Unit 4, Lesson 2

Decimales equivalentes

Standards

Addressing **4.NF.C.5, 4.NF.C.6, 4.NF.C.7**

Instructional Routines

- Card Sort
- MLR1 Stronger and Clearer Each Time
- True or False?

Goals

- Determine (orally) whether 2 ways of expressing tenths and hundredths are equivalent.
- Match (orally) diagrams and decimals that represent the same value.

Student Facing Learning Goals

Pensemos en decimales equivalentes.

Lesson Purpose

The purpose of this lesson is for students to reason about equivalent tenths and hundredths in decimal notation.

Narrative

Previously, students learned to represent tenths and hundredths shaded on a grid as fractions and in decimal notation. They continue to build their understanding of decimals in this lesson and take a closer look at decimals that are equivalent (for example, 0.2 and 0.20). Students articulate why the same value can be expressed in two different ways. They also encounter decimals in equations and on number lines, and use these representations to reason about equivalence.

Access for Students with Disabilities

- Representation

Required Materials

Materials to Copy

- Card Sort Diagrams of Fractions and Decimals (1 copy for every 2 students): Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	20 min
Synthesis Estimate	10 min

Teacher Reflection Questions

Which students did you not hear from today? Review your class list and try to recall something each student did or said. Make note of the students you missed. How will you bring their voices into the lesson tomorrow?

Warm-up

10 min

Verdadero o falso: Fracciones equivalentes

Standards

Addressing **4.NF.C.5**

Instructional Routines

- True or False?

The purpose of this True or False is to revisit equivalent fractions in tenths and hundredths. The reasoning students do here will be helpful later when students make sense of and identify decimals that are equivalent to given fractions or given decimals.

Student Task Statement

En cada caso, decide si la afirmación es verdadera o falsa. Explica tu razonamiento.

- $\frac{50}{100} = \frac{5}{10}$
- $\frac{20}{10} = \frac{20}{100}$
- $2 = 1 + \frac{90}{100}$
- $3\frac{1}{10} = \frac{31}{10}$

Student Response

Sample responses:

- True, because 50 hundredths and 5 tenths are both $\frac{1}{2}$.
- False, because $\frac{20}{10}$ is 2 and $\frac{20}{100}$ is less than 1.
- False, because $1 + \frac{90}{100}$ is $1\frac{90}{100}$, which is less than 2.
- True, because $3 + \frac{1}{10}$ is $\frac{30}{10} + \frac{1}{10}$, which is equal to $\frac{31}{10}$.

Launch

- Display one statement.
- *"Hagan una señal cuando sepan si la afirmación es verdadera o no, y puedan explicar cómo lo saben"* // "Give me a signal when you know whether the statement is true and can explain how you know."
- 1 minute: quiet think time

Activity

- Share and record answers and strategy.
- Repeat with each statement.

Activity Synthesis

- *"¿Qué saben sobre la relación entre décimas y centésimas que les haya ayudado a decidir si cada afirmación es verdadera o falsa?"* // "What do you know about the relationship between tenths and hundredths that helped you decide whether each statement is true or false?" (One tenth is 10 hundredths and one tenth is 10 times 1 hundredth. There are 10 tenths in 1 whole and 100 hundredths in 1 whole. If we multiply the numerator and denominator of a fraction in tenths by 10, we get an equivalent fraction in hundredths.)

Activity 1

15 min

Clasificación de tarjetas: Diagramas de fracciones y decimales

Standards

Addressing **4.NF.C.6**

Instructional Routines

- Card Sort

In this activity, students reinforce their understanding of equivalent fractions and decimals by sorting a set of cards by their value. This sorting task gives students opportunities to analyze fractions, decimals, and diagrams closely and make connections (MP7).

Access for Students with Disabilities

Representation: Access for Perception. Synthesis: Display a 10-by-10 grid, as well as a square of the exact same size, but with only the columns shown (representing just tenths). Shade 20 hundredths on the 10-by-10 grid and write 0.20 (twenty hundredths) above it. Shade 2 tenths on the other square and write 0.2 (2 tenths) above it. Invite students to discuss how these diagrams demonstrate equivalence of the two numbers.
Supports accessibility for: Conceptual Processing, Visual-Spatial Processing

Required Materials

Materials to Copy

- Card Sort Diagrams of Fractions and Decimals (1 copy for every 2 students): Activity 1

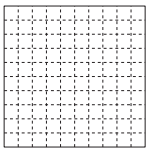
Required Preparation

- Create a set of cards from the blackline master for each group of 2–4.

Student Task Statement

Tu profesor te va a dar varias tarjetas. El cuadrado grande de cada tarjeta representa 1.

1. Clasifica las tarjetas de manera que las representaciones de cada grupo tengan el mismo valor. Prepárate para explicar tu razonamiento.
2. Uno de los diagramas quedó sin agrupar. ¿Qué número representa el diagrama de esa tarjeta? Escribe el número como una fracción y en notación decimal.
3. ¿Son 0.20 y 0.2 equivalentes? Usa fracciones y un diagrama para explicar tu razonamiento.



