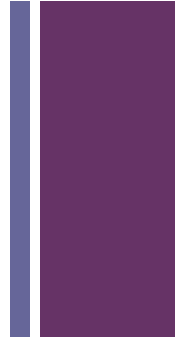
+ Let's start with something a little lighter today...



## ONE FOLD

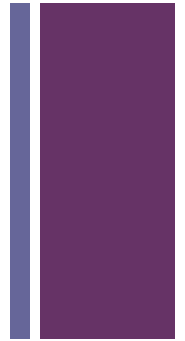
- Take a strip of paper and tape its left end to the table
- Pick up the right end to fold the strip in half
- A “valley” is created. Valleys have a value of 1

## + Two Fold



- What happens when we do this again?
- How many valleys?
- Are there any mountains?
  
- The sequence for the two fold is: 1, 1, 0

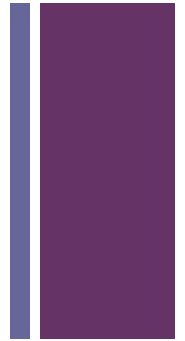
## + Now you try



- What is the sequence for a three fold?

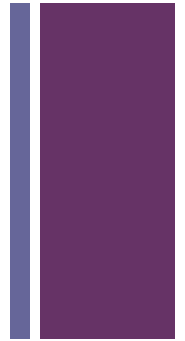
- What about a four fold?

# + Do any patterns emerge?



- How many numbers are in each sequence?
- Can we predict how many numbers will be in a five fold?

+  
So....



■ One Fold

1

■ Two Fold

110

■ Three Fold

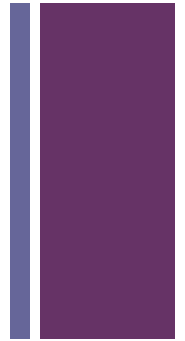
1101100

■ Four Fold

110110011100100



# + Just a little change...



■ One Fold

1

■ Two Fold

1 1 0

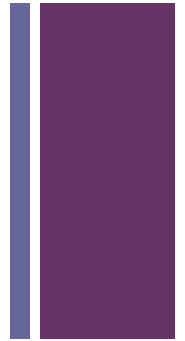
■ Three Fold

1 1 0 1 1 0 0

■ Four Fold

1 1 0 1 1 0 0 1 1 1 0 0 1 0 0

## + Question to ponder:



- What is the sequence of 1s and 0s for five folds?
- How many digits are in the one-hundred fold sequence? How many digits are 1s? How many are 0s?
- What is the 112<sup>th</sup> digit of the one-hundred fold sequence?