



Waldorf Education Resources

Fractions

Teachers' Handbook

*Written and Produced by Joyce and David Mollet
(Waldorf Education Consultants)
Learning through a whole language, interdisciplinary approach.*

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Fractions - W.E. Resource Packs

The Resource Pack are:

- based on the California Framework.
- approved for legal compliance.
- formulated so that sheets can be reproduced for a student to work on.
- structured to be "user friendly".
- divided into modules.

Sub-Unit 1	Fractions
Sub-Unit 2	Fractions
Sub-Unit 3	Fractions

Personal Portfolio

- We recommend that each student creates a personal portfolio.
- In many instances a student will use the reproduced sheets for direct insertion into his/her portfolio.
- The personal portfolio is the main mode of student assessment.
- This personal record provides a comprehensive record of a student's progress and level of understanding and achievement.

The WEC Approach

We believe that:

- learning about fractions is one of the most challenging tasks for elementary school children - the concepts involved are difficult and complicated.
- that two questions should be asked; the first - when should students be first introduced to fractions?; the second - is there an approach or methodology through which children can learn more easily?
- from the authors viewpoint the answer is "yes" to both questions - yes, there is a correct time to introduce fractions; and yes, there is an approach through which children can learn more easily.

When should fractions be taught?

- According to the Waldorf approach it is important to introduce fractions to children of 9/10.
- The reasons for this relate to children's growth patterns.
- Children at this age are losing their holistic and integrated perception of the world - up until this time children think globally i.e. they perceive and feel themselves to be part of the world - they also see the world as a unity.
- Teaching needs to relate to this unity and wholeness; indeed an important element is to convey the idea of totality, a wholeness which has various parts. However between the ages of nine and ten the holistic perceptions become fragmented.
- The teaching of fractions (taught from the whole to the parts) relates to the division and fragmentation of these holistic perceptions.
- Consequently, this is the ideal time to introduce "fractions", for in this subject area we have the experience of taking the whole to parts and then reassembling these various parts.
- The educator might ask the question: "Is this child ready to handle this content at this particular time?"; whereas the teacher using the Waldorf approach would find this question somewhat irrelevant, and would tend to ask such questions as: "What will help us feed and enrich this child at this particular stage of development?"

How should fractions be taught?

- Children of 7-14 live very much in the world of feeling - before this, their earlier years have been dominated, to a great extent, by the "will"; from around 7 the affective comes to the fore; after puberty the intellectual activity predominates.
- The elementary school child's world is also one of color, and pictorial representation.
- An approach which is in sympathy with the student's world is therefore to be recommended.
- This would include story-telling, craft, drama and visual representation.
- You will find in this teachers' resource packs such an approach.

Teachers' Note

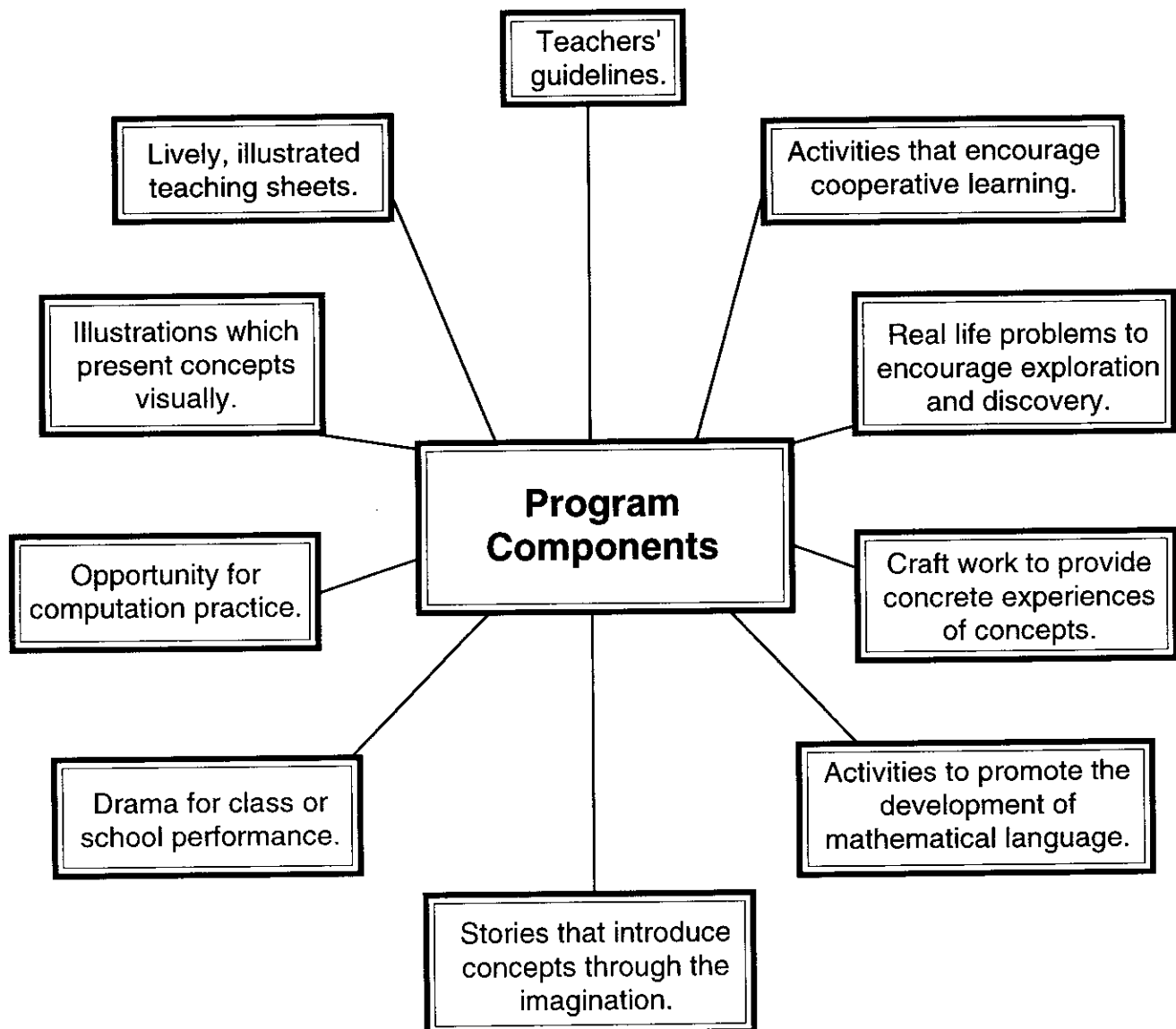
Please feel free to reproduce Sample Sheets in this Teachers' Handbook for use in the classroom.

Program Components

This graphic overview indicates the different types of components found in a Waldorf Education Resource Pack.

The approach is whole language and interdisciplinary and

- encourages cooperative learning.
- aims to involve the student's imagination and creative abilities.
- teaches through the heart, the head, and the hands.
- emphasizes the understanding of concepts and the development of insights.
- stimulates students to discover the beauty of mathematics.



Review taken from Arithmetic Teacher

Arithmetic Teacher - the main journal for the teaching of Arithmetic in the USA - the official publication of the National Council of Teachers of Mathematics Inc., 1906 Association Drive, Reston, VA 22091-1593 USA.

Fractions by David Mollet & Joyce Mollet. 1993
(Reproducible Masters).

Part 1,	42-pp. loose sheets,	ISBN 0-909001-31-6
Part 2,	39-pp. loose sheets,	ISBN 0-909001-32-4
Part 3,	34-pp. loose sheets,	ISBN 0-909001-33-2

“This fraction resource pack is divided into parts 1, 2, and 3. Part 1 addresses recognition and naming fractions, comparing fractions, and making a chart to find equivalent fractions. Part 2 deals with mixed numbers, improper fractions, and addition and subtraction of fractions. Part 3 moves into multiplication and division of fractions.

The teacher’s guidelines in each packet focus on the rationale for, and the developmental nature of, the material. Each packet also contains an answer key in the back.

