Just In Time Quick Check

Standard of Learning (SOL) 3.2a

Strand: Number and Number Sense

Standard of Learning (SOL) 3.2a

The student will name and write fractions and mixed numbers represented by a model.

Grade Level Skills:

- Name and write fractions (proper and improper) and mixed numbers with denominators of 12 or less in symbols represented by concrete and/or pictorial models.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

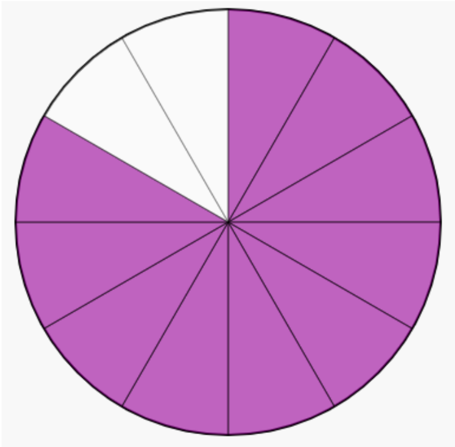
Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - Candy Bar Fractions (word)/PDF
  - Naming and Writing Fractions (word)/PDF
- VDOE Word Wall Cards: Grade 3 (Word)/PDF
  - Fraction: Models for one-half/one-fourth
  - Fraction: Models for two-thirds
  - Fraction: Models for five-sixths
  - Fraction: Models for three-eighths
- VDOE Instructional Videos for Teachers
  - Models for Teaching Fractions (gr. 3-8)
- Grade 3 Mathematics Standards of Learning: Student Performance Analysis 2019
- Desmos Activity
  - Polygraph: Fractions and Mixed Numbers

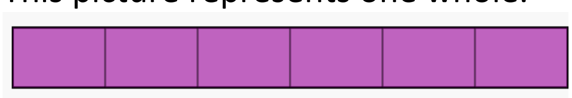
Supporting and Prerequisite SOL: 3.2b, 2.4a, 2.4b, 1.4a, 1.4b

SOL 3.2a - Just in Time Quick Check

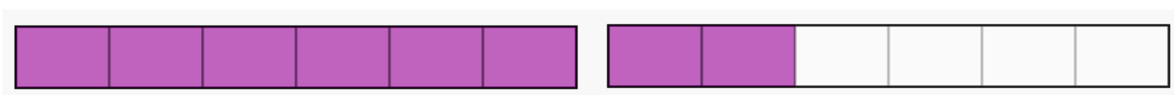
1. Write the fraction shaded in each picture.
   a. What fraction of the circle is shaded?



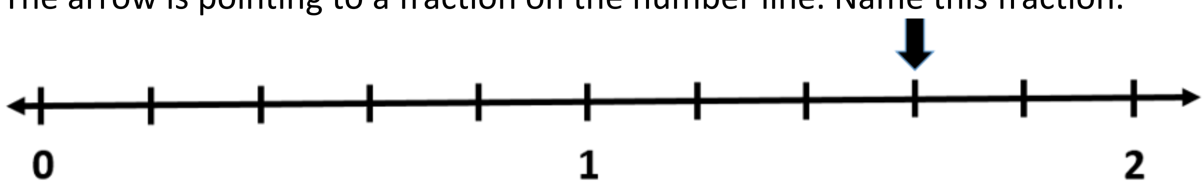
   b. This picture represents one whole.



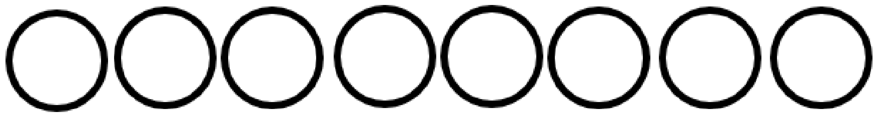
   Write the fraction that is shaded in the picture below.



