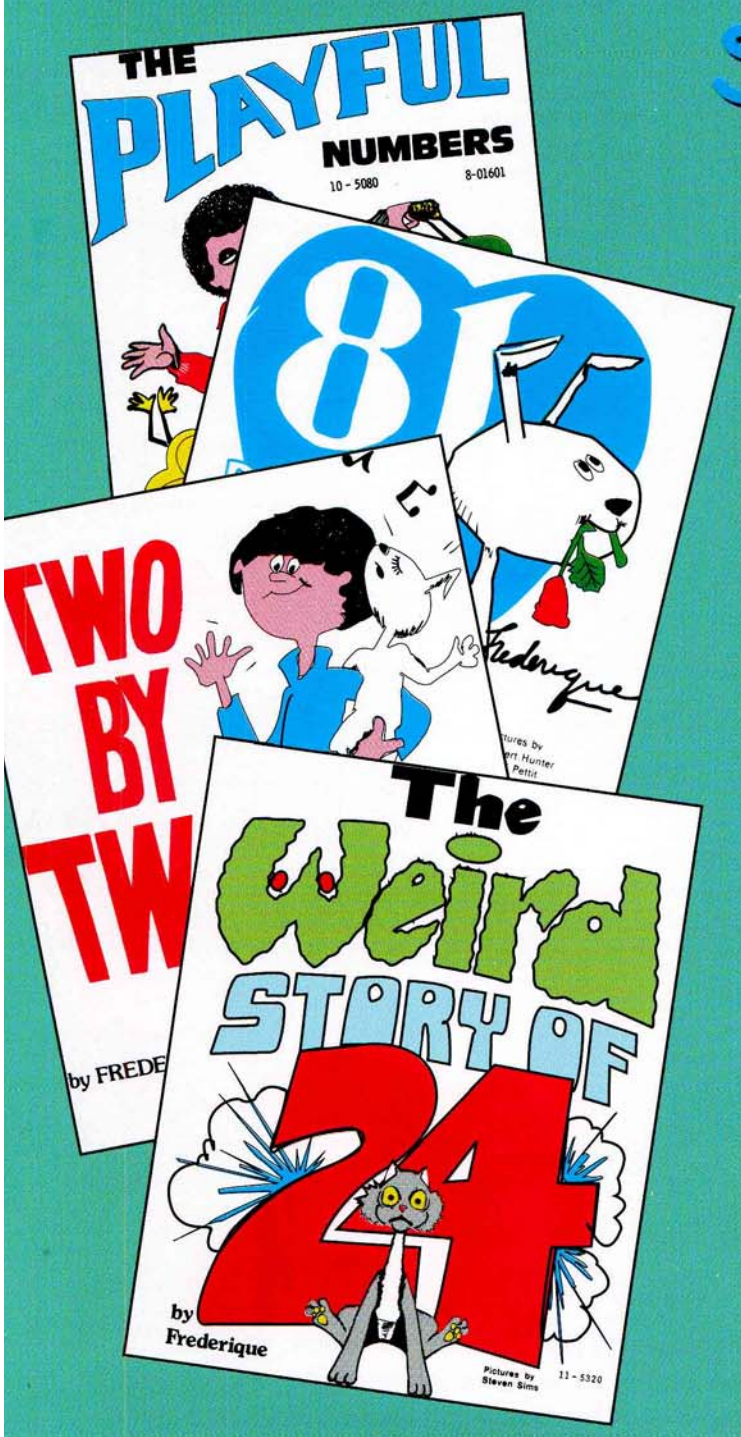

STORIES BY FRÉDÉRIQUE

Storybook Set I

Playful Numbers
81 Roses
Baby Is Born
One Out of Seven
I Am a Very Happy Boy
Little Dreamer
Two by Two
Weird Story of 24
Where's My Nose?
Happy Puppet
Magic Box
Summer School in the Old Days

Ages 5 – 8

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For additional information, contact:

McREL - CSMP
2550 S. Parker Rd., Suite 500
Aurora, CO 80014-1678
(303) 337-0990
http://www.mcrel.org/products/csmp

STORIES BY FRÉDÉRIQUE (SET I) INTRODUCTION

A CSMP Minipackage

A CSMP Minipackage presents a part of the CSMP curriculum through introductory lessons that can be taught by teachers with no prior CSMP training to students with no prior CSMP background. The purpose of each CSMP Minipackage is twofold:

- to introduce one or more of the nonverbal languages and instructional tools used in the CSMP elementary curriculum so that a teacher can pursue the possibility of implementing the entire program; and
- to provide mathematically rich activities that can be used immediately in the classroom.

This CSMP Minipackage introduces the Languages of Strings and Arrows and the Papy Minicomputer, using a collection of storybooks. These delightful stories by Frédérique Papy capture the imagination of young students and cover a wide range of topics involving mathematics. Students easily become engaged in these stories: there are questions to answer, pictures to relate to the story, and new adventures to invent for story characters. Dot, string, and arrow pictures reinforce each story while teaching important mathematical concepts and fundamental properties of numbers. The stories are appropriate for individual or group reading, at home or school.

Twelve Storybooks and How to Use Them

This booklet gives lesson ideas for the twelve storybooks in Set I of *Stories by Frédérique*. Although the order of use of the storybooks is not critical, you will find the first six stories more appropriate for younger students (four- to six-year-olds) and the last six directed more at seven and eight-year-olds. The storybook *Two by Two*, introducing the Papy Minicomputer, is a logical predecessor to *The Weird Story of 24* and *Summer School in the Old Days*.

Sometime before using a storybook lesson, read the storybook on your own. Be sure to read the comment on the last page. While doing this, think about the various situations and how your students might react to them. Feel free to bring your imagination, your experience, and your general familiarity with the interests and concerns of your students to bear on the lesson. The lesson description simply provides some suggestions on how students might react and how you might prompt creative thinking.