The student activity sheets vary from hands-on experiences to working with algorithms. The directions are clear and materials are listed when needed. The concept flows sequentially, using boxes to outline and group the information on the page and illustrations to supply visual clues. Interesting story paragraphs, story pages, poetry, and even a drama are included. **Opportunities exist for cooperative learning, and included is a terrific game requiring only a fraction chart, two dice, and some counters.**

Other hands-on activities include mobiles, counters, charts, and fraction wheels that students construct and use to solve problems.

The material is structured, but flexible, and would be a welcome addition to any intermediate school classroom..”

Inez Davis, Ruskin Elementary School, Ruskin, FL 33570.

The sequence of teaching followed in the Resource Packs

First Stage

- The first stage is to relate material to the experience of children.
- It is accepted that this experience is different from the adults' experience - children are not miniature adults.
- When teaching adults we would probably teach immediately to the "head", whereas for elementary school children the main task is to teach to the "heart" and "hands".
- Wherever possible, content is introduced so that it relates to artistic and pictorial representation, e.g. through storytelling.
- Through this type of format, information is absorbed in a way that is in empathy with the students' experience.

Second Stage

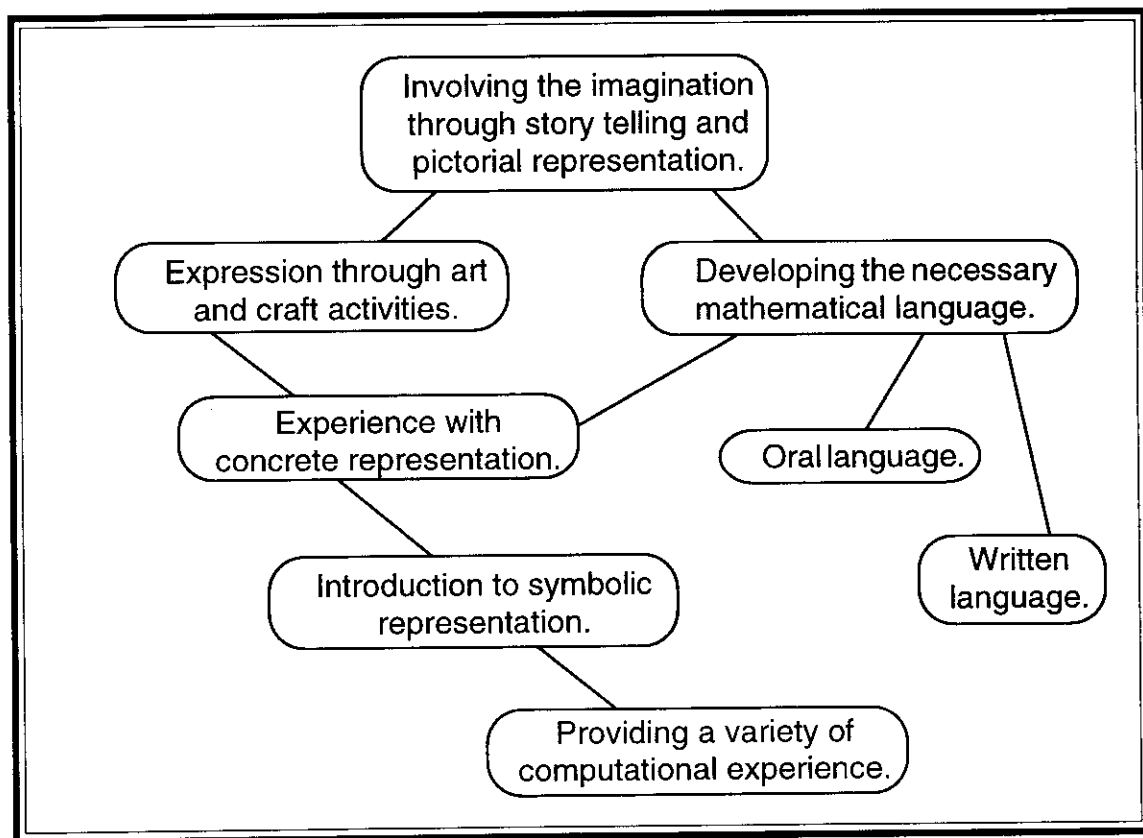
- The second stage is to encourage the students to express their experience through a variety of artistic formats.
- Some children will want to do this quickly; others will want to take their time.
- This stage should not be hurried and the children should be given enough time to work through a number of formats according to ability, aptitude and temperament.

Third Stage

- The third stage is to work through concrete examples.

Fourth Stage

- The final stage is to introduce the abstract concepts and to work symbolically with numbers.



Teachers' Guidelines

Teachers' Guidelines take different forms and fulfil different functions.

Prepares the teacher for the concepts to be developed in the following Student Activity Sheets.

The raison d'être for the activity.

Material required for the activity.

Step-by-step instructions for a practical activity or game.

Alternative approaches and development for an activity.

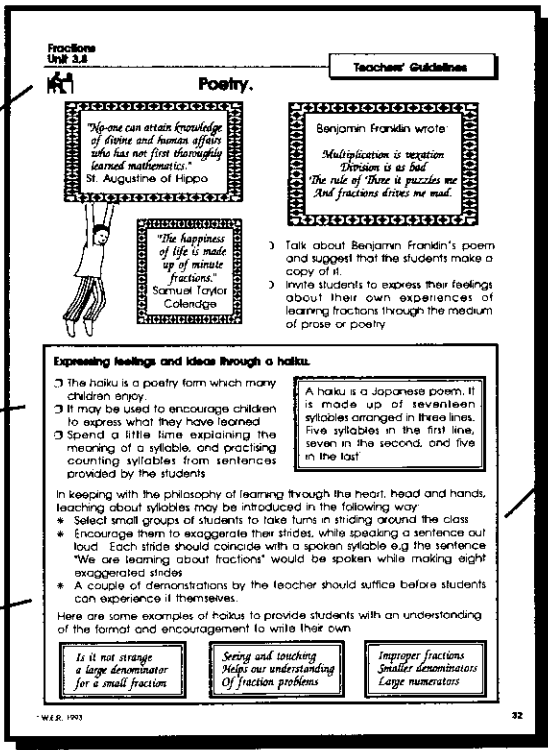
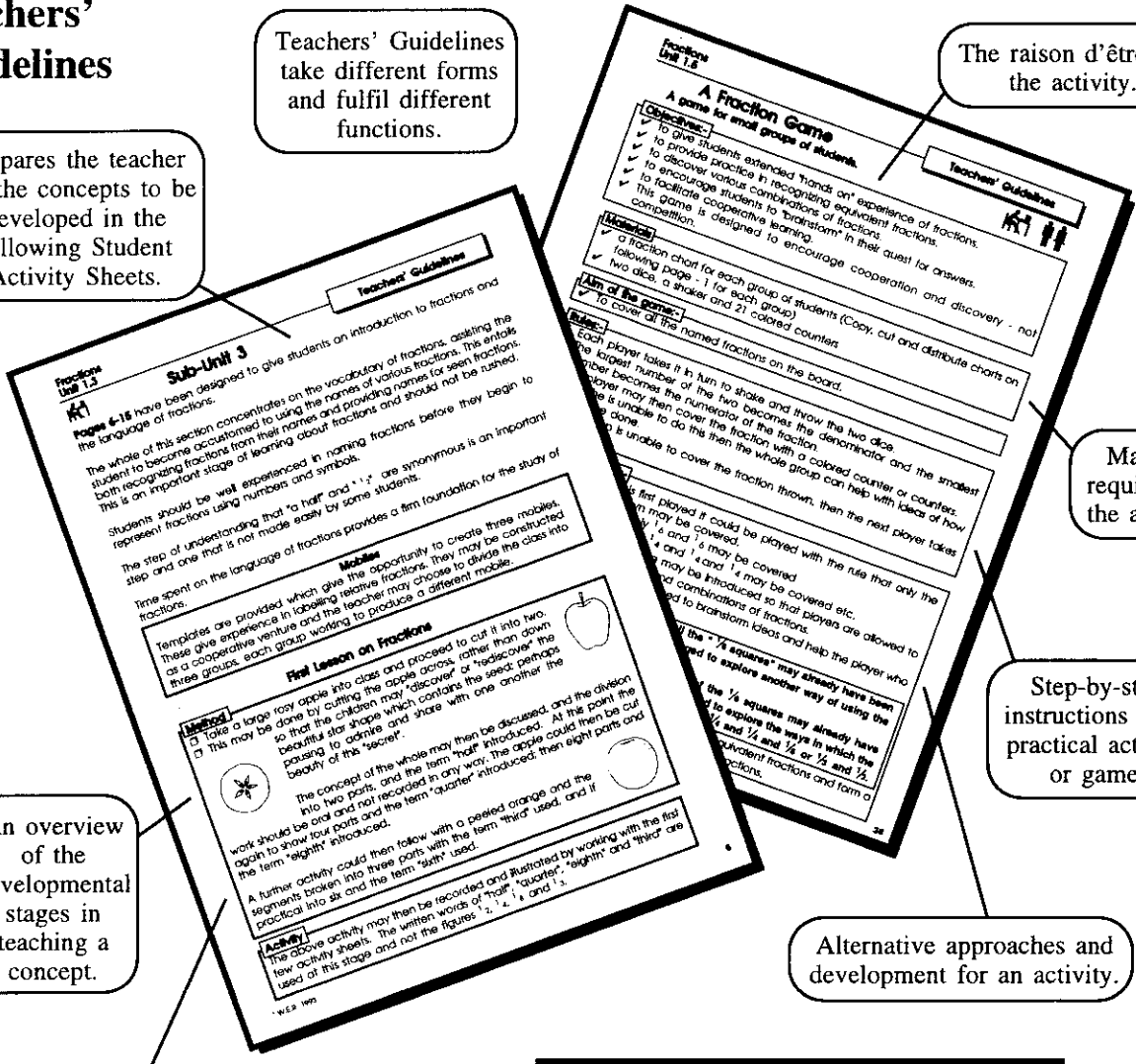
An overview of the developmental stages in teaching a concept.

