

If you've got the

TIME

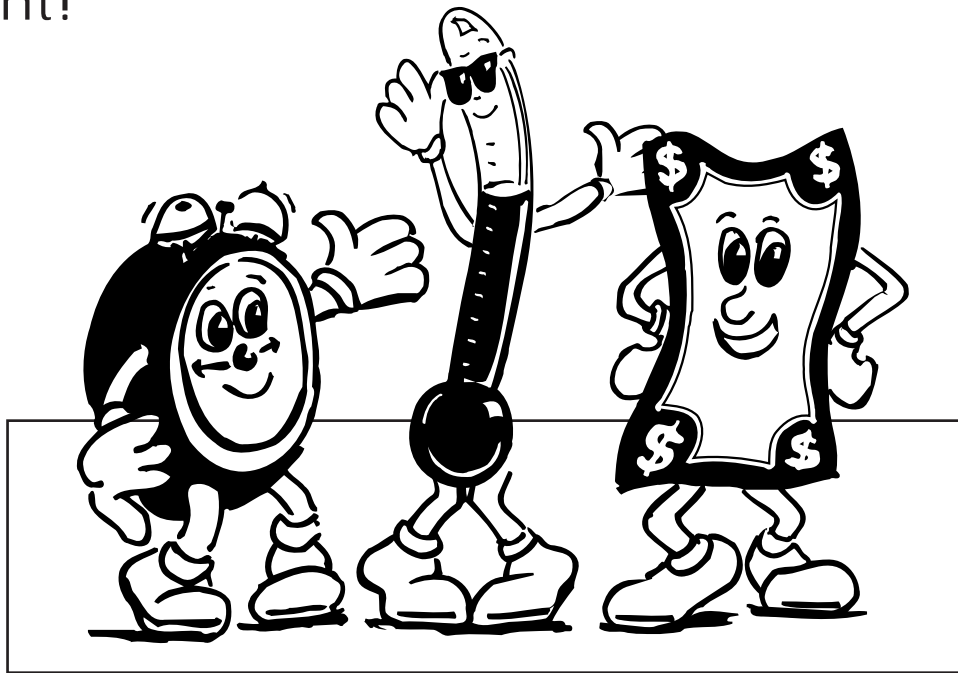
I've got the

MONEY

Especially if the

TEMPERATURE

is right!



Submitted by:

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TEACHING MATERIALS
from the
STEWART RESOURCES CENTRE



If you've got the
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● Introduction and Overview

This document seeks to provide user-friendly suggestions for primary teachers of mathematics. Three sub-topics of the measurement strand of the new elementary mathematics curriculum guide are covered. Parts of this document have been adapted freely from “Mathematics: A Curriculum Guide for the Elementary Level”.

Each sub-topic (Time, Money, Temperature) has several lessons. Teachers are invited to peruse the list of suggestions and select appropriate lessons for their particular classrooms.

The measurement strand makes up only 15% of the entire mathematics curriculum, and each sub-topic is only a small portion of the entire strand. Consequently, teachers are reminded that the content of these three sub-topics is frequently taught, not as a complete unit in itself, but all through the year, every year, for many years. Thus, the content, while sequential in nature, is taught incidentally and directly, and requires continual review and reteaching.

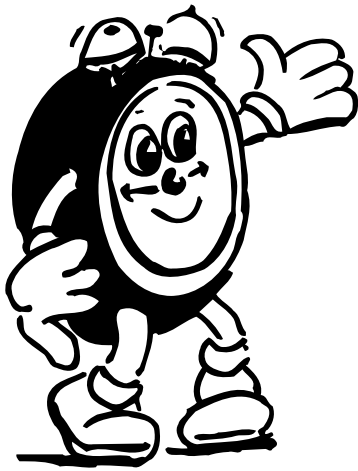
● Evaluation

Evaluation, for purposes of this unit, is to determine what has been taught - and the natural corollary is to improve instruction, monitor student progress, and show areas where reteaching may be required.

Since mainstreaming is an educational reality in today's classrooms, evaluation and assessment often need to be individually adapted. As well, measuring student progress requires a variety of techniques.