Launch

- Groups of 2–4
- Give each group a set of cards.

Activity

- *"Estas tarjetas tienen fracciones, decimales y diagramas. Clasifiquen las tarjetas según su valor. Juntos, expliquen cómo razonaron"* // "This set of cards includes fractions, decimals, and diagrams. Sort the cards by their value. Work with your group to explain your reasoning."
- *"Uno de los diagramas quedó sin agrupar. Escriban la fracción y el decimal que ese diagrama representa"* // "One diagram has no matching cards. Write the fraction and decimal it represents."
- 6–7 minutes: group work on the first two problems

Student Response

1. Groups:
   - $\frac{4}{10}$: A, F, J, K, M
   - $1\frac{40}{100}$: B, D, E, P
   - $\frac{14}{100}$: C, H, N
   - $\frac{4}{100}$: G, I, L
   - no matches: O
2. $1\frac{4}{100}$ (or equivalent) and 1.04
3. Yes. Sample response: 0.2 is $\frac{2}{10}$ and 0.20 is $\frac{20}{100}$. The two fractions are equivalent, so the two decimals are also equivalent. The diagram for 0.2 and 0.20 would both show 20 small squares shaded out of 100.

- Monitor for the ways students sort the cards and the features of the representations to which they attend.
- *"Resuelvan el último problema individualmente"* // "Work on the last problem independently."
- 2–3 minutes: independent work on the last problem

Activity Synthesis

- Invite previously selected groups to share each set of sorted cards and explain how they knew the representations belong together.
- *"¿Cómo supieron qué fracción y qué decimal escribir para el diagrama que no correspondía a ningún grupo?"* // "How did you know what fraction and decimal to write for the diagram without any matches?"
- Invite a student to share their response to the last problem. Highlight the equivalence of 0.2 and 0.20 as shown in the *Student Responses*.

Advancing Student Thinking

If students respond that 0.20 and 0.2 are not "the same," consider asking:

- *"¿A qué te refieres cuando dices que estos números no son lo mismo?"* // "What do you mean when you say these numbers are not the same?"
- *"¿Cómo representarías cada número en una cuadrícula? ¿En qué se parecen las cantidades y en qué son diferentes?"* // "How would you represent each number on a square grid? What is the same about the amounts and what is not the same?"

Activity 2

20 min

¿Verdadero o falso?

Standards

Addressing **4.NF.C.6, 4.NF.C.7**

Instructional Routines

- MLR1 Stronger and Clearer Each Time

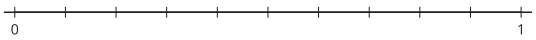
In this activity, students apply their understanding of equivalent fractions and decimals more formally, by analyzing equations and correcting the ones that are false. The last question refers to decimals on a number line and sets the stage for the next lesson where the primary representation is the number line.

As students discuss and justify their decisions about the claim in the last question, they critically analyze student reasoning (MP3).

This activity uses *MLR1 Stronger and Clearer Each Time*. Advances: reading, writing

Student Task Statement

1. En cada caso, decide si la afirmación es verdadera o falsa. Si es falsa, reemplaza uno de los números para que sea verdadera. Los números que hay a cada lado del signo igual no pueden ser idénticos.
   a. $\frac{50}{100} = 0.50$
   b. $0.05 = 0.5$
   c. $0.3 = \frac{3}{10}$
   d. $0.3 = \frac{30}{100}$
   e. $0.3 = 0.30$
   f. $1.1 = 1.10$
   g. $3.06 = 3.60$
   h. $2.70 = 0.27$
2. Jada dice que si se ubican los números 0.05, 0.5 y 0.50 en la recta numérica, solo quedarían 2 puntos marcados. ¿Estás de acuerdo? Explica o muestra tu razonamiento.



Student Response

1. a. True
   b. False. Sample response: $0.50 = 0.5$
   c. True
   d. True
   e. True
   f. True
   g. False. Sample response: $3.6 = 3.60$ or $3.06 = 3\frac{6}{100}$
   h. False. Sample response: $2.70 = 2\frac{70}{100}$ or $\frac{27}{100} = 0.27$
2. Yes. Sample response: The points 0.5 and 0.50 are equivalent, as they are both halfway between 0 and 1, so they share the same point (the fifth tick mark) on the number line. 0.05 is between 0 and 0.1.

Launch

- Groups of 2
- *"Antes, vimos ecuaciones que tenían fracciones en ambos lados del signo igual. Ahora exploremos ecuaciones que tienen fracciones y decimales, o solo decimales"* // "Earlier, we saw some equations with fractions on both sides of the equal sign. Now let's look at some equations that include fractions and decimals or just decimals."