Guidelines for introducing a concept.

Type of content icon.

Material which provides a background and introduction to an activity.

Introducing a whole language approach to the teaching of mathematics.



Detailed and clear instructions.

Stories

Fractions Unit 3.4 Student Activity sheet

Sam's Hamburger Party

Sam had decided to throw a party. He decided to have a barbecue beside the pool. When he planned the food he knew he would have to include hamburgers as these were everyone's favorite. Sam wanted these hamburgers to be special. Instead of 1-pound hamburgers he decided his would be larger, they would be 1/2 pound hamburgers. He brought 3 pounds of ground meat home from the store and then wondered how many hamburgers he would get out of this amount.

Let's help Sam work this out!

If these circles are the meat, then we would need to divide each pound into eighths. The first has been done for you. With ruler and pencil divide the other two circles into eighths.

- ✓ Select a different color for each hamburger, and shade in the amount of meat needed for each one.
- ✓ The first has been done for you - 3/8 of a pound of meat has been shaded for the first hamburger.
- ✓ Continue shading until all the meat has been used.
- ✓ Now you can count how many hamburgers can be made.

If Sam decides to make his hamburgers into 1/4 pound burgers, how many will he then get out of 3 pounds? Use these circles to help you work out the answer. Decide how you will divide the circles. Follow the same steps as before.

These two problems can be written in short hand form. Can you fill in the boxes?

$3 \div \frac{1}{2} = \square$ $6 \div \frac{1}{4} = \square$

Organised in modular form.

Short story stimulating an imaginary picture of a mathematical concept.

Story providing a background to mathematical calculations.

Attractive visual images.

Story designed to be read to the students.

Follow-up activities.

Approach which allows the material to fit into a whole language classroom organisation.

Computation arising out of the story content.

See page 7 for sample story Fractions Unit 1.5 "Distributing the Hay" (we recommend that this is used in conjunction with the sample Student Activity Sheets pp9/10).

Dramas

Fractions Unit 3.4 Drama

The Pied Piper of Hamelin
A Tale of Fractions and Settling Accounts

Characters
Narrator
1 Pied Piper
2 Grey Rats
2 Black Rats
2 Patchy Rats
2 White and Brown Spotted Rats
1 White and Brown Spotted Rat
16 children (played by the rats)
A number of townspeople

Narrator: "Once upon a time, long ago and far away, a town called Hamelin was plagued by rats. There were all sorts of rats - grey ones, black ones, patchy ones and spotted ones - and they were all big and horrible."

Grey Rat: "We are the grey rats, there are nine of us and we are horrible!"

Black Rat: "We are the black rats, there are two of us and we are horrible!"

Patchy Rat: "We are the patchy rats, there are three of us and we are horrible!"

White and Brown Spotted Rat: "I am the white and brown spotted rat, I like mice and cats, I'm clever and I trust no one and I'm horrible too!"

All the rats in unison: "We are the rats of Hamelin. We are 18 in all - grey and black, patchy and spotted."

White and Brown Spotted Rat: "The Pied Piper of Hamelin was a man who played a pipe that made the rats dance away from the town. He was a very clever man and he was a very handsome man. He was a very good friend of the rats and he was a very good friend of the townspeople. He was a very good friend of the rats and he was a very good friend of the townspeople. He was a very good friend of the rats and he was a very good friend of the townspeople."

Grey Rat: "We are the most important rats. We are half of all the rats in Hamelin. We are the most important rats. We are half of all the rats in Hamelin. We are the most important rats. We are half of all the rats in Hamelin."

Black Rat: "We are two eighths of all the rats. We think we're important!"

White and Brown Spotted Rat: "The 'rats' mean a rat, and that's a much smaller group than a ham."

Patchy Rat: "There are more of us, we are three eighths of all the rats!"

White and Brown Spotted Rat: "They really mean a ham, but they're quite right - that's a large group than a ham!"

White and Brown Spotted Rat: "I'm only an eighth of the rats in Hamelin, the group is so small, but I made up for that because I'm clever and cunning, cautious and careful."

Icon indicating a group activity.

A large cast in order to involve all class members.

Simple and clear layout.

Drama providing the experience on which later computation is based.

Attractive visual images.

Parts written in a variety of readability levels.

Some parts to be read in groups to assist the less able reader.

Clear and age appropriate font.

Activity designed to visually represent a mathematical concept.



Distributing the Hay

A farmer, Mr. Austin, had 18 horses of which he was very proud. During the summer months the animals fed on the rich grass of the pastures, and were strong and healthy.

But when winter came, the grass in the fields grew slowly and there was not enough for the horses to eat. Each year Mr. Austin bought hay so that his horses would not go hungry, and would stay healthy during the cold months.

Mr. Austin stacked the hay in a large barn; the hay was just the right food for the horses and it was quite easy to store. Once again winter arrived and the hay was ready, but Mr. Austin wanted to make sure that he treated all the animals fairly.

He wanted to make sure that each horse had the same amount to eat; that each of the 6 horses in his first field did not get more or less hay than each of the 12 horses he kept in the second field. He therefore had to work it out very carefully and he wrote down the following to help him make his calculations.

- The first field had 6 horses, and so held $\frac{6}{18}$ of all the horses.
- The second field had 12 horses, and so held $\frac{12}{18}$ of all the horses.
- In order to be fair to the horses, the first field should receive $\frac{6}{18}$ of the hay and the second field should receive $\frac{12}{18}$ of the hay.

However Mr. Austin found that it was a great deal of work to make sure each horse had its fair share. Each day he would take the hay and divide it into 18 portions (the same number as the number of horses). He would then take 6 of the portions to one pasture and 12 to the other pasture.

Soon Mr. Austin was grumbling to his wife that he wasn't sure how long he could go through all this work in order to make sure that the horses in each pasture had their fair share.

Mrs. Austin laughed and told him there was a much easier way to deal with the problem. She drew a picture of the hay in the way her husband had been dividing it up and with colored pencils she shaded the hay for 6 horses in one color, and the hay for 12 horses in another.

The illustration soon showed them both that $\frac{6}{18}$ of the hay was just the same size fraction as $\frac{1}{3}$, and that $\frac{12}{18}$ of the hay was just the same size fraction as $\frac{2}{3}$.

Mr. Austin could already see the advantage of working with these new fractions. He would now have only to divide the hay into 3 and not into 18, but he was a man who liked to work with numbers and so he sat down and worked it out for himself.