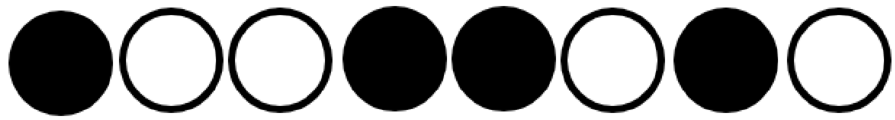
   c. The arrow is pointing to a fraction on the number line. Name this fraction.



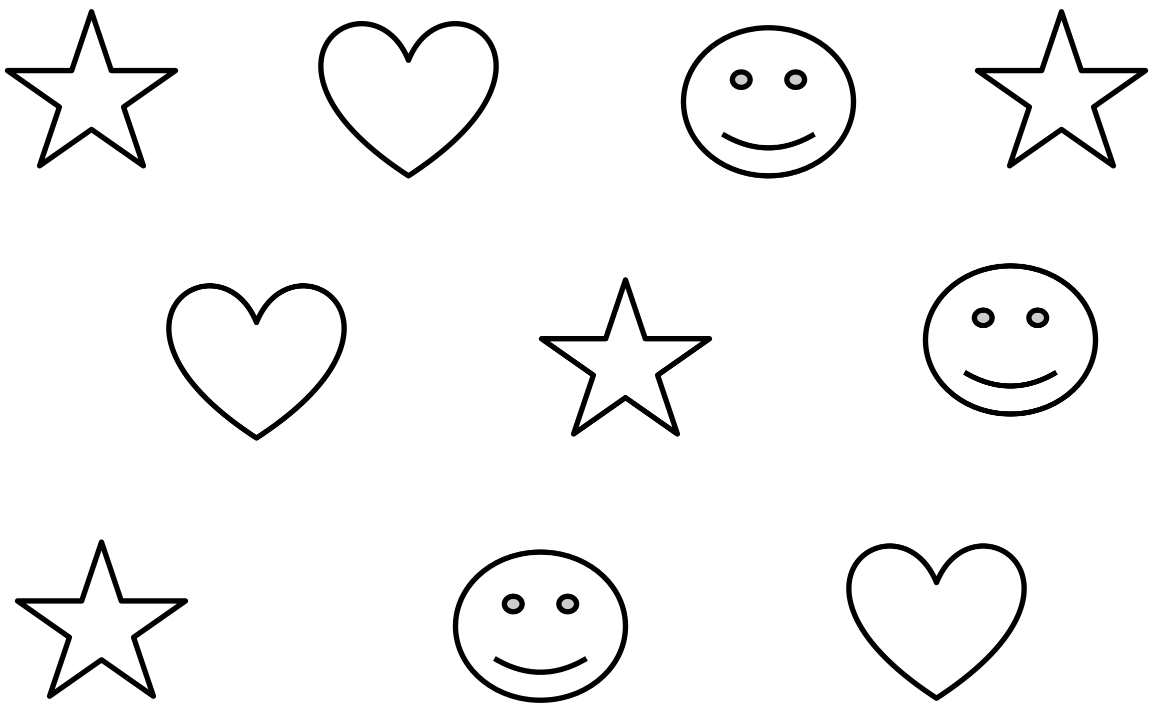
d. This set of circles represents one whole.



Write the fraction of this set that is shaded black.



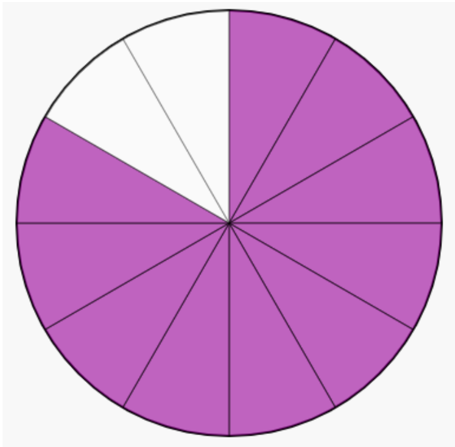
e. What fraction of this set is stars?