Brief story descriptions for all storybooks in this collection are given here.

The Playful Numbers

This story is about a little boy and his playful number friends. It is full of provocative pictures needing no words to suggest many ideas to students. Since an open situation tends to encourage students to use their creativity to develop the situation, the story is presented without any written narrative.

With your encouragement and guidance, let students help you tell a story as you explore the pictures together and discover what interesting ideas and mathematical concepts emerge and develop.

81 Roses

81 Roses is a love story about a little white dog and his 81-year-old "mother." The puppy explores the strange and sometimes frightening world of grown-ups. He experiences insecurity, fear, and joy. He grows and learns. Most important, he responds with happiness and affection to the warmth of those who love and respect him. Young children, who are so sensitive to their own feelings, will empathize with the little dog and with his friends, young and old.

With vivid simplicity, pictures of strings and arrows help tell the story. You may be surprised how concretely these abstract pictures speak to readers and involve them in counting or relational thinking.

The Baby Is Born

The birth of the second child in a family can be a traumatic experience. Suddenly the focus of attention switches from the only child to the new arrival. Feelings of rejection and resentment can follow unless the situation is handled very carefully.

The Baby Is Born is the story of just such a conflict and its subsequent resolution. It is seen through the eyes of the firstborn and the reader shares with him his changing feelings. This spectrum of emotions is illustrated, perhaps surprisingly, by means of two nonverbal mathematical languages: the language of strings and the language of arrows.

One Out of Seven

This story is about seven cuddly, lovable, little puppies, one of whom is always in trouble. He gets lost when the family goes for a walk. No sooner is he given a new dish than he breaks it. Try as he will, nothing he does seems to be right. His mother must constantly scold and punish him. His situation is one with which every child can sympathize.

The nonverbal languages of strings and arrows help to tell the story of the troublesome pup and his six brothers and sisters.

I Am a Very Happy Boy

I Am a Very Happy Boy is a story about a lonely child—sometimes he feels nobody notices him and he is afraid. Young children who are so sensitive to their own developing feelings will empathize with this boy. Pictures of dots, strings, and arrows reinforce the ideas in the story in a simple but powerful way and, at the same time, help students to enter the world of mathematics. In the end, the boy makes many new acquaintances and finds that he not so lonely after all.

The Little Dreamer

In *The Little Dreamer*, we meet a little boy who isn't too fond of schoolwork. Everything is so rigid and cut-and-dried. There is no room for fantasy and artistic expression. His parents, whom he wants to please so much, are disappointed with his school grades. The only solace he can find is in the company of his aunt, who shares his interest in clouds, birds, and trees. Using the mathematical languages of strings and arrows, she helps him "warm up" to mathematics. These languages give full rein to the imagination, making whole numbers familiar and less daunting.

Two By Two

In *Two by Two*, Cedric Shirtsleeves learns an intriguing new game. He finds out how he can represent the numbers he knows simply by using checkers and some colorful square boards. This story introduces the Papy Minicomputer, a simple abacus that combines the usual positional system with the fundamental notion of doubling.

As the narrative unfolds, insight into the anatomy of numbers is subtly deepened. Students begin to think of numbers in many different ways and discover how numbers can be shown with checkers on the colored squares.

This positional system lends strong support to the learning of the usual system of writing numbers. The positions of that system acquire a physical significance, and this concreteness brings the representation of numbers to life.

The Weird Story of 24

The delightfully illustrated tale of *The Weird Story of 24* is about a boy, his cat, and a weird number friend, 24. From the moment 24 shows up in the mailbox to the time of its odd disappearance, life is just one strange happening after another. Minicomputer boards appear on the ceiling, pictures vanish into thin air, checkers take on a life of their own—these peculiarities disturb the cat's morning snooze, but the boy takes it all with equanimity.

Behind all the strange occurrences, readers have a chance to learn more about the number 24. In particular, by anticipating how the boy is going to get 24 out of the various predicaments into which it falls, the readers strengthen their knowledge of and confidence with the Minicomputer.

Where's My Nose?

Where's My Nose? is a story about an only child whose understanding grandmother amuses him with a detective story about the boy, his nose, herself, her three lovely cats, three rabbits, one squirrel, three bugs, and a charming black poodle.

At first the boy is disappointed to find that his grandmother's story consists of nothing more than a picture of 14 dots, one for each of the characters. But the grandmother is patient and begins to attract the boy's interest by drawing a colored string around all the dots for animals with four legs. As more clues are given and more strings are drawn, the boy becomes absorbed in the discussion of the picture until finally he solves the mystery.

The Happy Puppet

The Happy Puppet tells the story of a lovable hand-puppet and the interesting games played with the puppet's friends, the dots. These games are vividly and colorfully portrayed by means of the versatile mathematical languages of strings and arrows. At one moment the dots are numbers, at another they are 100-year-old hippopotami, yet the mathematical languages can always faithfully record their exploits.

The Magic Box

The Magic Box is a story about a poor little boy with a very rich imagination. Although his working mother has little time to spend with him, she listens thoughtfully as he shares his ideas.

A valentine story drawn by the little boy presents an opportunity to explore a situation which is told completely in the language of colored arrows.

Summer School in the Old Days

Did you know that the whole numbers go to school during the summer? An important part of their summer school day is spent presenting themselves to one another in a variety of ways. In great-grandmother's time, the numbers used bundles of sticks for their presentations. Many numbers found carrying sticks terribly inconvenient. For example, the number 24,367 had an enormous mountain of sticks to bring to school each day. How times change! With the arrival of a modern convenience, Papy's Minicomputer, numbers no longer need to carry anything more than a small bag of checkers. (For example, 24,367 needs no more than nine checkers; and some say even fewer!)

