Literacy Enrichment and Academic Readiness for Newcomers (LEARN)

CURRICULUM GUIDE
LEARN-1 MATHEMATICS

Newfoundland Labrador
Education

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INTRODUCTION

Rationale

This Mathematics curriculum, referred to as LEARN-1 Math, has been designed for a specific student population – those students who have entered our school system from other countries where they have had minimum or no prior formal instruction in the area of mathematics. These students need to improve their math skills before they can meet success in the provincial mathematics curriculum.

The LEARN program is designed for students who have major gaps in literacy and numeracy achievement. Placement in the program is based solely on the student's individual skill level, **not** chronological age or grade placement in our school system. Multi-age and multi-level LEARN classes are to be expected.

LEARN-1 Mathematics may be offered to students who are age appropriate for grade 3 or higher. It is intended to prepare these students to enter the regular mathematics program in an age appropriate grade or to continue to LEARN-2 Mathematics whenever they master the LEARN-1 Mathematics outcomes.[1]

This course is comprised of **four strands**: 1) **Number, 2) Patterns and Relations, 3) Shape and Space (Measurement; 3D objects/2D shapes), and 4) Statistics and Probability (Data Analysis; Chance and Uncertainty).** These strands are the same as those found in the Provincial Mathematics curriculum currently implemented in our province's school. Within each strand of LEARN-1 Mathematics, outcomes are presented in sequential order, beginning at a Kindergarten level and moving through grades 1, 2, 3, 4 and 5. It should be noted here that although the outcomes are presented by grade, they are not all necessarily consistent with those outcomes found within the provincial curriculum guide. There is an increased emphasis in the LEARN-1 Mathematics curriculum on functional skills required by older students. However, the sequence of most main concepts is consistent with those found in the provincial mathematics curriculum.

Students enrolled in LEARN-1 Mathematics should work through the specific outcomes at their own pace and depending on their skill levels in various strands. For example, they may need to work at the grade 1 level in the Number strand, but be ready to cope with the grade 2 specific outcomes in the Shape and Space strand. This program needs to be used in this flexible manner.

[1] For the purpose of this document, an age appropriate grade refers to a grade no more than two grades lower than would normally be the case in the Newfoundland and Labrador school system.

The LEARN Program Components

The LEARN Program is developed to meet the academic needs of immigrant students with major gaps in literacy and numeracy achievement. These gaps are generally due to a lack of formal schooling.

LEARN-1 consists of two courses, LEARN-1 Language Arts: Basic Literacy and LEARN-1 Mathematics. There is no time frame for these courses but it is recommended that a student enrolled in LEARN-1 should spend at least one hour per day on each of these subjects. At this rate the beginner student, functioning at a K-1 level on entry into the program, should complete LEARN-1 in two academic years. The course descriptions are as follows:

- LEARN-1 Language Arts: Basic Literacy: a non-credit basic literacy course aiming to bring the student to a transitional reading level. Emphasis is on both academic and life skills reading and writing.
- LEARN-1 Mathematics: a non-credit course aimed to bring a student up to a grade 6 math level. Emphasis is on both academic and practical life skills mathematics.

LEARN-2 consists of four high school academic enabling courses:

- LEARN-2 Language Arts 701270: a 110 hour academic enabling course that builds skills and strategies for further high school studies in literature and language arts.
- LEARN-2 Mathematics: a non-credit course that covers intermediate outcomes and prepares students for high school mathematics.
- LEARN-2 Social Studies 701172: a 110 hour academic enabling course for further high school social studies. This course focuses on development of literacy skills and strategies within the context of Canadian social studies.
- LEARN-2 Science 701177: a 110 hour academic enabling course for further high school studies in science. This course focuses on the development of science literacy, skills and strategies within the context of earth science, life science and physical science.

Statement of Philosophy

This curriculum document is based on three strong beliefs, which have evolved after many years of research, experience and practice in the field of early learning development.

1. Learners are **individuals** who bring strengths, challenges and prior knowledge and experiences to the learning environment. This is regardless of age, cultural background and native tongue. Therefore, mathematics instruction must allow for and foster these individual characteristics, while building mathematical skill.
2. Learning is most likely to occur in meaningful, personally relevant contexts and environments. Achievement is maximized when the learner sees a purpose in acquiring a particular set of skills. The acquisition of functional math skills, as well as academic skills, is especially crucial in this LEARN-1 Mathematics curriculum.
3. Mathematics skills are best learned when students have many opportunities to use hands-on, concrete and visual materials and activities to learn new concepts. Only then will students be ready for abstract and then symbolic activities and processes.

Using Calculators

The use of calculators is not recommended with LEARN-1 Mathematics students in elementary and intermediate schools.

At the senior high school level calculators may be used as indicated in the curriculum document. Students must be expected to develop mathematical skills and reasoning, and some rote memory of facts; however, high school students may be taught how to use calculators as a necessary life skill or to check their answers.

Inquiry Based Learning

Students learn by exploring, creating and problem solving. In an effort to develop independent thinking and problem solving strategies students must be expected to pose questions, make predictions and find answers. Students need to develop the confidence and skills to become discoverers of information and problem solvers. Student will find that they have a lot to bring to the learning process and are able to learn both independently and cooperatively by using the analytical skills they are developing.

Games and Active Learning

Students learn by doing. Students can create flashcards, number cards and word cards and use them for their own learning or with a partner. Math games and competitions can help students reach outcomes in a relaxing and fun atmosphere. Active learning is engaging and motivating and develops lasting results. The key to success is in knowing what outcomes are being achieved in each case and ensuring that all activities are challenging and will develop needed skills.

Differentiated Instruction

Differentiated instruction is a teacher's response to learners' needs. It is likely that the LEARN classroom will have students of different reading and numeracy levels working side by side. Differentiated instructional strategies can help with effective planning, delivery and assessment in this diverse classroom. The teacher will use a variety of strategies and tools to differentiate instruction. Regardless of the specific combination of strategies and techniques used, there are several key elements of differentiated learning environments.

Content (what we teach), Process (how we teach) and Product (what we assess) can all be differentiated to meet the learning needs in diverse classrooms. Each activity that a student is involved in is chosen to contribute to reaching outcomes appropriate to the student's stage of achievement. In each case, the

teacher must judge how best to help the particular student progress. Not all students need to follow the same path to reach outcomes. Specific outcomes may vary from student to student at any time.

Differentiated instruction is guided by the general principles of respectful tasks, flexible grouping and ongoing assessment and adjustment.

Integrating Literacy and Numeracy

Students have been selected for the LEARN program based on their need for literacy and numeracy upgrading. Most are ESL students. Literacy, including reading, writing, speaking and listening, should be integrated with numeracy development. In the LEARN-1 Mathematics curriculum there are many opportunities to link literacy and numeracy, such as:

- Interactive read aloud of children's stories related to counting, patterns, shapes and number problems.[2]
- Keeping a math journal.[3]
- Creating classroom resources, such as word cards related to math, posters, charts, etc.
- Creating calendars.
- Reading word problems.
- Creating and writing word problems.
- Representing word problems visually (drawing).
- Reading simple word problems aloud for classmates to solve.
- Reading instructions.
- Using shopping flyers to create real life budgets, math word problems, and calculations.
- Working with real life forms and texts involving numeracy and literacy skills (e.g. phone bills, shopping flyers, receipts).
- Developing math skills through software and websites that involve reading.
- Articulating the steps to solving a math problem.
- Explaining to a partner how to solve a problem (Using either the first language (L1) or English).

Strategies for Working with ESL Students

Like learning a first language (L1), learning a second language (L2) is a developmental process, usually beginning with a silent period, during which time learners are building receptive language before they are ready to speak. Research has found evidence that the sequence of learning an L2 is very similar to the sequence of learning an L1. For example, people normally begin to acquire present tense forms before past tense forms, statement forms before question forms and, generally speaking, words that hold the most meaning, such as nouns and verbs, before articles and prepositions.

Language development follows a continuum and the key is to expose students to the language that they are ready to absorb. When we speak to beginning language learners we should speak in complete, simple sentences, not mimicking "broken" English. ESL students need to hear clear, standard language that they can understand and gradually acquire.

While a student may acquire day-to-day conversational English relatively quickly, it takes several years and structured ESL training for students to acquire the level of language needed to reach their potential in academic studies. Acquisition of English may be influenced by the student's L1. Some students tend to pick up English sounds, grammar and sentence structures more quickly than others. The challenges vary from student to student depending on the L1 and other factors such as age, motivation, confidence and attitude. A student who is literate in another language will benefit from transference of literacy skills; however, students in the LEARN program have limited literacy skills in any language. They will need time and guidance to develop both content and literacy skills.

[2] Many children's books related to math themes are available at the MUN curriculum centre and at the NL Public Libraries. Some are appropriate for adolescents.

[3] The student reflects on what was learned each day, may give examples or ask questions for further investigation. The journal can be written during the last 5 minutes of math class each day. Teachers can model entries to get students started.

All students can learn an additional language. This happens best in a non-threatening, comfortable environment where risk-taking is encouraged and emphasis is primarily placed on communication and secondarily on language form.

ESL students will learn English in much the same way that they learned their first language, over time, through exposure to comprehensible input, through meaningful interaction with people who speak the language and as they need it. The teacher's guidance along the way will help students to reach their potential both in content area understanding and in language development.

The following strategies are suggested:

Classroom Routines

- Gradually introduce and reinforce classroom routines and appropriate school behaviour.
- Print and explain homework assignments clearly and consider the time and resources needed to complete the assigned work; it may take ESL learners much longer to complete certain tasks and/or language tasks may need to be simplified.
- Allow the student a silent period, a period of up to several months to listen and build receptive vocabulary before being expected to speak. Give time for the student to build confidence and familiarity with the sounds of English.
- When the student does speak, use diplomacy in understanding what was said. Do not correct pronunciation or ask for restatement unless you cannot understand what was said. Focus on meaning, not pronunciation or grammar, in spoken language.
- Allow wait time for the student to formulate answers.
- Keep in mind that functioning all day in a second language can be tiring. Give breaks and extended time for completion of work.

Making language and content comprehensible and accessible

- At the beginning of each lesson, provide a clear overview of what will be covered and the expected outcomes or assignments.
- Relate content to the student's background knowledge and personal experience when possible, but tread lightly around sensitive issues.
- Print keywords, page numbers and other important information on the board.
- Print clearly rather than use cursive writing.
- Incorporate demonstrations, models and visuals, such as gestures, props, graphic organizers and charts, to explain or reinforce key ideas.
- Provide models of homework assignments, projects, presentations, test items.
- Monitor teacher talk—avoid slang and colloquial expressions or introduce them gradually in context; speak clearly in simple, plain language, using a normal tone and rate of speed or slightly slower. Enunciate clearly.
- Focus on vocabulary. Consider directing students to new vocabulary and asking them to try to figure out meanings in context before direct teaching or providing a definition.
- Recycle new words and key words. Be sure to repeat the words in several contexts.
- Provide meaningful hands-on activities in class to integrate lesson content.
- Provide meaningful exercises or activities that explicitly teach or reinforce the key vocabulary.
- Check for comprehension—use questions that require one word answers, props, and gestures. Encourage students to ask teachers or other students for clarification. Beware; the question, "Do you understand?" is often not answered accurately.
- Allow frequent opportunity for interaction and explanation. If the ESL student has a classmate with the same L1, allow them to discuss and help each other understand the content, using the L1 if they choose.
- Be available for extra support.

Peer Support

- Assign peers who have good communication skills to work with the student.
- Have a classmate ensure that the beginner ESL student is following instructions.

Self-Help and Autonomous Learning

- Encourage student self-assessment; for example, editing written work, correcting errors and highlighting suspected errors.
- Correct errors in grammar and spelling sparingly. Circle errors that you think the student can self-correct and check to ensure that the self-corrections are done.
- Encourage the student to use strategies for language learning, such as noting new words in a text, and guessing meaning before checking a dictionary.[4]
- Encourage students to take ownership of their studies; for example, when they have finished an assigned task they should review their work, continue to the next task or read silently. Ensure that appropriate reading materials and activities are available.
- Set up a computer centre with appropriate software or websites bookmarked.
- Set up a listening centre with books and audio recordings.
- Provide simple resources that the student can read independently and that address topics studied in the content areas.

[4] Seek more tips on language learning strategies from an ESL teacher.

Essential Graduation Learnings

Graduates from the public schools of Atlantic Canada are expected to demonstrate knowledge, skills, and attitudes in the following essential Graduation Learnings:

Aesthetic Expression
Graduates will be able to respond with critical awareness to various forms of the arts and be able to express themselves through the arts.

Citizenship
Graduates will be able to assess social, cultural, economic, and environmental interdependence in a local and global context.

Communication
Graduates will be able to use the listening, viewing, speaking, reading and writing modes of language as well as mathematical and scientific concepts and symbols to think, learn, and communicate effectively.

Personal Development
Graduates will be able to continue to learn and to pursue an active, healthy lifestyle.

Problem Solving
Graduates will be able to use the strategies and processes needed to solve a wide variety of problems, including those requiring language, mathematical, and scientific concepts.

Technical Competence
Graduates will be able to use a variety of technologies, demonstrate an understanding of technological applications, and apply appropriate technologies for solving problems.

Spiritual and Moral Development
Graduates will demonstrate understanding and appreciation for the place of belief systems in shaping the development of moral values and ethical conduct.

CURRICULUM OUTCOMES

There are four General Curriculum Outcomes:

1. Students will develop number sense.
2. Students will use patterns to describe the world and solve problems.
3. Students will use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes and analyze the relationships among 3D objects and 2D shapes.
4. Students will collect, display and analyze data to solve problems; use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

Outcomes for each of these strands have been further detailed in the Specific Curriculum Outcomes.

The Specific Curriculum Outcomes are cross-referenced with the current (2010) provincial curriculum outcomes. For further elaboration and suggestions for teaching, refer to the provincial mathematics curriculum guides. The code at the end of each specific outcome indicates the grade level, strand and outcome number in the provincial prescribed curriculum.

Specific Outcomes for the LEARN-1 Mathematics course have been selected to ensure that the student has the essential skills and knowledge to continue math studies at an intermediate level as well as basic functional math skills for everyday life.

STRAND: Number

Students will develop number sense.

Specific Outcomes	***Elaboration - Instructional Strategies/Suggestions***
1. Rote-count to 10 (forward, backward). [KN1] 2. Create sets of up to 10 objects. [KN3] 3. Count sets of up to 10 objects using 1:1 correspondence. [KN3] 4. Read numbers 0-10 when presented randomly. [KN1] 5. Print numbers 0-10 in sequence. [1N1] 6. Print numbers 0-10 when presented in random order. [1N1] 7. Determine which group (of up to 10 objects) has more, which has less/fewer, and whether the groups are equal. [KN5] 8. Count the results when two small sets are combined (up to a sum of 10) and give the associated addition sentence. [1N9] 9. Count the results when a small group is separated from a set of up to 10 objects and give the associated subtraction sentence. [1N9] 10. Use correct mathematical language to represent addition and subtraction (*add, plus, subtract, minus*, *equals*) and associated symbols. [1N9]	• USE MANIPULATIVES, VISUAL REPRESENTATIONS (PICTURES, CHARTS) AND SYMBOLS, **IN THAT ORDER**, TO TEACH NUMBER AND PLACE VALUE CONCEPTS. • Always use concrete and visual supports to teach number words and concepts (sets of objects – blocks, buttons, pennies, bread bag tags, etc.–along with labelled numeral cards). • Students memorize phone numbers, including their own. • Provide lots of opportunities to count many sets of items, including the students' own belongings – pencils, buttons on shirts, fingers, and the shapes learned in the Shape and Space strand of this program. • Display the mathematical terms ("count", "more", "equal", "add", "subtract", "plus", "minus") being taught as the students work with the concepts. Have the terms printed on index cards and refer to them during lessons. • Students create word cards with numbers and mathematical terms. Students make a number wall with numbers and number words from 1-100 displayed in order. • Using word cards, students create sentences such as: *Three is more than two, Two plus five equals seven,* etc. • Use the 5- and 10-frame to provide students with benchmarks with which to relate numbers. As they learn and internalize the values of 5 and 10, subsequent number concepts are easier to grasp. • Students make picture collages of sets of items and cut out the associated numerals from newspapers, catalogues or store flyers. • For younger students, reinforce number concepts using children's stories related to number.