He found that it was often possible to make the numbers of the fraction smaller and more manageable by dividing them. However, he realized that you must always perform the same division exercise on the **numerator** as on the **denominator**, or the final fraction would not be the same as the one you started with.

This is what he discovered. If you started with $\frac{6}{18}$ and divided the numerator and denominator by 2 it became $\frac{3}{9}$ and if you divided the numerator and denominator of $\frac{3}{9}$ by 3 it became $\frac{1}{3}$. He also discovered that if you started with $\frac{12}{18}$ and divided the numerator and denominator by 2 it became $\frac{6}{9}$ and if you divided the numerator and denominator of $\frac{6}{9}$ by 3 it became $\frac{2}{3}$.

So Mr. Austin found that instead of dividing the hay into 18 portions he now only needed to divide each day's hay into 3. He gave $\frac{1}{3}$ of the hay to the horses in the first pasture and $\frac{2}{3}$ to the horses in the second pasture.

He soon found that caring for his horses took far less time. He also knew that the horses in each of the pastures would now be able to have a fair share of the hay.

Student Activity Sheets (Visual Representation - Concept)

Introductory section to teach the concept.

Visual images to aid understanding.

"Fill-in" areas for student's work.

Extension activity.

Clear and age appropriate font.

Appealing visual images of the concept.

Computational practice using visual images.

Computational practice without visual images.

See page 9 for sample from Unit 1.5 "Distributing the Hay".

Student Activity Sheets (Visual Representation - Practice)

Visual images to aid understanding.

Icons indicating different types of activities.

Addition of fractions shown linguistically, numerically and illustratively.

Clear directions.

User friendly language and age appropriate font.

Visual images to aid computation.

Opportunity to interact with the material.

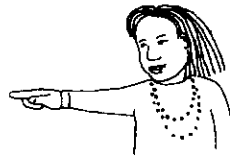
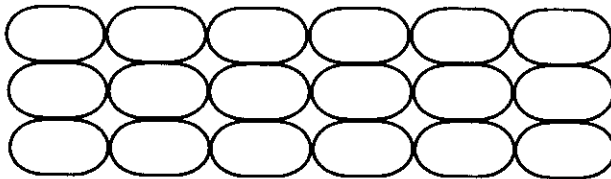
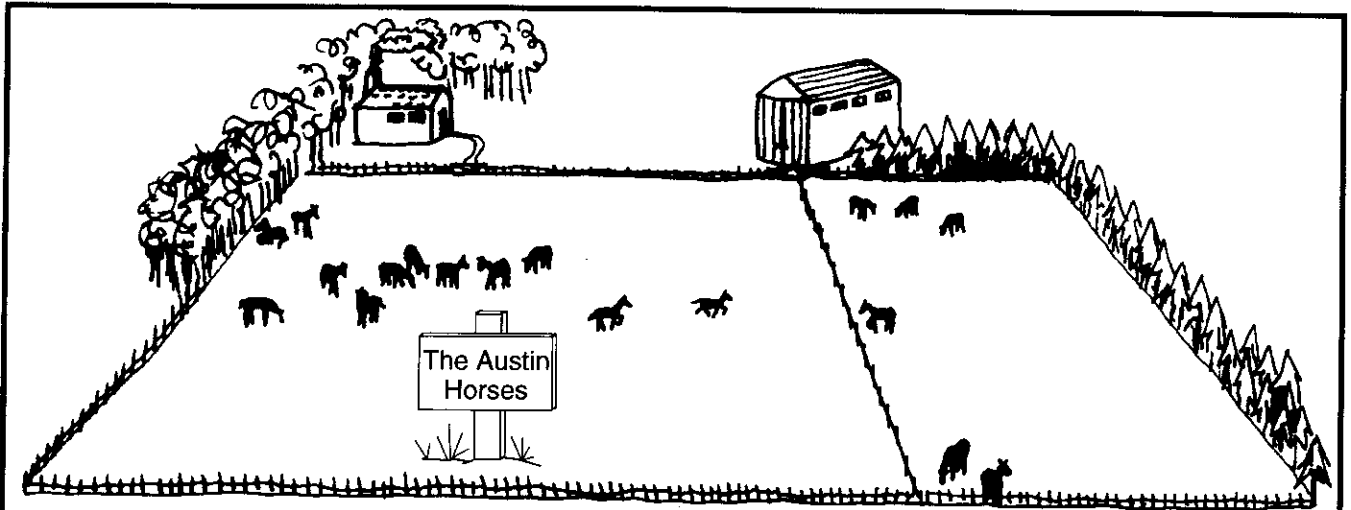
"Fill-in" areas for student work.

Extension activity.

See page 10 for sample from Unit 1.5 "Distributing the Hay".



Distributing the Hay



This is the drawing of the hay that Mrs. Austin made. The hay has been divided up into 18 portions, one for each horse.

- You may remember in the story how Mr. and Mrs. Austin divided up the hay.
- Shade the hay for the larger field in green.
- Shade the hay for the smaller field in yellow.
- Look carefully at the hay you have colored in.
- Can you see that $\frac{6}{18}$ is the same as $\frac{1}{3}$?
- Can you see that $\frac{12}{18}$ is the same as $\frac{2}{3}$?

This is how Mr. Austin checked the solution:

$$\frac{6}{18} = \frac{3}{9} = \frac{1}{3}$$

$$\frac{12}{18} = \frac{6}{9} = \frac{2}{3}$$

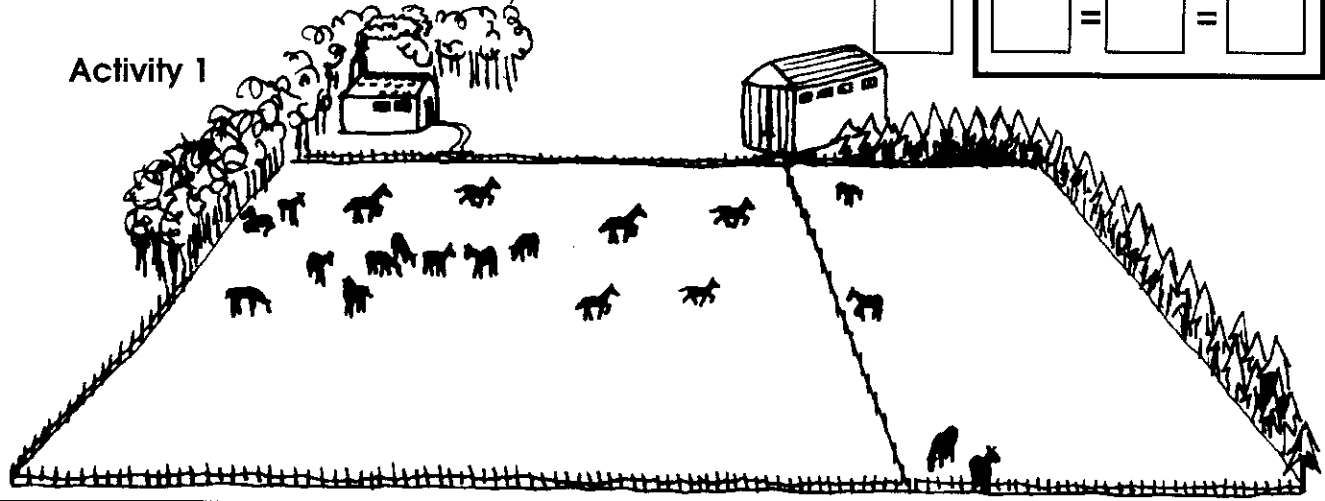
- The number of horses in the fields below has changed.
- Make a drawing of the hay as Mrs. Austin did.
- You can do this in the large field.
- Then shade the hay for the larger field in green and shade the hay for the smaller field in yellow.
- What fraction of the hay was put into each field?
- Write the fractions in the way Mr. Austin did.

