Unit 11
Fractions and decimals

Five daily lessons

National **Numeracy** *Strategy*

Year 4
Spring term

Unit Objectives
Year 4

• Use fraction notation. **Recognise simple fractions that are several parts of a whole;** such as ⅓ or ⅝ and mixed numbers such as 5¾; **recognise the equivalence of simple fractions** (e.g. fractions equivalent to ½, ¼ or ¾).	Page 22
Identify two simple fractions with a total of 1.	Page 22
• Order simple fractions; for example decide whether fractions such as ⅜ or ⁷⁄₁₀ are greater or less than one half.	Page 22
• Understand decimal notation and place value for tenths and hundredths and use it in context, e.g. order amounts of money; convert a sum of money such as £13.25.	Page 28

Link Objectives

Year 3

- **Recognise unit fractions such as ½, ⅓, ¼, ⅕, ⅒ . . . and use them to find fractions of shapes and numbers.**

  Begin to recognise simple fractions that are several parts of a whole, such as **¾, ⅔,** or **⅗**.

  Begin to recognise simple equivalent fractions; for example five tenths and one half, five fifths and one whole.

  Compare familiar fractions; for example know that the number one half lies between one quarter and three quarters.

  Estimate a simple fraction.

(Key objectives in bold)

Year 5

- Use fraction notation, including mixed numbers, and the vocabulary numerator and denominator.

  Change an improper fraction to a mixed number.

  Recognise when two simple fractions are equivalent, including relating to hundredths to tenths.
- Order a set of fractions such as 2, 2¾, 1¾, 2½, 1½, and position them on a number line.
- **Use decimal notation for tenths and hundredths.**

  Know what each digit represents in a number with up to two decimal places.

  Order a set of numbers or measurements with the same number of decimal places.
- **Round a number with one or two decimal places to nearest integer.**

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- Resource sheets 11.1 to 11.25
- Activity sheet 11.1
- Activity sheet 11.2
- Activity sheet 11.3
- Activity sheet 11.4
- OHT 11.1
- OHT 11.2
- OHT 11.3
- 8 strips of paper with subdivisions
- Whiteboards
- Clock face

department for education and skills

Planning sheet	Day One	Unit 11 *Fractions and Decimals*	Term: *Spring*	Year Group: *4*

Oral and Mental

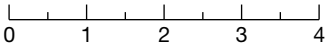
Objectives and Vocabulary

Count on or back in equal steps of ½, ¼, ⅓.

VOCABULARY
zero
half
halves
quarter
third

Teaching Activities

- Write ½ on board. Ask children to count in steps of ½ forwards and backwards, e.g.
  zero
  one half
  two halves
  three halves, etc.
- Write on the board . . .



  Point to the marker between 0 and 1.

  Q What does this represent?

  Agree it is ½. Point to the other markers and ensure children can read these as 'one and a half', 'two and a half' etc.

  Get children to count in steps of ½ this time using zero, half, one, one and a half, etc.

  Q What is five halves the same as?
  Q How else could we say it?

- Add to the number line ½, 1½, 2½ etc.

  Q How many halves are there in 3½?

  Encourage children to use the number line to confirm 3½ is seven halves.

  Repeat establishing equivalents for other numbers.

- Extend to quarters and thirds.

Main Teaching

Objectives and Vocabulary

Recognise simple fractions that are several parts of a whole.

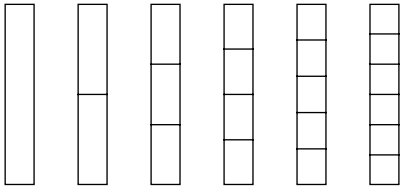
Identify two simple fractions with a total of 1.

VOCABULARY
equal parts
one whole
divide
fifths, sixths, eighths
part
fraction

RESOURCES
6 strips of paper
Activity sheet 11.1
Activity sheet 11.2

Teaching Activities

- Attach 6 strips of paper to the board as shown below with 5 of the strips divided into 2, 3, 4, 5 and 6 respectively.



  Q How many whole strips do we have?

  Agree that there are 6 strips and that 5 of the strips are divided into 2, 3, 4, 5, 6. Point to the second strip and cover up one of the halves.

  Q What fraction of the strip has been hidden?
  Q What fraction of the strip can you see?

  Repeat, hiding different parts of the strips and asking children what is hidden and what can be seen.

- Write on the board the table:

Can see	Hidden

  Q If you can see three quarters, how many quarters are hidden?

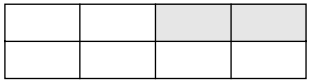
  Write ¾ in the 'Can see' box. With the class establish that ¼ is hidden and write that in the 'Hidden' box. Repeat.

  Q If you can see one sixth, what is hidden?

  Add ⅙ and ⅚ to the table. Use this to demonstrate how one sixth and five sixths together make six sixths, one whole. Write up ⅙ + ⅚ = ⅙ = 1 whole.

  Repeat with other combinations.

- On the board draw a rectangle,divided into 8 parts as shown below. Establish each part is one eighth. Shade in 2 parts and write the 'fraction story' beside the rectangle.



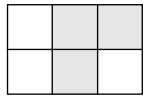
  ⅛ + ⅝ = ⅞ = 1 whole

- Give children Activity sheet 11.1 with shapes divided into quarters, fifths, sixths and eighths. Ask them to shade sections and write the 'fraction story' beside their drawing.

Plenary

Teaching Activities / Focus Questions

- Draw up on the board some of the children's 'fraction stories' and ask them to explain them to the class.
- Draw up a fraction such as:



  Q What fraction story can you give me for this?
  Q Can you give me another story from the same picture?

  Use this approach to introduce the equivalence between fractions, i.e. ⅜ and ½.

HOMEWORK – Give each child Activity sheet 11.2 and explain the instructions.

By the end of the lesson the children should be able to:

- **Recognise that simple fractions are several parts of a whole, e.g. ⅗ is 3 parts out of 5;**
- **Give the corresponding fraction to make a total of 1.**

(Refer to supplement of examples, section 6, page 22.)

Planning sheet	Day Two	Unit 11 *Fractions and Decimals*	Term: *Spring*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary

Recognise simple fractions.

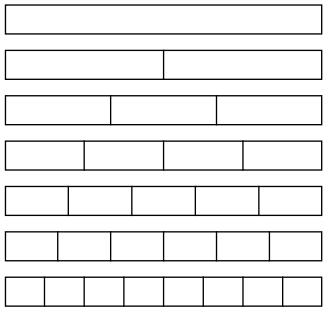
Identify two simple fractions with a total of 1.

VOCABULARY
fifths

RESOURCES
Activity sheet 11.2
8 strips of paper

Teaching Activities

- Attach to the board as shown the 6 strips of paper from Day 1. This time include an eighths strip.



Ask children to look at their homework on Activity sheet 11.2, and to identify the strip on the board that corresponds to the first strip on this sheet. Cover up one part of this strip.

> **Q** What fraction of the strip is hidden?

Agree it is ⅕. Write next to the strip 'fifths' and '⅕'.

- Select children's homework responses and use these to ask the class questions. Ask children to read out their fraction statements for fifths and as they do illustrate these using the strips. Repeat for the other homework questions, generating speed and accuracy of response from the children.