STRAND: *Number*
Students will develop number sense

Assessment Tasks

1. Count orally to and from 10 and name the number that comes before and after a given number (up to 10).
2. Display a set of counters of a given number (up to 10) OR hold up the appropriate number of fingers for a given numeral.
3. Touch-count a set of counters of a given number (up to 10).
4. Identify the number randomly shown on a numeral card (0 to 10) or pointed to by the teacher.
5. Print numbers 0 to 10 in order, when presented orally.
6. Print numbers 0 to 10 in random order, when presented orally.
7. Construct a set to show more than, fewer than, or an equal number to a given number of up to 10 objects.
8. Count and combine two sets of objects, count the resulting set and give the addition equation orally and in writing.
9. Separate a smaller set from a larger set of objects and give the subtraction equation orally and in writing.
10. Use *add, plus, equals* orally and in symbol form to represent addition, and *subtract, minus, equals* orally and in symbol form to represent subtraction.

Suggested Resources

Text Support
Strengthening Math Skills – Addition and Subtraction (Unit 1, selected lessons)

Blackline Masters (Appendices)(dot arrangement cards, 5-frame, 10-frame, digit cards) (With instructions and demonstration have students create these.)

Additional materials required
- Variety of counters – coins, blocks, buttons, bread bag tags, etc.
- Abacus
- Collage materials – old magazines, glue, poster paper, scissors
- Relevant math games, card games
  - Snakes and Ladders
  - Addition Bingo
  - Chinese Checkers
  - Playing Cards
- Stacking Cups, blocks

Counting books such as:
- 🕮 *I Spy Two Eyes: Numbers in Art* by Lucy Micklethwait
- 🕮 *Count and See* by Tana Hoban
- 🕮 *Ten Sly Piranhas* by William Wise

STRAND: *Number*
Students will develop number sense.

Specific Outcomes	***Elaboration - Instructional Strategies/Suggestions***
11. Rote count to 100 (forward, backward). [1N1] 12. Read and print all numbers to 100, in sequence. [1N1] 13. Read and print all numbers to 100 in random order. [1N1] 14. Read number words to 10. [1N4] 15. Construct and count sets up to 50, using accurate 1:1 correspondence. [2N4] 16. Demonstrate an understanding of the ones and tens places in two-digit numbers (early base ten concepts). [2N7] 17. Model numbers to 50, using base ten materials, to show groups of ten and ones. [2N7] 18. Compare the values of two-digit numbers, up to 50 (more/less). [2N7] 19. Recall addition facts for sums up to 10. [1N9] 20. Recall related subtraction facts for sums up to 10. [1N9]	• USE MANIPULATIVES, VISUAL REPRESENTATIONS (PICTURES, CHARTS) AND SYMBOLS, **IN THAT ORDER**, TO TEACH NUMBER AND PLACE VALUE CONCEPTS. • Ten-frames, as well as base-ten materials, are best for teaching number in terms of groups of ten and ones. • Math games and card games that involve naming and adding numbers are strongly recommended to teach and reinforce these important early number sense concepts. They are highly motivating, easy to make, and provide opportunities for paired or small-group activities. (Check on religious convictions about playing cards.) • Provide opportunities for students to count objects around the classroom/school (books on a shelf, number of students in their class, etc). • A hundred chart should be available during all math lessons for frequent reference and as a teaching tool. Students can create their own smaller versions for use at home and in school. • Use computer websites to reinforce the recall of basic addition and subtraction facts (See Appendix 2). • Students make up addition and subtraction flash cards and number lines. • Students label a number line to relay information (e.g. family members or classmates according to age), DS Games are popular and develop math skills as well as fine motor co-ordination. DS games may be able to be obtained second hand.

STRAND: *Number*
Students will develop number sense.

Assessment Tasks

11. Count orally to and from 100 and name the number that comes before and after a given number, to 100.
12. Identify the number shown on a numeral card (0 to 100). Print numbers 0 to 100, in order, when presented orally.
13. Identify the number shown, in random order, on a numeral card (0 to 100). Print numbers 0 to 100, in random order, when presented orally
14. Read all number words from zero to ten.
15. Construct and count sets up to 50, using accurate 1:1 correspondence.
16. Identify ones, tens places in 2-digit numbers (up to 50).
17. Use rods and units to display a given 2-digit number (up to 50) in at least 3 ways.
18. Indicate the larger (or smaller) of two 2-digit numbers (up to 50).
19. Recall sums for addition facts with sums to 10.
20. Recall differences for related subtraction facts.

Suggested Resources

Text Support
Spectrum Math, gr. 1 level, selected practice pages

Strengthening Math Skills – Addition and Subtraction (Unit 1, selected lessons)

Nimble with Numbers

Blackline Masters (Appendices)(hundred chart, numeral cards, 10-frame, place value charts)

Additional materials required
- 10-frame
- Variety of counters – coins, especially pennies, blocks, buttons, bread bag tags, etc.
- Base ten materials
- Hundred chart
- Number word cards (zero-ten)
- Addition/subtraction flash cards
- Relevant math games, card games
  - Addition/Subtraction Bingo
  - I Have/Who Has
  - Playing Cards
  - Cribbage Board

STRAND: *Number*
Students will develop number sense.

Specific Outcomes	***Elaboration - Instructional Strategies/Suggestions***
21. Skip-count by 2, 5, 10, from various starting points, with numbers up to 100. [2N1] 22. Demonstrate understanding of the hundreds place in a 3-digit number. [3N5] 23. Model numbers to 500, using base ten materials, to show groups of hundreds, tens and ones. [3N5] 24. Read and print all numbers to 500, in sequence and in random order. [3N1] 25. Demonstrate if a number (up to 100) is even or odd. [2N2] 26. Read number words to 20. [1N4] 27. Order 2-digit numbers by size (smallest to largest and vice versa). [2N5] 28. Solve simple word problems using one-digit numbers. [1N9] 29. Recall addition facts for sums to 18. [2N10] 30. Recall related subtraction facts for sums to 18. [2N10] 31. Add 3 1-digit numbers. [2N9]	• USE MANIPULATIVES, VISUAL REPRESENTATIONS (PICTURES, CHARTS) AND SYMBOLS, **IN THAT ORDER**, TO TEACH NUMBER AND PLACE VALUE CONCEPTS. • A colour coded hundred chart, with pockets and removable numeral cards will be helpful to teach the concepts at this stage. Use pairs work often to reinforce these number concepts with numbers to 100. Use color-coding to identify numbers on the chart as even or odd. • The board game “Snakes and Ladders” is an excellent way to strengthen number sense of numbers to 100. • Creating collections of 100 items can be a powerful learning experience. • Base-ten materials will play a **major** part in achieving the outcomes at this level. Students will need a lot of opportunities to use them. Dimes and pennies should also be used. • Skip counting can be done with pennies, nickels and dimes. • Display number words on the wall in the learning area for reference by the student. • Use flash cards, addition and subtraction Bingo games and other fun ways to teach and reinforce the basic facts. • With modelling, students can create simple word problems based on their real life experience. Students can exchange and solve problems.

STRAND: *Number*
Students will develop number sense.

Assessment Tasks

21. **Without referring to a 100 chart**, skip-count by 2, 5, 10, from various starting points, with numbers up to 100.
22. Identify the hundreds places in 3-digit numbers.
23. Use flats, rods and units to model a given 3-digit number (up to 500) in at least 3 ways.
24. Identify the number shown, in order and randomly, on a numeral card (0 to 500). Print numbers 0 to 500 in order and randomly.
25. Indicate whether a number (up to 100) is even or odd.
26. Read all number words from zero to twenty.
27. Sequence four 2-digit numbers by size (smallest to largest and vice versa).
28. Find the sum or difference for a one-step story problem (either oral or written, depending upon the literacy level of the student).
29. Recall sums for addition facts with sums to 18.
30. Recall differences for related subtraction facts.
31. Find the sum of 3 1-digit numbers.

Suggested Resources

Text Support
Spectrum Math, gr. 1, 2 levels, selected practice pages

Strengthening Math Skills – Addition and Subtraction (Unit 2, 3, selected lessons); Multiplication and Division (Units 1, 2, selected lessons); Fractions, Decimals and Percents (Unit 1, selected lessons)

Nimble with Numbers

Teacher's Supplementary Blackline Masters, (hundred chart, addition chart, place value chart, fraction circles, number cards 0-100)

Picture Books about shopping such as:
- 🕮 *The Shopping Basket* by John Burningham

Additional materials required
- Base ten materials
- Hundred chart
- Variety of counters including pennies, nickels and dimes.
- Addition/subtraction flash cards
- Relevant math games, card games
  - Snakes and Ladders
  - Addition/Subtraction Bingo
  - I Have/Who Has
  - Playing Cards

STRAND: *Number*
Students will develop number sense.

Specific Outcomes	***Elaboration - Instructional Strategies/Suggestions***
32. Add two 2-digit numbers, with/without regrouping. [2N9] 33. Subtract two 2-digit numbers, with/without regrouping. [2N9] 34. Demonstrate an understanding of multiplication as repeated addition. [3N11] 35. Demonstrate an understanding of division as equal sharing. [3N12] 36. Identify simple fractions (halves, thirds, fourths) using models, diagrams. [3N13] 37. Demonstrate an understanding of the thousands place in a 4-digit number. [4N1] 38. Model numbers to 1000 using base ten materials to show groups of thousands, hundreds, tens, ones. [4N1] 39. Read/print all numbers to 1000, in sequence and in random order. [4N1] 40. Skip-count by 2, 5, 10, from various starting points, with numbers up to 1000 (forward, backward). [3N1] 41. Read and write number words to 100. [2N4/3N2]	• Students will need a lot of opportunities to model and practice addition and subtraction of 2-digit numbers using base ten materials. • Use skip-counting and concrete materials to introduce multiplication. It makes the most sense when it is related directly to the previously-taught concept of addition. For example, have students make 4 groups of 2 blocks and skip-count by 2 to determine the total number. Use the addition sentence 2+2+2+2 = 8 and then teach how 4 **groups of** 2 becomes 4 **times** 2. • To teach the division concept at this stage, refrain from initially using the division symbol. It is important to first review the idea of equal sharing. Use blocks and other counters and ask students to divide them equally among each other. Then introduce the division symbol and equation, after much concrete practice. • Fractions can be a very abstract, challenging concept, even for students whose first language is English and who have been in school since Kindergarten. Use CONCRETE Materials to introduce and reinforce this concept. • Pizza and simple recipes can be used to reinforce fractions. • Use blank hundred charts for students to print the numbers from 101 to 1000. (See Appendix 3). The charts are also useful for skip-counting, shading number patterns and other related activities. • Play matching games with *number* cards and corresponding *number word* cards.

STRAND: *Number*
Students will develop number sense.

Assessment Tasks

32. Add two 2-digit numbers, with/without regrouping.
33. Subtract two 2-digit numbers, with/without regrouping.
34. Represent multiplication using equal grouping and arrays. For example, 3x5 can be shown using counters arranged in either 3 groups of 5 or in rows and columns (array) of 3 rows of 5.
35. Represent division using equal sharing. Use counters to show how a quantity has been equally divided among a specific number of places.
36. Cut or fold wholes (circles, rectangles) into equal halves, thirds and fourths.
37. Identify the thousands places in 4-digit numbers.
38. Use thousands cubes, flats, rods and units to model a given 4-digit number in at least 3 ways.
39. Identify a given number (0 to 1000), in order and randomly, on a numeral card (0 to 1000). Print numbers 0 to 1000 in random order when presented orally.
40. **Without referring to a 100 chart**, skip-count by 2, 5, 10, forward and backward from various starting points, with numbers up to 1000.
41. Read all number words to one hundred.

Suggested Resources

Text Support
Spectrum Math, gr. 2, 3 levels, selected practice pages

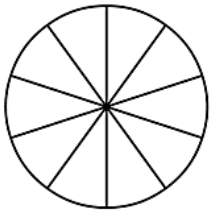
Strengthening Math Skills – Addition and Subtraction (Unit 3, selected lessons); Multiplication and Division (Units 1, 2, selected lessons); Fractions, Decimals and Percents (Units 1, 2 selected lessons)

Nimble with Numbers

Teacher's Supplementary Blackline Masters, (hundred chart, addition chart, place value chart, fraction circles, number cards 0-100)

Additional materials required
- Hundred chart
- Base ten materials
- Place value charts
- Number cards (2- and 3-digit cards)
- Number word cards (zero-hundred)
- Fractions manipulatives
- Multiplication flashcards
- Relevant math games
    - Multiplication Bingo
- Play pizza, cakes, pies that stick together with Velcro.
- Measuring cups, baking supplies

STRAND: *Number*
Students will develop number sense.

Specific Outcomes	***Elaboration - Instructional Strategies/Suggestions***
42. Compare the values of 3-digit numbers (more/less). [3N3] 43. Identify simple fractions (fifths, tenths) using models, diagrams. [4N8] 44. Demonstrate an understanding that ten equal parts (tenths) equals 1 whole. [4N8] 45. Extend the base ten system to model and record numbers involving tenths. [4N9] 46. Add two 3-digit numbers with and without regrouping. [3N9/4N3] 47. Subtract two 3-digit numbers with and without regrouping. [3N9/4N3] 48. Recall multiplication facts to 5x5. [3N11] 49. Use a calculator to solve simple computation problems using the four operations (sr. high only). 50. Demonstrate an understanding of numbers to 10 000. [4N1]	• Use a line of thick string or twine affixed to a bulletin board, clothespins and numbered cards and have students place 3-digit numbers on the line in the correct position in relation to other numbers. • Use fractions (tenths) to relate to decimals to the tenth place. Read 0.3 as **three tenths**, as well as reading it as a decimal ("decimal three" and "point three") to illustrate that the expressions have the same meaning. • Students make up their own set of flash cards with the multiplication facts to 5x5. Have them work in pairs to 'test' each other on their recall of the facts. Teach the students how to use a multiplication fact chart. • Create pie charts using tenths; students can follow teacher's instructions: "*There was a big group of people at the museum one day. Two tenths of the people were from China – Colour 2/10 of the pie red. Three tenths of the people were from India – Colour 3/10 blue, etc."* Students can make a legend to accompany the pie chart.  • Take the opportunity to talk about how different cultures/countries/groups have different ways of expressing numbers (10,000 or 10 000) as well as spellings (colour, color), pronunciations and dialects, etc. Different forms are acceptable and neither should be viewed as right or wrong.

STRAND: *Number*
Students will develop number sense.

Assessment Tasks

42. Indicate the larger (or smaller) of two 3-digit numbers.
43. Cut or fold wholes (squares, rectangles) into equal fifths and tenths.
44. Represent a given decimal (less than 1) using concrete materials or a diagram.
45. Represent a given number (up to 3 digits), which includes a decimal, using concrete materials or a diagram, and print the number accurately.
46. Add two 3-digit numbers, with/without regrouping.
47. Subtract two 3-digit numbers, with/without regrouping.
48. Recall products for multiplication facts up to 5x5.
49. Using the calculator, find the correct solutions to simple computation problems using the four operations. (sr. high only).
50. Indicate the meaning of each digit in a given numeral. Briefly explain the meaning of each digit in a given 4-digit numeral with all digits the same (i.e. What each digit means in 2222). Identify the missing numbers in an ordered sequence or on a number line.

