TEKS Cluster: Fractions

2.3 **Number and operations.** The student applies mathematical process standards to recognize and represent fractional units and communicates how they are used to name parts of a whole.

Fractions

Readiness Standards

2.3(B) explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part

Supporting Standards

2.3(A) partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words

2.3(C) use concrete models to count fractional parts beyond one whole using words and recognize how many parts it takes to equal one whole

2.3(D) identify examples and non-examples of halves, fourths, and eighths

TEKS Scaffold

TEKS	Student Expectation
3.3(H)	compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models (R)
2.3(B)	**2.3 Number and operations.** The student applies mathematical process standards to recognize and represent fractional units and communicates how they are used to name parts of a whole. The student is expected to: **(B) explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part**
1.6(G)	partition two-dimensional figures into two and four fair shares or equal parts and describe the parts using words (S)

Stimulus

Word Problem	Verbal Description	Chart/Table	Graph
Equation/ Expression	Manipulatives	Diagram/Image	Number Line
Base Ten Blocks	Measurement Tool	Formula	Geometric Figures

Content Builder (see Appendix for Tree Diagram)

- Explain that the more fractional parts used to make the whole, the smaller the part
- Explain that the fewer the fractional parts, the larger the part

Instructional Implications

In conjunction with 2.3(A), as students are partitioning whole objects into 2, 4, and 8 equal parts, they need to recognize and be able to explain that the more parts an object is divided into, the smaller the parts become; the fewer the parts an object is divided into, the larger the parts become. Instruction should provide real-world examples to build conceptual understanding (e.g., Would you rather share a candy bar with two friends or four? Would you rather have a slice from a pizza that was cut into four or eight equal parts? Why?).

Learning from Mistakes

Students may make the following mistakes:

- Not understanding that the more times you divide a whole object into parts, the smaller the parts become
- Thinking that one-eighth is larger than one-sixth because eight is bigger than six
- Not understanding that fractional parts of the same whole must be equal in area

Academic Vocabulary

eighths
fourths
fraction
fractional parts
halves
whole

2.3(A) **2.3 Number and operations.** The student applies mathematical process standards to recognize and represent fractional units and communicates how they are used to name parts of a whole. The student is expected to:

(A) partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words

Stimulus

Word Problem	Verbal Description	Chart/Table	Graph
Equation/ Expression	Manipulatives	Diagram/Image	Number Line
Base Ten Blocks	Measurement Tool	Formula	Geometric Figures

Academic Vocabulary

eighths
equal parts/equal shares
fourths
halves
whole

Role in Concept Development

Supports

- 3.3(H) compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models
- 2.3(B) explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part

Connection/ Relevance

This supporting standard develops the conceptual understanding of fractional parts of a whole. Being able to physically partition objects into equal parts in various ways allows students to observe how the size of the parts varies depending on the number of equal parts.

When to Teach

- Before/Prerequisite to 3.3(H)
- With 2.3(B)

Instructional Implications

Students should be provided with a whole object (e.g., strips, lines, regular polygons, and circles) and asked to partition it into two, four, and eight equal parts. Students should then describe the equal parts in words only (halves, fourths, and eighths). Instruction will not extend to the symbolic (e.g., $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$) until Grade 3. Encourage students to find more than one way to divide a given shape into equal parts (e.g., a square can be divided in two equal parts vertically, horizontally, or diagonally). This develops a student's understanding of how various shapes can represent the same fractional part (e.g., the rectangle formed from dividing the square vertically represents one-half and so does the triangle formed when the same square was divided diagonally). The use of geoboards supports the trial and error process of finding more than one way to represent a fractional part and comparing the amount of area represented in each fractional part regardless of the shape created.

Learning from Mistakes

Students may make the following mistakes:

- Not understanding that the more times you divide a whole object into parts, the smaller the parts become
- Thinking that one-eighth is larger than one-sixth because eight is bigger than six
- Not understanding that fractional parts of the same whole must be equal in area

2.3 Number and operations. The student applies mathematical process standards to recognize and represent fractional units and communicates how they are used to name parts of a whole. The student is expected to:

2.3(C) **(C) use concrete models to count fractional parts beyond one whole using words and recognize how many parts it takes to equal one whole**

Stimulus

Word Problem	Verbal Description	Chart/Table	Graph
Equation/ Expression	Manipulatives	Diagram/Image	Number Line
Base Ten Blocks	Measurement Tool	Formula	Geometric Figures

Academic Vocabulary

equal parts/equal shares
fractional parts
whole

Role in Concept Development

Supports

- 3.3(F) represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines
- 3.3(H) compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models
- 2.3(B) explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part

Connection/ Relevance

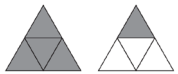
Recognizing how many parts it takes to equal one whole directs the student to focus on the size of the parts. The size of the parts allows the student to more accurately compare fractions. Counting fractional parts beyond one whole supports the concrete understanding of improper and mixed number fractions being equivalent (e.g., “five fourths” is the same as “one and one-fourth”).

When to Teach

- Before/Prerequisite to 3.3(F), 3.3(H)
- With 2.3(B)

Instructional Implications

All fraction lessons should begin with identifying how many parts it takes to equal one whole (e.g., if the whole is represented by the large triangle, then it takes four equal parts to represent the whole).



Students use manipulatives to represent fractional parts beyond one whole.

For example:

- Students identify that the whole is made up of four equal parts and they will be counting in fourths.
- Students must count each shaded part as one-fourth, two-fourths, three-fourths, four-fourths, and five-fourths.
- Students relate that it takes four parts to represent one whole. Thus, the pictorial representation of five-fourths can also be called one and one-fourth.

Instruction is limited to word use only (e.g., one-fourth, two-fourths, etc.) not the symbolic representation (e.g., $\frac{5}{4}$ or $1\frac{1}{4}$).

Learning from Mistakes

Students may make the following mistakes:

- Not recognizing that five-fourths and one and one-fourth are equivalent fractions

2.3(D) **2.3 Number and operations.** The student applies mathematical process standards to recognize and represent fractional units and communicates how they are used to name parts of a whole. The student is expected to:

(D) identify examples and non-examples of halves, fourths, and eighths

Stimulus

Word Problem	Verbal Description	Chart/Table	Graph
Equation/ Expression	Manipulatives	Diagram/Image	Number Line
Base Ten Blocks	Measurement Tool	Formula	Geometric Figures

Academic Vocabulary

equal parts/equal shares
eighths
fourths
halves
whole

Role in Concept Development

Supports

- 3.3(F) represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines
- 3.3(H) compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models
- 2.3(B) explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part

Connection/ Relevance

Identifying examples and non-examples of fractional parts of the same whole supports student understanding of the part-to-whole relationship and the size of the parts. This knowledge provides the foundation for being able to visually compare two fractions and/or concretely represent equivalent fractions.

When to Teach

Before/Prerequisite to 3.3(F), 3.3(H), 2.3(B)

Instructional Implications

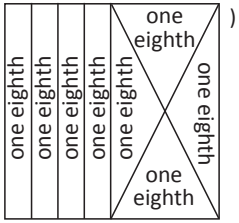
In conjunction with 2.3(A), as students partition figures into 2/4/8 equal parts and describe them as halves/fourths/eighths, students should recognize examples and non-examples of such partitions.

Examples: regular and irregular shapes divided equally

Non-examples: whole objects divided unequally

Learning from Mistakes

Students may make the following mistakes:

- Not understanding that fractional parts of the same whole must be equal in area but may not be congruent (e.g., 

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