Summer School in the Old Days is a story warmly told and richly illustrated. Much information is provided both in the detailed illustrations and in the text. The careful observer can discover, for example, in which year the new school building was opened. The story offers its readers an opportunity to gain new insights into the whole numbers and to extend their perspective to include a first idea of negative numbers. (A glimpse of this wider range of numbers is given when the number 0 finds new ways to present itself.)

For Further Information

Nonverbal languages and the Papy Minicomputer are used extensively in the CSMP curriculum. This CMSP Minipackage provides a simple introduction to these languages and tools in story contexts. To preview CSMP's unique approach to mathematics at the elementary school level and for more in-depth use of the languages and tools of CSMP, other Minipackages such as *Relations and the Language of Arrows* and *A-Blocks String Game* are useful. A brief description of these Minipackages is on page 35 of this booklet. For more information, contact:

McREL – CSMP
2550 S. Parker Rd., Suite 500
Aurora, CO 80014-1678
(303) 337-0990

THE PLAYFUL NUMBERS

Capsule Lesson Summary

Use a story without words to create an open-ended experience with numbers.

Description of Lesson

The Playful Numbers is a delightful little story with no words. It is deliberately presented in this way so that this early experience with numbers will be open-ended. Numbers can be viewed from many perspectives and, if students are permitted to explore the possibilities rather than having arbitrarily fixed boundaries laid down for "what numbers are," their mathematical lives will be much richer.

We encourage you to be an active participant with your students in the exploration of this little storybook. Ask them to help you create a story about the boy, his number friends, and his other friends. You may be surprised to discover some new ways of thinking about numbers!

The situations pictured in this book give the appearance of being quite independent from each other, the only link being the quasi-magical effect these playful numbers have on the environment. But, if you take a second look at the pictures, you will notice a few details here and there that provide additional links between them.

For example, three red buttons drop onto the floor on pages 2–3. On pages 12–13, the same three buttons show up again, along with six blue ones. In the picture on pages 10–11, five of the cats are each holding a white flag. But, wait a minute … so were the five mice on page 7. Whatever could have happened?

Because of the role played by details such as these, it is important for students to be able to see the pictures very clearly. Therefore, you might want to gather your students close to you and hold up your copy of the storybook to show them the pictures.

When you and your students have finished "reading" the story, don't rush into another activity. Instead, allow students to feel free to talk about the story with you. You may like to make a copy of this storybook available in the classroom for students who wish to glance through it in their spare time.

81 ROSES

Capsule Lesson Summary

Use the mathematical languages of strings and arrows to portray incidents in a story about a dog and his owner, an 81-year-old woman.

Description of Lesson

Although *81 Roses* uses the mathematical languages of dots, arrows, and strings, it is a story and can be used in class as you might use other storybooks. Observe the string and arrow pictures with the class, but try not to overemphasize the mathematical aspects.

You may wonder why this storybook (and others) is included in a set of mathematics storybooks. Part of the reason is to show students that these mathematical languages are powerful, useful, and as natural as their own spoken language. There should be room in the world of mathematics to express emotion and to give free rein to children's wonderful imaginations.

As you read the story, give students an opportunity to look at the realistic pictures in the book by holding up your copy. If you wish to focus on a particular picture, copy it onto the board.

Here are some questions you may wish to discuss as you read the story, but be careful not to destroy the story atmosphere.

Page 7

T: ***What do you think the blue arrow is for?*** (The blue arrow tells you that the dog is following its mother. Point to the dog and then to the mother.)

Page 9

T: ***How many dots are there in the blue string? Who are they?***

Page 13

T: ***Can you find the number 37 on this page? What are the other numbers?***

Pages 14 and 15

T: ***How many cookies were there to start with? How many cookies were left after the dog ate three of them?***

Pages 16 and 17

This would be a good place to stop the story if you feel it is too long for your class to take at one sitting. You can finish reading it another time. If you break the story into two sessions, be sure to ask students what they remember about the story before you start the second session.

Page 20

T: ***Which dot do you think represents the mother? What do the other dots represent?***

Page 21

T: ***How many dots are there in the blue string? Who are they?***

Who are the two dots outside the blue string?

Page 24

T: ***Do you have any idea how old the little dog's mother is now?***

Tell students to pay close attention as you continue to read the story so that they can find out.

After reading the story to the class, encourage students to feel free to talk about it (with you or with a partner) or to make a drawing about it if they wish. You may like to make a copy of this storybook available in a reading center for students who wish to glance through it in their spare time.

THE BABY IS BORN

Capsule Lesson Summary

Use the nonverbal languages of strings and arrows to illustrate and help tell a story about the birth of a second child in a family.

Description of Lesson

The Baby Is Born uses the nonverbal languages of dots, arrows, and strings to tell a story which may strike a chord for many of your students. It deals with the birth of the second child into a family and the emotional stress this event places on the firstborn.

Read this story as you would any other story. Give students an opportunity to look at the pictures by holding up your copy of the book at the appropriate times. The mathematical pictures are simple enough that they can be drawn on the board as you are reading the story. (Use the side of a small piece of chalk to draw large dots and thick strings when reproducing these pictures on the board.)

Take care not to interrupt the flow of the story; it is probably simple enough that everyone can understand it without any additional explanation. One exception to this might be on page 12; ask what has happened before you read the text. Throughout the book, give students enough time to look at the pictures since they carry quite a lot of information.

When you finish reading the story, you might suggest that students draw a picture of Veronica and her family. If you do this, you may find it useful to ask someone to remind the class who the people in Veronica's family are.

When this drawing has been completed, let your students draw a picture of their own families. Be prepared to help students who belong to large or complicated families. Students may wish to label the people and pets in their families.

Both of the drawings that the students make will probably be realistic. This is to be expected. However, students may decide to use dots and arrows instead.

ONE OUT OF SEVEN

Capsule Lesson Summary

Use the languages of strings and arrows to tell a story about a family of dogs. Answer numerical questions relating to the story.