In the primary grades, evaluation and assessment is an on-going, continuous, often informal, process. Data may be gathered through anecdotal records and by checklists. The assessments may be taken prior to formal teaching, during and after, for comparison purposes. Assessment stations are used more often today as the idea of learning centres becomes prevalent.

Formal testing may also be employed and includes such techniques as pencil and paper quizzes, and oral assessment. Performance tests can be particularly useful since the emphasis of the new curriculum is activity-based and manipulative.



● TIME - Suggested Lesson Ideas

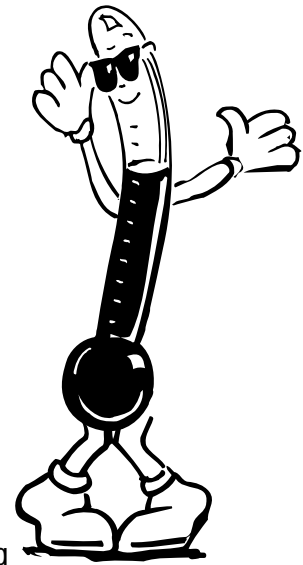
Duration: Approximately one week

Choose from the following list the lessons that best suit your learning objectives and the individual needs of your students. Realize and appreciate the fact that the teaching of time goes on incidentally all year, for several years.

- Begin the school year by counting off the days as they occur. Introduce the idea of the “Hundred Day Party”. Plan to teach this unit during the week that the one hundredth day of the school year will occur.
- Use a selection of children’s literature titles related to time such as Eric Carle’s *Grouchy Ladybug* (see Bibliography). Concentrate on durations of one minute by solving a variety of one minute problems such as “How many times can you bounce a ball in one minute?” “How many addition questions can you do in one minute?” “How long is one minute?” “Put your head up when you think one minute has passed.”
- Construct a classroom timetable on the chalk board and add to it as the day and week progress.
- Sequence a variety of events in pictorial form. Some suggested ideas are: photographs of people aging, trees or other plants changing according to the seasons, steps to making popcorn, a cake, etc.
- Construct simple analog clocks with paper plates, paper hands and a brass paper fastener.
- Construct simple digital clocks with strips of numbered papers wrapped around cylinders such as tin cans.
- Research and discuss the history of time pieces and clocks.
- Provide a display of a large variety of time measurement devices.
- Provide clock-face stampers for children to use at a learning centre.

- Prepare cooperative learning games such as:
 The Same Time
 Hickory Dickory Dock (both from Addison-Wesley Mathquest 1)
- Make posters or charts that record the passage of time such as MY DAY, A YEAR IN THE LIFE OF {student's name}, and so on.
- Play clock BINGO with clock faces instead of numbers.
- Integrate a lesson on contractions using o'clock as an example.
- Sequence a week in a student's life highlighting various activities for each day of the week.
- Collect data on the children's birthdays and graph the results.
- Visit the same outdoor park or location four times (September, December, March and June). Observe and record details regarding seasonal changes.
- Collect and display various calendars, daybooks, appointment books.
- Choose a sunny day and location to construct an easy sundial with a pole and rocks. Measure hourly and use rocks as indicators.
- Learn the verse "Thirty days hath September, April, June and November, and all the rest have thirty-one, except, February having 28. But Leap Year coming once in four, February then hath one day more".
- Learn the verse "Solomon Grundy; born on Monday; christened on Tuesday; married on Wednesday; took ill on Thursday; worse on Friday; died on Saturday; buried on Sunday. This is the end of Solomon Grundy."
- Learn the verse "Monday's Child is fair of face, Tuesday's child is full of grace, Wednesday's child is full of woe, Thursday's child has far to go, Friday's child is loving and giving, Saturday's child works hard for a living, and a child that's born on the Sabbath day is blithe and bonny and good and gay."
- Do activities in the gym or out of doors which can be timed with a stop watch.
- Prepare cardstock sets of cards for the months of the year, the days of the week, hours in a day, etc. Students can order these.
- Complete this chart every day:
 Today is MONDAY .
 Yesterday was SUNDAY .
 Tomorrow will be TUESDAY .