Main Teaching

Objectives and Vocabulary

Recognise simple fractions that are several parts of a whole.

Recognise the equivalence of simple fractions.

VOCABULARY
thirds
quarters
fifths
sixths
eighths
tenths
twelfths
twentieths
equal to
equivalent fractions
equivalence

RESOURCES
Activity sheet 11.3

Teaching Activities

- Discuss the children's homework.
- Add a tenths strip to those on the board. Establish it is a tenths strip. Cover up different parts of the strip to generate fraction stories. Cover up 7 parts.

> **Q** What fraction can we see? What fraction is hidden?

Record $\frac{3}{10} + \frac{7}{10} = \frac{10}{10} = 1$ whole. Repeat.

- Take down the halves strip. Fold it in half at the line on the strip and show the class. Attach the folded strip to the board.

> **Q** What fraction of the strip can you see?

Agree it is half of the strip. Write on the board ½.

> **Q** What other strips can be folded this way?

Take the quarters strip and fold in half at the line on the strip. Show the class. Attach to the board.

> **Q** What fraction of the strip can you see?

Agree it is 2 quarters and is the same length as the ½. Add to the board $\frac{1}{2} = \frac{2}{4}$.

Repeat with the sixths and eighths strip to generate $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$.

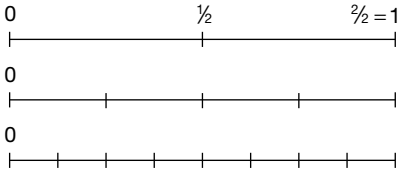
> **Q** What do you think the next fraction will be?

Agree it is $\frac{5}{10}$ and confirm this with the tenths strip. Generate other half equivalences with the class.

> **Q** What if the strips were divided into twelfths . . . ?

Unfold the strips. Generate equivalences for ⅓, ¼, ⅔, ¾, folding strips to help demonstrate equivalences.

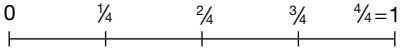
- Draw on the board three large number lines:



Count with class along the top line 0, ½, $\frac{2}{2} = 1$ whole.

> **Q** What step size will we need to count in on the second number line?

- Agree it is quarters and count with the class, recording as you count.



- Repeat for last number line in eighths. Point to ½.

> **Q** Which other fractions are in the same position?

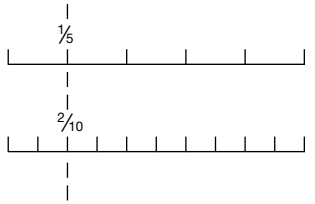
Agree these are $\frac{2}{4}$ and $\frac{4}{8}$ and link these to the earlier equivalents generated using the strips.

- Give children Activity sheet 11.3. Discuss the lines with the children and ask them to mark on fifths and tenths or thirds and sixths. Check children have done this correctly and ensure they have written $\frac{5}{5} = 1$ etc. Ask children to identify equivalent fractions.

Plenary

Teaching Activities / Focus Questions

- Collect children's answers and record equivalences on the board by modelling on the number line. E.g;



> **Q** What other strips might we use to find more fractions equivalent for fifths and tenths?
> **Q** How might we divide a number line up to get these fractions?

- After discussion, divide line into twentieths, point to divisions and ask children to name fractions. Determine equivalent fractions.

By the end of the lesson the children should be able to:

- **Begin to recognise the equivalence between halves, quarters and eighths; tenths and fifths; thirds and sixths.**

(Refer to supplement of examples, section 6, page 22.)

Planning sheet	Day Three	Unit 11 *Fractions and Decimals*	Term: *Spring*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary

Read the time from an analogue clock to the nearest minute and from a digital clock. Use the notation 9:53.

VOCABULARY
partition
place value chart

RESOURCES
Whiteboards
Clock face

Teaching Activities

- Show clock face to class. Start with hands at 4 o'clock. Move to 4:15.

  Q How else can we say this time?

  Get children to use 15 minutes past 4, quarter past four etc. Set the clock at other times. Ask children to write times on their whiteboards. Check answers and correct errors and misunderstandings.

  Q What would this time look like on a digital clock?

- Spend time discussing the times quarter past, quarter to and half past. Say a time, e.g. 5:23.

  Q Is this time before or after half past 5? Is it before or after quarter past five?

  Children write B or A for before and after on their whiteboards.

  Repeat using other times.

Main Teaching

Objectives and Vocabulary

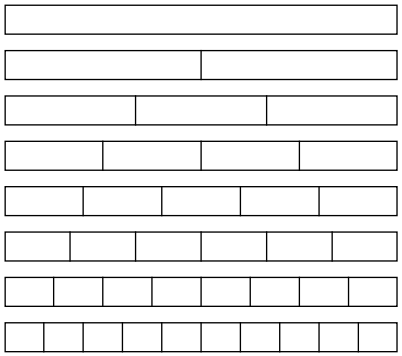
Order simple fractions; for example, decide whether fractions are greater or less than one half.

VOCABULARY
> greater than
< less than
equal to

RESOURCES
8 strips of paper
Activity sheet 11.4
Resource sheets 11.1 to 11.20

Teaching Activities

- Attach the 8 strips of divided paper to the board as shown.



  Quickly work through fraction stories with the class hiding and showing parts of the strips.

- Point to the halfway marks on the halves, quarters, sixths, eighths and tenths strips and ask children for the fractions. Remind them that these are equivalents.

- Remind children each whole strip represents 1 and they have been dividing the strips up into parts or fractions. These fractions can be represented on number lines and the position of the fractions on the number line represents the number of parts on the strips. Give out Activity sheet 11.4. Ensure that children can see the relationship between the fractions on the number lines and the divisions on the strips of paper. Using the number lines, ask for a pair of equivalent fractions. Record on the board using equals signs, e.g. $\frac{3}{5} = \frac{6}{10}$ etc.

  Ask children to find other equivalent fractions and record on their whiteboards.

- Find one half and identify all equivalent fractions.

  Q Can you show me a fraction which is more than one half?
  Q Can you show me a fraction which is less than one half?

  Discuss responses and refer to where they are on number lines. Refer to the appropriate strip to confirm that the fractions they have chosen are more or less than one half.

- Using children's answers write on the board a fraction less than one half, e.g. $\frac{1}{6}$ and $\frac{1}{2}$.

  Q What sign can we use to record $\frac{1}{6}$ to be less than $\frac{1}{2}$?

  Remind children and record $\frac{1}{6} < \frac{1}{2}$. Repeat for greater than and ensure children can use the signs < and >.

  Give children pairs of fractions and ask them to write the statements using < or > on whiteboards. Collect responses and correct any errors.

- Children record on whiteboards examples of fractions which are less or greater than one half using number lines as support. Collect answers and discuss children's methods of deciding and their use of the symbols.

  Write on the board: $\frac{2}{5} < \frac{3}{4}$.

  Q Is this true? How can we decide?

  Collect responses and refer to number lines and strips. Repeat for other pairs of fractions, making comparisons with $\frac{3}{4}$ and $\frac{1}{4}$.

Plenary

Teaching Activities / Focus Questions

- Use set of fraction cards on Resource sheet 11.1 to 11.20. Shuffle cards and show children a card. Ask children to read the fraction and decide whether it's greater or less than or equal to one half.