Suggested Resources

Text Support

Spectrum Math, gr. 3, 4 levels, selected practice pages

Strengthening Math Skills – Multiplication and Division (Units 1, 2, 3 selected lessons); Fractions, Decimals and Percents (Units 1, 2 selected lessons)

Nimble with Numbers

Teacher's Supplementary Blackline Masters, (hundred chart, place value chart, multiplication table, fraction circles, number cards 0-100)

Additional materials required

- Hundred chart
- Base ten materials
- Place value charts
- String or twine, bulletin board, clothespins, number cards (2- and 3-digit cards)
- Number word cards (zero-hundred)
- Fractions manipulatives
- Multiplication, division and fractions flashcards
- Calculator
- Relevant math games
  - Multiplication Bingo

STRAND: *Number*
Students will develop number sense.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
51. Read and write numerals to 10 000. [4N1] 52. Read and write number words to 1000. [4N1] 53. Compare and order numbers up to 10 000. [4N2] 54. Represent and describe numbers to 10 000 in a variety of ways. {4N1] 55. Round numbers to the nearest 1000. [5N2] 56. Extend the base ten system to model and record numbers involving hundredths. [4N9] 57. Relate proper fractions to decimals (tenths, hundredths) [4N10] 58. Add two 4-digit numbers with and without regrouping. [4N3] 59. Subtract two 4-digit numbers with and without regrouping. [4N3] 60. Recall multiplication and division facts to a product of 81. [4N5] 61. Demonstrate the process of multiplication by solving 3-digit x 1-digit equations. [4N6] 62. Demonstrate the process of division by solving 2-digit divided by 1-digit equations. [4N7] 63. Use a calculator to verify solutions to multiplication and division problems (sr. high only). [6N2]	• Use base ten materials and a place value chart to have students represent numbers to 10 000 in several ways. • Students order number cards (e.g. 6183, 5989, 7218, 6620) from least to greatest and vice versa and place them on a number line in relative position. • Pairs of students make challenging number cards for each other to sequence. • Use digit cards from 0 to 9. Pick any four cards. Make the smallest and the largest possible 4-digit numbers. Make three more 4-digit numbers and order them from smallest to largest. • Use menus and shopping flyers to plan a meal and a shopping list, sticking to a budget. • Relate proper fractions to decimals using manipulatives, diagrams and symbols. Let the base-ten flat represent one whole square. Use centimetre cubes to build a one-layer shape that is less than one whole square. Record your shape on cm grid paper. Write a fraction and a decimal to tell how much of the square is covered by your shape, or not covered by your shape. • Use fractions and decimals flash cards to play matching games. • Students use a multiplication table to find two numbers with a particular product, and whole numbers that divide evenly into a particular number. • Students use a calculator to find two numbers whose product is a particular number (sr. high only). • Students use a calculator to find whole numbers that divide evenly into a particular number (sr. high only).

STRAND: *Number*
Students will develop number sense.

Assessment Tasks

51. Identify the number shown, in order and randomly, (0 to 10 000). Print numbers 0 to 10 000 when presented in random order.
52. Read/write all number words to one thousand.
53. Sequence three 4-digit numerals by size (smallest to largest and vice versa). Explain the order, making reference to the place values of each digit.
54. Identify the ten thousands place in 5-digit numbers. Represent a given numeral using a place value chart or diagrams.
55. Indicate the multiple of 1000 that is nearest to a given 4-digit number. (i.e. 3125 is closest to 3000, as opposed to 4000).
56. Represent a given number (up to 4 digits), which includes a decimal to the hundredths place, using concrete materials or a diagram, and print the number accurately.
57. Read decimals as fractions (i.e. 0.5 is zero and five tenths). Express orally or in writing a given fraction with a denominator of 10 or 100 as a decimal. Express a given pictorial or concrete representation as a fraction or a decimal (i.e. 15 shaded squares on a hundred grid can be expressed as 0.15 or 15/100).
58. Add two 4-digit numbers, with/without regrouping.
59. Subtract two 4-digit numbers, with/without regrouping.
60. Recall multiplication facts up to 9x9.
61. Multiply a 3-digit and a 1-digit number correctly.
62. Divide a 2-digit number by a 1-digit number, with and without a remainder.
63. Using the calculator, verify the solutions to multiplication and division equations using numbers of up to 3 digits (sr. high only).

Suggested Resources

Text Support
Spectrum Math, gr. 4, selected practice pages

Strengthening Math Skills – Multiplication and Division (Units 3, selected lessons); Fractions, Decimals and Percents (Units 2 selected lessons)

Nimble with Numbers

Canadian Money Activity Book – Selected practice pages

Teacher's Supplementary Blackline Masters, (hundred chart, place value chart, multiplication table, fraction circles)

Additional materials required
- Hundred chart
- Base ten materials
- Place value charts
- Digit cards (0-9)
- Fractions manipulatives
- Multiplication, division, fractions, and decimals flashcards
- Calculator
- Relevant math games
  - Multiplication Bingo
  - Division Bingo
- Menus
- Grocery flyers

STRAND: *Number*
Students will develop number sense.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
64. Choose correct operation (add., subt., mult. or division) to solve 2-step word problems. [4N3] 65. Add and subtract decimals to the hundredths place, using base-10 materials, then diagrams and symbols. [4N11] 66. Read and write numerals to 1 000 000. [5N1] 67. Compare/order whole numbers to 1 000 000. [5N1] 68. Represent and describe proper fractions. [4N8] 69. Demonstrate and describe equivalent proper fractions. [5N7] 70. Compare and order proper fractions and decimals to thousandths. [5N10] 71. Relate decimals to fractions (to thousandths). [5N9] 72. Add and subtract decimals to the thousandths place. [5N11] 73. Demonstrate the process of multiplication by solving 3-digit x 2-digit equations. [5N5] 74. Demonstrate the process of division by solving 3-digit divided by 1-digit equations. [5N6]	• Show how you can solve the following problem, using base-10 blocks. 'Sam had a roll of paper 4.2 m long. After he cut off a piece to make a banner, there were 2.5 m left on the roll. How long was the piece cut off?' Other problems using decimals can be created and presented. Use students' real names and possible real life problems in demonstrations. • Students count their money at the beginning of the day and again after lunch. Use subtraction to figure out how much they've spent. • Using bills and coins money set, students role play buying items in a store. Students can prepare by putting price tags on items. • Continue to use base-10 materials to teach place value concepts at this level. • Scan the newspaper for several different numbers. Have at least one number close to 1 000 000 and at least two numbers less than one. Highlight the numbers and arrange the clippings in order, according to the size of the number involved. Rewrite numerals in words and vice versa. Students show how each number might be represented with base-ten materials or fraction pieces. • Students measure amounts of water (1/2 cup, 2/3 cup, 100ml, into clear glasses, label the glasses and arrange them from largest to smallest. • Baking, following a recipe, is helpful. • Use segmented fraction circles to identify and compare fractions. Students arrange several fractions in order of increasing size – 5/6, 2/3, 3/8, 2/4. • Use fractions and decimals flash cards to play matching games. • Use 'greater than', 'less than' or 'equal to' symbols to show how these are related – ¼ > 0.2; 0.61 > 0.16. • Use index cards on desks or posters in the classroom to display the algorithms (series of steps) for multiplying and dividing multiple-digit whole numbers. • Students create a collage of what they would buy for $1 000 000. (Real estate, automobile and furniture flyers can be used for large numbers.)

STRAND: *Number*
Students will develop number sense.

Assessment Tasks

64. Use the correct operation (add., subt., mult. or division) to solve two-step word problems involving numbers with at least 2 digits.
65. Add and subtract decimals to the hundredths place, with and without regrouping.
66. Identify the number shown, in order and randomly, on a numeral card to 1 000 000. Print numbers to 1 000 000 when presented orally in random order.
67. Sequence five 5- and 6-digit numerals by size (smallest to largest and vice versa). Briefly explain the order by making reference to the place values of each digit.
68. Briefly define a **proper** fraction and illustrate or represent using concrete materials or a diagram.
69. Generate a set of equivalent fractions and briefly explain why there are many equivalent fractions for any given fraction, using concrete materials.
70. Position a given set of **fractions** with like and unlike denominators on a number line and briefly justify the order. Order a given set of **decimals**, including thousandths, and explain the order by making reference to the place values of each digit.
71. Write a given decimal in fraction form. Write a given fraction with a denominator of 10, 100 or 1000 as a decimal.
72. Add and subtract decimals to the thousandths place, with and without regrouping.
73. Multiply a 3-digit and a 2-digit number correctly.
74. Divide a 3-digit number by a 1-digit number, with and without a remainder.

Suggested Resources

Text Support
Spectrum Math, gr. 4, 5 levels, selected practice pages

Strengthening Math Skills – Multiplication and Division (Units 3, 4 selected lessons); Fractions, Decimals and Percents (Units 1, 2 selected lessons)

Canadian Money Activity Book – Selected practice pages

Blackline Masters (Appendices)
(multiplication table, fraction circles, place value chart)

Additional materials required
- Fractions manipulatives
- Fractions and decimals flashcards
- Calculator
- Relevant math games
- Bristle board, poster paper.
- Newspaper
- Catalogues
- Grocery store, real estate, automobile, and furniture flyers
- Relevant math games
- Measuring cups, spoons, etc.
- Baking Supplies

STRAND: *Number*
Students will develop number sense.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
75. Multiply decimals to hundredths, using single-digit, whole number multipliers (using pencil/paper and a calculator in sr. high). [6N8] 76. Divide decimals to hundredths, using single-digit, whole number divisors (using pencil/paper and a calculator in sr. high). [6N8] 77. Solve problems involving three steps and at least two different operations using pencil/paper (and a calculator in sr. high). [6N2]	• Use money word problems and real-life objects such as menus, store flyers and other resources with prices to teach and reinforce the calculation of decimal amounts. • Older students investigate monthly costs of running a car, groceries, electric bills, etc. Use multiplication to get annual costs and create a household budget. An investigation of annual salaries, income taxes and other deductions, for various careers could be tied to this activity. • Students should estimate when budgeting before determining exact figures. • Students estimate and calculate sales taxes, using local flyers. • Students estimate an answer to a problem, and then determine the correct answer. Have them judge the reasonableness of their estimate. Use real-life problems such as calculating the cost of take-out food plus tax or calculating the distance to a location and number of hours it would take to drive at 100 km/hr, for example. • Students can try challenging problems such as; – 'Using only the number 2, and the symbols + and ÷ create an equation equivalent to 13.' (e.g. [(2+2+2+2+2) ÷ 2] + (2+2+2+2+2). • Students make up real life word problems or stories where characters have to solve real life math problems.

STRAND: *Number*
Students will develop number sense.

Assessment Tasks

75. Multiply decimals to hundredths, using single-digit, whole number multipliers.
76. Divide decimals to hundredths, using single-digit, whole number divisors.
77. Correctly solve problems involving three steps and at least two different operations, on paper and using a calculator.

Suggested Resources

Text Support
Spectrum Math, gr. 5 level, selected practice pages

Strengthening Math Skills – Multiplication and Division (Units 3, 4 selected lessons); Fractions, Decimals and Percents (Units 1, 2 selected lessons)

Blackline Masters (Appendices)
(multiplication table, fraction circles, place value chart)

This website, which has a variety of printable word problems for grades K-6 can be very helpful: http://www.primaryresources.co.uk/maths/mathsD1.htm#

Additional materials required
- Algorithm cards (for multiplication/division)
- Calculator
- Newspaper
- Catalogues
- Grocery store, real estate, automobile, and furniture flyers
- Telephone and utility bills
- Menus
- Bristle board, poster paper, newsprint.
- Baking supplies

STRAND: Patterns and Relations

Students will use patterns to describe the world and solve problems.

Specific Outcomes	***Elaboration - Instructional Strategies/Suggestions***
1. Copy and extend patterns, including those involving numbers, colors, shapes; using AB, ABC, AABB patterns. [KPR1] 2. Create patterns using AB, ABC, AABB configurations. [KPR1] 3. Recognize and name familiar arrangements of up to 10 objects or dots. [1N2/2N10] 4. Translate repeating patterns from one representation (e.g. actions) to another (e.g sound). [1PR2] 5. Use number patterns to help to solve addition and subtraction sentences (fact families, hundred chart). [2N9] 6. Sequence events based on the student's experiences (before/ after; first/then/last). [2N3]	• Use actions or sounds to present and reinforce the concept of repeated elements. Then continue to practice using various objects of different shapes and colors. • Students look for patterns in the classroom or home, using familiar things (stripes on clothing, floor tile patterns, etc. • Students create patterns using beads, string, coloured tiles, etc. • Simple movement patterns, such as dance steps, can reinforce patterns. Music with patterned clapping or drum beats can also be fun and establish the concept of patterns. • Students create pattern problems for partners to solve. • Students cut pictures from catalogues and glue them onto strips of paper to form patterns. • Use the dot arrangements and five- and ten-frame templates found in the appendix to teach recognition of number configurations. • Dice games strengthen recognition of several physical configurations. • Use fact families to work with pattern (3+5, 5+3, 8-3, 8-5).

STRAND: *Patterns and Relations*
Students will use patterns to describe the world and solve problems

Assessment Tasks

1. Copy a given repeating pattern (e.g. actions, sound, color, shapes). Extend a variety of given repeating patterns to two more repetitions.
2. Create a repeating pattern using manipulatives, musical instruments, or actions.
3. Identify familiar dot configurations (up to 10 dots) on circles and five- and ten-frames.
4. Represent a given repeating pattern using another mode (e.g. ABCABC to blue yellow green blue yellow green).
5. Find the solutions to simple addition/subtraction equations using a hundred chart and fact families.
6. Express or draw, in correct sequence, a series of steps (at least 4) to complete a relevant task, such as the routine to prepare for school, to get ready for bed, etc., using the terms, *first, then, last,* and *before, after.*

Suggested Resources

Text Support
Spectrum Math, gr. 1, 2 levels, selected lessons

Blackline Masters (Appendices) (dot arrangement cards, 5-frame, 10-frame, hundred chart)

Additional materials required
- Hundred chart
- Objects of various colors and shapes and sounds
- Dice
- Catalogues, scissors, glue
- Beads, string, coloured tiles
- Music,
- Simple rhythm instruments
- Bristle board or construction paper of different colours that can be cut up to make shapes and patterns

STRAND: ***Patterns and Relations***
Students will use patterns to describe the world and solve problems.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
7. Recognize and use patterns in an addition table. [2PR2] 8. Demonstrate an understanding of repeating patterns and increasing patterns and how they differ. [2PR1/2PR2] 9. Recognize and use patterns in a multiplication table. [4PR1] 10. Demonstrate an understanding of decreasing patterns. [3PR2] 11. Identify mathematical relationships and patterns using graphs, objects or models and technology. [4PR1/PR4] 12. Make predictions using numerical and non-numerical patterns. [4PR1/PR4] 13. Develop charts to record and reveal patterns. [4PR2] 14. Predict and justify pattern extensions. [4PR3] 15. Determine the pattern rule to make predictions about subsequent elements. [4PR3/5PR1] 16. Solve problems involving single-variable 1-step equations with whole-number coefficients and whole number solutions. [5PR2]	• Addition tables are useful for both reinforcing addition facts and seeing pattern. • The student should recall the repeating patterns made at previous levels using shapes and colors. Use number patterns as examples of increasing patterns (2, 4, 6…). • Using the multiplication table, guide students to explore and discover: numbers in each row and column increase by the same amount; numbers in each row increase by an amount one greater than the numbers in the previous row, etc. Hundred charts are useful to reinforce pattern concepts. • Use simple tables, such as the Carroll diagram below, or graphs, to show patterns/relationships between numbers. • Enter the whole numbers from 1 to 20, into the squares. • Have the student use cubes to build these shapes and explain how the pattern grows. Then, predict what the next one and the tenth one in the sequence will look like. • Expose students to a variety of charts and graphs to increase their confidence and competence in dealing with information presented in various formats.

	odd	even
Numbers greater than 9		
Numbers equal to or less than 9		

STRAND: ***Patterns and Relations***
Students will use patterns to describe the world and solve problems.