Description of Lesson

This story about a family of dogs not only uses the powerful mathematical languages of strings and arrows, but it also deals with number recognition and can be used as an introduction to addition.

Treat this story as you would any other story you might read to your class. Many of the questions you might ask have already been included in the storybook itself. However, you may want to make note of the following points:

- As a general rule, make sure students have enough time to look at the pictures on a page before you continue reading the story.
- Do not over emphasize the mathematical aspects of the story.
- Do emphasize the string and arrow pictures in relation to the storyline.

Page 2

Pause after "What has happened?" to give your students a chance to compare the two dot pictures and perhaps notice, on their own, that one dog is missing.

Page 3

Do not force students to count the dots in each string if they recognize, without counting, how many there are.

Pages 3, 4, and 8

As you read the number sentences on each of these pages, let students illustrate them with their fingers or with counters.

When you have finished reading the story, allow a little time for students to talk about or draw pictures having to do with the story.

I AM A VERY HAPPY BOY

Capsule Lesson Summary

Use the nonverbal languages of strings and arrows to illustrate and help tell a story about a lonely boy who finds that he is not alone after all.

Description of Lesson

Although *I Am a Very Happy Boy* uses the mathematical languages of dots, arrows, and strings, it is a story. Read this storybook with your class as you would read any other story. Let students discuss the pictures, but avoid overemphasizing the mathematical aspects of the story.

Be sure students have an opportunity to look at the pictures in the storybook. For any appropriate illustration, ask where the boy is and who the other dots could be for. The following information is provided for your use during the lesson.

Page 12

The blue arrow is for "I am following you."

Page 13

The green arrow is for "I am talking to you." The squirrel is alone on the left.

Page 14

The blue arrow is for "I am following you."

Page 15

The dog is alone on the left. The two farmers are in the red string.

Pages 28 and 29

The blue arrow is for "I am following you. "

You may like to make a copy of this storybook available in a reading center for students to read or look at on their own.

THE LITTLE DREAMER

Capsule Lesson Summary

Use the nonverbal languages of strings and arrows to illustrate and help tell the story of a "little dreamer" for whom school work does not come easily.

Description of Lesson

Read the storybook *The Little Dreamer* with your class as you would read any other story. Do not overemphasize the mathematical aspects of the story but do observe and discuss the use of the mathematical languages of dots, arrows, and strings. You may increase students' participation by posing questions and by asking them to identify various parts of the pictures.

Here are a couple specific suggestions for activities as you progress through the storybook.

Pages 5 and 6

Ask students to point to the nest (on page 5) that has three birds living in it; that has only one bird living in it; that is empty; that has two birds living in it.

Page 7

You might ask students to invent another story about this picture.

Page 8

Ask students to comment on the little boy's arrow picture. What do they notice?

Pages 11 and 12

Students might like to invent another story for this arrow picture.

When you finish reading the story, allow some time for the class to talk about it or to draw pictures related to it. You can suggest that students write or tell a story of their own illustrated with a picture that uses dots, arrows, and strings. You may want to make a copy of the storybook available for students who wish to look through it in their spare time.

Capsule Lesson Summary

Introduce the Papy Minicomputer and find several ways to represent numbers on this simple abacus. The title of the storybook, *Two by Two*, refers to the use of doubling in the Minicomputer's positional system.

Description of Lesson

For this lesson, you will want to have a Minicomputer available. An individual Minicomputer with punch out checkers or a demonstration (teacher's) Minicomputer kit may be used.

Pages 2–5

Read these pages with the students. Let students attempt to touch the ten dots with their ten fingers on page 4 (or page 2).

Pages 6 and 7

If you have a demonstration Minicomputer kit (with separate boards), invite students to position the boards as indicated on page 7.

Pages 8 and 11

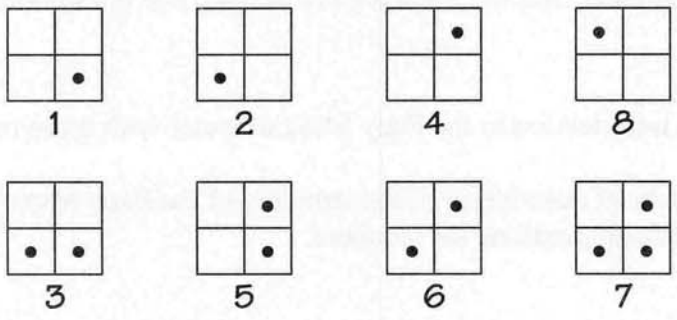
Refer to just one Minicomputer board. As you introduce the 4, 2, 1, and 8 positions on this board, students might like to view these numbers in other ways as well; for example, with fingers or on a number line or with blocks.

Let students try to put 3 on the Minicomputer before going on to page 12.

Pages 12–17

On each page relate the number fact to the configuration of checkers on the Minicomputer. You may ask students to count dots and consider how the arrangement of dots also relates to a number fact and to a Minicomputer configuration.

Before going on to page 18, review the following standard configurations on the Minicomputer.



Ask students if they can put 9 and 10 on just this one board of the Minicomputer.

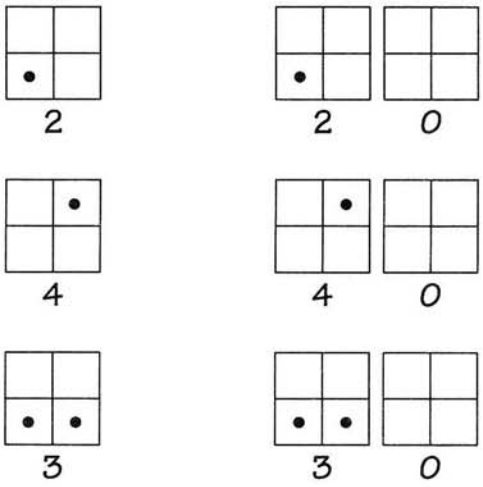
Pages 18–21

Introduce the tens board, and write digits under the boards as on page 20. You may like to ask students what they think the red and blue arrows are for on page 20.

