Task Model 1

Response Type: Multiple Choice, single correct response

DOK Level 1

3.NF.A.1
Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/*b*.

Evidence Required:
1. The student represents a fraction 1/*b* as 1 part of a whole that is partitioned into *b* equal parts, and a fraction *a/b* as the quantity formed by *a* parts of size 1/*b* using a model. For this evidence statement, *a/b* may be greater than, less than, or equal to 1.

Tools: None

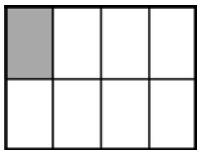
Prompt Features: The student is prompted to select the fraction represented by the model or the model represented by the fraction.

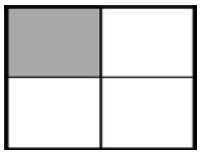
Stimulus Guidelines:

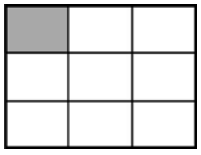
- Denominators are limited to 2, 3, 4, 6 and 8.
- Area models are polygons or circles.
- Follow any stated guidelines on allowable number ranges.
- Item difficulty can be adjusted via these example methods:
  - Unit fraction model partitioned into equal sized parts corresponding to the denominator; one part is shaded representing the unit fraction.
  - $\frac{a}{b}$ fraction models partitioned into equal parts representing the denominator; parts are shaded to represent an $\frac{a}{b}$ fraction.
- Models with the shaded areas switched should **not** be included as distractors (e.g., $\frac{7}{8}$ are shaded instead of $\frac{1}{8}$).

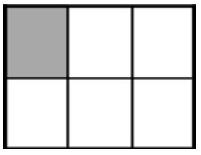
TM1
Stimulus: The student is presented with a fraction in the form of $\frac{a}{b}$.

Example Stem 1: Which model shows $\frac{1}{8}$ of the whole figure shaded?

A. 

C. 

B. 

D. 

Task Model 1

Response Type: Multiple Choice, single correct response

DOK Level 1

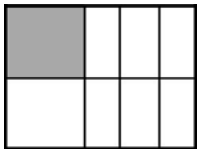
3.NF.A.1
Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/*b*.

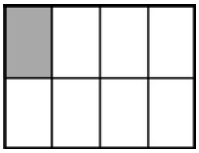
Evidence Required:
1. The student represents a fraction 1/*b* as 1 part of a whole that is partitioned into *b* equal parts, and a fraction *a/b* as the quantity formed by *a* parts of size 1/*b* using a model. For this evidence statement, *a/b* may be greater than, less than, or equal to 1.

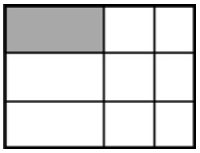
Tools: None

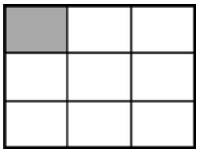
TM1 (continued)

Example Stem 2: Which model shows $\frac{1}{8}$ of the whole figure shaded?

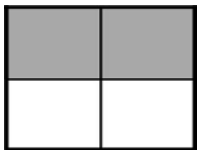
A. 

C. 

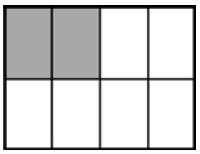
B. 

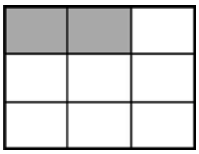
D. 

Example Stem 3: Which model shows $\frac{2}{6}$ of the whole figure shaded?

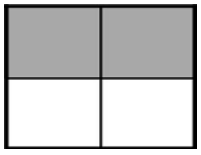
A. 

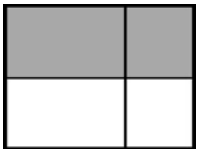
C. 

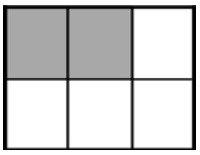
B. 

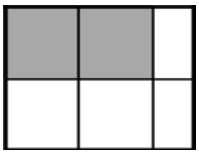
D. 

Example Stem 4: Which model shows $\frac{2}{6}$ of the whole figure shaded?

A. 

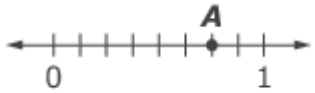
C. 

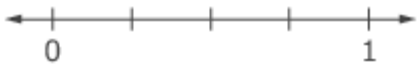
B. 