This is how Mr. Austin checked the solution:

$$\square = \square = \square$$

$$\square = \square = \square$$

Activity 1





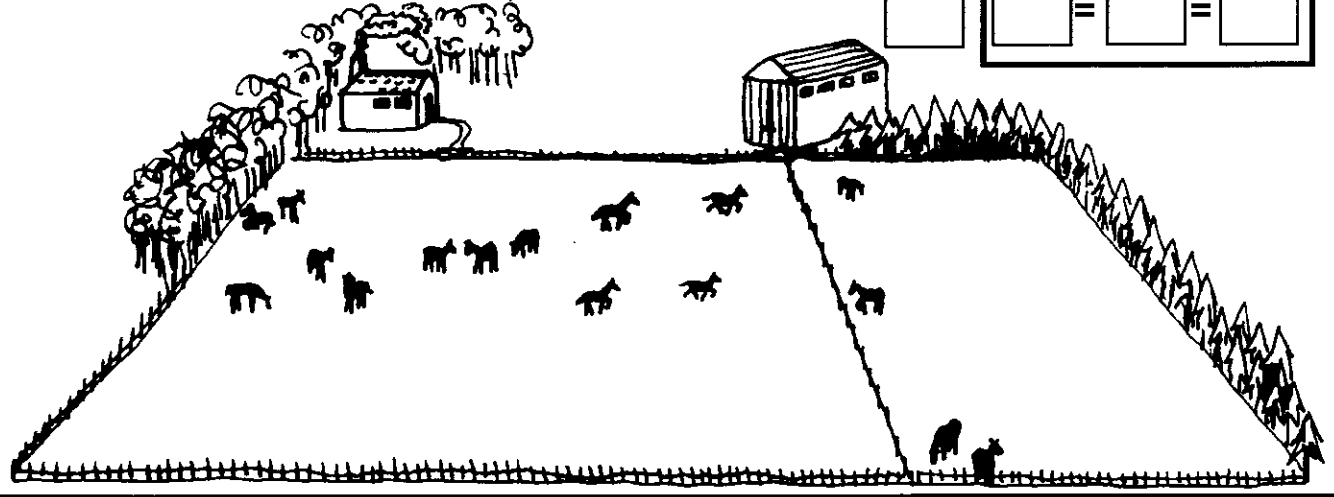
Distributing the Hay (continued)

Activity 2

- The number of horses in the fields below has changed.
- Make a drawing of the hay as Mrs. Austin did.
- You can do this in the large field.
- Then shade the hay for the larger field in green and shade the hay for the smaller field in yellow.
- What fraction of the hay was put into each field?
- Write the fractions in the way Mr. Austin did.

This is how Mr. Austin checked the solution:

	=		=	
	=		=	

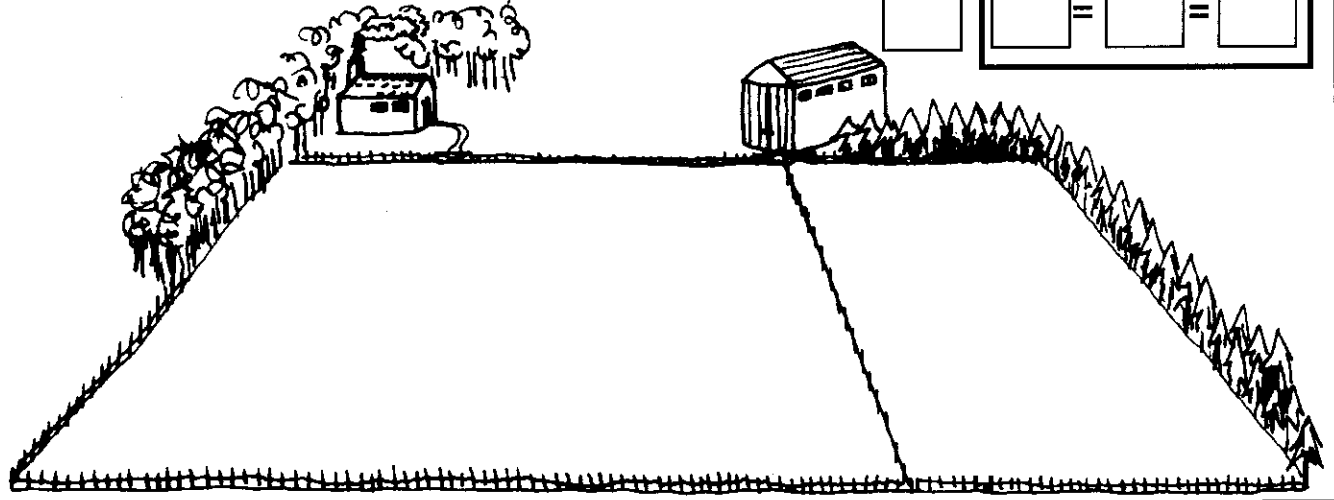


Activity 3

- 8 horses live in the large field and 4 horses in the small field.
- Draw them in their own fields.
- Make a drawing of the hay as Mrs. Austin did.
- You can do this in the large field.
- Then shade the hay for the larger field in green and shade the hay for the smaller field in yellow.
- What fraction of the hay was put into each field?
- Write the fractions in the way Mr. Austin did.

This is how Mr. Austin checked the solution:

	=		=	
	=		=	



Student Activity Sheets (Mathematical Language)

Practice in Naming Fractions.

Shade a quarter of this circle in red. Shade the rest of the circle green.

The green part is three quarters of the circle.

Shade a third of the circle in blue. Shade the rest of the circle yellow.

The yellow part is two thirds of the circle.

Can you name the grey shaded parts of the squares and circles?
Write the name below the figure - in the space provided.

1. [Diagram: Circle with 1/4 shaded] _____

2. [Diagram: Circle with 1/2 shaded] _____

3. [Diagram: Circle with 3/4 shaded] _____

4. [Diagram: Square with 1/4 shaded] _____

5. [Diagram: Square with 5/8 shaded] _____

6. [Diagram: Square with 7/8 shaded] _____

five eighths seven eighths

Color the unshaded parts of each figure using a different color for each example.
Put your chosen colors in the little boxes and write the name of that part of the square or circle alongside the little box. The last two have been done for you.

See page 12 for sample from Unit 1.3 "Recognizing Fractions 1".

Student Activity Sheets (Craft)

Making a Fraction Chart

You will need some squared paper.

Choose one with large squares to make a large chart.

Draw a rectangle which is seven squares along one side and five squares along the other.

Draw the first line and shade the strip a color of your choice. Label it "1".

Draw the second line and shade the second strip another color. Divide the strip into two equal parts and label the two halves.

Draw the third line and shade the third strip another color. Divide the strip into four equal parts and label the four quarters.

Draw the fourth line and shade the fourth strip another color. Divide the strip into eight equal parts and label the eighths.

The last strip is ready for you. Shade it a fifth color. Label the fifteenths.

Let us find out how we can use this Fraction Chart.

See page 13/14 for samples from Unit 1.3 "Assembling/Templates for Mobile 2".

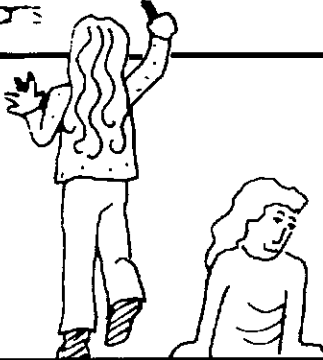


Recognizing Fractions 1

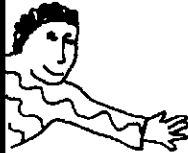
The baker said that he would cut the cake into four equal parts.

$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

Choose a partner and work together. Write four sentences similar to the ones below and give them to your partner to illustrate.



Illustrate these sentences with a drawing and label each fraction.



- ☆ The mother divided the chocolate bar into six equal parts.
- ☆ The teacher cut the length of cloth into three equal pieces.
- ☆ The student cut the apple into five equal pieces.
- ☆ The farmer fenced his field into five equal parts.
- ☆ The cook cut the pizza into eight equal parts.

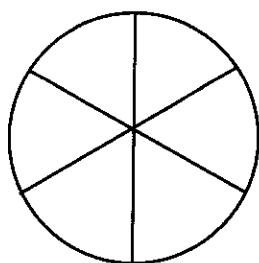
Write sentences for these drawings.



Assembling Mobile 2

This diagram illustrates the way in which the mobile is assembled.