Ask students to solve the house number problem on page 21 before continuing on to page 22.

Pages 22 and 23

After reading these pages together, suggest that students put 2 and 20, then 4 and 40, then 3 and 30 on the Minicomputer.



Pages 24 and 25

You may like to let students put 246 on the Minicomputer themselves before looking at page 25. Be sure to mention that now there is a hundreds board pictured.

Pages 26–29

On each page relate the number fact, the arrangement of dots, and the Minicomputer configuration.

Pages 30 and 31

Review the story and its introduction to the Papy Minicomputer with these two pages.

The following page has a brief description of the structure of the Papy Minicomputer along with a summary of the standard configurations for numbers.

THE PAPY MINICOMPUTER

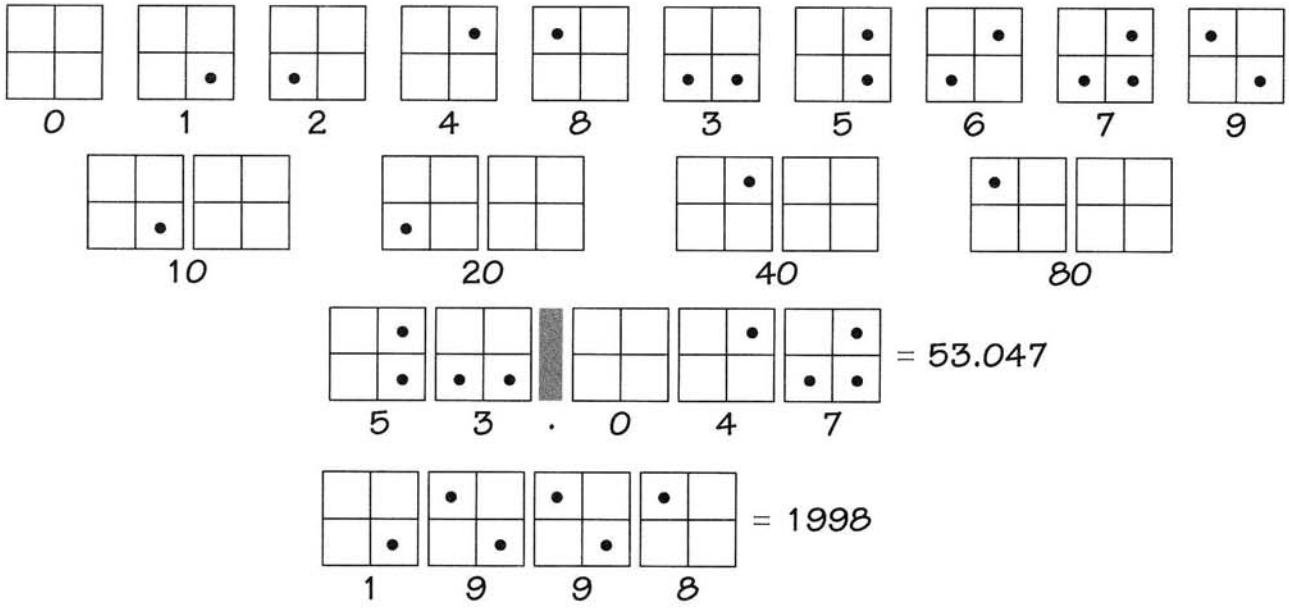
The Papy Minicomputer, a kind of abacus, models the positional structure of our system of numbers and hence lends itself as a powerful tool in arithmetic. The Minicomputer consists of brightly colored boards and a set of checkers. Each square has a numerical value. These are the values on the ones board.†

Brown 8	Purple 4
Red 2	White 1

As you move to the next board to the left, you have the tens board with corresponding values; the next board to the left is the hundreds board with corresponding values; and so on.

8 000	4 000	800	400	80	40	8	4
2 000	1 000	200	100	20	10	2	1

A number is put on the Minicomputer by placing checkers on its squares. A checker assumes the value of the square it is on. If several checkers are on the Minicomputer, the number is the sum of the values of the checkers. A number can be put on the Minicomputer in a variety of ways, but the representation that uses at most one checker on each square and uses checkers to represent a digit 9 or less is usually the easiest to read. In this case, we say that the number is in *standard configuration*. Standard configurations for the numbers 0–9 become as familiar to the students as the usual numerals so that they no longer need to do mental calculations for such configurations.



†The values of the squares are not written on the boards; learning them is part of becoming acquainted with the Minicomputer.

Capsule Lesson Summary

Read and discuss a story about a boy, a cat, and their wild adventures with the number 24.

Description of Lesson

Although *The Weird Story of 24* involves representation of numbers on the Minicomputer, it is also a story and may be presented that way to the class. The storybook *Two by Two* introduces the structure of the Papy Minicomputer, and there is a one-page description on the previous page. At minimum, students will need to know the values of the squares on the ones and tens boards to answer some of the questions in this storybook.

Read the story as you would read any story to your class. Here are some specific suggestions as you progress through the storybook.

Page 7

Ask a student to read the number on the Minicomputer.

Page 11

Put two blue checkers on the 8-square of the Minicomputer, asking a student to place a third blue checker and to explain why it belongs there. Ask students to check that the number on the Minicomputer is 24.

Page 19

Put one red checker on the 8-square and one on the 4-square of the Minicomputer. Give two more red checkers to a volunteer who should place them similarly. Ask why these additional checkers belong there. Check that the number is 24.

Page 25

Put a checker on the 8-square and a checker on the 2-square of the Minicomputer. Give a volunteer three checkers, which should be placed on the 8-square, the 4-square, and the 2-square, respectively. Ask why these new checkers belong there. Check that the number on the Minicomputer is 24.

Pages 28 and 29

Discuss why 24 is driving this particular train. If necessary, give hints to help point out that there are four cars with six soldiers each; so there are 24 soldiers on the train.