Assessment Tasks	***Suggested Resources***
7. Use an addition table independently to find solutions to addition equations and their related subtraction facts. 8. Identify the core of a **repeating** pattern, identify and extend a given double attribute pattern. Identify and use **increasing** patterns in hundred charts, addition tables and number lines. Create an increasing pattern and explain the pattern rule. 9. Identify and use patterns in a multiplication table to solve equations. 10. Identify the pattern rule of a given decreasing pattern and extend the pattern for the next three terms (skip-counting backward is a good way to assess this). 11. Identify the pattern found in a given table or chart. Identify errors or missing elements in a table or chart. 12. Predict what information could be found if the chart or table (numerical and non-numerical) were extended. 13. Solve a given problem using a Carroll diagram. 14. Predict and justify patterns created if more information was used to extend the diagram. 15. Indicate orally or in writing a given pattern using mathematical language, such as one more, one less, five more. 16. Solve a given single-variable equation with the unknown in any of the terms (e.g. $n + 2 = 5$; $4 + a = 7$; $6 = r - 2$; $10 = 2c$).	**Text Support** Spectrum Math, gr. 2, 3, 4 levels, selected lessons **Blackline Masters (Appendices)** (addition and multiplication tables, hundred chart) **Additional materials required** ➢ Wall hundred chart ➢ Cubes, Blocks **Text Support** Spectrum Math, gr. 3, 4, 5 levels, selected lessons **Blackline Masters (Appendices)** (addition and multiplication tables, hundred chart) **Additional materials required** ➢ Carroll diagrams ➢ Cubes

STRAND: Shape and Space (Measurement; 3D Objects/2D Shapes)

Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Specific Outcomes	***Elaboration - Instructional Strategies/Suggestions***
1. Name and create 2D shapes – circle, square, triangle, rectangle, diamond. [2SS8] 2. Name and briefly compare 3D shapes – sphere, cylinder, cone, cube. [2SS7] 3. Compare and order objects based on length, capacity, mass, using terms such as: *longer/shorter, more/less, larger/smaller, heavier/lighter.* [1SS1] 4. Name the days of the week. [2SS1] 5. Identify 2D shapes as similar to parts of 3D shapes (sphere, cylinder, cone, cube, pyramid, prism) in the student's environment. [1SS4] 6. Tell time to the hour on an analog clock and read time on a digital clock. [4SS1] 7. Name the months and seasons of the year. [2SS1]	• Use geoboards/elastics; toothpicks and marshmallows; and then pencil and paper to create the shapes. • Use actual 3D models to introduce these concepts. Have student look for these shapes in their environment. • Students create 3D shapes from bristle board and make a hanging mobile. • Students weigh themselves and/or measure their height using scales and measuring tape, then compare their weight and height to the rest of the class. • Students create days of the week posters and list activities they do on each day. They may illustrate their posters with simple drawings. • Students locate shapes in their environment. • Relate the hour on the clock to an event in the student's daily routine (7:00 – you get up, 3:00 – school ends, etc.) • Make telling the time and reading a calendar a regular part of your teaching routine. • Read poems and stories about the seasons. Students can talk about the seasons in their birth countries. • Students make clocks with bristle board and paper fasteners.

STRAND: *Shape and Space (Measurement; 3D Objects/2D Shapes)*
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Assessment Tasks

1. Identify when shown - circle, square, triangle, rectangle, diamond. Draw or create these shapes.
2. Identify and give one similarity and one difference between 3D shapes – sphere, cylinder, cone, cube.
3. Compare the length/height of two given objects using the words *shorter/longer (taller)* or *almost the same*. Compare the mass (weight) of two given objects using the words *lighter/heavier* or *almost the same.* Compare the volume (capacity) of two given objects using the words *more/less, larger/smaller,* or *almost the same.*
4. Name the days of the week without referring to a calendar or chart.
5. Identify 3D objects in the environment that have parts similar to a given 2D shape. (i.e. circle-sphere, square-cube, etc.)
6. Tell time to the hour on an analog clock and read time on a digital clock. Draw a given hour on a blank clock.
7. Name the months of the year in order, without referring to a calendar or chart. Recall the four seasons.

Suggested Resources

Text Support
Spectrum Math, gr. 1, 2 level, selected practice pages

Blackline Masters (Appendices) (blank clocks, blank calendar)

The website www.rainforestmaths.com has some excellent activities related to 2D and 3D shapes, at various skill levels.

Additional materials required
- Geoboards/elastics
- Marshmallows/toothpicks
- 2D shapes/3D figures
- Calendar
- Clocks
- Objects, containers, for discussions of weight and volume
- Scales, measuring tape
- Bristle board, tape, art supplies

Children's Books such as;
- 🕮 *Clocks and More Clocks* by Pat Hutchins

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Specific Outcomes

8. Recognize and name coins – penny, nickel, dime, quarter, loonie, toonie. [2N4]
9. State the value (in cents) of pennies, nickels, dimes. [3N1]
10. Create equivalent sets of coins up to 10 cents. [3N1]
11. Construct and briefly compare 3D objects -sphere, cylinder, cone, cube, pyramid, prism. [2SS7/3SS6]
12. Demonstrate a sense of how long 1 mm, 1cm and 1m are. [3SS3]
13. Demonstrate a sense of how much 1ml and 1 l are. [5SS4]
14. Demonstrate a sense of how much 1 gram and 1 kg are. [3SS4]
15. Tell time to half-hour intervals using an analog clock. [4SS1]

Elaboration - Instructional Strategies/Suggestions

- Use REAL coins to teach these money concepts, as much as possible.
- Students make posters and charts to display and label coins and equivalent groups (e.g. one dime = 2 nickels). Use plastic coins and stick with tape so they can be salvaged and reused later.
- Provide lots of opportunities for hands-on work with the coins before you introduce the concepts for practice on paper.
- Take a trip to the grocery store and find objects to fill in a chart categorizing by shapes:

2D Shapes			
Circle	Square	Rectangle	Triangle
- *Top of a tin of pears*	- *Tile on the floor*	- *Magazine*	- *Piece of Cheese*

3D Shapes			
Cylinder	Sphere	Cuboid	Cube
- *Pepsi tin* - *Sausage*	- *Orange*	- *Box of Corn Flakes*	-

- Modelling clay and toothpicks/marshmallows can be useful in building 3D models.
- Provide a variety of 3D models for students to explore and learn about their attributes.
- Use real objects found in the student's environment for weighing and measuring. Milk cartons, measuring cups and spoons, rulers, food packages of various sizes can be used to measure water, rice, objects in the classroom, etc.

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them

Assessment Tasks

8. Name when shown – penny, nickel, dime, quarter, loonie, toonie. Select appropriate coin when given a name of a coin – penny, nickel, dime, quarter, loonie, toonie.
9. State the value (in cents) of pennies, nickels, dimes.
10. Create sets of coins equalling ten cents using various combinations of pennies, nickels, and a dime.
11. Construct and briefly compare 3D objects: sphere, cylinder, cone, cube, pyramid, prism.
12. Identify 1 mm, 1cm and 1m with measuring tools and accurately measure items using these tools.
13. Identify 1ml and 1 L with measuring tools and accurately measure items using these tools.
14. Identify 1 gram and 1 kg with measuring tools and accurately measure items using these tools.
15. Tell time to half-hour intervals. Show the time to given half-hour intervals on a practice clock.

Suggested Resources

Text Support

Canadian Money Activity Book

Spectrum Math, gr. 1, 2, 3 level

Blackline Masters (Appendices) (blank clocks, blank calendar)

Additional materials required

- Coins
- Canadian Classroom Money Kit
- Bristle board, art supplies
- Geoboards/elastics
- Toothpicks/marshmallows
- Modeling clay
- 2D shapes/3D figures
- Items to measure and weigh
- Cm ruler and meter stick
- Kitchen scale for weighing food
- Various sizes of tins, milk cartons, containers

Suggested Children's Books:

- 🕮 *My Row and Piles of Coins* by Tololwa M. Mollell
- 🕮 *Weighing the Elephant* by Ting-Xing Ye
- 🕮 Fiction or non fiction material about the Pyramids of Egypt

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Specific Outcomes	***Elaboration - Instructional Strategies/Suggestions***
16. Indicate the number of days in a week, months in a year. [2SS1/3SS2] 17. Locate a week and a month on a calendar. [2SS1] 18. Locate the date on a calendar [2SS1] 19. State the value, in cents, of a quarter, a loonie, a toonie, and bills to $10. [4N9] 20. Count and record, using the cents symbol only, the value of collections of coins up to $1. [3N1] 21. Create equivalent sets of coins, using pennies, nickels, dimes, and quarters, up to $1 in value. [3N2] 22. Identify angles as right, acute or obtuse and demonstrate understanding of these terms. [5SS1] 23. Demonstrate an understanding of the term 'congruent' (same size and shape). [4SS6] 24. Recognize and represent a prism and a pyramid. [3SS6] 25. Describe 3D objects according to the shape of the faces, and the number of edges and vertices. [3SS6]	• Students cross off each day on a calendar. This daily use will provide the reinforcement needed of the calendar skills introduced, as well as opportunities to explore and strengthen number sense. • Students create a class calendar, with birthdays and special events. • Students use their school agenda daily to note homework assignments, special events, take-home reading assignments and other reminders. • Use real paper money and coins, when possible, to teach money concepts. • Students start a penny collection and exchange quantities of pennies for other coins. • Use a real object such as a picture frame or a greeting card to show the right angles. Use these objects to locate classroom items with angles that are smaller, larger and the same size as right angles. • Use real objects and geoboards/elastics to investigate the concept of congruency. • Provide a variety of 3D models for students to explore and learn about their attributes.

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Assessment Tasks

16. Indicate the number of days in a week and months in a year, without referring to a calendar.
17. Locate a week and a month on a calendar.
18. Locate the present date on a calendar.
19. State the value (in cents and dollars) of a quarter, a loonie, a toonie, and bills to $10.
20. Count and write, using the cents symbol only, the value of collections of coins up to $1.
21. Create sets of coins equaling $1 using various combinations of pennies, nickels, dimes, and quarters.
22. Using a geoboard/elastics or pencil/paper, construct shapes that include right, acute and obtuse angles and label them accurately.
23. Determine whether given shapes are congruent. Construct/draw shapes that are congruent and are not congruent.
24. Identify a prism and a pyramid when shown and briefly indicate the main difference between them.
25. Identify the faces, edges and vertices of given 3D objects, including cubes, spheres, cones, cylinders, pyramids and prisms.

Suggested Resources

Text Support

Canadian Money Activity Book (see appendix)

Spectrum Math, gr. 2, 3, 4, 5 levels, selected practice pages

Nimble With Numbers, Money section

Blackline Masters (Appendices) (blank clocks, blank calendar)

Additional materials required

- Calendar
- Coins/paper money
- Canadian Classroom Money Kit
- School provided agenda
- 3D objects
- Geoboards and elastics
- Children's literature, e.g. stories about the pyramids

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
26. Demonstrate an understanding of perimeter of regular and irregular shapes. [3SS5] 27. Identify the number of sides for regular and irregular polygons (triangles, quadrilaterals, pentagons, hexagons, octagons). [3SS7] 28. Tell time to 15-minute intervals using an analog clock. [4SS1] 29. Locate significant dates on a calendar (birthday, holidays, school start and end dates, family birthdays). [2SS1] 30. Count and record collections of coins and bills up to $10. [4N9] 31. Recognize the value of bills up to $100. [4N9] 32. Demonstrate an understanding of line symmetry by identifying and creating 2D shapes with symmetry. [4SS5] 33. Construct nets for pyramids and prisms. [3SS6]	• Students go on “Perimeter Patrol”. Walking the edge of the parking lot, the gym, the school grounds. Ask students to consider the shape (square? rectangular?). • Students use measuring tape to measure perimeters of various things inside the school and out (e.g. a room, a desk, a parking space, a section of the sidewalk. Ask student to find perimeter of rectangular spaces by measuring only two sides. • Use a REAL clock to teach time concepts. • Use a REAL calendar to locate and highlight dates. • Use sales flyers from various stores and have students cut out examples of prices and display on a themed poster (prices under $10, prices over $50, etc.). • Use real paper money and coins, when possible, to teach money concepts. • Use folding of paper to explore symmetry. Students fold a piece of paper in half, cut out a shape and unfold to examine the result. Miras are also useful to learn about symmetry, as are fabric designs. • Students create snowflakes, paper dolls, etc. by folding paper. Students can experiment and create their own abstract symmetrical figures as well as try to come up with real objects that are symmetrical. • Students use scissors, paper and tape or glue to make various nets into 3D figures. Make mobiles with the nets (See Appendices).

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Assessment Tasks

26. Measure and record the perimeter of given regular and irregular shapes.
27. Name the number of sides for triangles, quadrilaterals, pentagons, hexagons, octagons.
28. Tell time to 15-minute intervals. Show the time to given 15-minute intervals on a practice clock or draw.
29. Have the student locate dates on a calendar (birthday, holidays, school start and end dates, family birthdays) that are personally significant.
30. Count and write, using the dollar and decimal notations, collections of coins and bills up to $10.
31. Identify the values of bills up to the $100 bill.
32. Sort a given set of 2D shapes as symmetrical and non-symmetrical. Complete a symmetrical 2D shape given half the shape and its line of symmetry. Draw one or more lines of symmetry in a 2D shape.
33. Construct 3 prisms or pyramids from nets and briefly indicate how each can be distinguished by their net.

Suggested Resources

Text Support

Canadian Money Activity Book (see appendix)

Spectrum Math, gr. 2, 3, 4, 5 level, selected practice pages

Blackline Masters (Appendices) (nets, cm grid paper, blank clocks)

The website www.rainforestmaths.com has excellent activities related to 3D geometry.

Additional materials required

- Geoboards/elastics
- Canadian Classroom Money Kit
- 2D shapes/3D figures
- Picture frames, greeting cards, other objects with right angles
- Store sales flyers
- Cm ruler
- Calendar
- Clocks
- Coins/paper money

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
34. Identify terms of direction (north, south, east, west) and relate to maps. [6SS8] 35. Place an object on a grid, using rows and columns, *in that order.* [6SS8] 36. Measure regular and irregular 2D shapes by area, using standard units (cm², m²). [4SS3] 37. Tell time to 5-minute intervals on an analog clock. [4SS1] 38. Make purchases and change up to $10. [4N11] 39. Count and record collections of coins and bills up to $50. [4N9] 40. Construct different rectangles given either perimeter or area, or both. [3SS5/4SS3/5SS1] 41. Identify/ name quadrilaterals (rectangle, square, parallelogram, rhombus, trapezoid) according to number of sides, angles, vertices, parallel lines. [5SS6] 42. Identify edges and faces of 3D objects, and sides of 2D shapes that are – parallel, intersecting, perpendicular, vertical and horizontal. [5SS5]	• Use a simplified local area map to teach and practice indicating these directions. • Reinforce the rule of *rows, then columns* when dealing with ordered pairs. • Use a grid-numbered geoboard (A, B, C, D, E across the top and 1, 2, 3, 4, 5 down the side) to locate a hidden point in as few guesses as possible. • Use square units, beginning with cm², to teach measurement of area. • Use real situations as much as possible to have students practice using money. If the school office needs money counted, ask if your students can assist. • Use a centimetre grid to estimate and measure perimeter and area of outlines of various countries. • Use concrete materials such as geoboards, straws and tangrams to teach and reinforce these concepts. • Students draw a simple 3D object, showing edges, faces and sides (in perspective).