- Materials Required**
- The templates provided
 - Card or strong paper
 - Drinking straws cut to the appropriate lengths
 - Strong thread
 - Stapler to attach thread to "cut-out fractions" and the drinking straws

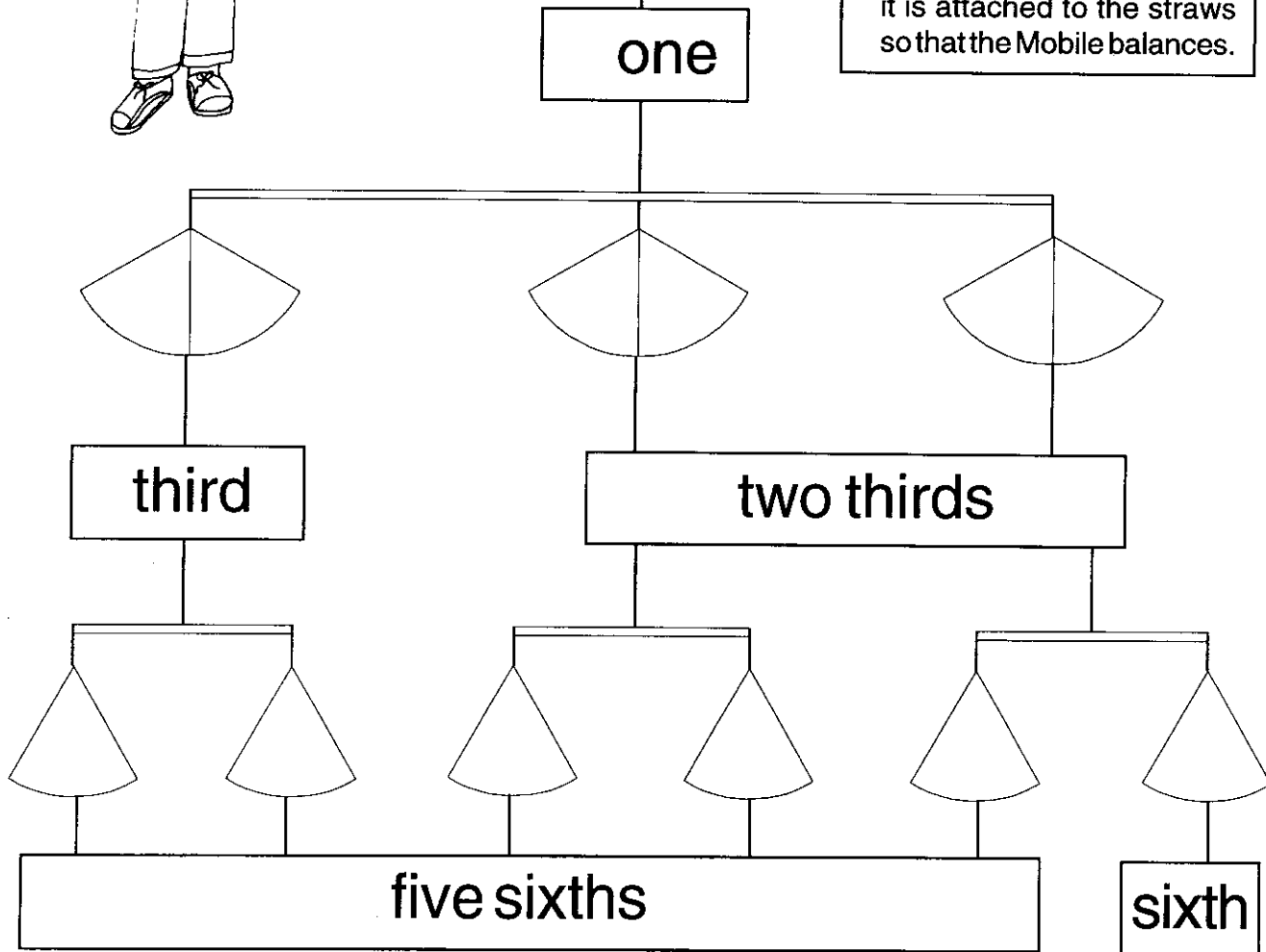


Key

— Thread

— Straws

You will need to adjust the position of the thread where it is attached to the straws so that the Mobile balances.

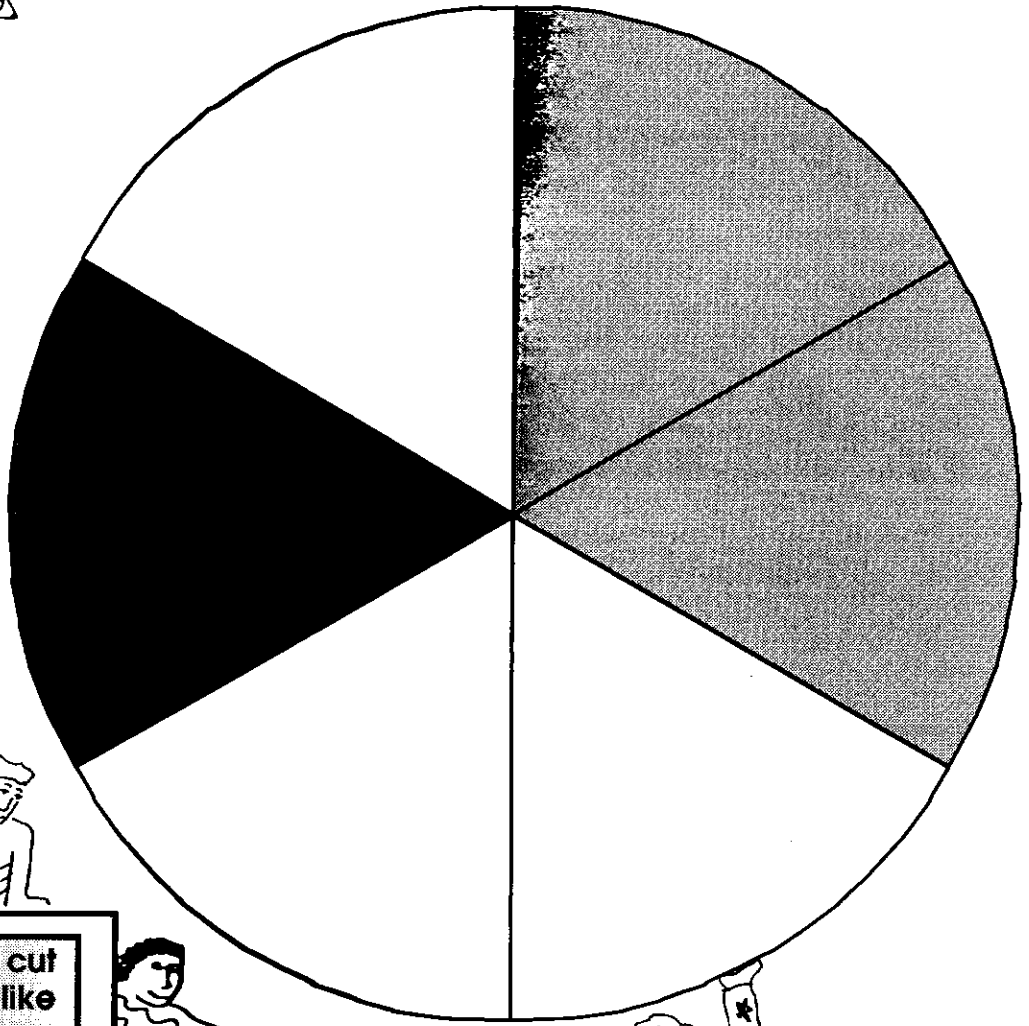
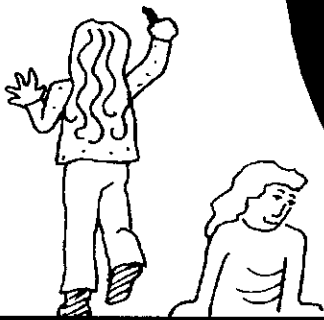




Templates for Mobile 2

This is what you will need:



White card
Drinking straws
Strong thread
Stapler
Colored pencils
Scissors
Ruler and pencil



From your card cut
three rectangles like
the one shaded here.

On 1 write the word "one".
On 1 write the word "third".
On 1 write the word "sixth".

This is what you do.

