

## Types of Images for the *Is It Fair?* Routine

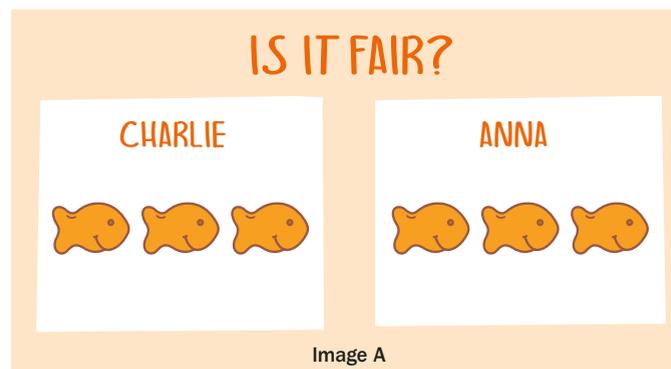
Although there are many ways to explore this routine, we have found a few types of images to be helpful in developing students' ideas, reasoning, and mathematical language within this snack context. These four types of image are explained in **Figures 5.3, 5.4, 5.5, and 5.6** and included in the *Is It Fair?* slide deck on the companion website.

**FIGURE 5.3**

### Image Type #1

Everything is the same (same snack type, same quantity of snack, same visual arrangement of snack)

#### Example of Possible Image



#### When to Use This Image

This is an early image to use with students. It can be used in two different ways:

1. as an image where you ask students to describe what they see;
2. as a quick image (flashed for just a few seconds). You can say to students, "I'll show you Charlie and Anna's snacks quickly and then you will decide whether their snacks are fair or not fair."

#### What's the Math?

##### Big Ideas

- Subitizing
- One-to-one correspondence
- Equivalence

##### Language Development

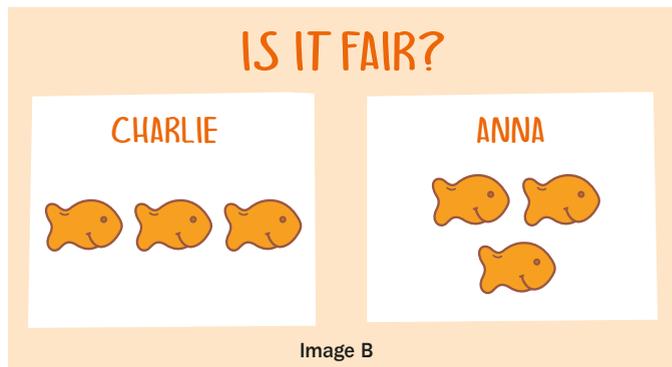
- *Same*
- *Equal*
- *Row*
- *Horizontal*
- *Middle [of the napkin]*

**FIGURE 5.4**

## Image Type #2

Same snack type and quantity; different visual arrangement of snack

### Example of Possible Image



### When to Use this Image

Although this image may appear straightforward to adults, expect that some children will not recognize Anna's snack as three. They may describe it as two and one. This image can generate rich mathematical conversations if there is disagreement about the total quantity and whether or not the situation is fair. Questions like, "How is Charlie's snack the same as Anna's snack? How are they different?" are useful. Also, challenge students who say the snacks are the same to prove *how* they are the same. As part of this "proof," you may ask students to rearrange one of the images to show that even though the snacks look different, the situation is fair because everyone gets the same amount of snack (Schultz-Ferrell, Hammond, and Robles 2007). This rearranging can be done by projecting the image on an interactive whiteboard or simply by having physical images of the snacks on magnets that students can move around on a magnetic board.

### What's the Math?

#### Big Ideas

- Subitizing
- One-to-one correspondence
- Equivalence
- Part-whole relations  
(two and one is three)