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Assessment Tasks

34. Identify north, south, east and west directions on a map.
35. Correctly locate a given point on a grid.
36. Determine the area of a regular shape and an irregular shape. Construct a rectangle for a given area.
37. Tell time to 5-minute intervals. Show the time to given 5-minute intervals on a practice clock or draw.
38. Use money (up to the amount of $10) to make a purchase and determine the amount of change that is due.
39. Count and write, using the dollar and decimal notations, collections of coins and bills up to $50.
40. Draw or construct two or more rectangles for a given perimeter in a problem-solving context. Draw or construct two or more rectangles for a given area in a problem-solving context.
41. Sort a given set of quadrilaterals according to number of sides, angles, vertices, and parallel lines.
42. Identify parallel, intersecting, perpendicular, vertical and horizontal edges and faces on 3D objects. Identify parallel, intersecting, perpendicular, vertical and horizontal sides on 2D shapes.

Suggested Resources

Text Support

Canadian Money Activity Book (see appendix)

Spectrum Math, gr. 3, 4, 5, 6 levels, selected practice pages

Blackline Masters (Appendices) (cm grid paper, blank clocks)

Additional materials required

- Geoboards/elastics
- 2D shapes/3D figures
- Scissors, glue, tape (for making nets)
- Miras
- Fabric samples with symmetrical designs
- Local area map
- cm ruler
- Clocks
- Coins/paper money

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
43. Plot whole number ordered pairs in the first quadrant with intervals of 1, 2, 5, and 10. [6SS8] 44. Identify a point in the first quadrant, using ordered pairs. [6SS8] 45. Estimate and measure containers by volume using cm^3. [6SS3] 46. Perform a single transformation (translation, rotation or reflection) of a 2D shape and draw the image. [5SS7] 47. Identify a single transformation, including a translation, rotation and reflection of 2D shapes. [5SS8] 48. Read an analog clock to the nearest minute and write the time. [4SS1] 49. Make purchases and change up to $50. [4N11]	• Reinforce the rule of *rows, then columns* when dealing with ordered pairs. • Students practise plotting points on various grids from given coordinates, then join the dots and describe the shape using various attributes. • Give students ordered pairs and have them match the pairs with lettered points on a given graph. Ask questions about what kinds of shapes are made when points are joined. • Use different sizes of cracker boxes to estimate and measure volume. Estimate the volume of each box in cubic centimetres. Order the boxes according to the estimates. Show how to use centicubes (unit cubes from base ten set) or a ruler to check your estimate. • Use a board game such as Monopoly or Money Bingo as a fun way to practice working with money (and to build language skills at the same time).

STRAND: ***Shape and Space (Measurement; 3D Objects/2D Shapes)***
Students will: use direct and indirect measure to solve problems; describe the characteristics of 3D objects and 2D shapes, and analyze the relationships among them.

Assessment Tasks

43. Accurately plot whole number ordered pairs in the first quadrant with intervals of 1, 2, 5, and 10.
44. Correctly identify a point in the first quadrant, using ordered pairs.
45. Estimate and measure containers by volume using cm^3.
46. Translate a given 2D shape horizontally, vertically or diagonally and draw. OR rotate a given 2D shape about a point and draw OR reflect a given 2D shape in a line of reflection and draw.
47. Identify a given single transformation as a translation, rotation or reflection.
48. Tell time to the nearest minute and write the time accurately.
49. Use money (up to the amount of 50) to make a purchase and determine the amount of change that is due.

Suggested Resources

Spectrum Math, gr. 3, 4, 5, 6 levels, selected practice pages

Graph paper

Additional materials required

- Geoboards/elastics
- 2D shapes/3D figures
- Tangrams
- Drinking straws
- Cracker boxes of various sizes
- Clocks
- Coins/paper money
- Canadian Classroom Money Kit
- Monopoly game
- Money bingo game

STRAND: Statistics and Probability (Data Analysis; Chance and Uncertainty)

Students will collect, display and analyze data to solve problems; use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
1. Compare data in two categories, using words such as *more, less, same.* [2SP2/3SP2] 2. Interpret simple pictographs and bar graphs. [2SP2/3SP2] 3. Demonstrate an understanding of and use tally marks as a simple way to collect data. [2SP1/3SP1] 4. Create simple pictographs and bar graphs based on data collected from a simple survey. [2SP1/3SP1] **5.** Interpret information from simple pictographs and bar graphs created by the student. [2SP2/3SP2] 6. Select a sample or population and organize the collection of data. [3SP1] 7. Construct a bar graph and a pictograph, using many-to-one correspondence to draw conclusions. [4SP2]	• Use meaningful situations to have students compare and interpret data (which shelf has more books, which has fewer; find two students with the same number of siblings, etc.). • Students should have opportunities to view and interpret numerous graphs (created in class as well as those found elsewhere) before they will be gathering data, and creating and interpreting graphs. • Students conduct a simple survey about a favourite food, t.v. show, sport, etc. The topic should be personally meaningful and easy to gather data about, using tally marks. Students use the data to create and interpret simple graphs. • Other sources of information for data collection and graphing might integrate Science or Language Arts concepts such as daily temperature over a weekly period, favourite author, etc.

STRAND: ***Statistics and Probability (Data Analysis; Chance and Uncertainty)***
Students will collect, display and analyze data to solve problems; use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

Assessment Tasks	***Suggested Resources***
1. Make accurate comparisons of data in two categories, using such words as *more, less, same*. 2. Determine the common attributes of simple pictographs and of bar graphs. Answer questions about the information found in each. 3. Record the number of objects in a given set using tally marks. Collect and organize data using tally marks. Answer questions using the collected data. 4. Create and label a pictograph to display a given set of data. Create a bar graph from a given set of data. 5. Interpret each type of graph to answer basic questions. 6. Select a sample population, and organize the data using tally marks, line plots, charts and lists. 7. Create and label (with categories, title and legend) a pictograph to display a given set of data, using many-to-one correspondence and justify the choice of correspondence used. Create and label (with axes and title) a bar graph to display a given set of data, using many-to-one correspondence and justify the choice of interval used.	**Text Support** Spectrum Math, gr. 1, 2, 3, 4 levels, selected practice pages **Additional materials required** ➢ Examples of various graphs **Text Support** Spectrum Math, gr. 3, 4, 5, 6 levels, selected practice pages **Additional materials required** ➢ Examples of various graphs ➢ Dice, coin

STRAND: ***Statistics and Probability (Data Analysis; Chance and Uncertainty)***
Students will collect, display and analyze data to solve problems; use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

Specific Outcomes	***Elaboration – Instructional Strategies/Suggestions***
8. Differentiate between first-hand (primary) and second-hand (secondary) data. [5SP1] 9. Construct and interpret double bar graphs to draw conclusions. [5SP2] 10. Describe the likelihood of a single outcome occurring, using words such as *impossible, possible,* and *certain.* [5SP3] 11. Compare the likelihood of two possible outcomes occurring, using words such as *less likely, equally likely, more likely.* [5SP4]	• Students collect primary data and represent results with graphs. ◦ Students collect primary data by carrying out and recording results for a class or school survey. (e.g. Favourite foods, t.v. shows, countries of birth, etc.). ◦ Primary data can also be collected by observation (e.g. Random Sample - Observe the first 50 people who walk past and record shirt colour). ◦ Primary data can be collected on weather by measuring temperature for a number of consecutive days. • Students collect secondary date from texts and create graphs to represent the data (e.g. temperatures reports from the newspaper, statistics on populations of countries). • Use the flipping of a coin, and then the rolling of dice, to teach and reinforce the concept of probability.

STRAND: *Statistics and Probability (Data Analysis; Chance and Uncertainty)*
Students will collect, display and analyze data to solve problems; use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

Assessment Tasks	***Suggested Resources***
8. Indicate the difference between first-hand and second-hand data. Find examples of second-hand data in print and in electronic media, such as newspapers, and the Internet. 9. Represent a given set of data by creating a double bar graph, label the title and axes, and create a legend. Draw conclusions from a given double bar graph to answer questions. Provide examples of double bar graphs in a variety of print and electronic media, such as newspapers, and the Internet. 10. Provide examples of events that are *impossible, possible* or *certain*, from personal contexts. Classify the likelihood of a single outcome occurring in a probability experiment as *impossible, possible* or *certain*. 11. Identify outcomes from a given probability experiment which are *less likely, equally likely* or *more likely* to occur than other outcomes.	**Text Support** Spectrum Math, gr. 5, 6 levels, selected practice pages **Additional materials required** ➢ Examples of various graphs ➢ Dice, coin

APPENDICES

Appendix 1: Required Resources

Resources for LEARN-1 Mathematics

Teacher Resources:

Canadian Money Activity Book, by Sherry Wolf, (Learning Resources Inc., 1995, Vernon Hills, Illinois) ISBN: 1-56911-978-3

Nimble with Numbers – Engaging Math Experiences to Enhance Number Sense and Promote Practice, by L. Childs, L. Choate, M. Wickett (Dale Seymour Publications, 1998)

Strengthening Math Skills Series, 3 book: *Addition and Subtraction*; *Multiplication and Division*; *Fractions, Decimals and Percents* (Steck Vaughn Supply, Harcourt Achieve Inc., 2008) (distributed by Nelson Education Canada)

Software Program: *Math Resource Studio 4*: http://www.schoolhousetech.com/Math/Default.aspx

Student texts

Spectrum Math Series, grades 1 – 6

The Quick- Math Handbook for Everyday Mathematics (Intermediate, Canadian Edition), Curriculum Associates Inc, USA, (www.CAinc.com)

Manipulatives

- Variety of counters
- Hundreds wall chart with removable, color-coded numbers
- Number word cards
- Calculators
- Fraction circles
- 2D shapes (attribute blocks)
- Centimeter ruler
- Meter stick
- Graphing mat
- Money set – both coin and bills
- Calendar
- Multilink cubes
- Base ten materials
- Numeral cards (0-100)
- Operations flash cards
- Geoboards/elastics
- 3D figures (geometric solids)
- Measuring tape
- Measuring containers – ml, liter
- Dice
- Clock

Appendix 2: Recommended Websites

www.topmarksco.uk/ (K-2)
www.rainforestmaths.com (all levels)
www.awesomelibrary.org (all levels)
www.multiplication.com (gr. 3, 4, 5)
www.edhelper.com (all levels)
www.abcteach.com (all levels)
www.firstschoolyears.com (K-2)
www.enchantedlearning.com (K-3)
www.themathworksheetsite.com (all levels)
www.homeschoolmath.net (all levels)
www.schoolhousetech.com (all levels)
www.schoolexpress.com (all levels)
www.thatquiz.org/ (Canadian currency)
www.lizardpoint.com/math/mathsheet.html
www.kidzone.ws/math/index.htm
www.algebrahelp.com/

Games:

http://merrelles.com/English.html

Appendix 3: Blackline Masters

Numeral Cards 1-9 50
Numeral Cards 1-10 51
Dot Cards (1 and 2) 52
Dot Cards (3) 53
Dot Cards (4) 54
Dot Cards (5) 55
Five Frames 56
Ten Frames 57
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Numeral Cards 21-50 61
Numeral cards 51-80 62
Numeral Cards 81-100 63
Numeral Cards 1-100 64
100 Chart 65
100 Chart (count by 2) 66
Grid 67
10 x 10 Grid 68
Times Table Frame 69
Number Lines 70
Blank Calendar 71
Hundreds-Tens-Ones Chart 72
Thousands-Hundreds-Tens-Ones Chart 73
Fractions Circles 74
Clocks 76
Prism Nets 77