  Repeat with different cards asking children to justify their decisions.

By the end of the lesson the children should be able to:

- **Recognise that $\frac{1}{2}$ is more than $\frac{1}{4}$ and less than $\frac{3}{4}$.**
- **Identify a fraction greater than $\frac{1}{2}$ e.g. $\frac{3}{4}$, $\frac{5}{8}$, $\frac{2}{3}$.**

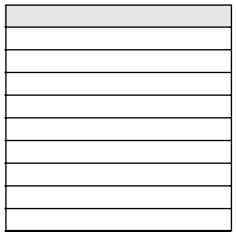
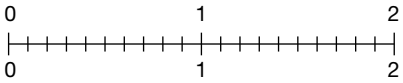
(Refer to supplement of examples, section 6, page 22.)

Planning sheet	Day Four	Unit 11 *Fractions and Decimals*	Term: *Spring*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Order simple fractions. VOCABULARY tenths RESOURCES 8 strips of paper Resource sheets 11.1 to 11.20.	• Attach the 8 strips of divided paper to the board, leaving gaps between the strips that are large enough to attach the fraction cards. Shuffle the fraction cards and turn over one card. Show the class. Ask the class to read the fraction. **Q** On which strip should the card be attached? **Q** Where on the strip should the card be placed? Agree the answer with the class and attach the card. • Select another card and decide where this should be attached. **Q** Which of these fractions is the bigger? Which is the smaller? Compare the two fractions if necessary, using the strips to demonstrate which is bigger/smaller. Return cards to bottom of pack and repeat using two other cards.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Understand decimal notation and place value for tenths. VOCABULARY decimal fractions decimal point decimal decimal place RESOURCES Resource sheets 11.21 to 11.25 OHT 11.1	• Show OHT 11.1. Explain that it represents 1 whole square divided into ten rows. Point to the first row:  **Q** What fraction of the square is this? In the first row record both $\frac{1}{10}$ and 'one tenth'. Explain that this can also be written as 0·1, 'zero point one' and that this is called a decimal fraction. Record 0.1 next to $\frac{1}{10}$, and refer to the decimal point. • Identify the first two rows. **Q** What fraction of the square is this? Agree it is $\frac{2}{10}$ and record $\frac{2}{10}$, 'two tenths' and 0.2 in the second row. Refer to 'zero point two' and explain that the decimal point separates the whole and part numbers. The first number before the point is the unit and after the point the numbers are tenths. • Repeat generating 0.3 to 0.9. When the whole square is referred to, remind the children this represents $\frac{10}{10}$, ten tenths or 1 whole and this is written as 1·0, 1 whole and 0 tenths. • Draw the number line below on the board.  • With the class, count from 0 to 1: 0, $\frac{1}{10}$, $\frac{2}{10}$,… to $\frac{10}{10}$. Record these values on the top of the line. Repeat counting: 0, 0.1, 0.2,… to 1.0. Ensure children do not say 'zero point ten'. Emphasise again that the point separates whole numbers from the tenths. **Q** What happens when we count past 1? Discuss suggestions. Model with two copies of OHT 11.1. E.g. $\frac{10}{10} + \frac{1}{10} = \frac{11}{10}$. Establish that for the tenths, the count continues $\frac{11}{10}$, $\frac{12}{10}$ etc. Continue the count to $\frac{20}{10}$. Record values on number line. **Q** What is $\frac{20}{10}$ the same as? Agree it is equivalent to 2. Model 1 whole + 0.1 = 1.1. Establish that the count is one point one, one point two etc. Continue the count, record values on the number line. Ensure children recognise that 1.9 leads to 2.0. • Repeat the counting from 0 in steps of $\frac{1}{10}$ and zero point one etc. Compare the two forms recorded to establish that $\frac{13}{10} = 1.3$ etc. **Q** What is $\frac{17}{10}$ as a decimal fraction? Collect answers, use the number line to confirm the equivalences. Repeat and project forward. **Q** What is $\frac{24}{10}$ as a decimal fraction? Collect responses, correct any errors and misunderstandings.

Plenary

Teaching Activities / Focus Questions

• On the board write the headings

H T U • t

big enough for the digit on Resource sheets 11.21 to 11.25 to be placed beneath the headings.

Establish that the letters mean hundreds, tens, units and tenths.

• Make 35.6 using the place value cards. Ask children to read the number, emphasise the decimal point.

Q What is the value representing 3, the 5 and the 6?

Collect responses and correct errors and misunderstandings.

• Make 157·6 using place value cards.

Q What is each digit worth?

Repeat for other numbers.

By the end of the lesson the children should be able to:

- **Respond to questions such as what does the digit 6 in 3·6 represent?**
- **Write the decimal fraction equivalent to $\frac{4}{10}$ etc.;**
- **Count from 0 in steps of $\frac{1}{10}$;**

(Refer to supplement of examples, section 6, page 28.)

Planning sheet	Day Five	Unit 11 *Fractions and Decimals*	Term: *Spring*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Understand decimal notation for tenths. VOCABULARY tenths point greater than less than (< and >) whiteboards RESOURCES Resource sheets 11.1 to 11.20.	• Select the tenths fractions from the Resource sheets 11.1 to 11.20. Shuffle the cards. Turn over top two cards and show class. Ask class to read cards. **Q** Which fraction is bigger? Children write the bigger fraction on their whiteboards. Return cards and repeat. • Shuffle and select 1 card, e.g. $\frac{3}{10}$. **Q** How do we represent this as a decimal fraction? Children show answers on their whiteboards. • Show two cards. Ask children to change these to decimal fractions. **Q** Which is bigger/smaller? Children to write 0.1 < 0.4 etc on their whiteboards.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Understand decimal notation and place value for tenths and hundredths and use in context. VOCABULARY decimal place hundredths tenths RESOURCES OHT 11.2 OHT 11.3 Resource sheets 11.21 to 11.25	• Write 4.67 on the board. Say that this is a decimal fraction with the decimal point separating whole numbers from the part numbers or fractions. **Q** Where have you seen a number like this? Collect responses and draw out examples from measures and money. • Write £4.67. **Q** What is the 4 worth? **Q** What is the 6 worth? **Q** What is the 7 worth? Emphasise that 4 is 4 whole pounds and that the digits 6 and 7 represent parts of £1, and these are pence. **Q** How many pence in a pound? Establish that there are 100 pence in a pound and there are 67 pence in £4.67. • Show children OHT 11.2. How many rows? Columns? Squares? Establish there are 100 small squares. Suppose each small square represented one penny. **Q** What would the big square be worth? Agree it would be worth 100 pence or £1. Highlight one small square. **Q** What would one small square be worth? Agree it would be worth 1p. **Q** How do we write this as £ and p? Write on the board 1p and £0.01. Establish that children understand these represent the same amount. Read £0.01 as zero point zero one to children. Explain how such decimals are read using other examples, e.g. 0.46 is zero point four six not zero point forty-six. **Q** What would two small squares be worth? Record 2p and £0.02. Continue to ensure children can use the two representations. Check with questions. **Q** What is £0.09, £0.47 in pence? **Q** What is 75p, 3p in £ and pence? • Superimpose OHT 11.3 on OHT 11.2. Explain that this shows all the decimal values from 0.01 to 1.00 which is 1 whole. Point out the pattern and structure of the square and remind children that there are 100 squares in the big square so that 0.32 means that all the squares up to that square represent $\frac{32}{100}$ of the whole. Ask questions such as: **Q** What does 0.73 represent? Collect answers and discuss other cases. Point to 0.40. **Q** What does 0.40 represent? Agree that this represents $\frac{40}{100}$ of the square. Remind children that it is also 4 rows of squares out of 10 rows so it is $\frac{4}{10}$ of the square. Work through other questions to ensure that children can interpret the tenths and hundredths.