Activity

- *"Tómense unos minutos para terminar la actividad individualmente. Luego, compartan con su compañero cómo pensaron"* // "Take a few minutes to complete the activity independently. Then share your thinking with your partner."
- 6–7 minutes: independent work time
- *"En cada pregunta del primer problema, tomen turnos para explicarle a su compañero cómo supieron si la afirmación era verdadera o falsa"* // "For each equation in the first problem, take turns explaining to your partner how you know whether it is true or false."
- 3–4 minutes: partner discussion

Activity Synthesis

MLR1 Stronger and Clearer Each Time

- *"Compartan con su pareja su respuesta a la última pregunta. Por turnos, uno habla y el otro escucha. Si es su turno de hablar, compartan sus ideas y lo que han escrito hasta ese momento. Si es su turno de escuchar, hagan preguntas y comentarios que ayuden a su compañero a mejorar su trabajo"* // "Share your response to the last question with your partner. Take turns being the speaker and the listener. If you are the speaker, share your ideas and writing so far. If you are the listener, ask questions and give feedback to help your partner improve their work."
- 3–4 minutes: structured partner discussion.
- Repeat with 1–2 new partners.
- *"Ajusten su borrador inicial basándose en los comentarios que les hicieron sus compañeros"* // "Revise your initial draft based on the feedback you got from your partners."

- 2–3 minutes: independent work time

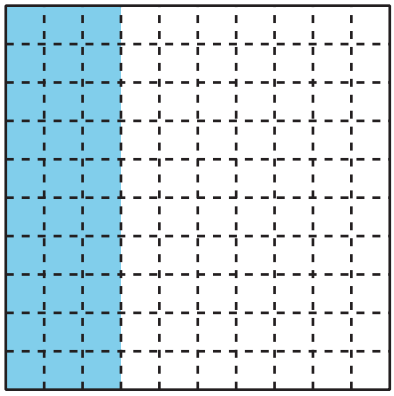
Lesson Synthesis

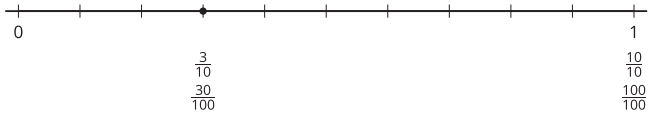
"Hoy exploramos distintas formas de representar decimales que son equivalentes. Usamos cuadrículas, rectas numéricas y fracciones para mostrar que dos decimales pueden representar el mismo valor" // "Today we looked at different ways to represent decimals that are equivalent. We used square grids, number lines, and fractions to show that two decimals can represent the same value."

"Supongan que un compañero no vino a la clase de hoy. ¿Cómo podrían convencerlo de que 0.3 y 0.30 son equivalentes? Escriban por lo menos dos maneras distintas de hacerlo" // "Suppose a classmate is absent today. How would you convince them that 0.3 and 0.30 are equivalent? Write down at least two different ways."

Select students to share their thinking.

Display the representations they used, or draw and display the following:





$$\frac{3 \times 10}{10 \times 10} = \frac{30}{100}$$

$$\frac{3}{10} = \frac{30}{100}$$

As needed, summarize student thinking for each representation. For example:

- *"0.3 es 3 décimas y 0.30 es 30 centésimas. La misma parte sombreada representa 3 décimas y también 30 centésimas"* // "0.3 is 3 tenths and 0.30 is 30 hundredths. The same shaded part represents 3 tenths and 30 hundredths."
- *"3 décimas y 30 centésimas se marcan en la recta numérica con el mismo punto"* // "Both 3 tenths and 30 hundredths share the same point on the number line."
  - *"0.3 es $\frac{3}{10}$ y 0.30 es $\frac{30}{100}$. Las dos fracciones son equivalentes"* // "0.3 is $\frac{3}{10}$ and 0.30 is $\frac{30}{100}$. The two fractions are equivalent."

Suggested Centers

- Rolling for Fractions (3–5), Stage 1: Equivalent Fractions (Supporting)
- Get Your Numbers in Order (1–5), Stage 4: Denominators 2, 3, 4, 5, 6, 8, 10, 12, 100 (Supporting)

Cool-down

5 min

¿Iguales o diferentes?

Standards

Addressing **4.NF.C.7**

Student Task Statement

1. Selecciona **todas** las afirmaciones verdaderas.
   a. $0.2 = 0.20$
   b. $5.40 = 5.04$
   c. $1.30 = 1.3$
   d. $0.07 = 0.70$
   e. $2.05 = 2.5$
2. ¿Cuál de estos números es equivalente a 0.9? Explica cómo lo sabes.
   a. 0.09
   b. 0.90
   c. 9.0
   d. 9.09

Student Response

1. A and C
2. B. 0.90. Sample response: 0.9 is $\frac{9}{10}$, which is equivalent to $\frac{90}{100}$. $\frac{90}{100}$ written as a decimal is 0.90.

Responding to Student Thinking

Students may say that options B ($5.40 = 5.04$) and D ($0.07 = 0.70$) in the first problem are both true. In each case, the numbers on the two sides of the equal sign have the same set of digits, just in different places. (Option B has a 5, a 4, and a 0, and option D has two 0s and a 7.)

Next Day Supports
Launch the lesson by asking students to recap the important points of the previous lessons.