Revision Date: 03/11/2024

Curriculum Planning & Assessment Resource

Mathematics
Grade 4

The Consortium
Alberta Professional Learning Consortium

Curriculum Planning & Assessment Resource
Mathematics
Grade 4 - Time

About This Document

This Curriculum Planning & Assessment Resource is intended to be a collection of sample activities, assessments, and resources that teachers may wish to use as they develop their unit plans. This document is not intended to be a sequential list of activities. Rather, the intent is that teachers choose from this resource what is appropriate for their context, and sequence it in their planning.

The sample activities, assessments and resources included in this document have undergone an initial review to determine appropriateness and alignment to the curriculum. However, it is expected that teachers use their professional judgment in selecting activities, assessments and resources that are appropriate for their context.

While every attempt has been made to provide credit and receive permissions, some errors or omissions may have occurred. Please contact info@arpdc.ab.ca to report any error or omissions.

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Important Links

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- Assessment Planners (under development)
- Video on How to use the Unit and Assessment Planner
- K-3 Math Action Verbs and 4-6 Math Verb Resources

Curriculum Progressions
- Skills and Procedures Progression K-3 (under development)
- Concept Progressions (under development)

Interactive Numbered Outcomes Document with Skills

Acknowledgements

Thank you to all the teachers, numeracy specialists, and technical expertise from Alberta school divisions and ARPDC who collaborated to develop, review, and revise these planning and assessment documents to support curriculum implementation.

Grade 4 Time 1

Organizing Idea:

Time: Duration is described and quantified by time.

Guiding Question:

What might be the relevance of duration to daily living?

Learning Outcome:

4T1 Students communicate duration with standard units of time.

Summative Assessment(s) - Transfer *(In Progress)*

Summative assessments can include the following.

- *Understanding/making sense of a novel context from the real world using one or more concepts (eg. “How are place value and money related?).*
- *Understanding/making sense of a novel context using one or more understandings (eg.Students use money to model the conversion of base 10 values and relate them to base 10 block’).*
- *Being able to describe* why *(linking concepts) something is true, a result, or what might be an extension using learned concepts and understandings.*
- *Apply learning (create products; undertake projects; taking action such as creating a campaign) in a novel context or taking action using the understanding(s).*
- *Construct arguments by taking a position and verifying/proving it with known understandings.*

Transfer/Summative Samples

[*understanding surface vs deep vs transfer*]

4T1 Summative Sample

Click to jump!

KUSP 4T1

Literature Connections

KUSP 4T1

Prerequisite Knowledge

Understanding of the relationship between seconds, minutes and hours on an analog clock without conversions; can tell time on an analog and digital clock; distinguishes between a.m. and p.m.; ia able to express time using 12 hour and 24 hour cycles; understands that the unit fraction 1/60 expresses a second in relation to a minute or a minute in relation to an hour..

Pre-Assessment

Nelson Pre-Assessments
Pre-Assessments 3 & 4: Finding Each Students Pathway
Grade 3:
Hours and Minutes - p.35
Difference in Time - p.36
Grade 4:
Telling Time - p 55

I Know Statements | Metacognition

- I know that time can be expressed as fractions in a circle.
- I know that duration can be found by finding the difference between a start time and end time.

Learning Recovery

- Express time in minutes, hours, days, weeks, months, and years.
- Model fractions of a whole
- Charlotte's Clock - supportive approach to teaching telling time. (Learning Difficulties. 2005) Special Children. *Charlotte's Clock, Vikki Horner Consultancy.*

Student Language | Essential vocabulary & concepts

- **Minute:** the time it takes for the minute hand to move from one tick mark to the next on an analogue clock; 60 seconds
- **Hour:** the time it takes the hour hand to move from one number to the next on an analogue clock; 60 minutes
- **Quarter Hour:** Another way of saying 15 minutes
- **Analog clock:** a clock with a minute hand and an hour hand
- **Digital clock:** a clock on which time is displayed numerically
- **Quarter past the hour:** 15 minutes after the hour
- **Half past the hour:** 30 minutes after the hour
- **Quarter to the hour:** 15 minutes before the hour
- **Duration:** the amount of time between the start and the end of an activity or event