SOL 3.2a - Just in Time Quick Check Teacher Notes

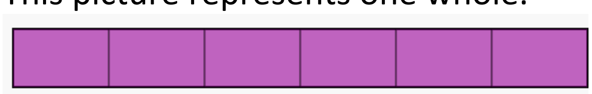
Common Errors/Misconceptions and their Possible Indications

1. Write the fraction shaded in each picture.
   a. What fraction of the circle is shaded?

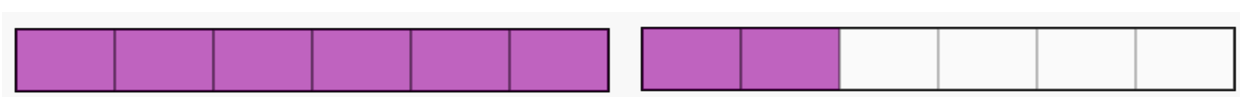


Students may write $\frac{2}{10}$ or $\frac{10}{2}$, where the numbers used as the numerator and the denominator each represent a part of the circle. This may indicate a lack of understanding that the denominator names the total number of equal parts in the whole. Activities that help students develop conceptual understanding of the numerator and denominator in a fraction ask students to name the number of pieces described in the model (in this example, the number of pieces shaded) and record that number as the numerator, and then ask students to record the total number of equal pieces in the whole as the denominator. Practice naming examples and non-examples (the fraction shaded in this circle is $\frac{10}{12}$ and not $\frac{10}{2}$) may also help students discriminate between correct and incorrect names for fractions.

   b. This picture represents one whole.



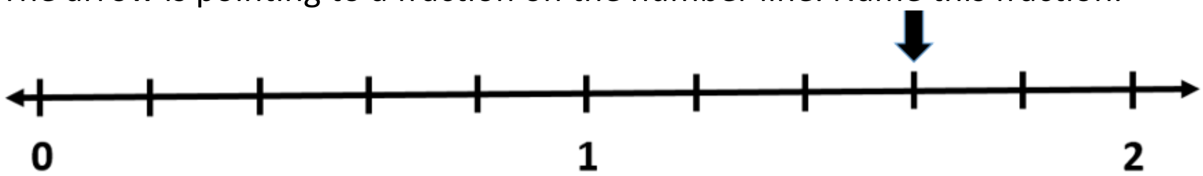
Write the fraction that is shaded in the picture below.



Students who do not recognize the whole, even though it is described at the beginning, may name the picture as $\frac{8}{12}$, counting the twelve equal parts that make up the two wholes as the number of parts in one whole and then counting the 8 shaded parts to get $\frac{8}{12}$. These students do not recognize that there are two wholes, each having 6 equal parts, with only one whole completely shaded and the other only having two parts shaded, thus creating the fractions $\frac{8}{6}$ and $1\frac{2}{6}$.

Students may say the fraction is $\frac{2}{6}$ because they are excluding the whole on the left and only counting the $\frac{2}{6}$ of the second whole on the right. They may only think of proper fractions and will need to develop an *understanding that we can have more counting pieces in the numerator than the denominator making an improper fraction. Students who have difficulty naming improper fractions like $\frac{8}{6}$ may benefit from counting by unit fractions past the whole (e.g., $\frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}, \frac{6}{6}, \frac{7}{6}, \frac{8}{6}$). The use of a variety of manipulatives like pie circles, bars, and pattern blocks in addition to counting by fractions on a number line may also help students to understand the relationship between improper fractions and mixed numbers. Students may find it easier to move from improper to mixed numbers than to move from mixed numbers to improper fractions.*

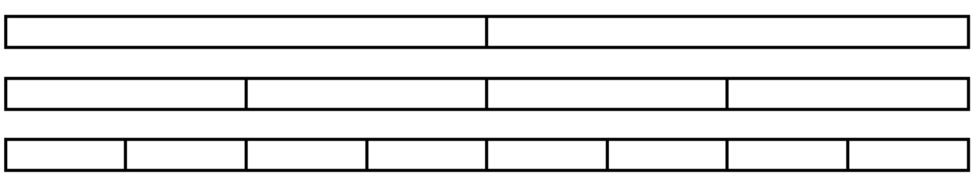
c. The arrow is pointing to a fraction on the number line. Name this fraction.