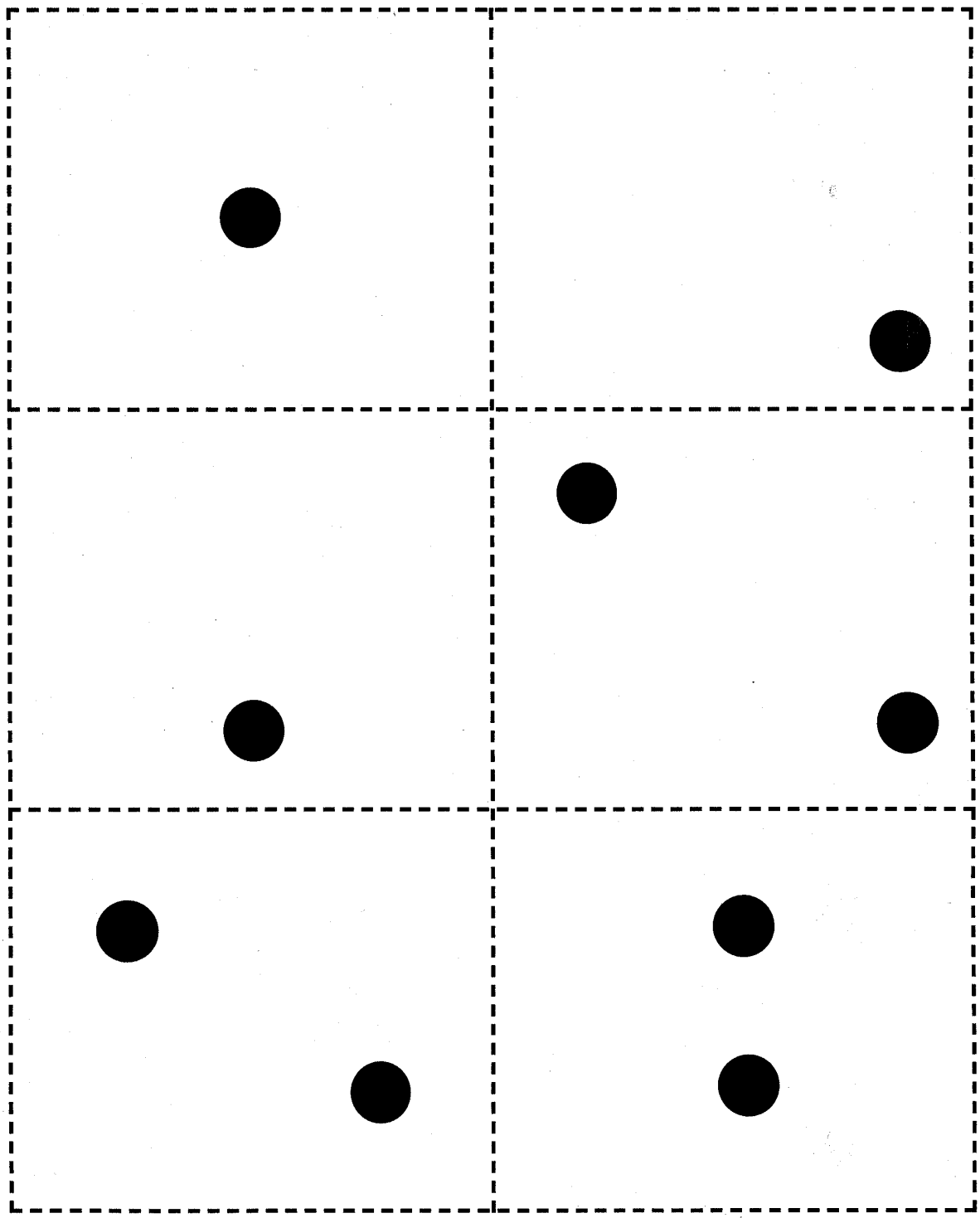
Numeral Cards 1-9

1	2	3
4	5	6
7	8	9

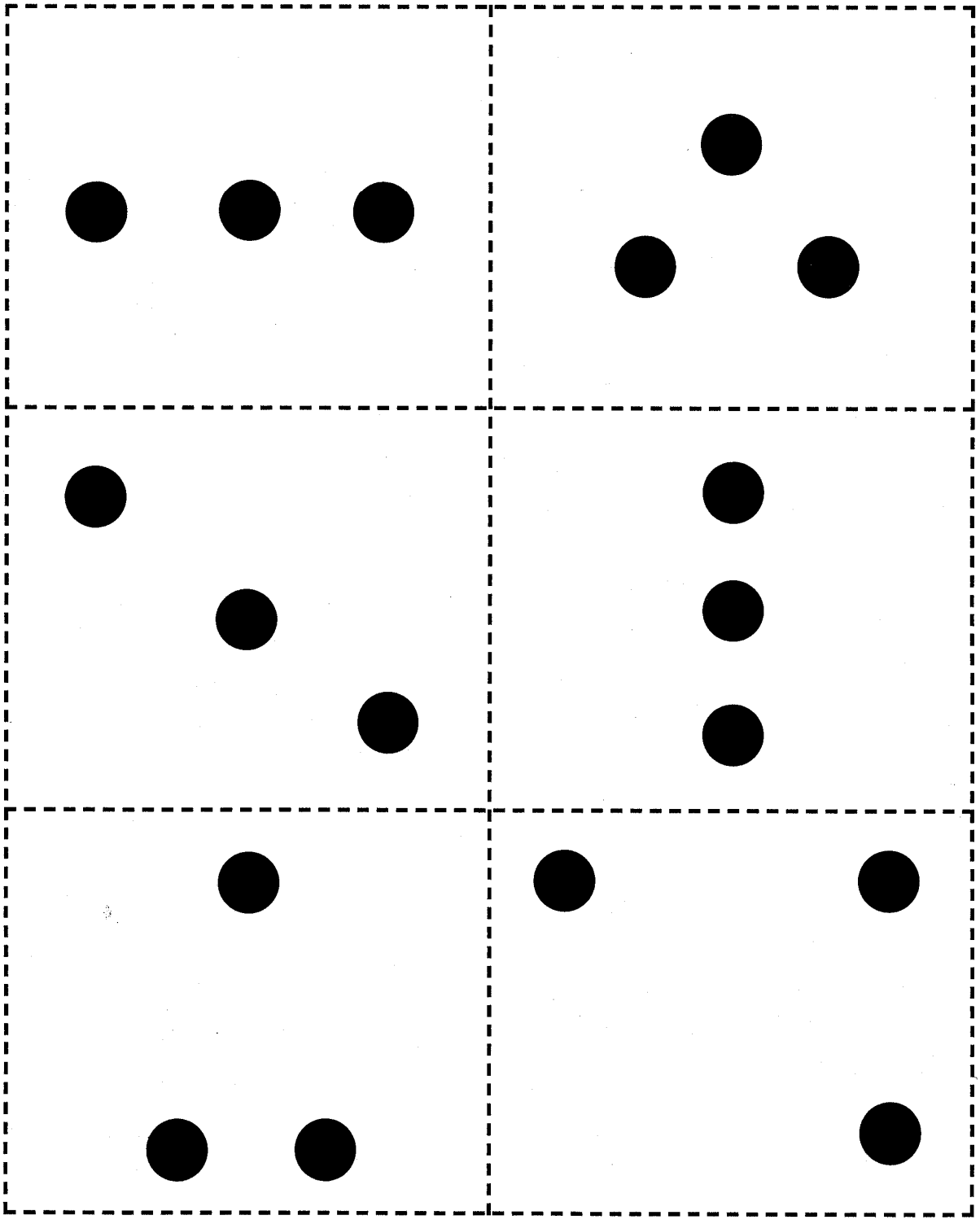
Numeral Cards 1-10

9	1
7	2
8	3
6	4
10	5

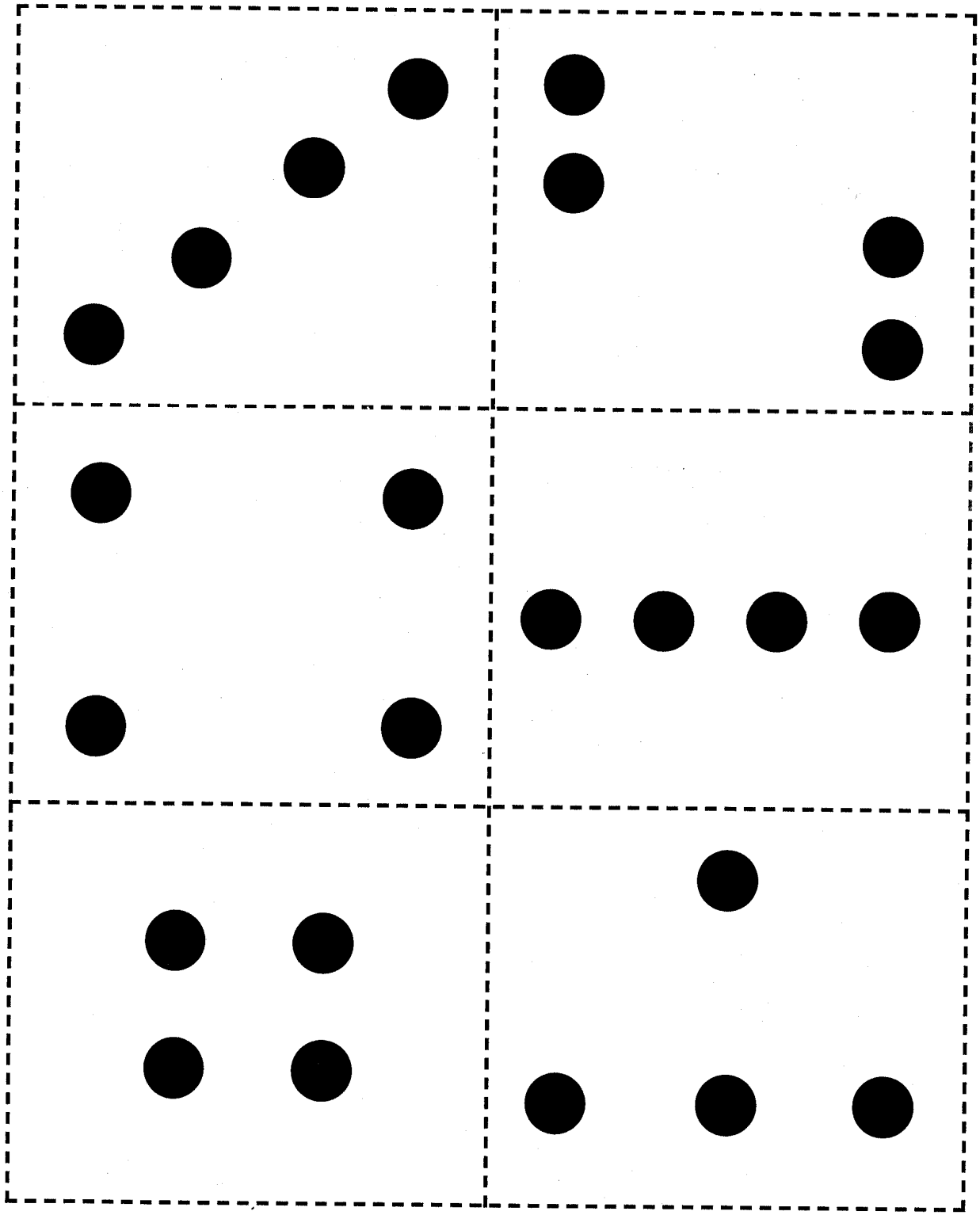
Dot Cards (1 and 2)



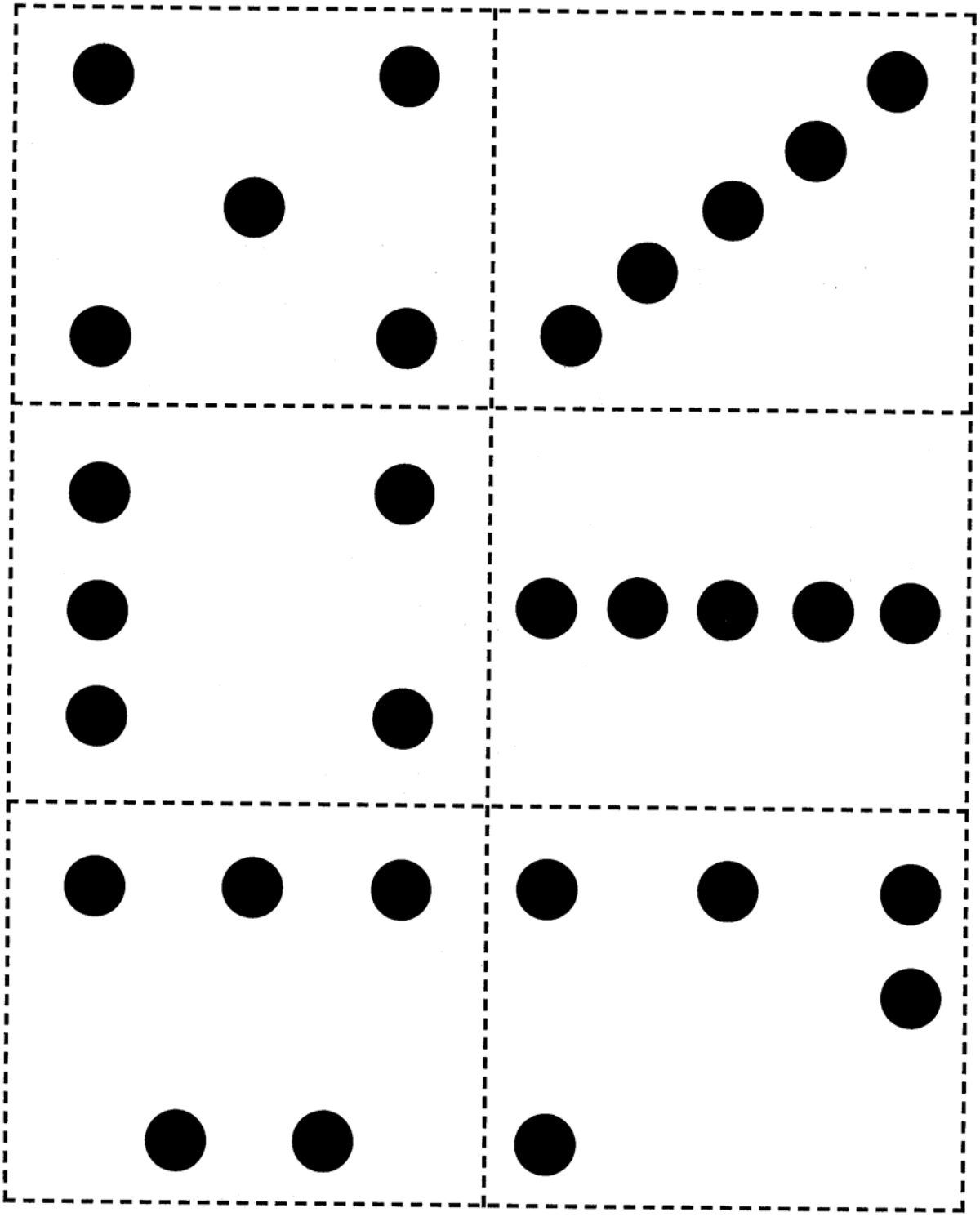
Dot Cards (3)



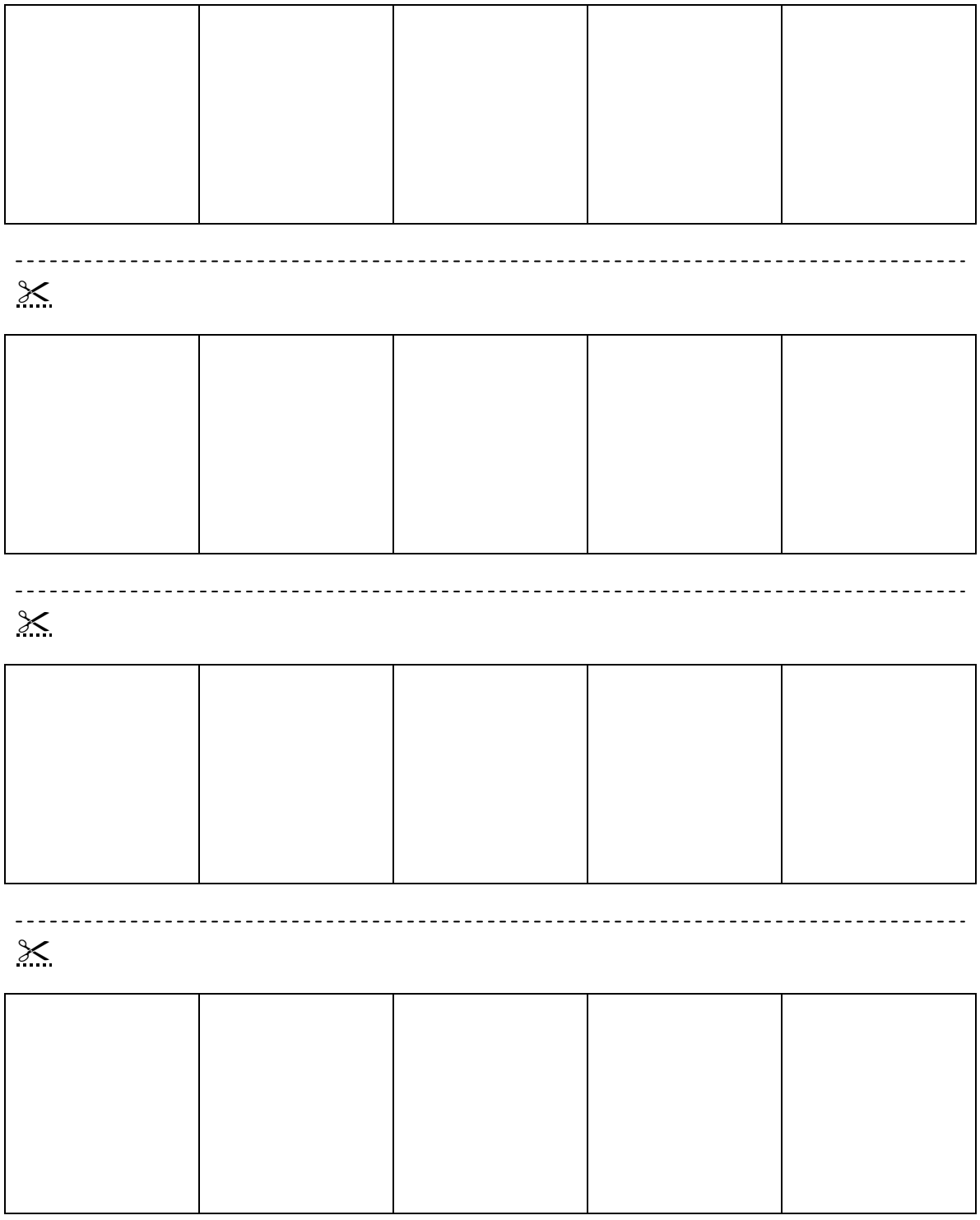
Dot Cards (4)