#### Language Development

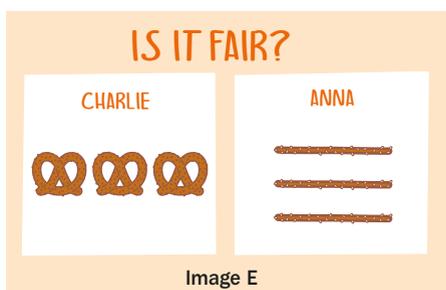
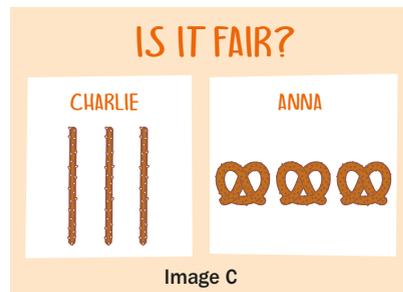
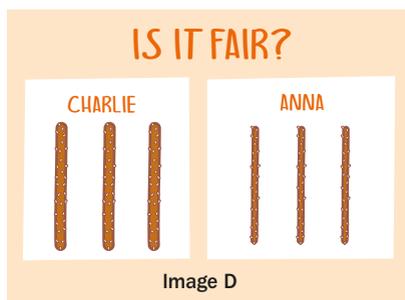
- *Same/different*
- *More/less/equal*
- *Row(s)*
- *Horizontal*
- *Middle* (of the napkin)

FIGURE 5.5

### Image Type #3

Same snack type and quantity; various sizes and shapes of snack are shown

#### Example of Possible Image



#### When to Use this Image

There may be disagreements with this type of image about whether or not the situation is fair. Use these disagreements to help students understand that sometimes *multiple* ways of thinking can be correct. This kind of image is an example of an ambiguous situation that leaves it up to the interpreter to justify his position (Danielson 2016).

Image C can be used to generate big ideas around quantity (e.g., that  $3 = 3$ ) and that the amount of snack can be a separate attribute from the type of snack itself. In this set of images, one can consider the attributes as (1) quantity; (2) type of pretzel; (3) density (thick/thin) and, (4) height (tall/short). Also, expect for students to grapple with issues of fairness related to size (is the tall pretzel “more” than the short one?).

A common argument for Image D is that you get more snack with the *fatter* pretzel and, therefore, although both children are getting three pretzels, Charlie is eating a little more pretzel than Anna (Greenes, Ginsburg, and Balfanz 2014).

Image E is designed for students to develop spatial awareness and specific language related to how the image is organized. For example, children might describe what they see by saying, “There are three pretzels at the top of the napkin” or by using their hands to indicate that although Charlie has three pretzels in one row, Anna has three rows of pretzels. As new language arises from children, keep track of the words that help them describe what they are seeing.

#### What’s the Math?

##### Big Ideas

- Subitizing
- One-to-one correspondence
- Equivalence

##### Language Development

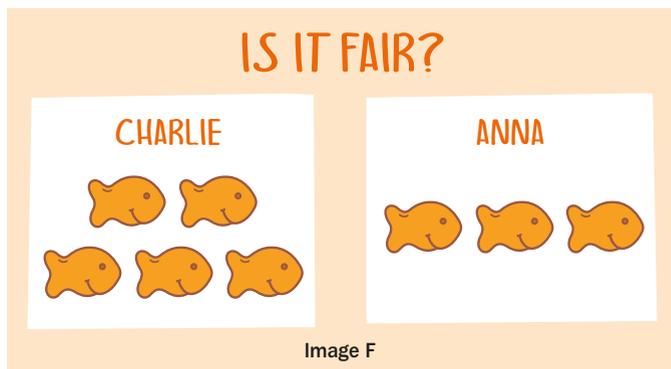
- Same/different
- More/less/equal
- Row(s)
- Horizontal/vertical
- Middle (of the napkin)
- Tall/short
- Thick/thin
- Big/little

FIGURE 5.6

## Image Type #4

Same type of snack, but different quantity

### Example of Possible Image



### When to Use this Image

This image type is designed for students to compare sets and to discuss fair or not fair and ways to make the situation fair. Notice how the goldfish in Image F are organized in a way that draws attention to the three in a row (e.g., how one set has the other set *inside* of it). This is a big idea related to hierarchical inclusion and part-whole relations. It is okay if children are not immediately able to resolve the dilemma of how to make the situation fair. With experience and opportunities to talk to one another, they will develop more strategies for equalizing sets (Mercer 2008).

### What's the Math?

#### Big Ideas

- Subitizing
- One-to-one correspondence
- Equivalence
- Hierarchical inclusion (three is inside of five)
- Part-whole relations (two and three equals five)
- Missing part ( $3 + ? = 5$ )

#### Language Development

- *Same/different*
- *More/less/equal*
- *Row(s)*
- *Horizontal*
- *Middle* (of the napkin)
- *Inside*