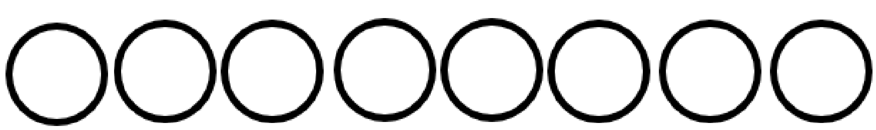
When working with number lines, students may count all of the tick marks instead of the spaces between them, over counting the number of parts making the whole. In this example, students may name the fraction as $\frac{9}{11}$ (starting with zero, the arrow is on the ninth tick mark and there are eleven tick marks from zero to two, inclusive) or as $1\frac{4}{6}$ (starting with the tick mark at 1, the arrow is on the fourth tick mark and there are six tick marks from one to two, inclusive).

Some students may think the arrow is at one and a half because there are two tick marks on either side of the tick mark labeled with the arrow. Other students may think that it is representing $1\frac{3}{4}$, because the arrow is at the third tick mark out of 4 tick marks before the 2 on the number line. These students are counting the marks between 1 and 2, instead of counting the equal spaces between the tick marks on the number line.

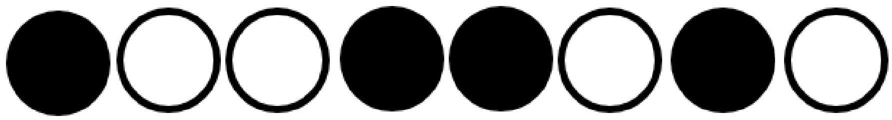
Students may need experiences with folding strips of paper that represent a whole and then marking each fold as a fraction. For example, the first fold would represent half, and the next fold now makes four equal parts or represents fourths ($\frac{1}{4}$ and $\frac{3}{4}$, while $\frac{1}{2}$ is equal to $\frac{2}{4}$). Then one last fold creates eighths. Once students see the equal parts are counted and not the lines for fractions between zero and one, they can explore the same activity between zero and two. In this activity, the middle line in the first fold becomes one and the lines in the next strip become $\frac{1}{2}$ and $1\frac{1}{2}$. The last strip would represent fourths.



d. This set of circles represents one whole.



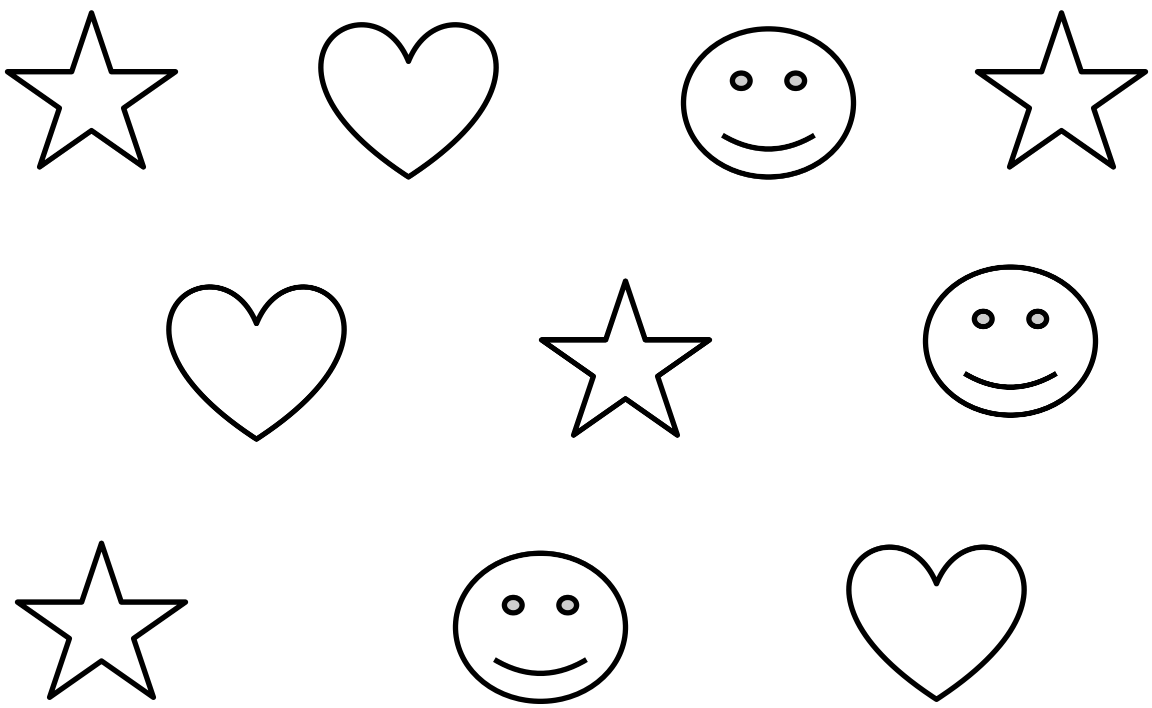
Write the fraction of this set that is shaded black.