D. 

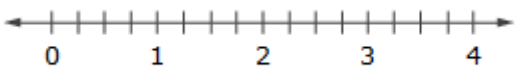
Rubric: (1 point) The student selects the correct model (e.g., A; C; C; B).

Response Type: Multiple Choice, single correct response

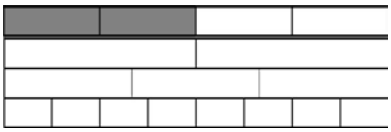
Task Model 2a **Response Type: Equation/Numeric** **DOK Level 2** **3.NF.A.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram. **a.** Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. **b.** Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line. **Evidence Required:** 2. The student identifies and represents fractions on a number line using the interval 0–1 as the whole, with or without partitioning. **Tools:** None	**Prompt Features:** The student is prompted to identify the numerical fraction represented by a given point on a number line. **Stimulus Guidelines:** • Denominators are limited to 2, 3, 4, 6 and 8. • Follow any stated guidelines on allowable number ranges. • Item difficulty can be adjusted via these example methods: ○ Identify a fraction represented by a labeled point on a number line; number line is from 0–1 and divided into increments. ○ Identify a fraction represented by a labeled point on a number line; number line is from 0–1 and **not** divided into increments. **TM2a** **Stimulus:** The student is presented with a fractional number line where a fraction is designated by a point on the number line. **Example Stem:**  Enter the fraction located at point *A* on the number line. **Rubric:** (1 point) The student enters the fraction that is located at the point on the number line (e.g., $\frac{6}{8}$). **Response Type:** Equation/Numeric

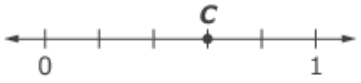
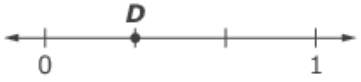
Task Model 2b **Response Type: Graphing** **DOK Level 2** **3.NF.A.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram. **a.** Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. **b.** Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line. **Evidence Required:** 2. The student identifies and represents fractions on a number line using the interval 0–1 as the whole, with or without partitioning. **Tools:** None	**Prompt Features:** The student is prompted to use the Add Point tool to place a given fraction on a number line. **Stimulus Guidelines:** • Denominators are limited to 2, 3, 4, 6 and 8. • Follow any stated guidelines on allowable number ranges. • Item difficulty can be adjusted via these example methods: ○ Identify the location of a fraction on a number line; number line is from 0–1 and is either divided into increments or **not** divided into increments. ○ Identify a fraction on a number line; number line begins at 0 and extends to a whole number past 1 and is divided into increments. **TM2b** **Stimulus:** The student is presented with a fractional number line. **Example Stem:** Use the Add Point tool to place a point on the number line where $\frac{2}{4}$ should be located.  **Rubric:** (1 point) The student places a point at the correct location on the number line (e.g., $\frac{2}{4}$ is placed halfway between 0 and 1). **Response Type:** Graphing **Accessibility Note:** Graphing items are not currently able to be Brailled. Minimize the number of items developed to this TM.

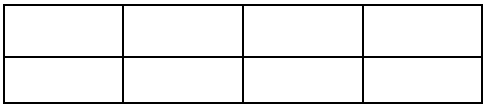
Task Model 2c **Response Type: Drag and Drop** **DOK Level 2** **3.NF.A.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram. **a.** Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. **b.** Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line. **Evidence Required:** 2. The student identifies and represents fractions on a number line using the interval 0–1 as the whole, with or without partitioning. **Tools:** None	**Prompt Features:** The student is prompted to drag one or more fractions to the correct location on a number line. **Stimulus Guidelines:** • The student is prompted to drag one or more fractions to the correct location on a number line. • Denominators are limited to 2, 3, 4, 6 and 8. • Follow any stated guidelines on allowable number ranges. • Item difficulty can be adjusted via these example methods: ○ Drag a fraction to its correct location on a number line; number line is from 0–1 and **not** divided into increments. ○ Identify a fraction represented by a labeled point on a number line; number line begins at 0 and extends to a whole number past 1 and is divided into increments. **TM2c** **Stimulus:** The student is presented with a number line and two or more fractions in the form $\frac{a}{b}$. **Example Stem 1:** Drag each fraction to the number line, as close to the exact location as possible.  $\frac{3}{8}$ $\frac{1}{8}$ **Rubric:** (2 points) The student places both fractions at the correct location on the number line (e.g., $\frac{1}{8}$ and $\frac{3}{8}$ are placed at their approximate location). A tolerance of ± half of the unit fraction is acceptable for scoring (e.g., ± $\frac{1}{16}$ because $\frac{1}{8}$ is the unit). (1 point) The student places one fraction within the interval of tolerance for its correct location AND places the other fraction on the correct side (less than or greater than) of the correctly placed fraction. The same tolerance level as the 2-point rubric is allowed for determining the correct location. **Response Type:** Drag and Drop **Accessibility Note:** Drag and drop items are not currently able to be Brailled. Minimize the number of items developed to this TM. **TM2c (continued)**

Task Model 2c **Response Type: Drag and Drop** **DOK Level 2** **3.NF.A.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram. **a.** Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. **b.** Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line. **Evidence Required:** 2. The student identifies and represents fractions on a number line using the interval 0–1 as the whole, with or without partitioning.	**Example Stem 2:** Place each fraction on the number line, as close to its exact location as possible.  $\frac{2}{2}$ $\frac{1}{4}$ $\frac{4}{1}$ $\frac{2}{4}$ **Rubric:** (2 points) The student places all fractions at the correct location on the number line (e.g., $\frac{2}{2}$, $\frac{1}{4}$, $\frac{2}{4}$and $\frac{4}{1}$ are placed at their approximate location). A tolerance of ± half of the unit fraction is acceptable for scoring (e.g., ± $\frac{1}{8}$ for fourths). (1 point) The student places three out of four fractions at the correct location, within the interval of tolerance, AND places the other fraction on the correct side (less than or greater than) of the correctly placed fractions. **Response Type:** Drag and Drop **Source:** Illustrative Mathematics (3.NF.A.2a) http://www.illustrativemathematics.org/illustrations/173 **Accessibility Note:** Drag and drop items are not currently able to be Brailled. Minimize the number of items developed to this TM.

Tools: None	

Task Model 3a
 	
Response Type: Equation/Numeric
 	
DOK Level 1
 	
3.NF.A.2
Understand a fraction as a number on the number line; represent fractions on a number line diagram.
a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.
b. Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.
 	
Evidence Required: 3. The student identifies two fractions as equal if they are the same size or at the same point on a number line.
 	
Tools: None
	Prompt Features: The student is prompted to write or identify an equivalent fraction for the given model.
	
	Stimulus Guidelines:
	• Follow any stated guidelines on allowable number ranges. Fractions are represented by area models, fraction strips, or number lines.
	• Denominators are limited to 2, 3, 4, 6 and 8.
	• Follow any stated guidelines on allowable number ranges.
	• Item difficulty can be adjusted via these example methods:
	  ○ Two fraction models that are polygons or circles where denominators are multiples of each other. One fraction model has part(s) shaded.
	  ○ Fraction strips with a shaded fraction on the top row.
	  ○ Two number lines where denominators are multiples of each other. One number line has a labeled point at a location.
	
	TM3a
	Stimulus: The student is presented with a visual fraction model with a fraction shaded.
	
	Example Stem: Use the fraction strip model shown to help you with this problem.
	
	 
	
	Enter a fraction equal to $\frac{2}{4}$ that has a **different** denominator.
	
	Rubric: (1 point) The student enters an equivalent fraction (e.g., $\frac{1}{2}$ or $\frac{4}{8}$).
	
	Response Type: Equation/Numeric

Task Model 3b **Response Type: Multiple Choice, multiple correct responses** **DOK Level 1** **3.NF.A.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram. **a.** Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. **b.** Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line. **Evidence Required:** 3. The student identifies two fractions as equal if they are the same size or at the same point on a number line. **Tools:** None	**TM3b** **Stimulus:** The student is presented with a fractional number line with a point labeled on the number line. **Example Stem:** Use this number line to answer the question that follows.  Choose **all** the number lines that show a fraction equal to the fraction shown by point *P*. A.  B.  C.  D.  E.  **Rubric:** (1 point) The student selects all number lines that show $\frac{1}{2}$ (e.g., A, B). **Response Type:** Multiple Choice, multiple correct responses

Task Model 4 **Response Type:** **Hot Spot** **DOK Level 2** **3.NF.A.3b** Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. **b.** Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. **Evidence Required:** 4. The student generates simple equivalent fractions using visual fraction models. **Tools:** None **Accessibility Note:** Hot spot items are not currently able to be Brailled. Minimize the number of items developed to this TM.	**Prompt Features:** The student is prompted to generate an equivalent fraction based on a whole divided into sections. **Stimulus Guidelines:** • Follow any stated guidelines on allowable number ranges. • Fraction model is a polygon or circle. • Denominators are limited to 2, 3, 4, 6 and 8. • Item difficulty can be adjusted via these example methods: ○ Fraction models are divided into 4, 6, or 8 equal parts and students generate a fraction model equivalent to $\frac{1}{2}$. ○ Fraction models are divided into 6 or 8 equal parts and students generate a fraction model equivalent to $\frac{1}{3}$ or $\frac{1}{4}$. ○ Fraction models are divided into 6 or 8 equal parts and students generate a fraction model equivalent to $\frac{3}{4}$ or $\frac{2}{3}$. ○ Fraction models are divided into 2, 3, or 4 equal parts and students generate a fraction model equivalent to $\frac{2}{4}$, $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$, $\frac{2}{8}$, $\frac{4}{8}$, or $\frac{6}{8}$. **TM4** **Stimulus:** The student is presented with a blank visual fraction model to generate an equivalent fraction. **Example Stem:** Use this model to solve the problem.  Click parts of the model to shade $\frac{2}{4}$ of the whole model. **Rubric:** (1 point) Student creates a fraction model equal to the given fraction (e.g., $\frac{4}{8}$). **Response Type:** Hot Spot

Task Model 5

Response Type: Equation/Numeric

DOK Level 1

3.NF.A.3c
Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*

Evidence Required:
5. The student expresses whole numbers as fractions and recognizes fractions equal to whole numbers.

Tools: None

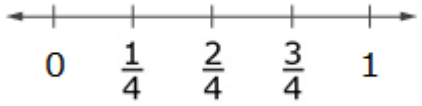
Prompt Features: The student is prompted to enter either the numerator or denominator needed to complete a fraction equal to a whole number.

Stimulus Guidelines:

- Follow any stated guidelines on allowable number ranges.
- Denominators are 1, 2, 3, 4, 6, and 8.
- Denominator is equal to 1 when fraction is equal to a whole number that is greater than 1.
- Item difficulty can be adjusted via these example methods:
  - Represent a fraction as a whole number using fraction models such as number lines and rectangular figures.
  - 0–1 number line with fraction increments either labeled or not labeled.
  - Unknown numerator or denominator represented with a box that completes a fraction equal to a whole.

TM5a
Stimulus: The student is presented with a visual fraction model with an equation using a whole number and a fraction. Either the numerator or the denominator is unknown and represented with a box.

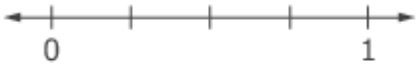
Example Stem 1: Use the number line to help you complete the equation.



$1 = \frac{\square}{4}$

What numerator goes in the box (☐) to make the equation true?

Example Stem 2: Use the number line to help you complete the equation.



$1 = \frac{\square}{4}$

What numerator goes in the box (☐) to make the equation true?

Rubric: (1 point) The student enters the correct value (e.g., 4; 4).

Response Type: Equation/Numeric

Task Model 5

Response Type: Equation/Numeric

DOK Level 1

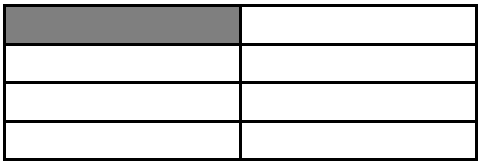
3.NF.A.3c
Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*

Evidence Required:
5. The student expresses whole numbers as fractions and recognizes fractions equal to whole numbers.

Tools: None

TM5a (continued)

Example Stem 3: The fraction model shows $\frac{1}{8}$ of the whole figure shaded.



What numerator goes in the box (☐) to make the equation true?

$$\frac{\square}{8} = 1$$

TM5b
Stimulus: The student is presented with an equation using a whole number and a fraction. Either the numerator or the denominator is unknown and represented with a box.

Example Stem 1: What denominator goes in the box (☐) to make the equation true?

$$2 = \frac{2}{\square}$$

Example Stem 2:
What numerator goes in the box (☐) to make the equation true?

$$\frac{\square}{1} = 2$$

TM5c
Stimulus: The student is presented with an equation where 1 is written as a fraction and numeral. Either the numerator or the denominator of the fraction for 1 is represented with a box.

Example Stem 1:
What numerator goes in the box (☐) to make the equation true?

$$\frac{\square}{2} = 1$$

Example Stem 2:
What denominator goes in the box (☐) to make the equation true?

$$1 = \frac{2}{\square}$$

Rubric: (1 point) The student enters the correct value (e.g., 8; 1; 2; 2; 2).

Response Type: Equation/Numeric

Task Model 6a

Response Type: Matching Tables

DOK Level 2

3.NF.A.3d
Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Evidence Required:
6. The student compares two fractions with the same numerator or the same denominator using the symbols <, =, or >.

Tools: None

Version 3 Update:
Changed TM5 from an equation/numeric response type to a matching table response type. Updated the stimulus and stem to match the new format.

Prompt Features: The student is prompted to compare fractions with either the same numerator or the same denominator by identifying the symbol needed to complete an inequality.

Stimulus Guidelines:

- Denominators are limited to 2, 3, 4, 6, and 8.
- Follow any stated guidelines on allowable number ranges.
- Item difficulty can be adjusted via these example methods:
  - Select the symbol needed to compare two fractions with the same denominator.
  - Select the symbol needed to compare two fractions with the same numerator.

TM6a
Stimulus: The student is presented with two pairs of fractions with the same numerators and/or same denominators and directed to compare them using (<, >, or =).

Example Stem:
Select the symbol (<, >, or =) that correctly compares each pair of numbers.

	<	>	=
$\frac{5}{8} \square \frac{5}{6}$			
$\frac{3}{6} \square \frac{3}{8}$			

Rubric: (1 point) The student identifies the correct symbol to compare pairs of fractions (e.g., <, >).

Response Type: Matching Tables

Task Model 6b **Response Type: Multiple Choice, single correct response** **DOK Level 2** **3.NF.A.3d** Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. **Evidence Required:** 6. The student compares two fractions with the same numerator or the same denominator using the symbols <, =, or >. **Tools:** None	**Prompt Features:** The student is prompted to compare fractions with either the same numerator or the same denominator by identifying the unknown numerator or denominator. **Stimulus Guidelines:** • Denominators are limited to 2, 3, 4, 6, and 8. • Follow any stated guidelines on allowable number ranges. • Item difficulty can be adjusted via these example methods: ○ Identify the unknown numerator or denominator needed to complete a comparison of two fractions with the same denominator. ○ Identify the unknown numerator or denominator needed to complete a comparison of two fractions with the same numerator. **TM6b** **Stimulus:** The student is presented with an incomplete comparison of two fractions using the symbols < or > where either the numerator or denominator is the unknown. **Stem:** Which number goes in the box to make the comparison true? $\frac{5}{8} > \frac{\square}{8}$ A. 3 B. 5 C. 7 D. 9 **Rubric:** (1 point) The student selects the correct number (e.g., A). **Response Type:** Multiple Choice, single correct response

Task Model 6c

Response Type: Matching Tables

DOK Level 2

3.NF.A.3d
Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Evidence Required:
6. The student compares two fractions with the same numerator or the same denominator using the symbols <, =, or >.

Tools: None

Prompt Features: The student is prompted to compare fractions with either the same numerator or the same denominator by selecting true or false to show whether an inequality is true.

Stimulus Guidelines:

- Denominators are limited to 2, 3, 4, 6, and 8. Fractions may use any denominator that is a multiple of 2, 3, and/or 5 and less than or equal to 100.
- Follow any stated guidelines on allowable number ranges.
- Item difficulty can be adjusted via these example methods:
  - Select true or false to show whether a comparison of two fractions with the same denominator is true.
  - Select true or false to show whether a comparison of two fractions with the same numerator is true.

TM6c
Stimulus: The student is presented with two or three comparisons of two fractions using the symbols <, >, or =.

Stem: Decide whether each comparison is true or false. Click True or False for each comparison.

	True	False
$\frac{3}{4} < \frac{1}{4}$		
$\frac{2}{4} < \frac{2}{3}$		

Rubric: (1 point) The student answers correctly, identifying each as True or False (e.g., F, T).

Response Type: Matching Tables