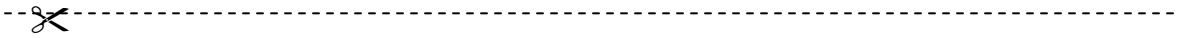
Dot Cards (5)



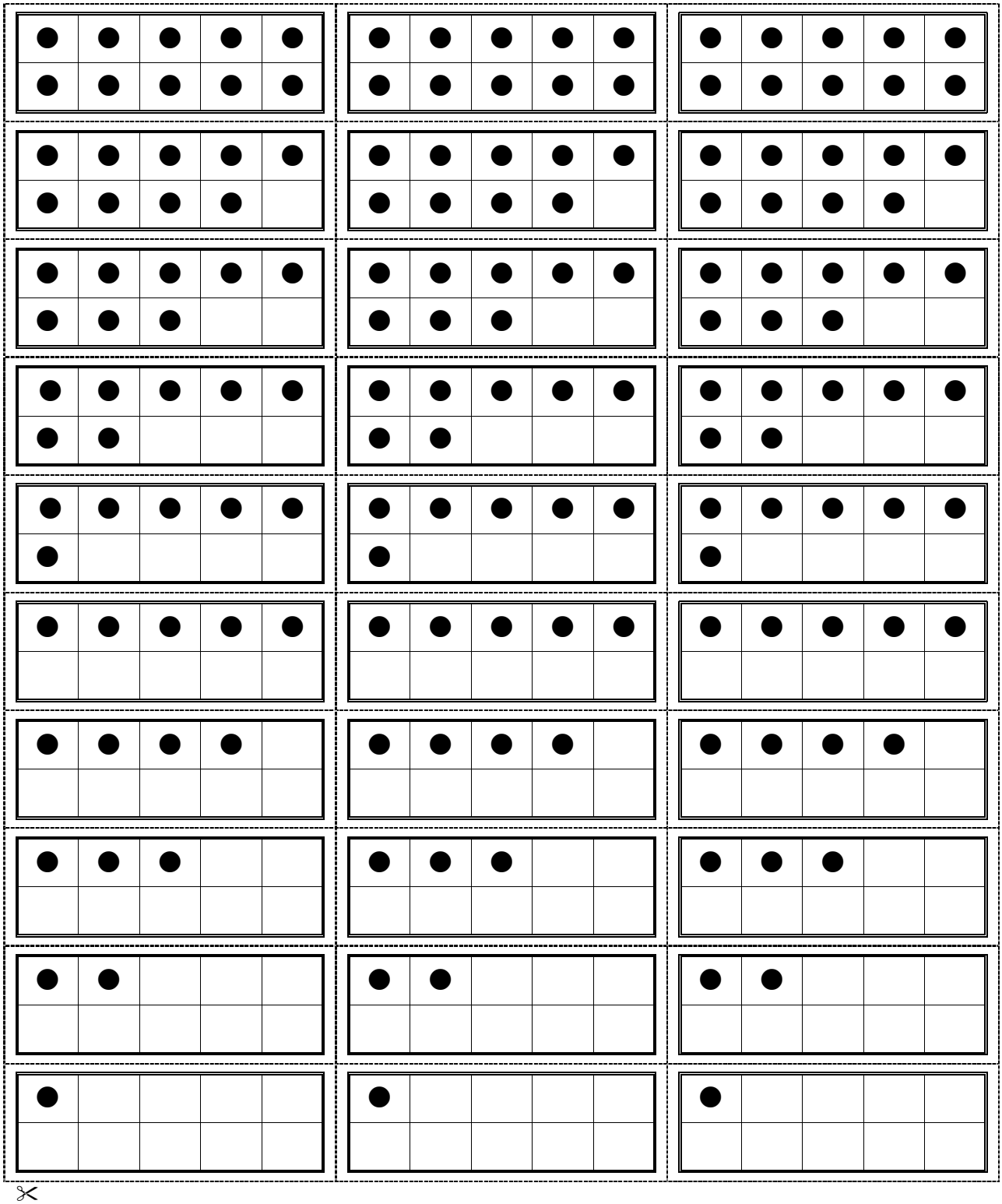
Five Frames



Ten Frames



Ten Frames 1-10



Addition Table

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

Numeral Cards 0-20

0	1	2	3	
4	5	6	7	
8	9	10	11	
12	13	14	15	
16	17	18	19	20

Numeral Cards 21-50

21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50

Numeral cards 51-80

51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80

Numeral Cards 81-100

81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100

Numeral Cards 1-100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

100 Chart

Count by ____ to 100

100 Chart (count by 2)

Count by 2 to 100

	2		4				8		

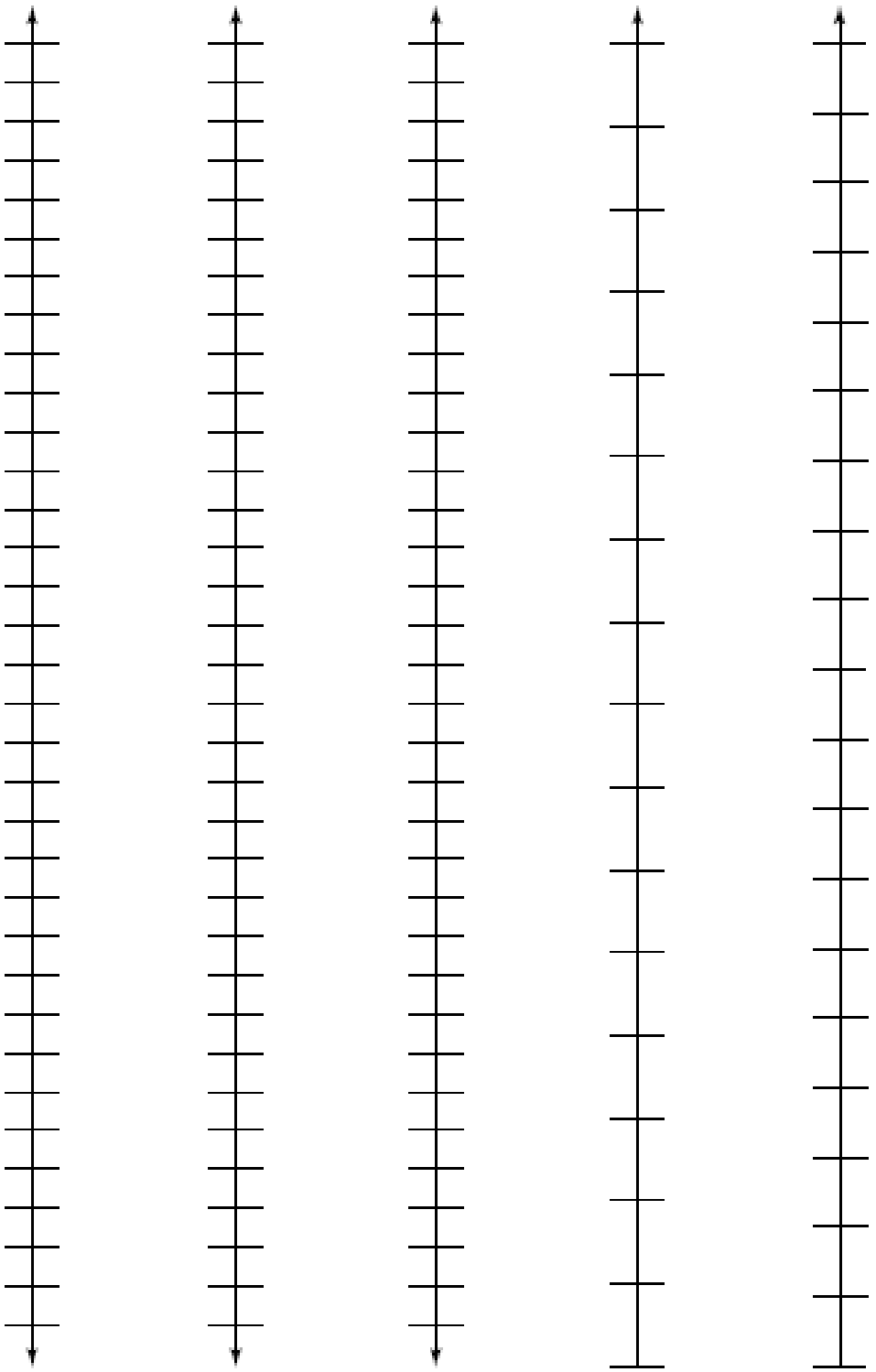
Grid

10 x 10 Grid

Times Table Frame

x	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										

Number Lines



Blank Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