Plenary

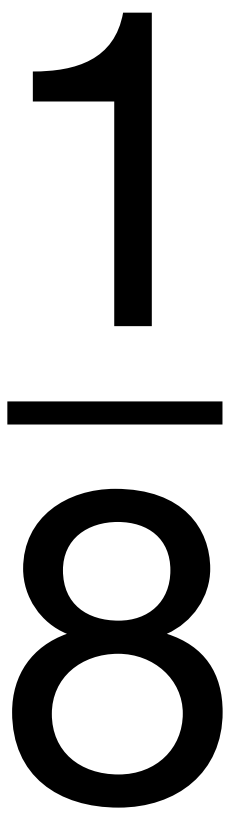
Teaching Activities / Focus Questions
• Write on the board: H T U • t h for use with the digit cards on Resource sheets 11.21 to 11.25. **Q** What do these letters mean? Explain the h is hundredths. Make 1.25 using the cards. Ask children to read the number and to identify the values of the digits. Ask a series of questions such as: **Q** How can we make a number where the digit representing tenths is 2? **Q** How can we make a number with 8 hundredths? **Q** How can we make a number with 2 whole ones and 5 tenths? **Q** How can we make a number with 2 decimal places? Collect answers and discuss the different digits. **By the end of the lesson the children should be able to:** • **Respond to questions such as what does the digit 5 in 7·15 represent?** (Refer to supplement of examples, section 6, page 28.)

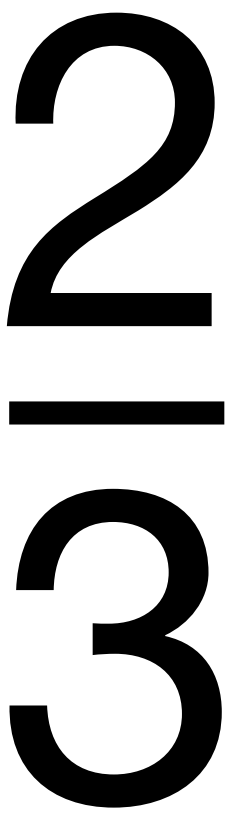
0

$\frac{7}{10}$

$\frac{1}{2}$

$\frac{1}{5}$


1
8


2
3

$\frac{3}{4}$

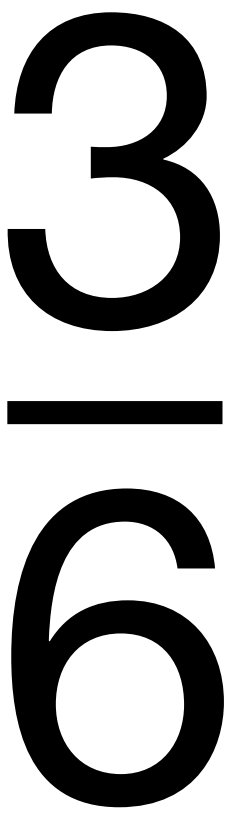
$\frac{4}{6}$

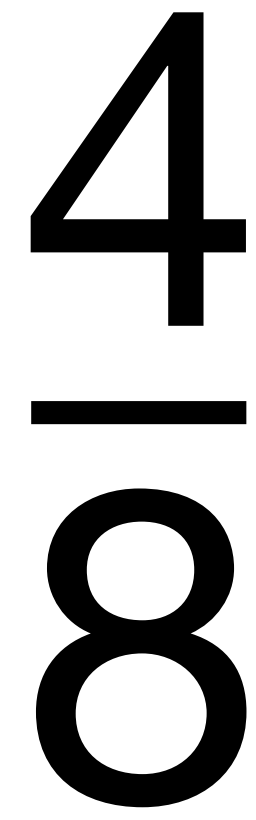
5 | 8

2 | 9

$\frac{4}{10}$

$\frac{3}{5}$


3
6

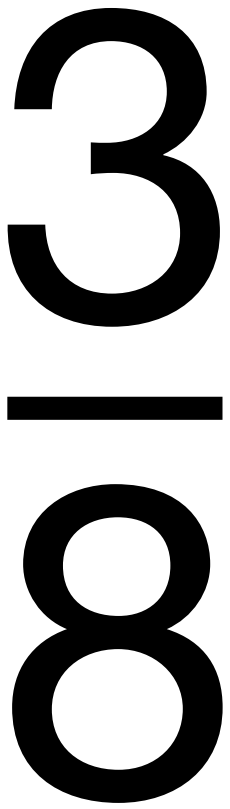

4
8

$\frac{4}{5}$

$\frac{1}{3}$

$\frac{1}{4}$

$\frac{2}{5}$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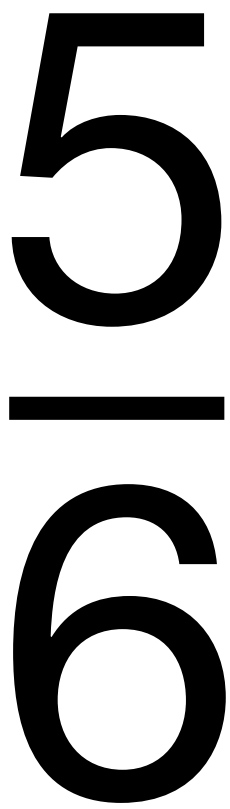
5
6

$\frac{3}{10}$

$\frac{2}{8}$

$\frac{9}{10}$

$\frac{7}{8}$

$\frac{1}{10}$

$\frac{6}{8}$

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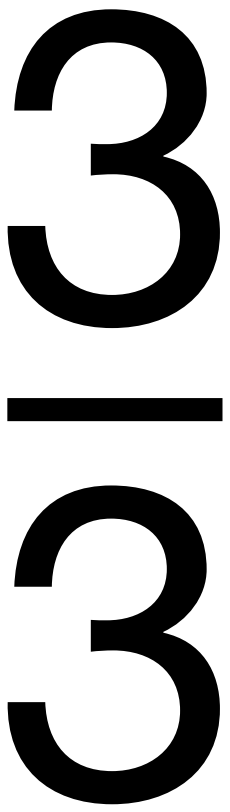
$\frac{1}{6}$