- Flip coins a given number of times. Discuss heads, tails and the probability of the results.
- Play "What time is it, Mr. Wolf?" or similar-type games during Physical Education.
- Discuss day, night, tomorrow, today, yesterday, morning, afternoon, evening.
- Make pendulums of differing lengths. Time the swing and compare results. Show a metronome from the music department.
- Make a huge clock in the gym using students holding posters stating 1:00, 2:00, etc. and two brooms of differing lengths for clock hands.
- Collect data regarding the number of clocks in each student's home, and graph the results.
- Estimate the amount of time required to perform some task such as stacking blocks. Then, do the activity and actually time it; see who was able to estimate closest to the right time.
- Run a string or wire below the chalk board ledge. Use it with photographs or pictures and clothes pins - a "real" time line.
- Make large puzzle pieces on cardstock of three or four representations for the same time. Laminate.
- Conclude the unit with a "Hundred Day Party" on the actual hundredth day of the school year. Celebrate with 100 minutes of fun, 100 minutes of movies, 100 jelly beans, 100 ounces of drink, and so on.



● TEMPERATURE - Suggested Lesson Ideas

Duration: Approximately one week

Choose from the following list the lessons that best suit your learning objectives and the individual needs of your students. Realize and appreciate that much of this topic can be taught incidentally throughout the school year, for several years.

- Have a pictorial weather chart pasted up permanently and discuss it daily.
- Discuss temperature daily by having the children become aware of the temperature before they leave for school.
- Discuss “wind chill factor”, especially during periods of “indoor recess”.
- Make the children aware of temperature by using children’s literature titles such as Robert Munsch’s 50 Below Zero (see Bibliography).
- Visit the same park or location four times during the school year (September, December, March and June). Discuss seasonal temperatures, etc.
- Make a metre high thermometer out of heavy cardboard and red ribbon. Use it daily in your classroom.
- Make student-size thermometers similar to the metre-high class thermometer. Use these for oral questioning and evaluation.
- Display a wide variety of thermometers - alcohol thermometers of all descriptions, meat or cooking thermometers, round (metal spring) outdoor or window thermometers, oral, rectal medical thermometers, and so on.
- Introduce negative and positive numbers with thermometers.
- Set up stations where children can measure warm, cool, hot, cold water as well as buckets containing ice and snow.

- Make ice cream using cream in a small container inside a large container packed with snow and sprinkled liberally with salt. Measure the temperature of the snow/salt combination frequently throughout the experiment.
- Discuss heat sensitive objects such as “Hyper-colour” T-shirts, etc.
- Make seasonal charts with magazine pictures to indicate average temperatures, activities, etc.
- Graph temperatures over a designated period of time - could be hourly over a single day, or at the same time of day for a week or a month.
- Visit the furnace room of your school. Discuss class thermostat, observe duct work.
- Show and discuss a power bill. Discuss methods of heating a home - gas, oil, electric, wood, etc.
- Estimate the temperature. Check your estimates with an accurate reading or report.
- Discuss health-related issues - average (body) temperature, fevers, etc.
- Discuss why a dog or other furred animal pants.
- Discuss weather “forecasts” and weather “reports”.
- Watch weather reports on TV or listen on the radio. Incorporate map skills.



● MONEY - Suggested Lesson Ideas

Duration: Approximately one week

Choose from the following list the lessons that best suit your learning objectives and the individual needs of your students.

- Introduce the topic of money with children's literature titles such as *Alexander, Who Used to Be Rich Last Sunday* or *Matthew and the Midnight Money Van* (see Bibliography).
- Play detective and use a magnifying glass to examine a collection of real coins stored in a cloth bag or change purse.
- Provide opportunities for the children to see, manipulate, count and compare actual coins and paper money. Note colours, shapes, thicknesses, relative sizes, estimated and real weights, values.
- Discuss and research the history of money including bartering, minting, the introduction of the loon dollar, and so on.
- Show traditional dollar bills and compare with a loon dollar. Discuss why we have moved to the loon or "loonie".
- Coins can be mounted with rubber cement onto card stock. The cards can be laminated as well. Use for demonstration purposes or in station activities.
- Develop a poster with coins and bills mounted, labelled as to value and laminated.
- For interest's sake, show collections of foreign coins or invite a coin collector to visit the class and discuss his/her hobby.
- Provide opportunities for students to manipulate, count, classify coins in a sorting tray. (An egg carton works well, too.)
- Research the history and origin of "Piggy Banks". Display a collection of same.