Students may name the fraction shaded as $\frac{4}{4}$. This error may indicate that students are using whole number knowledge, thinking that the four black circles represent the numerator and the four white circles represent the denominator. These students do not understand the whole is made up of the set of circles, and since eight equal-sized circles are in the set, the denominator should be eight.

Experiences using two-colored counters to model that there are eight in a set with all of them red, and then turning over different numbers of counters and naming both of the fractions shown, may help build understanding of set models. For example, after turning over four counters, four of the eight counters are one color and four of the 8 counters are another color. In this example, each single counter represents $\frac{1}{8}$ of the set; $\frac{4}{8}$ of the set is one color, and $\frac{4}{8}$ of the set is another color. Then the number in the set can change for the denominator and some counters can be turned over to the other color for the numerator. Some students will be flexible in their thinking to show that the picture is representing equivalent fractions, $\frac{4}{8}$ and $\frac{1}{2}$.

e. What fraction of this set is stars?

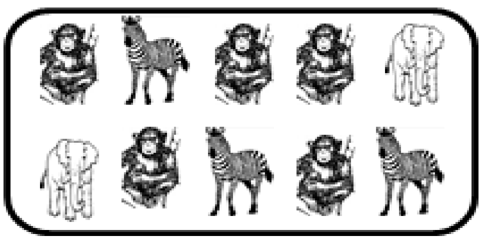


Students may have difficulty identifying the whole when a set has different types of items. In this example, students may think the fraction is $\frac{4}{6}$ which indicates that they see the four stars and the other six items as separate groups. Students are unable to recognize that the entire set of ten items is one whole, and this whole includes both the four stars and the other six items. These students would benefit from experiences creating a set given the description of that set that uses fractions. For example, students could be asked to draw a set of circles where $\frac{3}{7}$ of the set of circles is shaded and $\frac{4}{7}$ of the set is unshaded.

Other students name the fraction as $\frac{4}{3}$*, which may indicate that they see the four stars and they recognize that there are three hearts and three smiley faces. Since both of the types of items left are the same amount, students may decide this must be the denominator. Again, they are not viewing the ten items as a whole set. Experiences with sets having only two different types of items should be provided before experiences with sets having more than two different types of items.*

Another misconception is that the students may see the answer as four. These students are using whole number knowledge and are counting the stars but not considering them as part of the set. They are seeing each item as an individual item not as a fractional part of a set. It is important for students to understand the vocabulary of fractions so they know if the problem is asking for a whole number answer, or a fraction of a set, or the fractional part that is shaded or being used.

In a set model, each member of the set is an equivalent part of the set. In set models, the whole needs to be defined, but members of the set may have different sizes and shapes. For instance, if a whole is defined as a set of ten animals, the animals within the set may be different. For example, students should be able to identify apes as representing $\frac{5}{10}$ *of the animals in the set shown:*



Students may benefit from experiences with sets that are comprised of congruent figures (e.g., twelve eggs in a carton) before working with sets that have noncongruent parts.