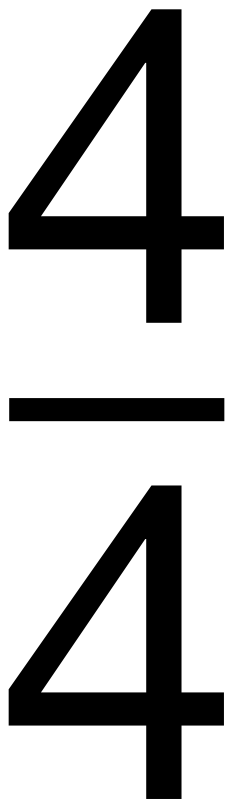
$\frac{2}{4}$

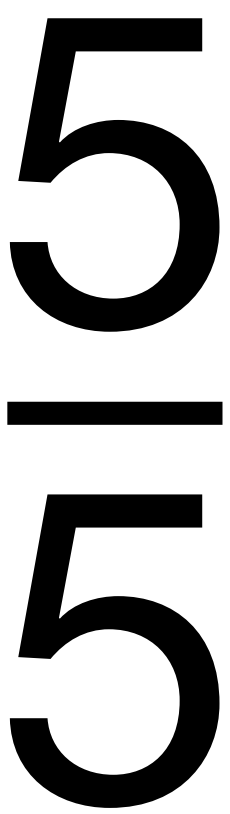
1

2

2



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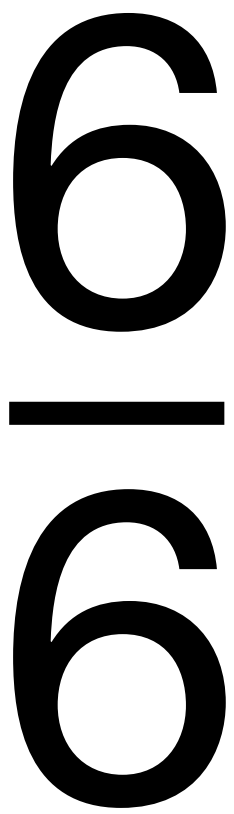
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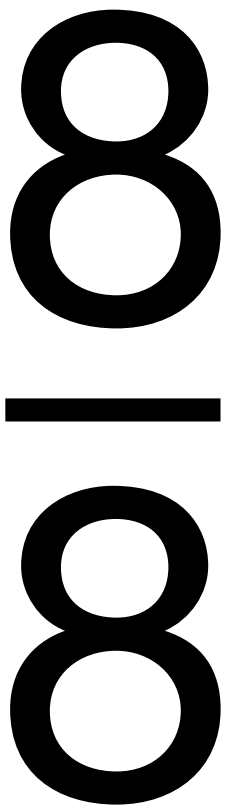
6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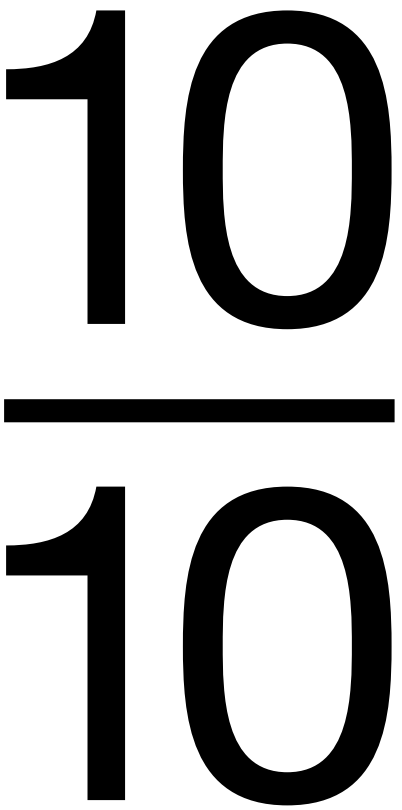
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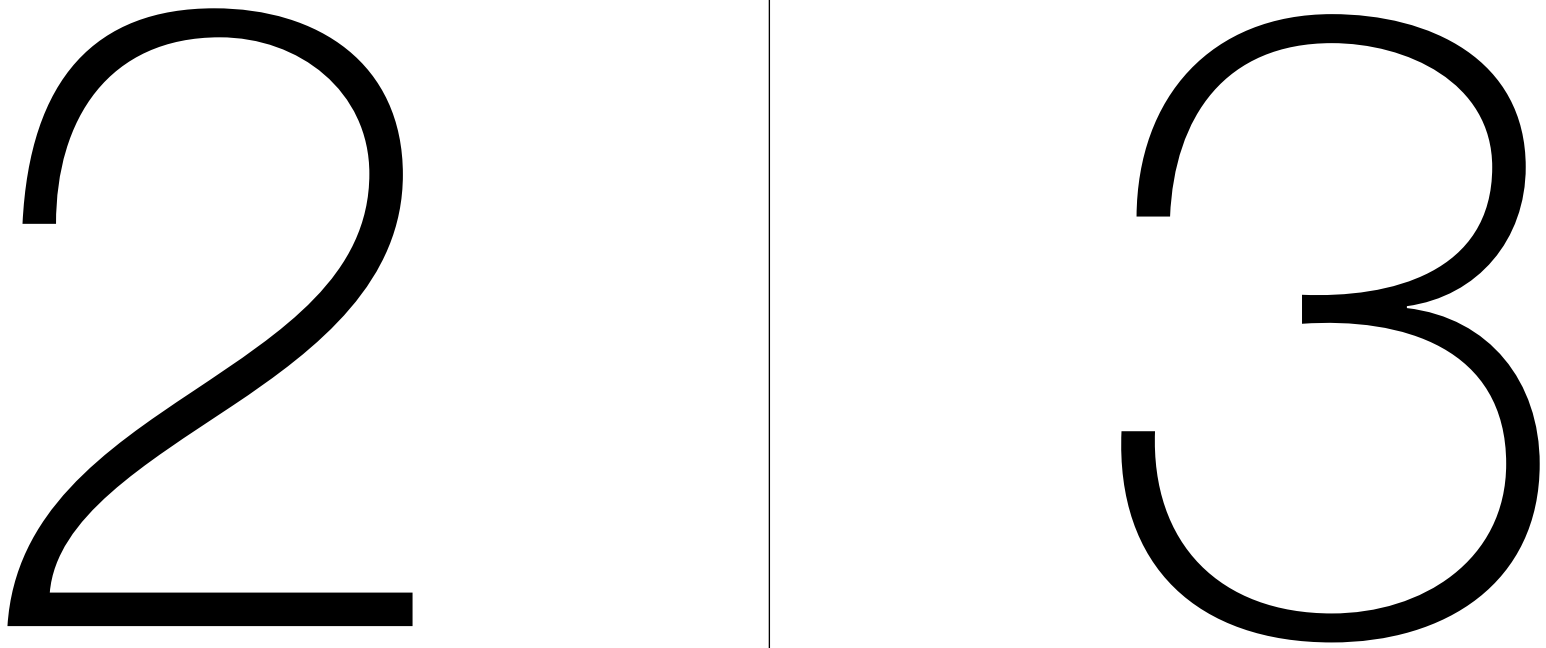
10