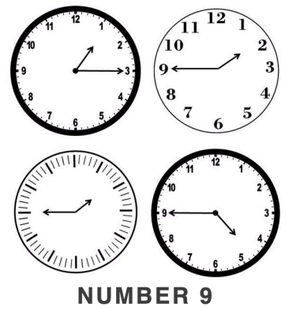
I Can Statements | Skills

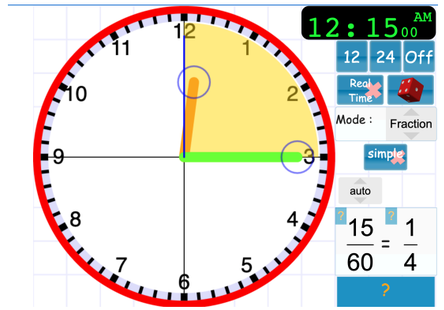
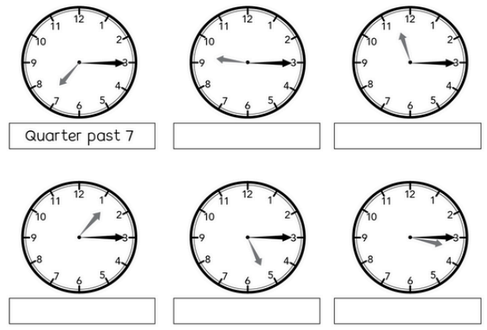
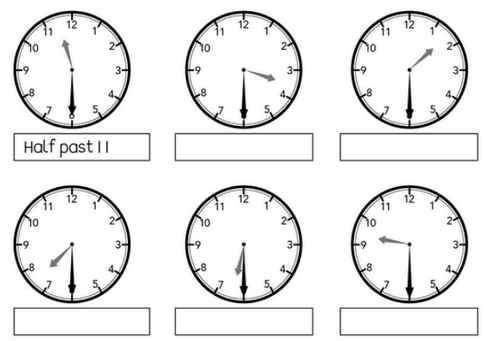
- I can divide a clock into 15-minute sections.
- I can use the terms 'quarter past', 'half past', and 'quarter to' to tell the time.
- I can divide a clock into 20-minute sections.
- I can divide a clock into 30-minute sections.
- I can express time using fractions of the hour.
- I can determine the time, to the minute, on an analog clock.
- I can use addition/subtraction to find the duration of an event.
- I can convert between seconds, minutes, and hours.
- I can compare the duration of events using seconds, minutes, and hours.
- I can read and explain minutes past the hour and minutes to the next hour.
- I can solve word problems involving the duration of events.

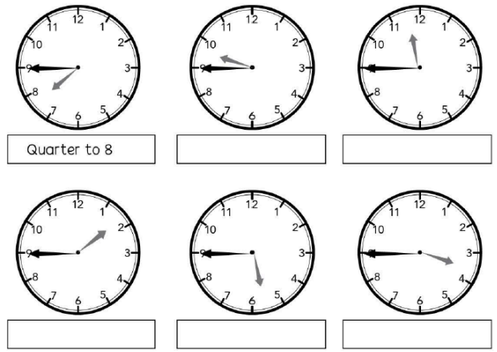
Enhancement

- Can you solve the bridge riddle? by Alex Gendler, TED-Ed Riddles
- Use a timer to introduce elapsed time. Identify the elapsed time for different activities.

Make the clock PBL

Learning Outcome	4T1 Students communicate duration with standard units of time.				
Knowledge	**Understanding**	**Skills & Procedures**	**Achievement Indicators**	**Illustrative Examples**	**Assessment**
Time of the day can be expressed with fractions of a circle, including • quarter past the hour • half past the hour • quarter to the hour Duration can be determined by finding the difference between a start time and end time.	Analog clocks can relate duration to a circle.	Relate durations of 15 minutes, 20 minutes, 30 minutes, 40 minutes, and 45 minutes to fractions of a circle. (a)	Represent time in relation to fractions on an analog clock (fractioning clock into quarters, thirds, and in half).	**Hands on Activity:** Give students a copy of an analog clock. Have the students cut it in half. How many minutes in each half? Have the students cut the clock in half again. What fraction does one piece represent? How many minutes are in each piece of the fraction? *(ARPDC created)* **Example:**  What fraction of each circle is gray? How many minutes does each fraction represent? *(ARPDC created)* **Example:**  What fraction of each circle is gray? How many minutes does each fraction represent? *(ARPDC created)* **Discussion:** Ask students what they noticed about the picture below.	**Class Starter:** Which One Does not Belong? Justify your thinking.\  **Source:** wodb.ca **4T1a** **Using Fraction Terms with Time - Surface**

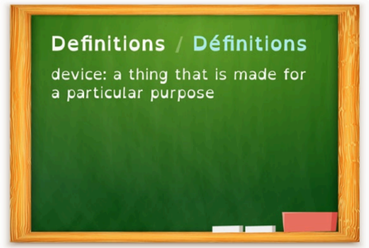
				 **Discussion:** Ask students what they noticed about the picture below. This virtual manipulative can be used to introduce the fractional form of expressing time. For example: 12:15 can also be read as a “quarter past twelve”. ***(adapted from Visnos.com)***	
		Express time of day using fractions. (b)	Express time of day in relation to these fractions.	**Example:** Express the time using fractions.  (cleverlearner.com)  (cleverlearner.com)	[4T1b Elapsed Time - Forwards and Backwards](#) **- Surface - K5 Learning**