- ✓ From your card cut out **one circle the same size** as the one above. Draw lines to divide it into 6 equal parts and **color each segment** a different color. Do this on both sides of your circle.
- ✓ Cut out three segments the **same size as the one shaded** . Draw lines on each to divide them into **two parts**. **Color each segment** to match the segments on your circle. Do this on **both sides of your segments**.
- ✓ Cut out six segments the **same size as the one shaded** . **Color each segment** to match the segments on your circle. Do this on both sides of your segments.

From your card cut two of these rectangles.
On one write the words "two thirds". On the other write the words "five sixths".

Student Activity Sheets (Cooperative Learning)

Fractions Unit 3.3

Teacher's Guidelines

Cooperative Learning Activities

These problems are designed for solving by small groups of students.

The problems are designed to

- ✓ encourage discussion
- ✓ foster cooperative learning
- ✓ stimulate alternative ways of problem solving
- ✓ provide opportunity for students to experience both a left and right hand brain approach to problem solving
- ✓ encourage both lateral and linear thinking
- ✓ demonstrate that problems may be solved pictorially as well as abstractly - i.e. visually and cognitively
- ✓ develop the language of fractions in both its written and spoken forms.

Activity 1 - Problem Solving

- ✓ organize the students into small groups
- ✓ provide each group with a copy of the problem to be solved
- ✓ allow sufficient time for the groups to discuss different ways of solving the problem
- ✓ suggest that they might like to draw their solutions
- ✓ suggest that they might like to use the fraction charts they used for previous problem solving
- ✓ suggest that they might like to use numbers instead of pictures
- ✓ ask the groups to appoint spokespersons
- ✓ invite each spokesperson to report back to the class on the answers to the problems, and the ways in which they were solved.

Activity 2 - Creating Problems

This activity is designed to fulfil the same aims as the previous activity.

- ✓ organize the students into small groups
- ✓ provide each group with a fraction problem
- ✓ examples are provided below, but others may be substituted depending on which area of fractions the students are studying
- ✓ invite each group to share ideas and create a real life situation which could be illustrated by the written problem
- ✓ encourage the students to create a story through discussion and the sharing of ideas
- ✓ invite each student to write the story, illustrate it with drawings and diagrams, adding the original problem at the end.

Suggestions

$1\frac{1}{2} + 2\frac{1}{2} =$	$2\frac{1}{2} + 3\frac{1}{2} =$	$4\frac{1}{2} + 1\frac{1}{2} =$
$1\frac{1}{2} + 2\frac{1}{2} =$	$4\frac{1}{2} + 1\frac{1}{2} =$	$7\frac{1}{2} + 1\frac{1}{2} =$

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Callout boxes:

- A "whole language" approach.
- Clearly set out goals.
- Clearly set out guidelines.
- An alternative approach.
- Teachers introduction to the cooperative learning Student Activity sheets.
- Accommodating students with different learning styles.
- Encouraging the use of illustrations to aid understanding of a mathematical concept.
- Encouraging the use and development of mathematical language.

See page 16 for sample from Unit 3.3 "Cooperative Learning Activities".

Student Activity Sheets (Computational Practice)

Fractions Unit 2.3

Mixed Numbers : Practice Sheet

Student Activity Sheet

Calculate the mixed number which is represented by each diagram.

Write each mixed number in the box.

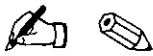
If you find the letters which match each of these mixed numbers, write them in the box. You will be able to complete the sentence.

number has a
number and a
number.

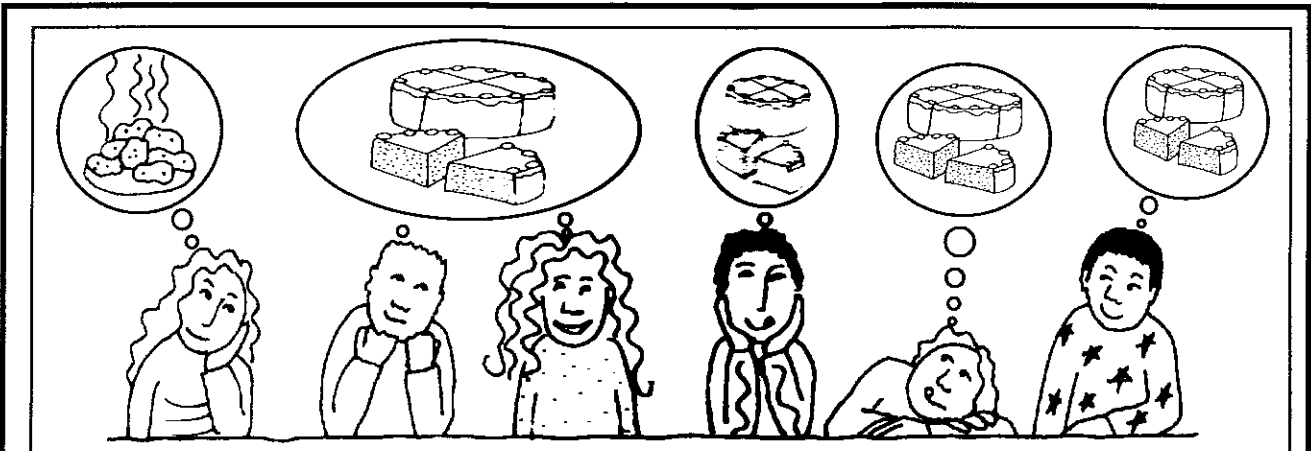
Callout boxes:

- Attractive visual images.
- An additional facet to the activity.
- Practice of a concept introduced earlier.
- Simple and clear instructions.
- A self-correcting element.

See page 17 for sample from Unit 2.3 "Improper Fractions : Practice Sheet".



Cooperative Learning Activities (continued)

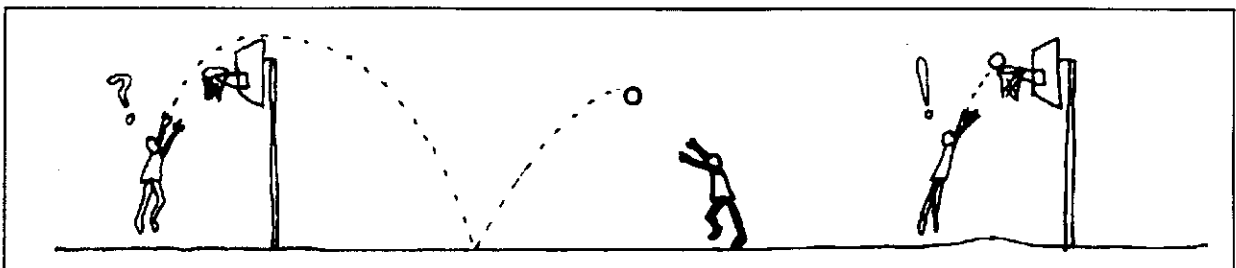


3 Sarah had five friends over to join in a slumber party. Food for their evening meal (for the six of them) had been left on the kitchen table. It was left to Sarah and her friends to divide up the food so that each one had an equal share. There were:

- ✓ 3 pints of orange juice,
- ✓ 2 large pizzas,
- ✓ 7 baked potatoes and
- ✓ 4 large cakes filled with strawberries and fresh cream.

Can you work out what fractions of the juice, pizza, potatoes and cakes each friend had?

4 Mrs. Davies' basketball team was the best in the school. Carlos very much wanted to be chosen for it. Every morning before school he practiced shooting hoops.