1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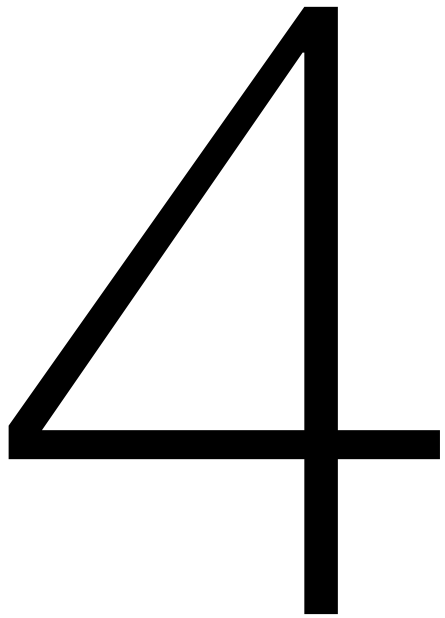
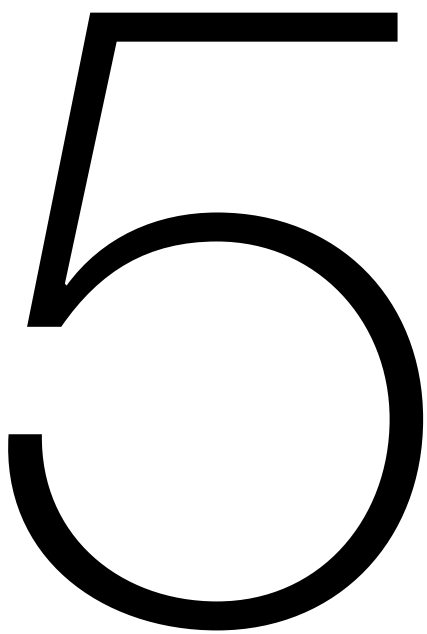
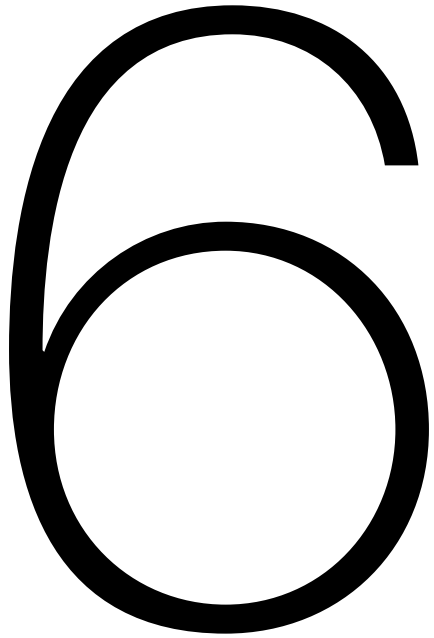
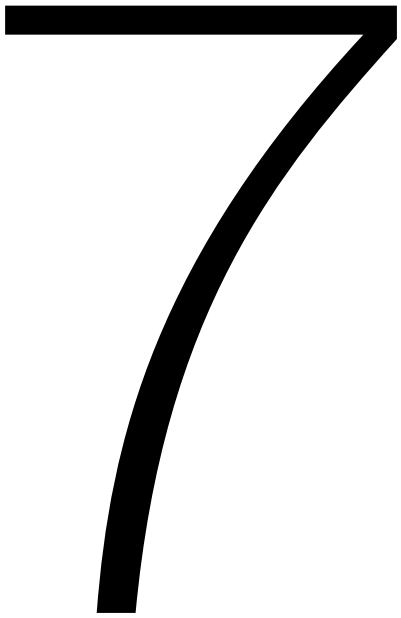
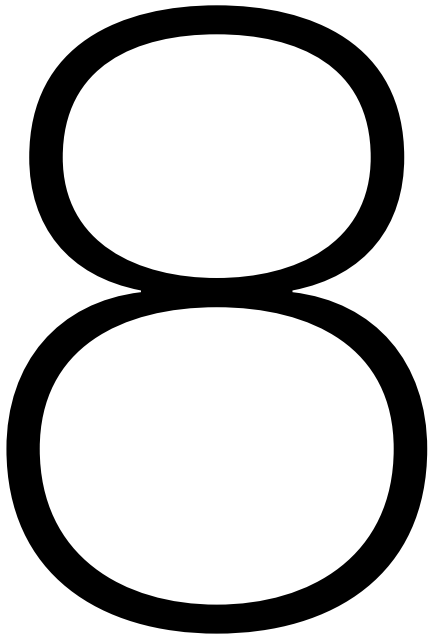
3

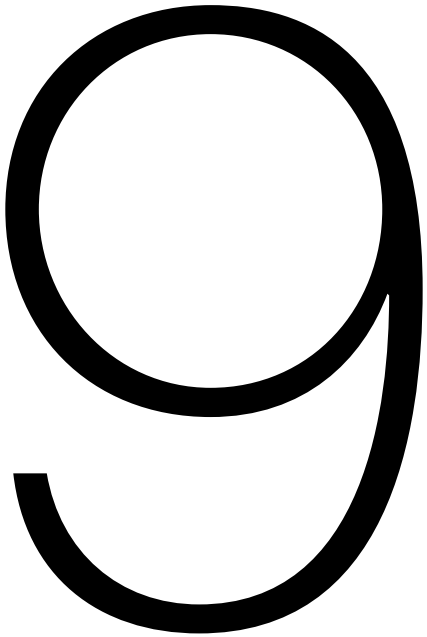




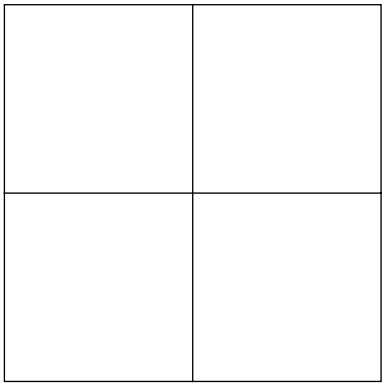






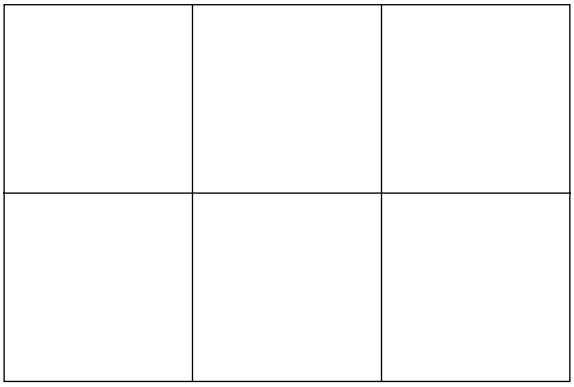


quarters



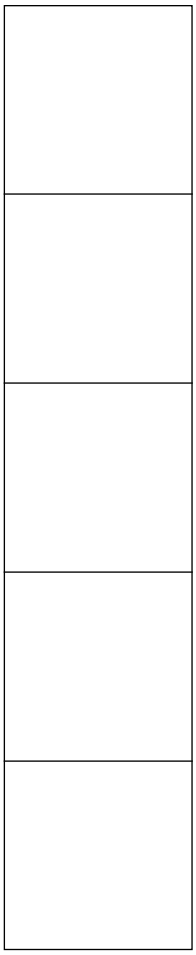
.....

sixths

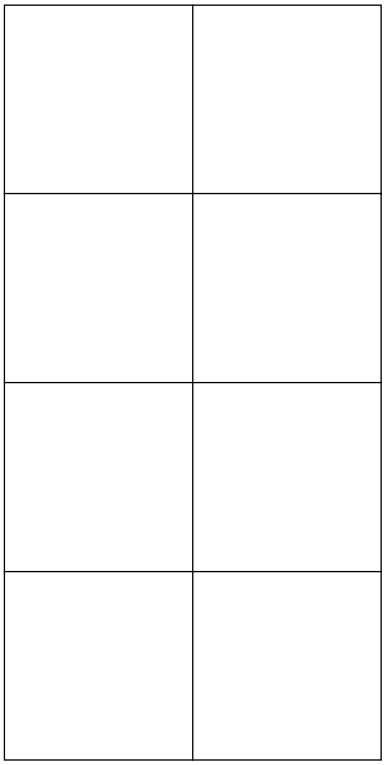


.....