- Do rubbings of various coins using coloured chalk or crayons. These can also be enlarged on the photocopier for an interesting display.
- After students have had the opportunity to examine real coins, provide play money which is very realistic and inexpensive today.
- Students can stack coins and compare values, and graph the results.
- Teach the symbols "\$" and "¢" and provide kinaesthetic opportunities for the students by cutting these symbols out of sandpaper, felt and so on.
- Solve a variety of problems that deal with realistic money questions. "How much" type questions allow practice with adding and subtracting amounts of money. Advance to making change.
- Discuss point-of-sale electronic terminals such as the ones children are already seeing when their parents pay for groceries, and other purchases.
- A field trip might include an excursion to a nearby grocery store where products and prices could be compared (integrated with health nutrition lessons).
- A field trip might include a tour of a banking institution. Children would enjoy seeing the vault, safety deposit boxes, etc.
- Visit an automated banking machine (ATM) and demonstrate its use.
- Discuss cheques - both pay cheques and those we write to pay for items. Incorporate this incidentally when children bring cheques for school fees, etc.
- Discuss various charge cards and the manner in which they are used.
- Make a bar graph of student allowances. Discuss how allowances are spent.
- Overheads of money can be made using picture representations.
- Bulletin boards can feature pictures and prices which can be incorporated into realistic problems for use during the unit.
- Remember that money concepts evolve from simple to sophisticated and need to be revisited frequently throughout the school year.
- Use catalogue pictures or newspaper advertisements to discuss realistic money problems.
- Build towers of coins of different denominations up to \$1.00, \$2.00, \$5.00.
- Use coin stampers to show "How much".

- Trade coins of equal value with a “banker” and a “customer”. Students can take turns in each role.
- Involve the class in the counting and wrapping of money collected school-wide (eg. UNICEF, Hot Dog Sale, etc.).
- Have a class bake sale, or white elephant sale to culminate the unit. Plan to donate the proceeds to a school or community charity.

● Suggested Instructional Methods for Teaching Time, Money and Temperature

Direct Instruction

- Structured Overview
- Explicit Teaching
- Mastery Lecture
- Drill and Practice

Indirect Instruction

- Problem Solving
- Reflective Discussion

Experiential Learning

- White Elephant
 - Bake Sale
 - Simulations
 - Role Playing
 - Games

Independent Study

- Learning Activity
 - Packages
- Learning Centres
- Homework

Interactive Instruction

- Role Playing
- Brainstorming
- Discussions
- Problem Solving
 - Interviewing
- Cooperative Learning
 - Groups

Manipulatives/Resources

Some Suggestions

Time	Money	Temperature
<ul style="list-style-type: none"> • pictures • 12 hour clocks • digital clocks • analog clocks • clock stamps • stop watch • calendars • watches • sand timer/egg timer • sundial • magazines • paper plates 	<ul style="list-style-type: none"> • real money • play money, coins and bills, up to \$10.00 • money stamps • cash register • overhead transparencies of money, coins • a variety of items to "play store" • catalogues 	<ul style="list-style-type: none"> • pictures of seasons, activities, dress • non-standard thermometer • bowls • thermometers - indoor, outdoor, dipping, blank, picture • containers • ice, snow, warm and cold water