Page 31

Ask who sent the letter. (24, because $4 \times 6 = 24$)

When you finish reading the story, allow some time for the class to discuss it. In particular, you may want to discuss what the cat does in the story and how it is affected by 24's antics.

Writing Activity

Let students choose any number from 2 to 23 and write their own *Weird Story of* __. These may be illustrated and shared.

WHERE'S MY NOSE?

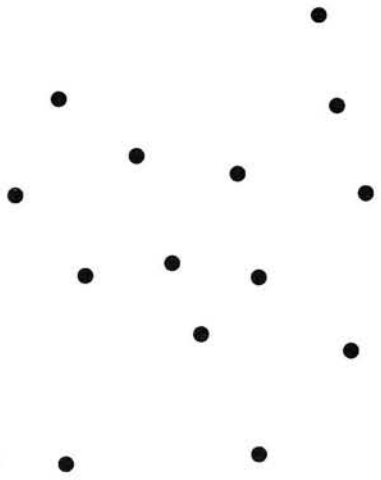
Capsule Lesson Summary

Progressively present a detective story about finding where certain things are in a picture of fourteen dots. Use colored strings (classifications) for clues.

Description of Lesson

We suggest that you tell your class the story of *Where's My Nose?*, holding up your copy of the storybook at crucial moments so that your students can see the pictures. The dialogue here is a little more elaborate than that in the storybook. The reading level in the storybook, though, may be more appropriate for your students if they would want to read the story by themselves.

Before you start the story, draw fourteen dots well spread across your chalkboard.



T: ***Today I'm going to tell you a story about my friend Nick and his grandmother. Nick loved his grandmother very much and used to visit her often. She lived in the country with her charming black poodle and her three lovely cats. Whenever Nick came to see her, she made up very interesting games for them to play together. She knew that Nick wanted to be a detective when he grew up so she often invented detective games for him.***

One day Nick went to visit his grandmother. She was very happy to see him and he was happy to be with her again. He had been wondering for several days what new game she would have for him when he arrived. He was very excited when she told him that she had prepared a detective game for him. She gave him a piece of paper with lots of dots on it just like the picture you see on the board.

Nick was puzzled by this picture because he had been expecting to receive a detective game from his grandmother. But she told him to be patient and that he would soon be surprised. First she said he should count the dots. How many dots are there?

S: ***Fourteen.***

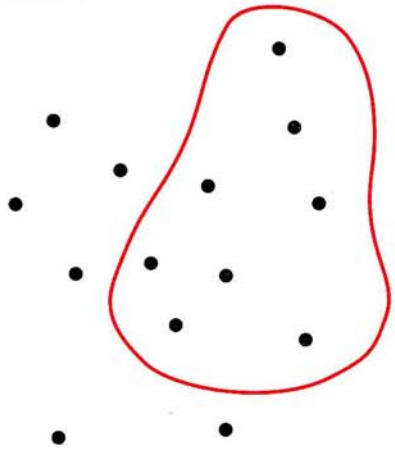
Ask a student to point to the dots and count aloud with the class, watching to be sure all of the dots are counted just once.

T: ***She told him the dots were for three rabbits, her charming black poodle, her three lovely cats, three plant bugs, a squirrel, herself, Nick, and Nick's nose. Then she asked him if he could tell her which dots were for which things.***

Make a list on the board of what the dots are for. Allow students to guess which dot is for which object, for example, which dot is for Nick's nose.

T: ***Of course it was not possible for Nick to know for sure which dot was for which thing. His grandmother told him he was going to have a chance to be a detective. She would give him some clues so that he could identify each dot. First she drew this red string.***

Draw a red string around eight of the dots you have drawn on the board.



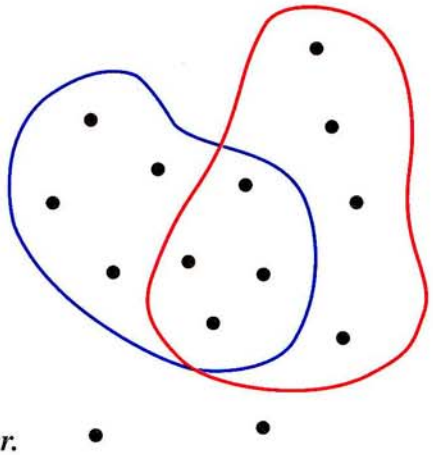
T: ***She told him that the dots inside the red string were for animals with four legs. Nick thought for a moment and then shouted that the dot for him must be outside the red string. Was he right?***

S: ***Yes, because he has only two legs.***

Discuss placement of the fourteen things. Decide that, indeed, eight things (three rabbits, the poodle, three cats, and the squirrel) are inside the red string and the other six (Nick, Nick's nose, grandmother, and three bugs) are outside the red string. Do not label the dots yet.

T: ***Nick's grandmother then asked if it was possible to know for sure which dot was for which thing. Was it now possible to locate Nick's nose? Nick thought and thought but could not think of any way to know which dot was the nose, so he asked his grandmother to give him a second clue.***

Draw a blue string as in this illustration. Draw carefully, so that there are eight dots in the blue string, and four of them are also in the red string.



T: ***His grandmother then drew this blue string and told him that the blue string was for all things that were able to climb trees. She also told Nick that as a young girl she could climb trees, but no longer.***

Nick was a great tree climber so surely he was in the blue string. What do you think about those two dots that are outside of both strings? Nick was sure he knew something about them.

S: ***One is for Nick's nose and one is for Nick's grandmother.***

T: ***How are you sure?***

S: ***Well, Nick's nose doesn't climb a tree (not by itself) and Nick's grandmother said she cannot climb trees. Also, they do not have four legs.***

T: ***But which is which?***

Again, discuss placement of the fourteen things. Consider particular objects and decide where they must be—the cats, for example, must be in the middle because they have four legs and climb trees. Or point to a dot and ask what it could be for. In doing so, the class should note both placement of the fourteen things and the four distinct regions of the picture. Further, they should realize that they still do not know exactly which dot is for which thing.