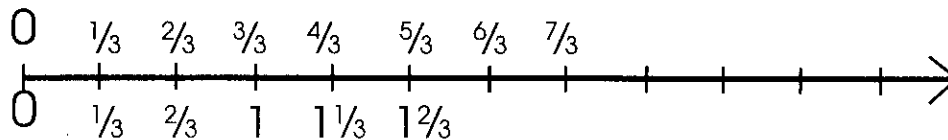
He kept a record of each day's score to see if he was improving.
Carlos' basketball practice scores:

Monday	- 10 scores out of 20 tries
Tuesday	- 12 scores out of 24 tries
Wednesday	- 18 scores out of 30 tries
Thursday	- 18 scores out of 24 tries
Friday	- 32 scores out of 40 tries

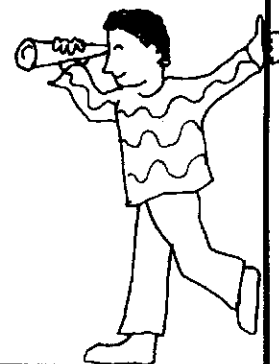
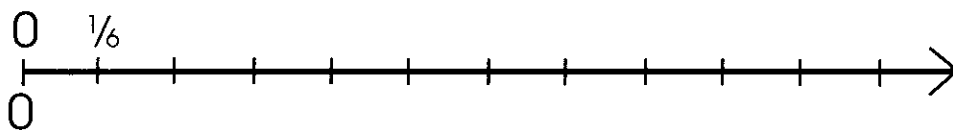
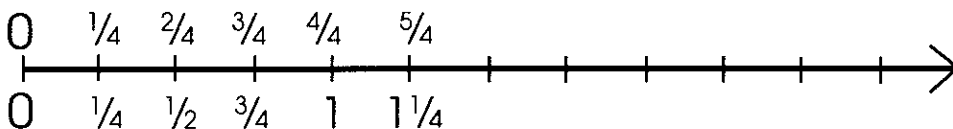
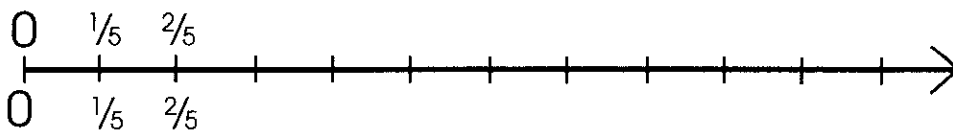
Was Carlos' score improving?
How can you show this?



Improper Fractions : Practice Sheet.



- This fraction line is marked in thirds.
- Continue to label the divisions above the line.
- The fractions above the line are improper fractions.
- Label the divisions below the line in red, changing the improper fractions to mixed numbers.



Carry out the same activity with these lines.



Use these lines to help you write these improper fractions as mixed numbers.

1 $7/4 = \square$

2 $7/3 = \square$

3 $7/6 = \square$

4 $13/4 = \square$

5 $15/3 = \square$

6 $9/5 = \square$

7 $9/6 = \square$

8 $7/5 = \square$

9 $11/3 = \square$

Do you remember that $1/4$ is really one divided into four, or $1 \div 4$.

Similarly $7/4$ is also $7 \div 4$,

and so $7 \div 4 = \text{one and three left over} = 1\frac{3}{4}$.

We can now work out improper fractions in this way.

$9/4 = 9 \div 4 = \text{two and one left over} = 2\frac{1}{4}$.

Calculate these in the same way.

$11/5 = \square \div \square = \square = \square$

$8/3 = \square \div \square = \square = \square$

Waldorf Education

an approach for use in public or private schools

Do you believe in children's creative ability?

Do you believe in your own creative ability?

- ♥ If you answer "Yes", examine the Waldorf approach - you will find it worthwhile.
- ♥ Read what teachers and educators have to say about Waldorf methods.

"After more reading and discussions I became quite convinced that the approach is basically a good system for educating our youth. It is certainly worthy of support. I am happy to recommend both the approach and Dr. David Mollet." John H. W., Professor of Education

"I have found the workshop most beneficial - teaching to the right hand side of the brain as well as the left has afforded my students a wonderful approach to learning. I would recommend the workshop to any teacher who is interested in offering his/her students the best education possible." Joan C., 6th & 7th grades

"The concept of the Waldorf approach is of great interest to me. It supports some of the ideas about teaching that I have had for many years. I would sincerely hope that the approach could be made more operational in the school system - I think the approach has some tremendous potential. I would hope that you (David) would have success in implementing the approach in public schools in California. There is definite merit in the approach and it would be of great benefit to students."

Ron H., Superintendent of Schools

"Highly creative but instinctive and natural - we need these methods now." Ros C., Elementary School Teacher

This workshop has given me a better understanding of how children learn and why. All teachers should take it." Janet P., Elementary School Teacher

"What I learned convinced me that there is a great deal in the approach that would be applicable in any school program. The emphasis on the unique qualities of each child has remained with me and subtly altered my perception of children. I would recommend examination of the approach to all teachers." Joyce M., Superintendent of Schools

- ♥ The following workshops on Waldorf education are available (if needed you can take the courses for credit)

- Teaching Fractions in Public Schools - the Waldorf Approach
- Teaching the Multiplication Tables in Public Schools - the Waldorf Approach
- Teaching Geometry in Public Schools - the Waldorf Approach
- Storytelling - the Waldorf Approach
- Methodology of Teaching - the Temperaments
- Learning to Write and Read : Stages of Child Development
- The Waldorf Approach and the teaching of History
- The Waldorf Approach and the teaching of the Ancient Civilizations

Workshops include.....

- * Materials for implementing the Waldorf approach in your classroom.
- * Reproducible and ready-to-use materials.
- * A variety of lesson plans.
- * Resource list.
- * Entertaining lesson demonstrations.

Mollet Learning Academy (MLA) - Inspiring Children to Learn

Dr. David Mollet, President, Tel: NZ h (09) 555-2021 c (022) 101-1741 USA (619) 463-1270

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Waldorf Education Resources: <http://molletlearningacademy.com/waldorfedu/index.html>

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There are 3 SubUnits on Fractions

- SubUnit Fractions 1 - \$25
- SubUnit Fractions 2 - \$25
- SubUnit Fractions 3 - \$25

Discounted price for 3 SubUnits - \$60

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Please tick if you are interested in any of the above in Spanish _____

Examples of Content

Fractions 1

- The Language of Fractions
- Fraction Names
- Activities in Naming Fractions
- Templates for Fraction Mobiles
- Instructions for Assembling Mobiles
- Writing Fractions with Numbers & Symbols
- Numerator and Denominator
- Recognizing Fractions
- Fractions as Part of a Set
- Fractions Around Us
- Muffin Activity
- Color (Colour) of Eyes Activity
- Fractional Parts of Numbers
- Comparing Fractions
- Fraction Charts
- Distributing the Hay - Story
- Distributing the Hay - Activity
- Making a Fraction Chart
- Equivalent Fractions
- A Fraction Game
- Charts for Fraction Game
- The Greedy Farmer - Game

Fractions 2

- Mixed Numbers
- Improper Fractions
- Adding Fractions
- Activity - Let's Add Fractions Together
- New Animals at the Zoo - Story
- Activity - Easter Eggs
- Adding Fractions Using a Chart
- Activity - Experience of Subtraction
- Fraction Circles
- Making a Fraction Wheel
- Activities using the Fraction Wheel
- Addition & Subtraction Puzzles

Fractions 3

- Cooperative Learning
- Cooperative Learning Activities
- The Pled Piper of Hamelin - Drama
- Multiplication and Division
- Multiplying Fractions
- Activity - Let's Go Shopping
- Revision of Multiplication
- Activity - Sam's Hamburger Party
- Group Learning Activities
- Division of Fractions
- Revision of Division
- Problem Solving in Groups
- Multiplication and Division Puzzles
- Poetry

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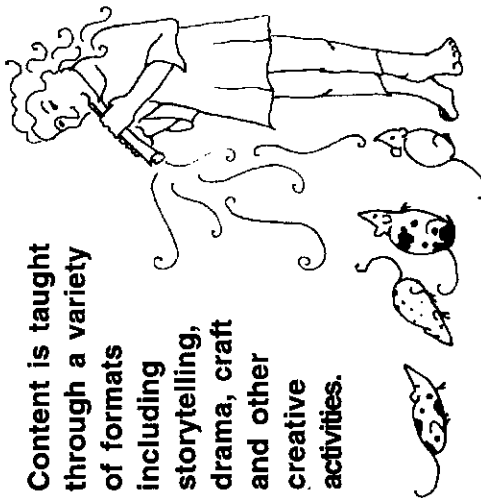
New Zealand Whole Language
Teaching Foundation
(Inc. Waldorf Education Resources)

Please circulate to:
• The Principal • Head of Mathematics
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A Whole Language Approach to the Teaching of Fractions

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Content is taught through a variety of formats including storytelling, drama, craft and other creative activities.



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