				 (cleverlearner.com) **Example:** Express the time using fractions. a. 3:15 b. 12:45 c. 6:30 *(ARPDC created)* **Example:** Show the following times using an analog clock. a. Quarter to 2. b. 4:30 c. Half past 7 d. Quarter past 6 *(ARPDC created)* **Example:** **8.** Stefan looked at this clock and said, "It is quarter to six." Petra looked at the clock and said, "It is five forty-five." Who is correct? Explain.  *(Math Makes Sense 4. Pearson Publishing, p. 130)*	
		Determine duration in minutes using a clock. (c)	Determine duration in minutes using a clock.	For students needing additional support with duration, consider using manipulatives or Mathigon Clock. Additionally, using the Teaching Clock would help make each step visible for students. (Source: TopMarks.co.uk) **Infusing Indigenous Knowledge into Curriculum (Grades 1-12) : Main Website:**	

Activity:

Make a Sun Dial

How does the sun help people track the passage of time?

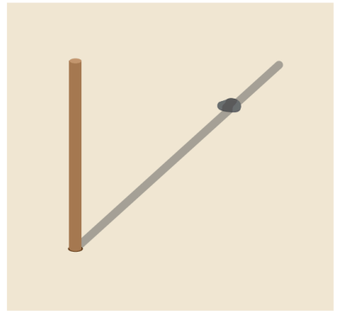


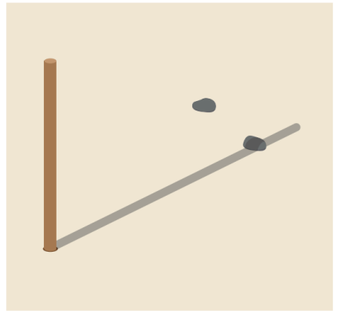
The sundial is one of the oldest **devices** known to measure time. People use sundials to see shadows created by the sun, which helps them predict the time of day. Sundials are not used often anymore, but some people still have them for fun and interest.

Construis un cadran solaire pour mesurer le passage du temps.

Here is how to build a sun dial with just a stick and some stones.

- Put the stick in the ground and mark the shadow of the stick with a stone.
- As time passes, the shadow will move.
- Try checking it each hour. What do you notice?
- Will the shadow be the same tomorrow? Next week? In a few weeks?





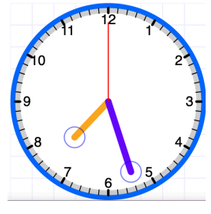
After making a sundial, have students estimate duration from one shadow recording to another.
(Source: Connecting to the Earth Through an Exploration of Time, p. 9)

Example:
Estimate how much time it takes

a. to brush your teeth in the morning
b. for math class
c. to eat supper

(ARPDC created)

Example:



How much time has elapsed?
(adapted from Visnos.com)

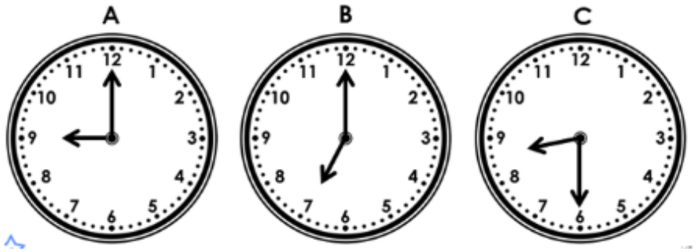
				7. This chart shows Emma's Saturday activities. Copy and complete the chart. **a)** **b)** **c)** *(Math Makes Sense 4. Pearson Publishing, p. 137)* **Example:** Look at the clock below. What time will it be 37 minutes later? ***(adapted from Visnos.com)*** **Activity:** Have students play Time Teller - Elapsed time in minutes *(Source: roomrecess.com)*	
		Convert between hours, minutes, and seconds. (d)	Convert between hours, minutes, and seconds.	Recommendation to convert between hours, minutes and seconds, before calculating duration **Activity:** To Help Students Visualize how many seconds there are in a minute, have the students explore using the Geared Clock in Mathigon. 1. Have the second hand clicked on. 2. Have the students start with the second hand at 12. Then have the students move the second hand once around. What did the minute hand do? 3. How many seconds is 1 minute? To Help Students Visualize how many minutes there are in an hour, have the students explore using the Geared Clock in Mathigon. 1. Have the second hand clicked off. 2. Have the students start with the minute hand at 12. Then have the students move the minute hand once around. What did the hour hand do?	**4T1d Minutes to Seconds - