Implementing the ELPS in Mathematics

Equivalent Fractions
Equivalent Fractions

Texas Essential Knowledge and Skills (TEKS)

5.2 A  Number, operation, and quantitative reasoning. The student uses fractions in problem-solving situations. The student is expected to generate a fraction equivalent to a given fraction such as $\frac{1}{2}$ and $\frac{3}{6}$ or $\frac{4}{12}$ and $\frac{1}{3}$.

5.14A  Underlying processes and mathematical tools. The student applies Grade 5 mathematics to problems connected to everyday experiences and activities in and outside of school. The student is expected to identify the mathematics in everyday situations.

5.14C  Underlying processes and mathematical tools. The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem.

5.14D  Underlying processes and mathematical tools. The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to use tools such as real objects, manipulatives, and technology to solve problems.

5.15A  Underlying processes and mathematical tools. The student communicates about Grade 5 mathematics using informal language. The student is expected to explain and record observations using objects, words, pictures, numbers, and technology.

5.15B  Underlying processes and mathematical tools. The student communicates about Grade 5 mathematics using informal language. The student is expected to relate informal language to mathematical language and symbols.

5.16A  Underlying processes and mathematical tools. The student uses logical reasoning. The student is expected to make generalizations from patterns of sets of examples and nonexamples.

5.16B  Underlying processes and mathematical tools. The student uses logical reasoning. The student is expected to justify why an answer is reasonable and explain the solution process.

Content Objective

Students will generate equivalent fractions and understand relationships between equivalent fractions.
Equivalent Fractions

English Language Proficiency Standards (ELPS)

(c)(3) Cross-curricular second language acquisition/speaking. The ELL speaks in a variety of modes for a variety of purposes with an awareness of different language registers (formal/informal) using vocabulary with increasing fluency and accuracy in language arts and all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in speaking. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student’s level of English language proficiency. The student is expected to:

(D) speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency

(c)(5) Cross-curricular second language acquisition/writing. The ELL writes in a variety of forms with increasing accuracy to effectively address a specific purpose and audience in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in writing. In order for the ELL to meet grade-level learning expectations across foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student’s level of English language proficiency. For Kindergarten and Grade 1, certain of these student expectations do not apply until the student has reached the stage of generating original written text using a standard writing system. The student is expected to:

(I) narrate, describe, and explain with increasing specificity and detail to fulfill content area writing needs as more English is acquired

Language Objective

Students will record equivalent fractions on diagonal grid paper and express, both numerically and in words, the process used to generate equivalent fractions.
Equivalent Fractions

College and Career Readiness Standards

Mathematics Standards

I. Numeric Reasoning

B. Number Operations

1. Perform computations with real and complex numbers.
   c. Solve problems involving rational numbers, ratios, percents, and proportions in context of the situation.

Prior Knowledge

In fourth grade, students used concrete objects and pictorial models to generate equivalent fractions. This lesson builds on the previously taught operational skills (multiplication and division) which allow a better facilitation for the understanding of fractions.
Equivalent Fractions

Materials/Equipment

Advance preparation:
• Masking tape approximately 10 feet long on the floor to use as a number line
• Number Cards - 1 set cut apart

For each student:
• 36 two-color counters
• Calculator
• Diagonal grid paper rectangle (optional)
• Activity pages:
  - Equivalent Fractions
  - Equivalent Fractions Relationships
  - Journal
  - Verbal and Visual Word Association
  - Generating Equivalent Fractions
  - Performance Assessment
  - Selected Response

Vocabulary

<table>
<thead>
<tr>
<th>Academic Vocabulary</th>
<th>Essential Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>fraction</td>
<td>generate</td>
</tr>
<tr>
<td>equivalent fraction</td>
<td>process</td>
</tr>
<tr>
<td>factor</td>
<td>relationship</td>
</tr>
<tr>
<td>partition(ed)</td>
<td></td>
</tr>
<tr>
<td>numerator</td>
<td></td>
</tr>
<tr>
<td>denominator</td>
<td></td>
</tr>
<tr>
<td>non-unit fraction</td>
<td></td>
</tr>
<tr>
<td>unit fraction</td>
<td></td>
</tr>
</tbody>
</table>
Equivalent Fractions

Engage

The Engage portion of the lesson is designed to generate student interest in the relationships between numeric and pictorial representations of fractions. This part of the lesson is designed for whole group instruction.

1. Place a long piece of masking tape on the floor to represent a number line. Add some benchmark numbers on the masking tape (0, ½, 1, etc.).

2. Distribute Number Cards (pp. 18-21).

3. Prompt the students that are holding fraction number cards to place the cards (one at a time) on the number line in the appropriate position.

Facilitation Questions

Does the position of any of the cards need to be adjusted? Why? Responses may vary. Possible response(s) include: Yes. The card with \( \frac{3}{4} \) on it needs to move to a position halfway between \( \frac{1}{2} \) and 1.

How can you tell whether or not a fraction needs to be placed closer to 0 or closer to 1? Responses may vary. Possible response(s) include: If the numerator of the fraction is less than half of its denominator, the fraction will be closer to 0. If the numerator of the fraction is more than half of its denominator, the fraction will be closer to 1. If the numerator of the fraction is exactly half of its denominator, the fraction will be exactly halfway between 0 and 1.

What are some points on the number line that have more than one number card? Response may vary. Possible response(s) include: One point is \( \frac{4}{8} \) and \( \frac{1}{2} \) or \( \frac{6}{8} \) and \( \frac{3}{4} \).

Why were two different number cards placed on the exact same point on the number line? Responses may vary. Possible response(s) include: There are different fractions that represent the same value.

How can two number cards have the same distance from 0? Responses may vary. Possible response(s) include: More than one fraction can represent the same distance from 0; there are multiple ways to represent or name this distance or value.
Equivalent Fractions

Explore

The **Explore** portion of the lesson provides the student with an opportunity to be actively involved in the exploration of the mathematical concepts addressed. This part of the lesson is designed for groups of three to four students.

1. Distribute the *Equivalent Fractions Activity Pages* (pp. 23-25) to each student.

2. Prompt the students to use the grid on each of the *Equivalent Fractions Activity Pages* to shade the fraction noted on each page.

   **Teacher Note:** A Diagonal Grid rectangle (p. 22) is provided as an *optional* resource for students’ use during this activity. The Diagonal Grid rectangle can either be used as an introduction to gridding the fractions given or for additional practice in generating equivalent fractions. You will need to make additional copies of Diagonal Grid rectangle, as needed.

   **Sample models**

   ![Sample models](image)

   \(\frac{1}{3}\) \hspace{1cm} \(\frac{1}{4}\) \hspace{1cm} \(\frac{5}{8}\)

**Facilitation Questions**

What are some ways that you can accurately divide your model into the appropriate number of parts? *Responses may vary. Possible response(s) include: I can fold the paper rectangle into 3 equal parts.*

How could you use the grid to help you divide the rectangle into equal parts? *Responses may vary. Possible response(s) include: The length of one side of the rectangle is 24 units. 24 divided into three parts is 8. Each of my parts will have one side that is 8 units long.*
3. Prompt the students to continue to evenly partition (divide) each paper model into more parts to generate more fractions equivalent to $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{5}{8}$.

4. Prompt students to write the equivalent fractions that they have generated onto the appropriate Equivalent Fractions Activity Page.

**Teacher Note:** Make sure that you convey explicitly that the whole is partitioned into equal parts.

Sample models

- Fractions equivalent to $\frac{1}{3}$
- Fractions equivalent to $\frac{1}{4}$
- Fractions equivalent to $\frac{5}{8}$

**Facilitation Questions**

What part of the paper model does the numerator of each of your fractions represent? Responses may vary. Possible response(s) include: The part shaded represents the numerator.

What part of the paper model does the denominator of each of your fractions represent? Responses may vary. Possible response(s) include: The total number of parts that the whole rectangle is divided into represents the denominator.

What happened to the denominator of your fraction when you folded or divided your model into more parts? The denominator increased.

What happened to the size of the parts when you folded or divided your model into more parts? The size of the parts decreased.
Equivalent Fractions

Explain

The Explain portion of the lesson is directed by the teacher to allow the students to formalize their understanding of the TEKS addressed in the lesson. Use the Facilitation Questions to prompt student groups to share their responses to the activity.

1. Distribute the Equivalent Fractions Relationships Activity Pages (pp. 26-28) to each student.

2. Prompt the students to use words to describe a process for generating equivalent fractions.

3. Prompt students to record (on the first table) the numerators and denominators of 5 of the equivalent fractions that they generated in the Explore phase of the lesson.

4. Prompt the students to express numerically the process used to generate the equivalent fractions in the space provided (on the first table) of the Equivalent Fractions Relationships Activity Page.

Teacher Note: You may have to provide students with an example for the first equivalent fraction, being explicit while discussing the process used for generating equivalent fractions. See examples below.

Examples:

<table>
<thead>
<tr>
<th>Process</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{3} \times 2 ) \times 2 \ = \ \frac{2}{6} \ = \ \frac{1}{3} \ = \ \frac{1}{3} \times 2 \ = \ \frac{2}{8} \ = \ \frac{1}{4} \ = \ \frac{1}{4} \ = \ \frac{1}{4} \ = \ \frac{1}{4} \ = \ \frac{1}{4} \</td>
<td></td>
</tr>
<tr>
<td>( \frac{5}{8} \times 2 ) \times 2 \ = \ \frac{10}{16} \ = \ \frac{1}{8} \ = \ \frac{1}{8} \ = \ \frac{1}{8} \ = \ \frac{1}{8} \ = \ \frac{1}{8} \ = \ \frac{1}{8} \ = \ \frac{1}{8} \</td>
<td></td>
</tr>
</tbody>
</table>

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Equivalent Fractions

5. Prompt the students to use the second table on the *Equivalent Fractions Relationships Activity Page* to record the numerators and denominators of the equivalent fractions that they generated in the **Explore** phase of the lesson.

6. Use the following Facilitation Questions to assist students as they describe in words the relationship between the numerators and denominators of each of the fractions given. Adapt Facilitation Questions for each fraction accordingly.

**Facilitation Questions**

Students should write their responses to the first two questions on the corresponding *Equivalent Fractions Relationships Activity Page* of each fraction given.

*What patterns do you notice in the relationships between the numerators of your equivalent fractions and the relationships between the denominators of your equivalent fractions?* Responses may vary. Possible response(s) include: The relationship between the numerators of a pair of equivalent fractions is the same as the relationship between the denominators of the same pair of equivalent fractions.

*What generalizations can you make from the patterns that you could use to generate more fractions equivalent to ___?* Responses may vary. Possible response(s) include: I can multiply or divide the numerator and denominator of any given fraction by any common factor to generate an equivalent fraction.

7. Prompt the students to express numerically the process used to generate the denominator/numerator of the equivalent fraction in the process column of the second table on the *Equivalent Fractions Relationships Activity Pages*.

8. Prompt the students to use words to describe a process for generating equivalent fractions.

**Facilitation Questions**

**Fraction \( \frac{1}{3} \)**

*How can we determine what factor times 1 equals 3?* Responses may vary. Possible response(s) include: Divide 3 by 1 to get a factor of 3.
Equivalent Fractions

What result do we get when we multiply ______ (numerator of any other fraction equivalent to \(\frac{1}{3}\)) by 3? Responses may vary. Possible response(s) include: We get the denominator of the fraction.

Is this relationship consistent with all of the other fractions that you have listed on your table? Why or why not? Yes. Each time I divide the denominator by the numerator, I get the same number.

Fraction \(\frac{1}{4}\)

How can we determine what factor times 1 equals 4? Responses may vary. Possible response(s) include: Divide 4 by 1 to get a factor of 4.

What result do we get when we multiply ______ (numerator of any other fraction equivalent to \(\frac{1}{4}\)) by 4? Responses may vary. Possible response(s) include: We get the denominator of the fraction.

Is this relationship consistent with all of the other fractions that you have listed on your table? Why or why not? Responses may vary. Possible response(s) include: Yes. Each time I divide the denominator by the numerator, I get the same number.

Fraction \(\frac{5}{8}\)

How can we determine what factor times 5 equals 8? (Students may use a calculator.) Responses may vary. Possible response(s) include: Divide 8 by 5 to get a factor of 1.6.

What result do we get when we multiply ______ (numerator of any other fraction equivalent to \(\frac{5}{8}\)) by 1.6? Responses may vary. Possible response(s) include: We get the denominator of the fraction.

Is this relationship consistent with all of the other fractions that you have listed on your table? Responses may vary. Possible response(s) include: Yes. Each time I divide the denominator by the numerator, I get the same number.

Teacher Note: Although multiplying fractions and decimals is not a 5th grade student expectation, allow students to use calculators to determine the relationship between the numerator and denominator of non-unit fractions to illustrate that the multiplicative relationship exists in all fractions—unit and non-unit.
Equivalent Fractions

9. Distribute the *Journal Activity Page* (p. 29) to each student.

10. Prompt the students to use their experiences in the **Explore** and **Explain** phases of the lesson to develop a procedure for generating equivalent fractions.

11. Prompt the students to write their procedures on the *Journal Activity Page*.

12. Prompt the students to share their written procedure with a classmate.

13. Distribute the *Verbal and Visual Word Association Activity Page* (p. 30) to each student.

14. Prompt the students to complete the *Verbal and Visual Word Association Activity Page*.

*Teacher Note:* Remind students to include multiplying the numerator and denominator by 2 in their example as part of the process for generating equivalent fractions.

<table>
<thead>
<tr>
<th>Vocabulary Term</th>
<th>Visual Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent Fractions</td>
<td><img src="image1" alt="Visual Representation" /></td>
</tr>
<tr>
<td>7/10</td>
<td>70/100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractions that represent the same value.</td>
<td><img src="image2" alt="Example" /></td>
</tr>
<tr>
<td>4 \div 2 = \frac{2}{4} \div \frac{2}{2} = \frac{1}{2}</td>
<td></td>
</tr>
</tbody>
</table>
Equivalent Fractions

Elaborate

The Elaborate portion of the lesson provides an opportunity for the student to apply the concepts of the TEKS within a new situation. In this lesson, students will generate equivalent fractions numerically and justify their procedure with concrete/pictorial models. This part of the lesson is designed for groups of two or three students.

1. Provide the students with Generating Equivalent Fractions Activity Pages (pp. 31-33).

   Teacher Note: Steps 2-6 will be repeated for each Generating Equivalent Fractions Activity Page. Facilitation Questions are specific for each given fraction. Use accordingly.

2. Prompt the students to describe their procedure for generating fractions that are equivalent to each fraction given and to record their procedure on the appropriate Generating Equivalent Fractions Activity Page.

3. Provide the students with 36 two-color counters. Advise students that they will not be using all 36 two-color counters for each fraction. Remember, students will be working on each Generating Equivalent Fractions Activity Page one at a time.

4. Prompt the students to show \( \frac{12}{16} \) with 32 counters; \( \frac{3}{5} \) with 30 counters; and \( \frac{8}{12} \) with 36 counters.

5. Prompt the students to use the two-color counters to show their procedure for determining the numerator and denominator of a fraction equivalent to the fraction they are working on.

6. Prompt the students to record their models in pictures.
Equivalent Fractions

Facilitation Questions

Fraction \(\frac{12}{16}\)

**How does the model demonstrate dividing the numerator and the denominator by the same factor?** Responses may vary. Possible response(s) include: When I modeled \(\frac{12}{16}\) with 32 counters, I created 16 equal groups of 2 counters with 12 of the groups yellow. To represent \(\frac{6}{8}\), I combined pairs of equal groups of counters to create 8 equal groups with 6 of the groups yellow. This represented dividing the numerator and denominator of \(\frac{12}{16}\) by a factor of 2. I combined pairs of equal groups of counters again to create 4 equal groups with 3 of the groups yellow to represent \(\frac{3}{4}\). This represented dividing the numerator and denominator of \(\frac{12}{16}\) by a factor of 4.

**How many fractions can you generate that are equivalent to \(\frac{12}{16}\)?** Responses may vary. Possible response(s) include: An infinite number because as long as I increase or decrease the numerator and denominator by the same factor, any factor will generate an equivalent fraction.

Fraction \(\frac{3}{5}\)

**How does the model demonstrate multiplying the numerator and denominator by the same factor?** Responses may vary. Possible response(s) include: To show \(\frac{3}{5}\) with 30 counters, I made 5 equal groups of counters. Three of the groups have all red counters and the other 2 groups have all yellow counters. When I multiply the denominator, I am increasing the number of groups by separating each group into 2 equal groups; therefore, I will have 10 equal groups, \(5 \times 2 = 10\). This increases the number of groups of red counters (numerator) by the same factor of 2, \(3 \times 2 = 6\).

**How many fractions can you generate that are equivalent to \(\frac{3}{5}\)?** Responses may vary. Possible response(s) include: An infinite number, because as long as I increase or decrease the numerator and denominator by the same factor, any factor will generate an equivalent fraction.
Equivalent Fractions

Fraction $\frac{8}{12}$

How does the model demonstrate dividing the numerator and the denominator by the same factor? Responses may vary. Possible response(s) include: When I modeled $\frac{8}{12}$ with 36 counters, I created 12 equal groups of 3 counters with 8 of the groups red. To represent $\frac{4}{6}$, I combined pairs of equal groups of counters to create 6 equal groups with 4 of the groups red. This represents dividing the numerator and denominator of $\frac{8}{12}$ by a factor of 2. I combined pairs of equal groups of counters again to create 3 equal groups with 2 of the groups red to represent $\frac{2}{3}$. This represents dividing the numerator and denominator of $\frac{8}{12}$ by a factor of 4.

How many fractions can you generate that are equivalent to $\frac{8}{12}$? Responses may vary. Possible response(s) include: An infinite number, because as long as I increase or decrease the numerator and denominator by the same factor, any factor will generate an equivalent fraction.
Equivalent Fractions

Evaluate

The Evaluate portion of the lesson provides the student with an opportunity to demonstrate his or her understanding of the TEKS addressed in the lesson.

1. Provide each student with a Performance Assessment Activity Page (p. 34).

2. Upon completion of the activity page, use a rubric to assess student understanding of the concepts addressed in the lesson.

3. Prompt the students to complete the Selected Response Activity Pages (pp. 35-37).

Formative Assessment

Note: Formative assessment items test concepts taught in the lesson and provide teachers valid information on whether students learned the concepts, principles, and skills related to the lesson. A transfer assessment question provides information on whether the students can take the concepts from the lesson and apply them in a novel situation.
Implementing the ELPS in Mathematics

Resources
Number Cards (Page 2)

2  
---
 4

3  
---
 4

1  
---
 8

2  
---
 8

Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5
Number Cards (Page 3)

3

8

4

8

5

8

6

8

Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5
Number Cards (Page 4)

7

8
Equivalent Fractions Activity Page (Page 1)

Fractions Equivalent to \( \frac{1}{3} \)

\[
\begin{align*}
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\frac{1}{3} &= \square \\
\end{align*}
\]
Equivalent Fractions Activity Page (Page 2)

Fractions Equivalent to $\frac{1}{4}$

Student Name: ________________________________

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

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

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

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

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

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

Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5
Student Name: ______________________________

Equivalent Fractions Activity Page (Page 3)

Fractions Equivalent to \( \frac{5}{8} \)

\[
\begin{align*}
\frac{5}{8} &= \frac{5}{8} \\
\frac{5}{8} &= \frac{5}{8} \\
\frac{5}{8} &= \frac{5}{8} \\
\frac{5}{8} &= \frac{5}{8} \\
\frac{5}{8} &= \frac{5}{8} \\
\frac{5}{8} &= \frac{5}{8}
\end{align*}
\]
What patterns do you notice in the relationships between the numerators of your equivalent fractions and the relationships between the denominators of your equivalent fractions?

What generalizations can you make from the patterns that you could use to generate more fractions equivalent to $\frac{1}{3}$?

Describe in words the relationship between the numerators and denominators of fractions equivalent to $\frac{1}{3}$.

How could you use this relationship to generate more fractions equivalent to $\frac{1}{3}$?
Student Name: ________________________________

**Equivalent Fractions Relationships Activity Page (Page 2)**

What patterns do you notice in the relationships between the numerators of your equivalent fractions and the relationships between the denominators of your equivalent fractions?

What generalizations can you make from the patterns that you could use to generate more fractions equivalent to $\frac{1}{4}$?

<table>
<thead>
<tr>
<th>Number of Parts Shaded (Numerator)</th>
<th>Process</th>
<th>Total Number of Parts (Denominator)</th>
<th>Total Number of Parts (Denominator)</th>
<th>Process</th>
<th>Number of Parts Shaded (Numerator)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>?</td>
<td>4</td>
<td>4</td>
<td>?</td>
<td>1</td>
</tr>
</tbody>
</table>

Describe in words the relationship between the numerators and denominators of fractions equivalent to $\frac{1}{4}$.

How could you use this relationship to generate more fractions equivalent to $\frac{1}{4}$?

*Mathematics TEKS Connection: Grade 3-5*  
*Student Lesson: Grade 5*
Student Name: ________________________________

**Equivalent Fractions Relationships Activity Page (Page 3)**

<table>
<thead>
<tr>
<th>Process</th>
<th>Process</th>
</tr>
</thead>
</table>
| \[
\begin{array}{c}
5 \\
8
\end{array}
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| \[
\begin{array}{c}
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What patterns do you notice in the relationships between the numerators of your equivalent fractions and the relationships between the denominators of your equivalent fractions?

What generalizations can you make from the patterns that you could use to generate more fractions equivalent to \(\frac{5}{8}\)?

Describe in words the relationship between the numerators and denominators of fractions equivalent to \(\frac{5}{8}\).

How could you use this relationship to generate more fractions equivalent to \(\frac{5}{8}\)?

**Mathematics TEKS Connection: Grade 3-5**
Student Lesson: Grade 5

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Journal Activity Page

Write a detailed procedure for generating equivalent fractions.
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<th>Visual Representation</th>
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<tbody>
<tr>
<td>Equivalent Fractions</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Generating Equivalent Fractions Activity Page (Page 1)

Generate 2 other fractions equivalent to $\frac{12}{16}$.

$\frac{12}{16} = \square$  $\frac{12}{16} = \square$

Describe your procedure.

Use 32 two-color counters to justify your solution.

Draw a representation of your counters below.

$\frac{12}{16}$  $\square$  $\square$
Student Name: ________________________________

Generating Equivalent Fractions Activity Page (Page 2)

Generate 2 other fractions equivalent to \( \frac{3}{5} \).

\[
\begin{array}{c}
\frac{3}{5} = \square \\
\frac{3}{5} = \square \\
\end{array}
\]

Describe your procedure.

Use 30 two-color counters to justify your solution.

Draw a representation of your counters below.

\[
\begin{array}{c}
\frac{3}{5} \\
\square \\
\square \\
\end{array}
\]

Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5
Student Name: ________________________________

Generating Equivalent Fractions Activity Page (Page 3)

Generate 2 other fractions equivalent to \( \frac{8}{12} \).

\[
\begin{align*}
\frac{8}{12} &= \boxed{} & \frac{8}{12} &= \boxed{}
\end{align*}
\]

Describe your procedure.

Use 36 two-color counters to justify your solution.

Draw a representation of your counters below.

\[
\begin{array}{c|c|c}
\frac{8}{12} & \boxed{} & \boxed{} \\
\hline
\frac{8}{12} & \boxed{} & \boxed{}
\end{array}
\]

Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5
Student Name: ________________________________

Performance Assessment

One third of the 21 students in Marsha’s class have brown hair. One fourth of the 24 students in Jim’s class have brown hair. What is the total number of students in Marsha’s and Jim’s classes who have brown hair? Explain your thinking.

Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5
Student Name: ____________________________

Selected Response Activity

1. Ross bought a 12 pack box of sodas. Ross and his friends drank 8 of the sodas while watching a baseball game. Which fraction below shows the shaded circles as the fractional amount of the box of sodas that are left?

A

B

C

D
2. What is the relationship between the numerator and the denominator in the fractions listed below?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

A The numerator is 12 less than the denominator.
B The denominator divided by 3 is the numerator.
C The denominator is 12 more than the numerator.
D The denominator is 5 times the numerator.

3. Use the table to answer the question.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>16</td>
</tr>
</tbody>
</table>

If this pattern continues, what will the fraction be when the denominator is 64?

A \( \frac{16}{64} \)
B \( \frac{9}{64} \)
C \( \frac{32}{64} \)
D \( \frac{12}{64} \)
Student Name: ________________________________

4. Jack purchased \( \frac{3}{4} \) of a pound of smoked turkey at the deli. If there are 16 ounces in a pound, how many ounces of smoked turkey did Jack purchase?

A 8 ounces
B 12 ounces
C 13 ounces
D 30 ounces
Responses may vary. Possible responses include:

Fractions Equivalent to $\frac{1}{3}$

$$
\begin{align*}
\frac{1}{3} & = \frac{2}{6} \\
\frac{1}{3} & = \frac{4}{12} \\
\frac{1}{3} & = \frac{8}{24} \\
\frac{1}{3} & = \frac{16}{48} \\
\frac{1}{3} & = \frac{20}{60} \\
\frac{1}{3} & = \frac{25}{75}
\end{align*}
$$

Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5
Equivalent Fractions Activity Page (Page 2)

Answer Key

Responses may vary. Possible responses include:

Fractions Equivalent to $\frac{1}{4}$

\[
\frac{1}{4} = \frac{2}{8} \\
\frac{1}{4} = \frac{4}{16} \\
\frac{1}{4} = \frac{8}{32} \\
\frac{1}{4} = \frac{16}{64} \\
\frac{1}{4} = \frac{32}{128} \\
\frac{1}{4} = \frac{64}{256}
\]

Mathematics TEKS Connection: Grade 3–5
Student Lesson: Grade 5
Equivalent Fractions Activity Page (Page 3)

Answer Key

Responses may vary. Possible responses include:

Fractions Equivalent to $\frac{5}{8}$

$\frac{5}{8} = \frac{10}{16}$

$\frac{5}{8} = \frac{20}{32}$

$\frac{5}{8} = \frac{40}{64}$

Mathematics TEKS Connections: Grade 3-5
Student Lesson: Grade 5
**Equivalent Fractions Relationships Activity Page (Page 1)**

**Answer Key**

Responses may vary. Possible responses include:

<table>
<thead>
<tr>
<th>Process</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{3} \times 2 \times 2 )</td>
<td>( \frac{2}{6} )</td>
</tr>
<tr>
<td>( \frac{1}{3} \times 3 \times 3 )</td>
<td>( \frac{3}{9} )</td>
</tr>
<tr>
<td>( \frac{1}{3} \times 4 \times 4 )</td>
<td>( \frac{4}{12} )</td>
</tr>
<tr>
<td>( \frac{1}{3} \times 5 \times 5 )</td>
<td>( \frac{5}{15} )</td>
</tr>
<tr>
<td>( \frac{1}{3} \times 6 \times 6 )</td>
<td>( \frac{6}{18} )</td>
</tr>
</tbody>
</table>

What patterns do you notice in the relationships between the numerators of your equivalent fractions and the relationships between the denominators of your equivalent fractions? Responses may vary. Possible responses include: The relationship between the numerators of a pair of equivalent fractions is the same as the relationship between the denominators of the same pair of equivalent fractions.

What generalizations can you make from the patterns that you could use to generate more fractions equivalent to \( \frac{1}{3} \)? Responses may vary. Possible responses include: I can multiply or divide the numerator and denominator of any given fraction by any common factor to generate an equivalent fraction.

<table>
<thead>
<tr>
<th>Number of Parts Shaded (Numerator)</th>
<th>Process</th>
<th>Total Number of Parts (Denominator)</th>
<th>Total Number of Parts (Denominator)</th>
<th>Process</th>
<th>Number of Parts Shaded (Numerator)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( \times 3 )</td>
<td>3</td>
<td>3</td>
<td>( \div 3 )</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>( \times 3 )</td>
<td>6</td>
<td>6</td>
<td>( \div 3 )</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>( \times 3 )</td>
<td>9</td>
<td>9</td>
<td>( \div 3 )</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>( \times 3 )</td>
<td>12</td>
<td>12</td>
<td>( \div 3 )</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>( \times 3 )</td>
<td>15</td>
<td>15</td>
<td>( \div 3 )</td>
<td>5</td>
</tr>
</tbody>
</table>

Describe in words the relationship between the numerators and denominators of fractions equivalent to \( \frac{1}{3} \). Responses may vary. Possible responses include: The denominator is 4 times the numerator for all fractions equivalent to \( \frac{1}{3} \).

How could you use this relationship to generate more fractions equivalent to \( \frac{1}{3} \)? Responses may vary. Possible responses include: I could multiply any given numerator by 3 to generate a fraction equivalent to \( \frac{1}{3} \). I could divide any given denominator by 3 to generate a fraction equivalent to \( \frac{1}{3} \).
Equivalent Fractions Relationships Activity Page (Page 2)

**Answer Key**

Responses may vary. Possible responses include:

What patterns do you notice in the relationships between the numerators of your equivalent fractions and the relationships between the denominators of your equivalent fractions? Responses may vary. Possible responses include: The relationship between the numerators of a pair of equivalent fractions is the same as the relationship between the denominators of the same pair of equivalent fractions.

What generalizations can you make from the patterns that you could use to generate more fractions equivalent to \( \frac{1}{4} \)? Responses may vary.

Possible responses include: I can multiply or divide the numerator and denominator of any given fraction by any common factor to generate an equivalent fraction.

<table>
<thead>
<tr>
<th>Process</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{4} \times 2 ) ( \times 2 )</td>
<td>( \frac{1}{4} + 2 ) ( \frac{1}{4} + 2 )</td>
</tr>
<tr>
<td>( \frac{1}{4} \times 3 ) ( \times 3 )</td>
<td>( \frac{1}{4} + 3 ) ( \frac{1}{4} + 3 )</td>
</tr>
<tr>
<td>( \frac{1}{4} \times 4 ) ( \times 4 )</td>
<td>( \frac{1}{4} + 4 ) ( \frac{1}{4} + 4 )</td>
</tr>
<tr>
<td>( \frac{1}{4} \times 5 ) ( \times 5 )</td>
<td>( \frac{1}{4} + 5 ) ( \frac{1}{4} + 5 )</td>
</tr>
<tr>
<td>( \frac{1}{4} \times 6 ) ( \times 6 )</td>
<td>( \frac{1}{4} + 6 ) ( \frac{1}{4} + 6 )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Parts Shaded (Numerator)</th>
<th>Process</th>
<th>Total Number of Parts (Denominator)</th>
<th>Total Number of Parts (Denominator)</th>
<th>Process</th>
<th>Number of Parts Shaded (Numerator)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( \times 4 )</td>
<td>4</td>
<td>4</td>
<td>( +4 )</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>( \times 4 )</td>
<td>8</td>
<td>8</td>
<td>( +4 )</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>( \times 4 )</td>
<td>12</td>
<td>12</td>
<td>( +4 )</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>( \times 4 )</td>
<td>16</td>
<td>16</td>
<td>( +4 )</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>( \times 4 )</td>
<td>20</td>
<td>20</td>
<td>( +4 )</td>
<td>5</td>
</tr>
</tbody>
</table>

Describe in words the relationship between the numerators and denominators of fractions equivalent to \( \frac{1}{4} \). Responses may vary. Possible responses include: The denominator is 4 times the numerator for all fractions equivalent to \( \frac{1}{4} \).

How could you use this relationship to generate more fractions equivalent to \( \frac{1}{4} \)? Responses may vary. Possible responses include: I could multiply any given numerator by 4 to generate a fraction equivalent to \( \frac{1}{4} \). I could divide any given denominator by 4 to generate a fraction equivalent to \( \frac{1}{4} \).
### Equivalent Fractions Relationships Activity Page (Page 3)

**Answer Key**

Responses may vary. Possible responses include:

What patterns do you notice in the relationships between the numerators of your equivalent fractions and the relationships between the denominators of your equivalent fractions? Responses may vary. Possible responses include: The relationship between the numerators of a pair of equivalent fractions is the same as the relationship between the denominators of the same pair of equivalent fractions.

What generalizations can you make from the patterns that you could use to generate more fractions equivalent to $\frac{5}{8}$? Responses may vary. Possible responses include: I can multiply or divide the numerator and denominator of any given fraction by any common factor to generate an equivalent fraction.

### Table:

<table>
<thead>
<tr>
<th>Number of Parts Shaded (Numerator)</th>
<th>Process</th>
<th>Total Number of Parts (Denominator)</th>
<th>Process</th>
<th>Number of Parts Shaded (Numerator)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>$\times 1.6$</td>
<td>8</td>
<td>$\div 1.6$</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>$\times 1.6$</td>
<td>16</td>
<td>$\div 1.6$</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>$\times 1.6$</td>
<td>24</td>
<td>$\div 1.6$</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>$\times 1.6$</td>
<td>32</td>
<td>$\div 1.6$</td>
<td>20</td>
</tr>
<tr>
<td>25</td>
<td>$\times 1.6$</td>
<td>40</td>
<td>$\div 1.6$</td>
<td>25</td>
</tr>
</tbody>
</table>

Describe in words the relationship between the numerators and denominators of fractions equivalent to $\frac{5}{8}$. Responses may vary. Possible responses include: The denominator is 1.6 times the numerator for all fractions equivalent to $\frac{5}{8}$.

How could you use this relationship to generate more fractions equivalent to $\frac{5}{8}$? Responses may vary. Possible responses include: I could multiply any given numerator by 1.6 to generate a fraction equivalent to $\frac{5}{8}$. I could divide any given denominator by 1.6 to generate a fraction equivalent to $\frac{5}{8}$.
Generating Equivalent Fractions Activity Page (Page 1)

Answer Key

Generate 2 other fractions equivalent to \( \frac{12}{16} \).

Responses may vary. Possible responses include:

\[
\begin{align*}
\frac{12}{16} &= \frac{6}{8}\\
\frac{12}{16} &= \frac{3}{4}
\end{align*}
\]

Describe your procedure.

Responses may vary. Possible responses include: I divided the numerator and the denominator of the fraction by the same factor of 4 to get \( \frac{3}{4} \). I divide the numerator and the denominator by the same factor of 2 to get \( \frac{6}{8} \).

Use 32 two-color counters to justify your solution.

Draw a representation of your counters below.

<table>
<thead>
<tr>
<th>( \frac{12}{16} )</th>
<th>( \frac{6}{8} )</th>
<th>( \frac{3}{4} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses may vary. Possible responses include:</td>
<td>Responses may vary. Possible responses include:</td>
<td>Responses may vary. Possible responses include:</td>
</tr>
<tr>
<td>![Counter Representation 1]</td>
<td>![Counter Representation 2]</td>
<td>![Counter Representation 3]</td>
</tr>
<tr>
<td>12 out of 16 equal groups of counters are yellow.</td>
<td>6 out of 8 equal groups of counters are yellow.</td>
<td>3 out of 4 equal groups of counters are yellow.</td>
</tr>
</tbody>
</table>
### Generating Equivalent Fractions Activity Page (Page 2)

**Answer Key**

Generate 2 other fractions equivalent to \( \frac{3}{5} \).

Responses may vary. Possible responses include:

\[
\frac{3}{5} = \frac{6}{10} \quad \quad \quad \quad \quad \quad \quad \quad \frac{3}{5} = \frac{9}{15}
\]

Describe your procedure.

Responses may vary. Possible responses include: I multiplied the numerator and the denominator by the same factor of 2 to get \( \frac{6}{10} \). I multiplied the numerator and the denominator by the same factor of 3 to get \( \frac{9}{15} \).

Use 30 two-color counters to justify your solution.

Draw a representation of your counters below.

<table>
<thead>
<tr>
<th>( \frac{3}{5} )</th>
<th>( \frac{6}{10} )</th>
<th>( \frac{9}{15} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 out of 5 equal groups of counters are red.</td>
<td>6 out of 10 equal groups of counters are red.</td>
<td>9 out of 15 equal groups of counters are red.</td>
</tr>
</tbody>
</table>

**Mathematics TEKS Connection:** Grade 3-5

**Student Lesson:** Grade 5

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Generating Equivalent Fractions Activity Page (Page 3)

**Answer Key**

Generate 2 other fractions equivalent to \( \frac{8}{12} \).
Responses may vary. Possible responses include:

\[
\frac{8}{12} = \frac{4}{6} \quad \frac{8}{12} = \frac{2}{3}
\]

Describe your procedure.
Responses may vary. Possible responses include: I divided the numerator and the denominator of the fraction by the same factor of 2 to get \( \frac{4}{6} \). I divide the numerator and the denominator by the same factor of 4 to get \( \frac{2}{3} \).

Use 36 two-color counters to justify your solution.

Draw a representation of your counters below.

<table>
<thead>
<tr>
<th>( \frac{8}{12} )</th>
<th>( \frac{4}{6} )</th>
<th>( \frac{2}{3} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses may vary. Possible responses include:</td>
<td>Responses may vary. Possible responses include:</td>
<td>Responses may vary. Possible responses include:</td>
</tr>
<tr>
<td>8 out of 12 equal groups of counters are red.</td>
<td>4 out of 6 equal groups of counters are red.</td>
<td>2 out of 3 equal groups of counters are red.</td>
</tr>
</tbody>
</table>

Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5

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Performance Assessment (Answer Key)

One third of the 21 students in Marsha’s class have brown hair. One fourth of the 24 students in Jim’s class have brown hair. What is the total number of students in Marsha’s and Jim’s classes who have brown hair? Explain your thinking.

*Answer: 13*

### Answers and Error Analysis for Selected Response Activity:

<table>
<thead>
<tr>
<th>Question Number</th>
<th>TEKS</th>
<th>Correct Answer</th>
<th>Conceptual Error</th>
<th>Conceptual Error</th>
<th>Procedural Error</th>
<th>Procedural Error</th>
<th>Guess</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.2A</td>
<td>B</td>
<td>D</td>
<td></td>
<td>A</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5.2A</td>
<td>D</td>
<td>A</td>
<td>C</td>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>5.2A</td>
<td>C</td>
<td>B</td>
<td>D</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5.2A</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td></td>
<td></td>
<td>D</td>
</tr>
</tbody>
</table>

*Mathematics TEKS Connection: Grade 3-5
Student Lesson: Grade 5*
Technology Enrichment:
Equivalent Fractions

Mathematics/5th Grade

Use any of the following technology-enriched activities to replace a pen-and-paper activity in your lesson. These activities support the TEKS for Technology Applications for grades 3-5.

1. Use online manipulatives to model and discuss fraction problems. Allow students to show and explain their work using the manipulatives on an interactive whiteboard.

RtI Tier 1 Differentiation Activity

- **Use connecting cubes to represent fractions.** [http://www.eduplace.com/kids/mw/manip/mn_5.html](http://www.eduplace.com/kids/mw/manip/mn_5.html)

- **Use Pattern Blocks to represent fractions.** [http://nlvm.usu.edu/en/nav/vlibrary.html](http://nlvm.usu.edu/en/nav/vlibrary.html) >Choose 3-5, Geometry

- **Use any of the fraction tools, such as Equivalent Fractions or Fractions – Comparing to model problems.** (Engage Phase, Elaborate Phase) [http://nlvm.usu.edu/en/nav/vlibrary.html](http://nlvm.usu.edu/en/nav/vlibrary.html) >Choose 3-5, Numbers and Operations

TEKS for Technology Applications

1. Creativity and innovation. (C) use virtual environments to explore systems and issues

4. Critical thinking, problem solving, and decision making. (B) collect, analyze, and represent data to solve problems using tools such as word processing, databases, spreadsheets, graphic organizers, charts, multimedia, simulations, models, and programming languages
Technology Enrichment: Equivalent Fractions

Students can use interactive whiteboard software, a graphic organizer program, drawing program, or word processor to create math vocabulary posters. (Explain Phase)

<table>
<thead>
<tr>
<th>Vocabulary Term</th>
<th>Equivalent Fractions</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent Fractions</td>
<td><img src="image" alt="Diagram" /></td>
<td>fractions that represent the same value</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
</tbody>
</table>

4 \div \frac{2}{8} = \frac{2}{4} \div \frac{2}{2} = \frac{1}{2}

TEKS for Technology Applications

1. Creativity and innovation. (A) create original products using a variety of resources
2. Communication and collaboration. (A) draft, edit, and publish products in different media individually and collaboratively; (B) use font attributes, color, white space, and graphics to ensure that products are appropriate for multiple communication media, including monitor display, web, and print; (E) evaluate the product for relevance to the assignment or task; and (F) perform basic software application functions, including opening applications and creating, modifying, printing, and saving files
3. Critical thinking, problem solving, and decision making. (B) collect, analyze, and represent data to solve problems using tools such as word processing, databases, spreadsheets, graphic organizers, charts, multimedia, simulations, models, and programming languages; (C) evaluate student-created products through self and peer review for relevance to the assignment or task
Technology Enrichment: Equivalent Fractions

3 Use an online graphing tool to collect data from peers. Students can use fractions to represent data on the graph. (Enrichment Differentiation Activity)

http://nlvm.usu.edu/en/nav/vlibrary.html > Choose 3-5, Bar Chart

![Favorite Sports Bar Chart](image)

<table>
<thead>
<tr>
<th>Favorite Sports</th>
<th>Basketball</th>
<th>Baseball</th>
<th>Football</th>
<th>Soccer</th>
<th>Gymnastics</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td></td>
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</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TEKS for Technology Applications

(2) Communication and collaboration. (C) collaborate effectively through personal learning communities and social environments; (D) select and use appropriate collaboration tools

(3) Research and information fluency. (B) collect and organize information from a variety of formats, including text, audio, video, and graphics; (C) validate and evaluate the relevance and appropriateness of information; and (D) acquire information appropriate to specific tasks

(4) Critical thinking, problem solving, and decision making. (A) identify information regarding a problem and explain the steps toward the solution; (B) collect, analyze, and represent data to solve problems using tools such as word processing, databases, spreadsheets, graphic organizers, charts, multimedia, simulations, models, and programming languages
Technology Enrichment: Equivalent Fractions

4. Use a blog or a discussion forum, such as Collaborize Classroom, to create student math journals. Create your own account at http://www.collaborizeclassroom.com Students can share word problems, explain their thinking, and respond to their peers’ writing. (Elaborate, Evaluate Phase) Be sure to establish clear guidelines for online etiquette before participating in a discussion.

For a demo account, visit: http://elps.collaborizeclassroom.com
Username/Email = elps_student; Password = collaborate
> Choose Class 1 Discussions to see sample discussion questions.

Other suggested collaborative sites:

TEKS for Technology Applications

(2) Communication and collaboration. (A) draft, edit, and publish products in different media individually and collaboratively; (C) collaborate effectively through personal learning communities and social environments; (D) select and use appropriate collaboration tools; (E) evaluate the product for relevance to the assignment or task

(4) Critical thinking, problem solving, and decision making. (C) evaluate student-created products through self and peer review for relevance to the assignment or task

(5) Digital citizenship. (A) adhere to acceptable use policies reflecting positive social behavior in the digital environment; (B) respect the intellectual property of others; (C) abide by copyright law and the Fair Use Guidelines for Educational Multimedia; (D) protect and honor the individual privacy of oneself and others; (E) follow the rules of digital etiquette; (F) practice safe, legal, and responsible use of information and technology; and (G) comply with fair use guidelines and digital safety rules