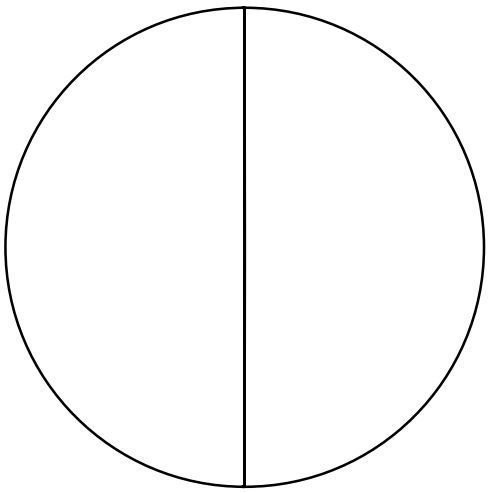
Hundreds-Tens-Ones Chart

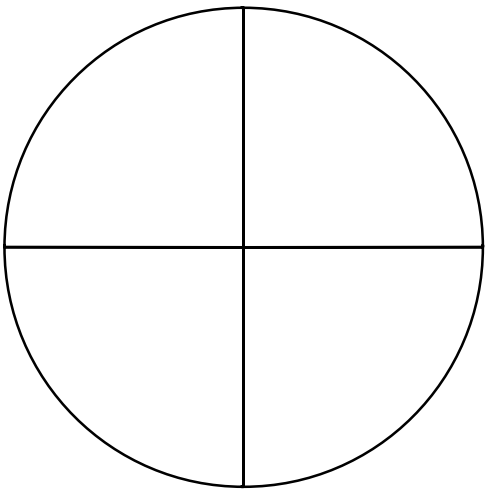
Hundreds	Tens	Ones

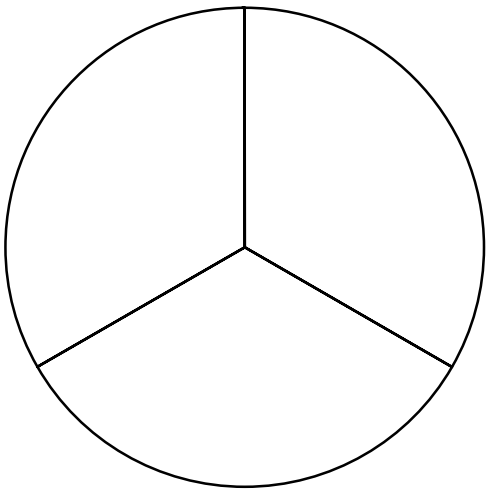
Thousands-Hundreds-Tens-Ones Chart

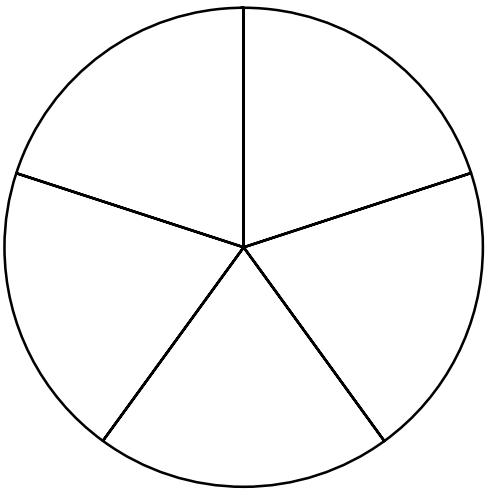
Thousands	Hundreds	Tens	Ones

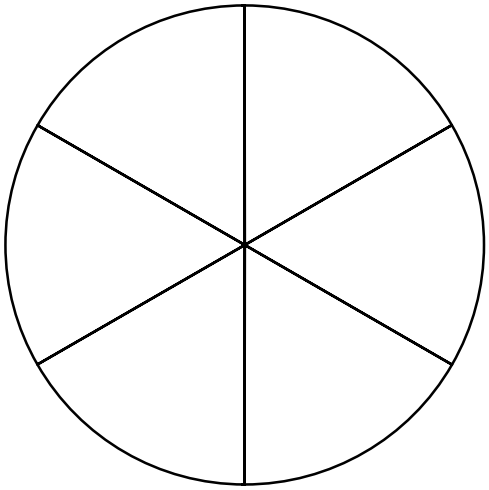
Fractions Circles

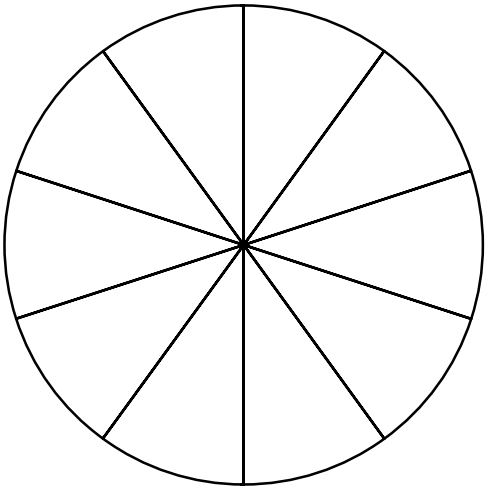


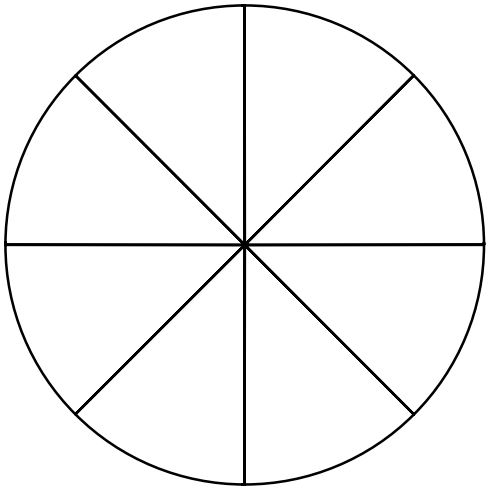


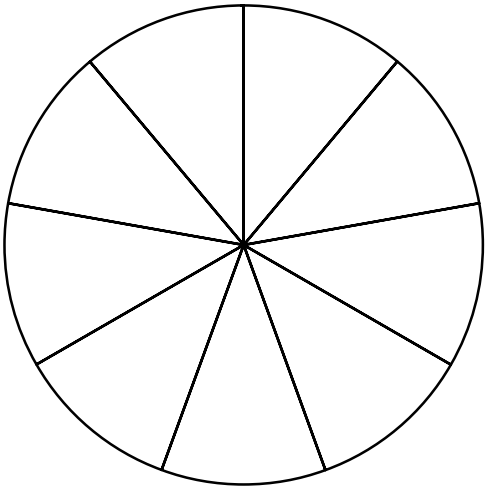




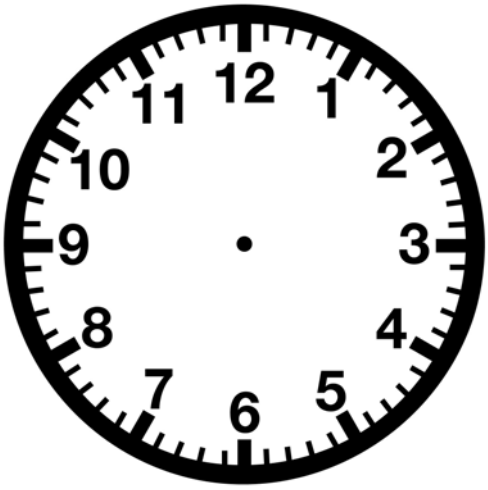
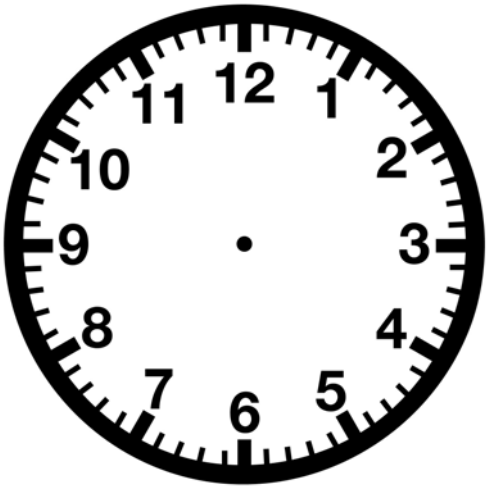
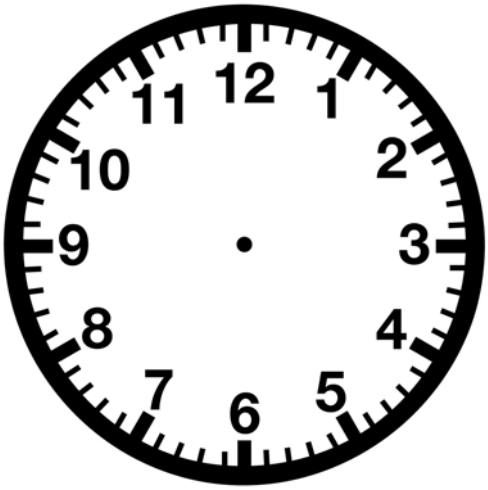
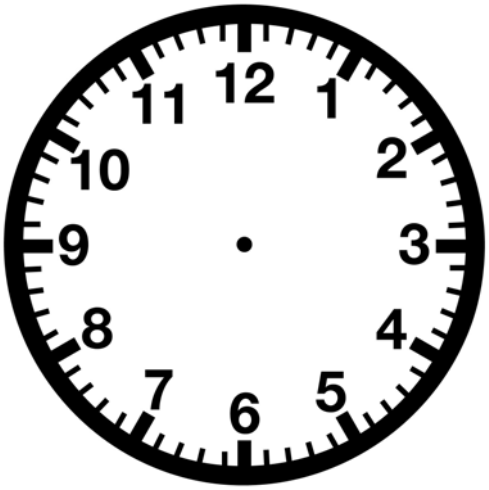
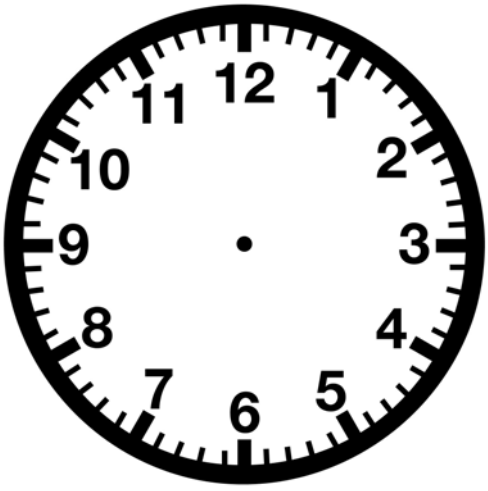
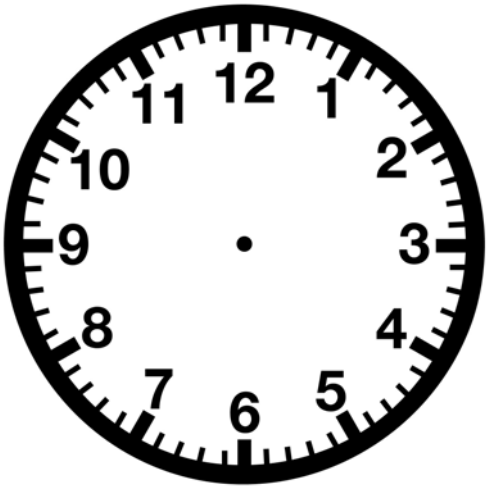




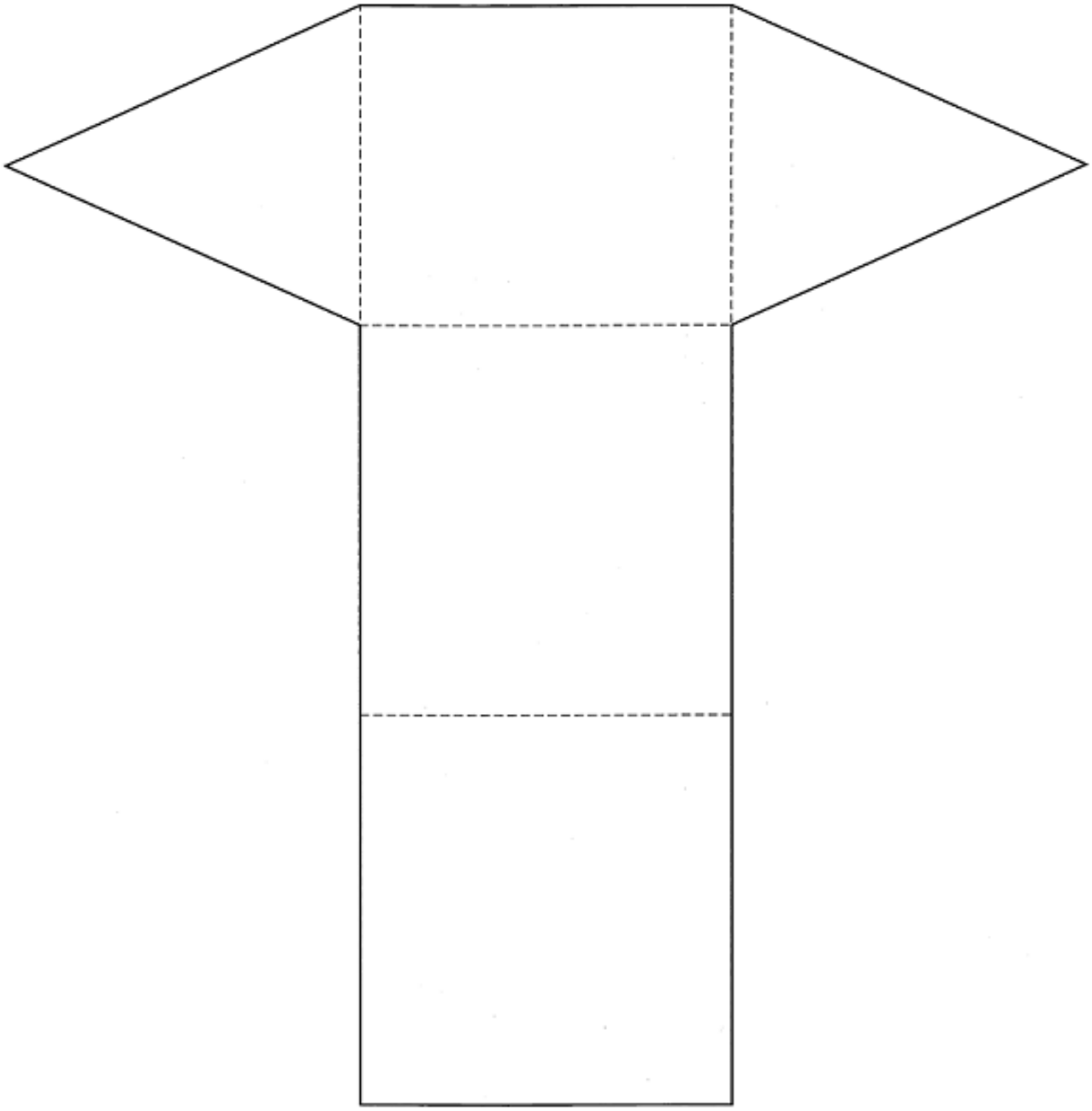


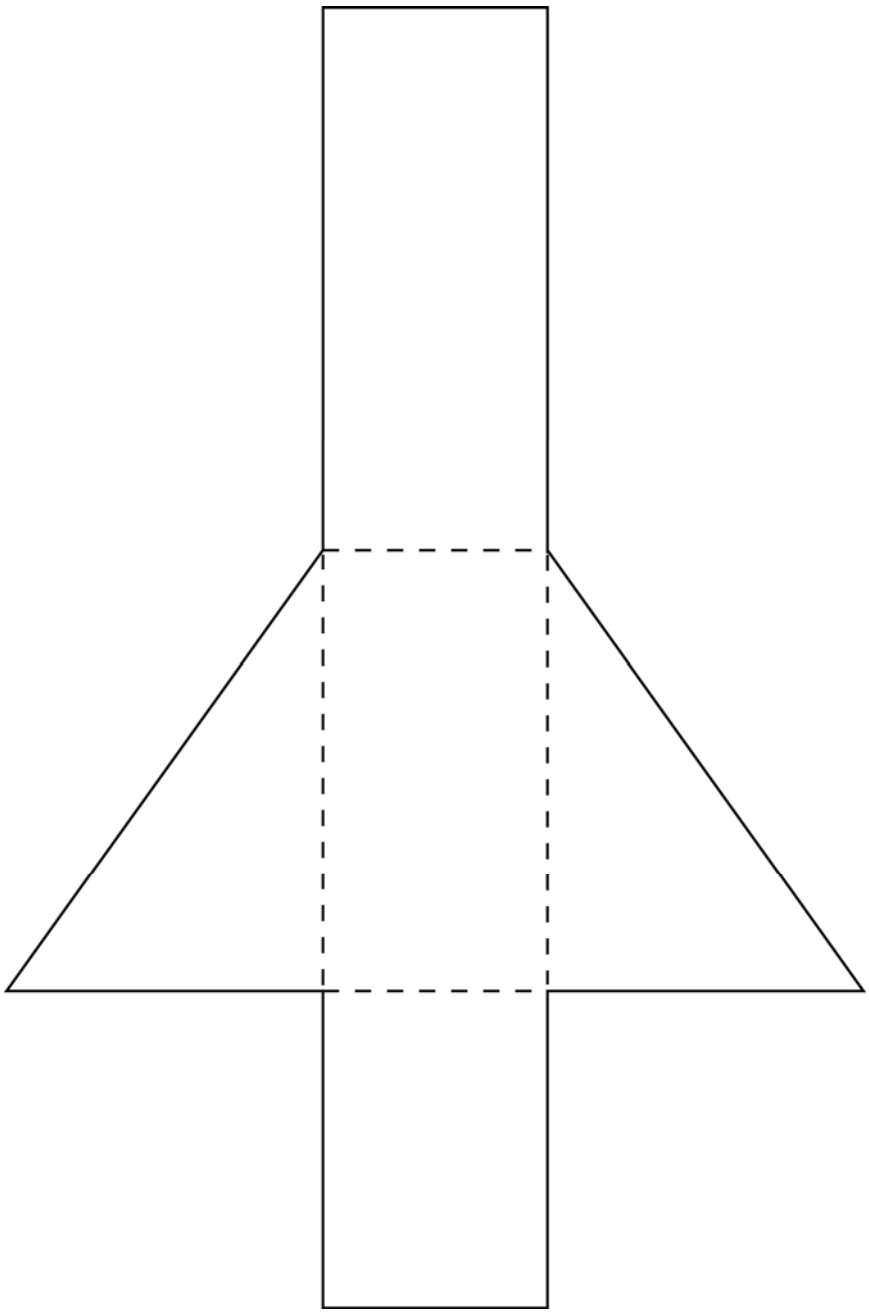


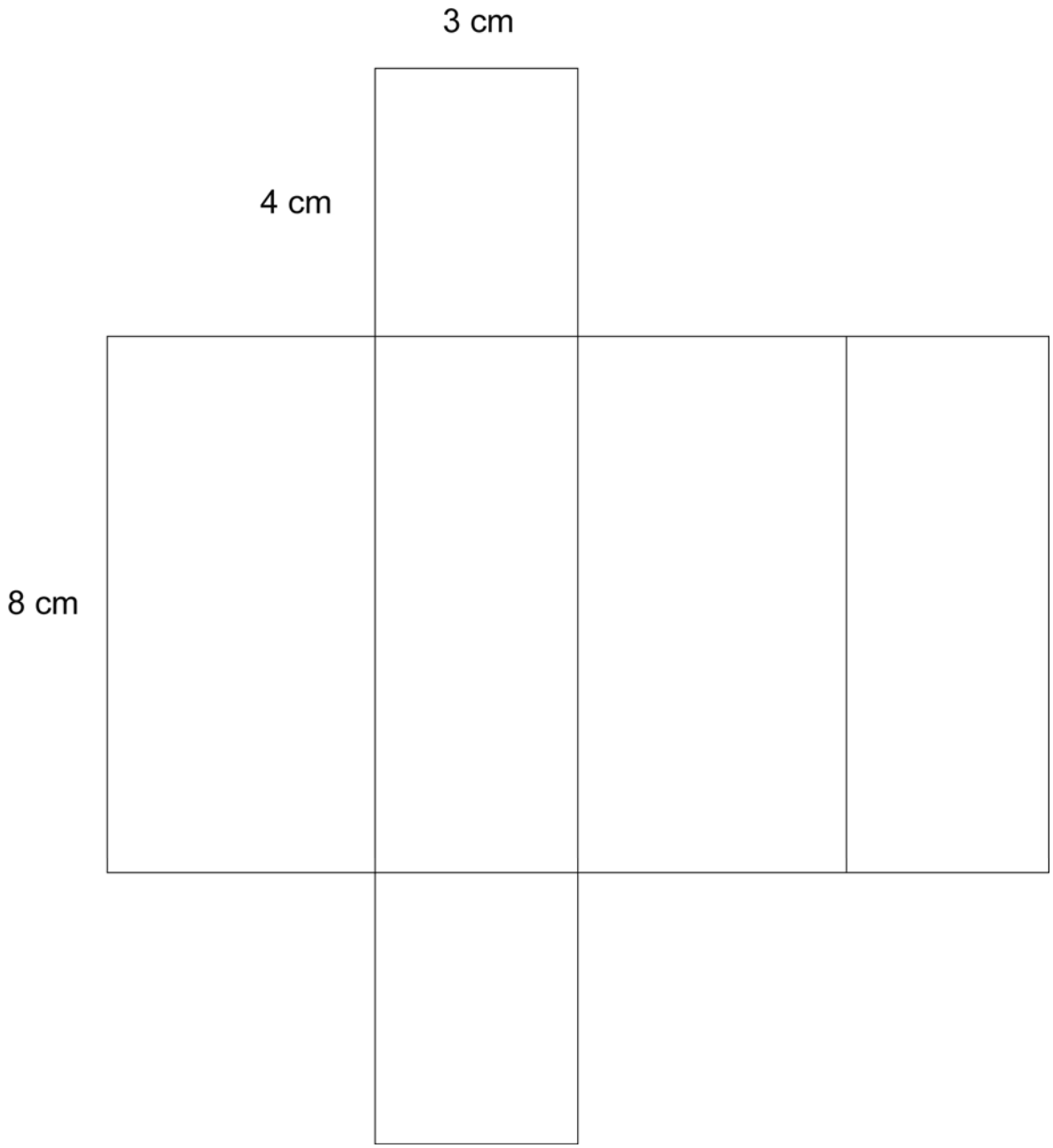
Clocks

Prism Nets






3 cm
4 cm
8 cm