fifths

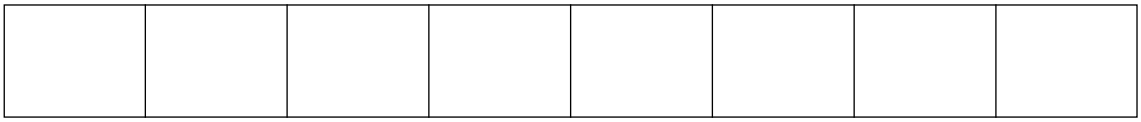


eighths



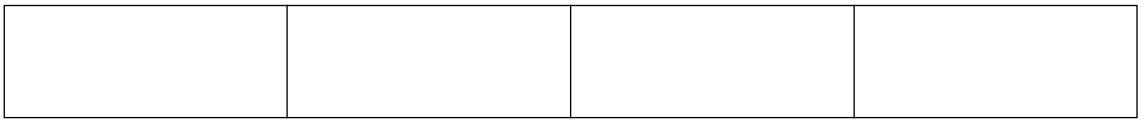
Cover up a fraction of each strip (one whole strip) and complete the sentences.

I can see _____ I cannot see _____ My fraction story _____

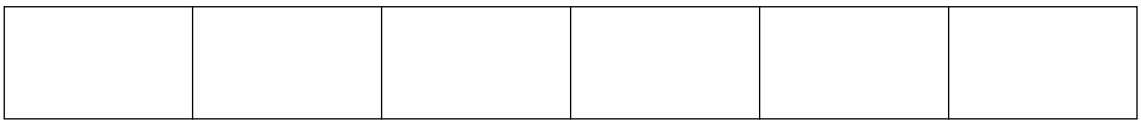


I can see _____ I cannot see _____ My fraction story _____

I can see _____ I cannot see _____ My fraction story _____



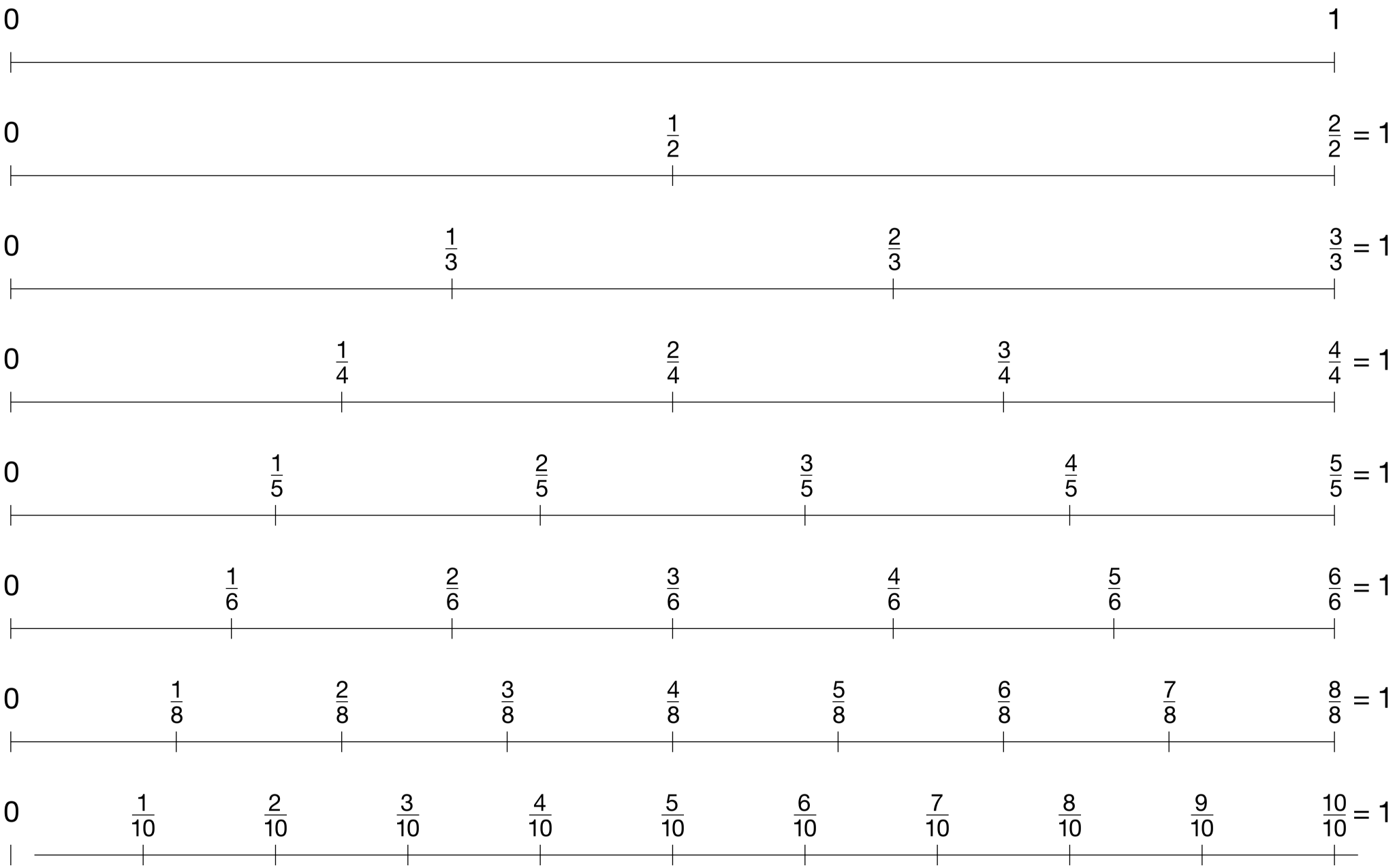
I can see _____ I cannot see _____ My fraction story _____

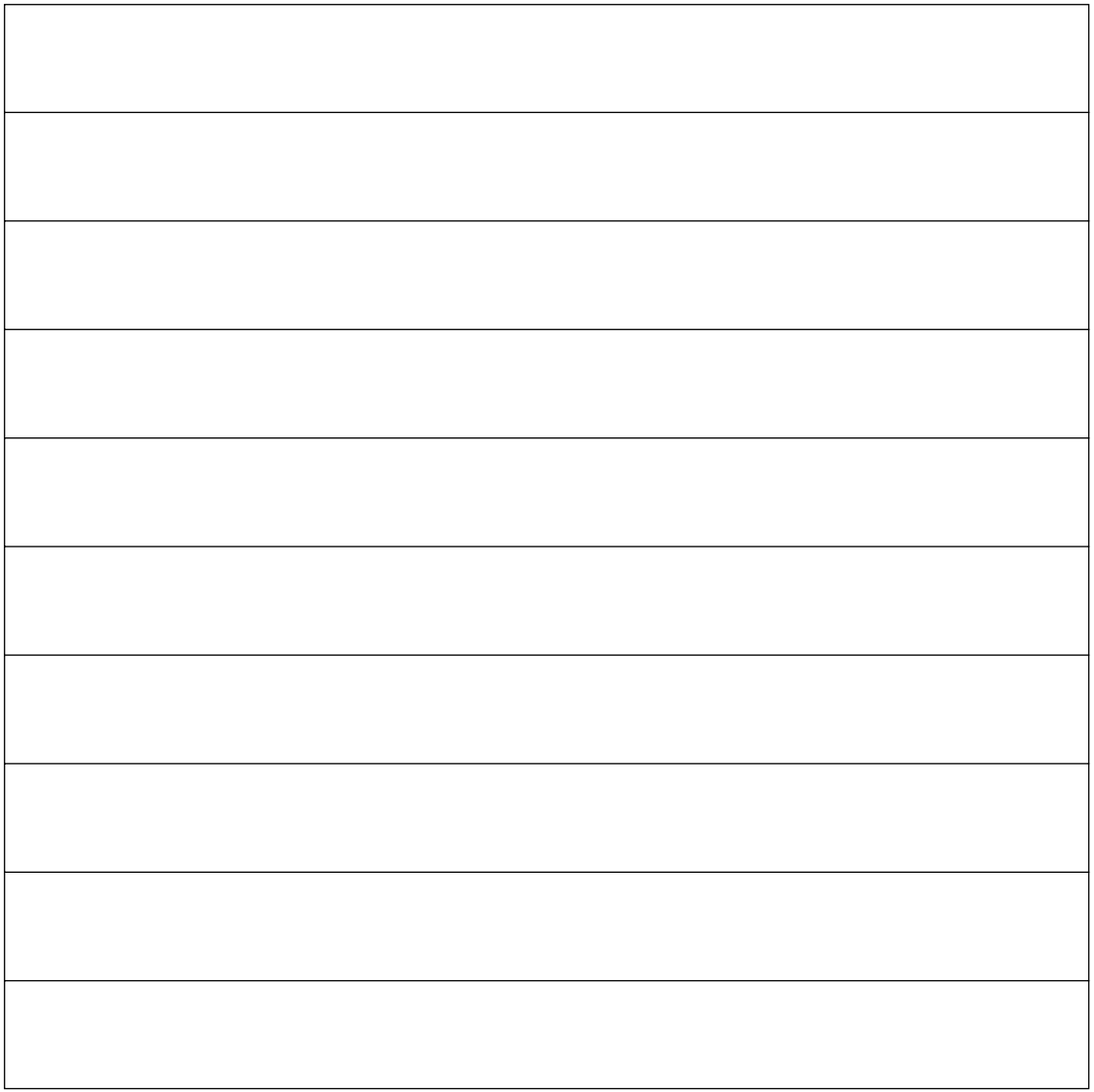


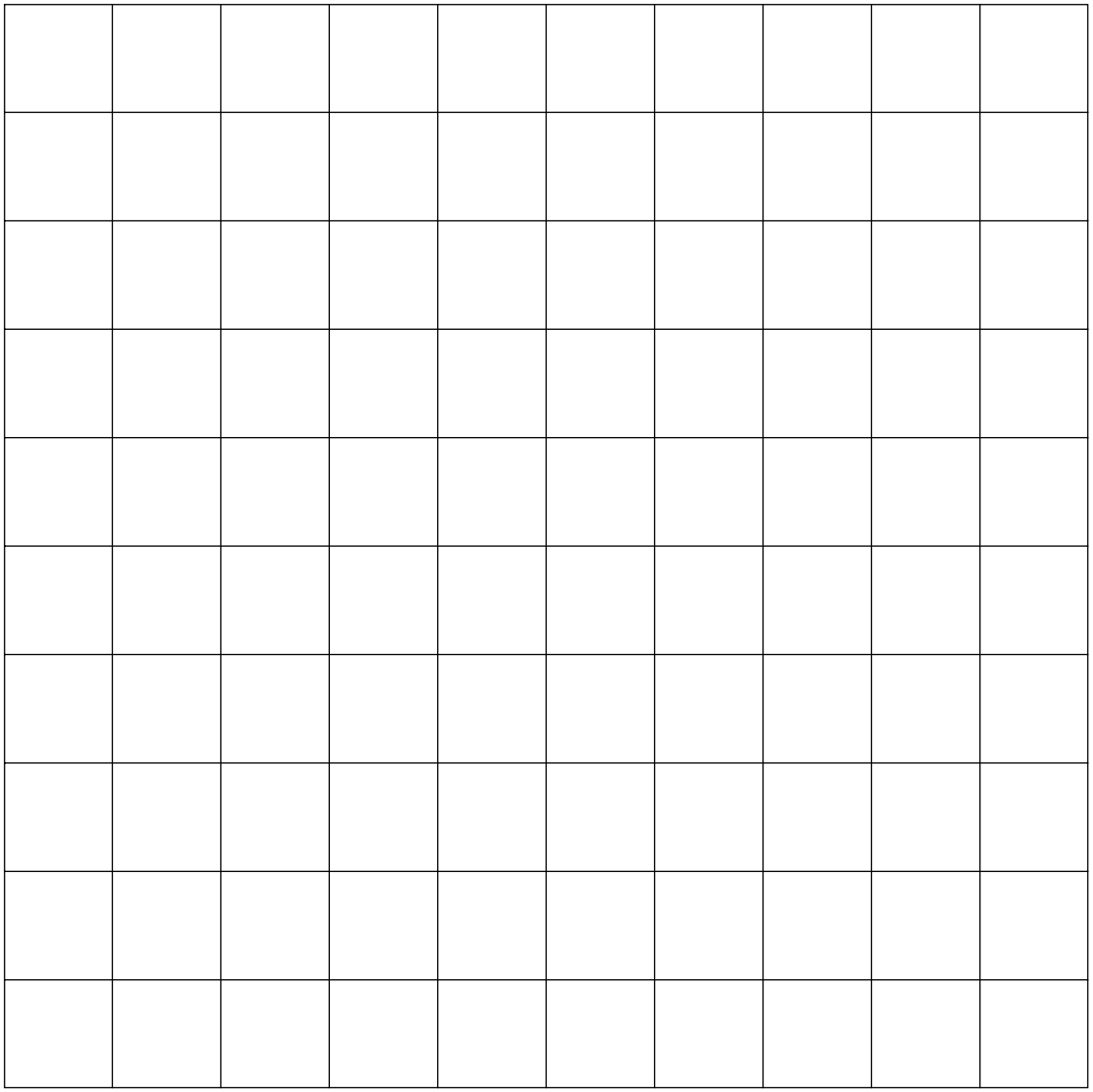
I can see _____ I cannot see _____ My fraction story _____

Fifths and Tenths

Thirds and Sixths


0
1
0
1/2
2/2 = 1
0
1/3
2/3
3/3 = 1
0
1/4
2/4
3/4
4/4 = 1
0
1/5
2/5
3/5
4/5
5/5 = 1
0
1/6
2/6
3/6
4/6
5/6
6/6 = 1
0
1/8
2/8
3/8
4/8
5/8
6/8
7/8
8/8 = 1
0
1/10
2/10
3/10
4/10
5/10
6/10
7/10
8/10
9/10
10/10 = 1





0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00