Curriculum: Scope and Sequence



TIME

Grade 1	Grade 2	Grade 3
<p>Students should be able to:</p> <ul style="list-style-type: none">• solve a variety of problems involving time• identify longer/shorter periods of time using non-standard units• determine the length of time (non-standard units) using a variety of simple “clocks”• understand the concept of time by using a digital clock (hour), and 12 hour clock (hour, half hour)• order events according to time• understand and explain:<ul style="list-style-type: none">24 hours = 1 day30 days = 1 month7 days = 1 week12 months = 1 year	<p>Students should be able to:</p> <ul style="list-style-type: none">• solve a variety of problems involving time• understand the concept of time by using a digital clock (minute), and a 12 hour clock (quarter hour, five minute)• order events according to time• understand and explain:<ul style="list-style-type: none">30 days = 1 month60 minutes = 1 hour12 months = 1 year	<p>Students should be able to:</p> <ul style="list-style-type: none">• solve a variety of problems involving time• understand the concept of time by using a 12 hour clock (minute, second)• estimate elapsed time in minutes• order events according to time• understand and explain:<ul style="list-style-type: none">60 seconds = 1 minute365 days = 1 year

Curriculum: Scope and Sequence

MONEY



Grade 1	Grade 2	Grade 3
<p>Students should be able to:</p> <ul style="list-style-type: none"> • solve a variety of problems relating to money • identify coins/bills up to one dollar • understand the relationship between pennies, nickels, dimes. • count with pennies, nickels, and dimes 	<p>Students should be able to:</p> <ul style="list-style-type: none"> • solve a variety of problems relating to money • identify coins/bills up to ten dollars • understand the relationship between quarters, dollars 	<p>Students should be able to:</p> <ul style="list-style-type: none"> • solve a variety of problems relating to money • identify coins/bills up to one hundred dollars • count with two dollars, five dollars, ten dollars • use strategies to make change for given values to five dollars • add and subtract amounts of money using correct symbols for cents and dollars

Curriculum: Scope and Sequence

TEMPERATURE



Grade 1	Grade 2	Grade 3
<p>Students should be able to:</p> <ul style="list-style-type: none">• solve a variety of problems involving temperature• compare temperatures using terms such as “hotter”, “colder”, “warmer”, or “cooler”	<p>Students should be able to:</p> <ul style="list-style-type: none">• solve a variety of problems involving temperature• compare temperatures using terms such as “hotter”, “colder”, “warmer”, “cooler”• compare and estimate, then read a thermometer and record in degrees Celsius	<p>Students should be able to:</p> <ul style="list-style-type: none">• solve a variety of problems involving temperature• compare and estimate, then read a thermometer and record in degrees Celsius• use environmental signs to estimate temperature

Common Essential Learnings and Foundational Objectives For Teaching Time, Money and Temperature

<p>Technological Literacy</p> <ul style="list-style-type: none"> • trace the historical evolution of measurement tools for time, temperature. • trace the historical development of minting of coins. • discuss the evolution of banking as we know it today. 	<p>Numeracy</p> <ul style="list-style-type: none"> • use measurement tools and devices accurately • collect data • record data • graph data • count, compare coins, bills 	<p>Communications Skills</p> <ul style="list-style-type: none"> • develop measurement vocabulary • listen attentively • follow instructions • organize information • make predictions • share personal experiences • participate in group discussions and activities
<p>Critical and Creative Thinking</p> <ul style="list-style-type: none"> • brainstorm ideas, vocabulary • classify information • discover relationships • explain, create, predict information • compare and contrast data • evaluate 	<p>Personal and Social Skills and Values</p> <ul style="list-style-type: none"> • share personal experiences • respect differences • demonstrate cooperative work techniques • develop a personal sense of responsibility towards the use of money 	<p>Independent Learning</p> <ul style="list-style-type: none"> • work alone, in pairs, in small and large groups • organize personal time, space, materials • collect data • relate new knowledge to prior knowledge • evaluate program

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- Big Time Bears
- Completed Hickory, Dickory, Dock
- Exploring Measurement, Time and Money Level I, II and III (software)
- The Guy Who Was Five Minutes Late
- It's About Time
- Lemonade Parade
- Math, Money and You
- Old Enough
- Telling Time
- This Book is About Time
- Time
- Time, Lines and Events
- Time to...
- Understanding Mathematics Five
- Windows on Mathematics: Money and Time