T: ***Now Nick's grandmother was ready to give the final clue. After this clue all the dots will be known. Let's see how good a detective you are.***

Draw a green string as in the next illustration. Be careful that you have the correct number of dots in each region of your picture.

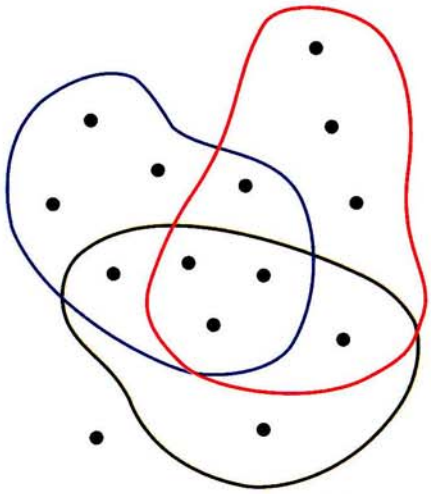
T: ***She drew this green string and told Nick it was for all things that like to eat meat.***

Nick became very excited. He loved hamburgers, so now he could find the dot for himself. Where is Nick?

S: ***There*** (pointing to the only dot inside both the green and blue string but outside the red one).

T: ***Explain your answer.***

S: ***Nick eats meat and can climb trees but does not have four legs. So Nick is in the green string and also in the blue string, but he is outside the red string. This has to be Nick because it's the only dot there.***



Label the dot Nick.

T: ***Very good. Now, Nick's grandmother also likes hamburgers so where is she?***

S: ***She must be there*** (pointing to the dot inside the green string but outside both the red and blue strings).

T: ***Why?***

S: ***Because she eats meat but cannot climb trees and does not have four legs. And there is only one dot inside the green string and outside both the red and blue strings.***

T: ***Good thinking. I will label this dot so we will remember it's Nick's grandmother.***

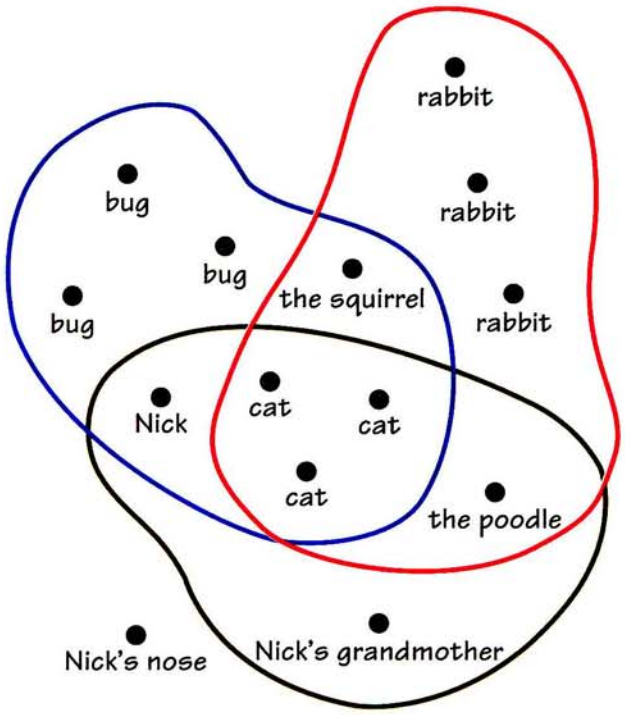
You should now have two of the fourteen dots labeled, one for Nick and one for his grandmother.

T: ***The three lovely cats also love meat as most cats do. Who can locate the three cats?***

S: ***There*** (pointing to the three dots in the middle), ***because we already know cats have four legs and can climb trees.***

T: ***And the poodle likes meat too. So now you should be able to finish the problem completely. Where are the rabbits, the squirrel, the poodle, the bugs, and Nick's nose?***

Choose different students to locate the nose, the poodle, the bugs, the rabbits, and the squirrel. Ask students to explain their answers. After a correct answer, label the appropriate dot(s). The final picture will have all the dots labeled.



T: ***Nick was very proud of his successful detective work and you should be proud of yourselves also. This was a problem that could only be solved by careful thinking.***

Let students look at the pictures and read the storybook on their own.

Writing Activity

Students or student partners may enjoy writing their own classification stories. This is a good activity for a "Writing Workshop" or a special project.

THE HAPPY PUPPET

Capsule Lesson Summary

Read the storybook *The Happy Puppet* and invent new stories about the various string pictures and arrow pictures in the book. This storybook involves the reader in using the mathematical languages of strings and arrows to record a variety of real and make-believe events.

Description of Lesson

Sometime before this lesson begins, read the *The Happy Puppet* on your own. Also read the comment by Edward Martin on the last page of the storybook. While doing this, think about the various situations and how your students might react to them. Feel free to bring your imagination, your experience, and your general familiarity with the interests and concerns of your students to bear on the lesson. This lesson description simply provides some suggestions on how students might react and on how you might prompt creative thinking.

In order to create the right climate for the fanciful adventures of *The Happy Puppet*, the story should not be read too slowly. Students should have an opportunity to look at the pictures and to answer the questions by pointing to dots or to parts of the realistic drawings, or by telling their own stories. Allow spontaneous reaction and expression of feeling about *The Happy Puppet*.

Pages 1 and 2

Read both pages to the class. Encourage discussion about what a hand-puppet is and how one might use hand-puppets to tell make-believe stories. On page 2 there are many interesting pictures about which students may wish to comment. Simply ask what they see and you will get a variety of responses.

S: ***I see lots of arrows and some loops.***

S: ***I see +, x and ÷.***

S: ***I see 44 + 44 and 88, and they are the same.***

S: ***Also, 11 + 11 + 11 + 11 + 11 + 11 + 11 + 11 = 88.***

S: ***88 is on the Minicomputer flags.***

Pages 3 and 4

Read both pages to the class. Let students comment on the changing interpretation of the eight dots and perhaps give some new interpretations of their own. Be sure to note how there are always eight dots; the number of dots does not change even though the interpretation may.

Students might not be familiar with the word *jubilant*. Discuss its meaning and how it fits the Happy Puppet's game.

Pages 5 and 6

Read both pages collectively, pausing to allow students to answer the questions. Ask students to locate the different cars in the string picture. After some discussion of this situation, encourage students to invent their own stories about the string picture. Let the class discuss whether a student's story fits the picture. You may find it helpful to draw the picture on page 5 on the board during this discussion.

Pages 7 and 8

Read both pages, pausing to allow students to point to appropriate dots and to answer the questions. In each situation, discuss the meaning of the red arrows. You may like to draw the picture on the board and let the class make up other stories for the picture.

Pages 9 and 10

Read and discuss pages 9 and 10. Encourage students to tell their own stories about the arrow picture. Do not expect clearly stated stories that fit the picture exactly, but do encourage the class to check whether a story does fit the picture.

Pages 11 and 12

Read these pages collectively, pausing to ask students to point to appropriate dots and answer the questions. After reading page 12, ask students to show where the various toys are in the string picture.

Pages 13 and 14

Read these pages collectively. There are no string or arrow pictures to be investigated on these pages.

Give students a copy of the puppet picture to color and to use to tell their own stories. They may also enjoy copying or drawing their own string and arrow pictures. The puppet and the pictures can go home with students who might like to tell their families about *The Happy Puppet*.

THE HAPPY PUPPET - Blackline

Capsule Lesson Summary

Read the storybook *The Magic Box* and discover where the main character is in an arrow picture for a valentine story. Find several of his friends in the picture based on clues given in the story.

Description of Lesson

Sometime before this lesson begins, read *The Magic Box* on your own. Also, read the comment by Ann Karmos on the last page of the storybook. While doing this, think about the various situations and how your students might react to them. Feel free to bring your imagination, your experience, and your general familiarity with the interests and concerns of your students to bear on the lesson. This lesson description simply provides some suggestions on how students might react and on how you might prompt their thinking.

Pages 1–6

Encourage discussion about the boy's games or about other games he could invent. Let students comment on the many adventures one can have with a big box.

Pages 7 and 8

After reading these pages, let students suggest valentine stories for the arrow picture on page 8. You may want to draw this arrow picture on the board.

Pages 9 and 10

Let students talk about sending and receiving valentines. If this lesson is close to Valentine's day, the topic will be especially interesting.

Let students comment on some of the situations illustrated in the arrow picture. For example, a student may note the red loop means a person sent a valentine to himself (or herself). There are several places in the picture where two people sent valentines to each other. One person sent no valentines; two people received no valentines.

Encourage students to find the little boy (he received the most valentines) and his friends (the ones to whom he sent valentines).

Pages 11 and12

Let students answer the question on page 12 as well as discuss any other idea of interest to them.

Pages 13 and 14

Here there are a few other children to find in the arrow picture based on the little boy's descriptions of them.

Suggest that students tell a valentine story about their own family and/or about some of their friends by drawing an arrow picture.

SUMMER SCHOOL IN THE OLD DAYS

Capsule Lesson Summary

Read the storybook *Summer School in the Old Days* and discuss the illustrations in it.

Description of Lesson

Read the storybook *Summer School in the Old Days* with your class as you would read any other story. You may wish to read it aloud yourself or ask students to read it aloud. Most of the content of this storybook is presented in the illustrations, so it is important that students have time to look at the pictures and to comment on them. Frequently ask students to describe what they see on a particular page of the storybook. The following suggestions as well as the text of the storybook will help you to guide the discussion of the illustrations.

Pages 3–7

Ask students how many sticks each of the numbers pictured is carrying and how the sticks are grouped. Emphasize that some sticks are loose and some sticks are bundled in tens and in hundreds. For example, 354 is carrying three bundles with 100 sticks, five bundles with 10 sticks, and four loose sticks.

Pages 8–11

Ask students to suggest number sentences for each of the presentations by 12 and 45. Record the number sentences on the board.

Pages 12 and 13

Determine the number of sticks the children stole from 74; then ask how many sticks 74 has left. Encourage students to calculate this number rather than counting the sticks in the picture.

Pages 14–17

Ask students to comment on the way 74 has arranged the sticks and to notice how the new sticks are stored. Discuss how 74 might arrange the new sticks which 0 has brought. Emphasize that 74 is 7 tens and 4 ones.

Pages 18–21

Ask students what the flag of the World of Numbers looks like. (A Minicomputer) Notice any other Minicomputers in the pictures, and ask what numbers are displayed when there are checkers on them.

Page 22 and 23

Encourage students to explain why the numbers no longer carry any sticks and why 0 does not carry a bag of checkers.

Page 24–27

Ask students to suggest a number sentence for each of the presentations by 9.

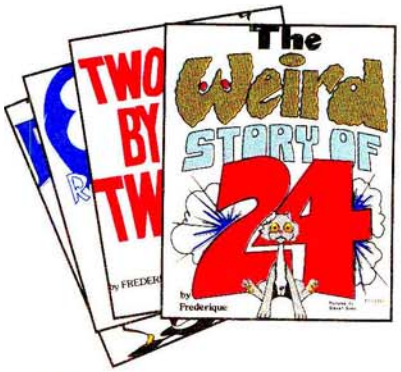
Invite students to explain why the number 357 is on the Minicomputer in each of the three presentations on pages 26 and 27.

Pages 28–32

Encourage students to think about what 0 did with the red and the blue checkers on page 32.

Writing Activity

Invite students to write a story of their own about the numbers.



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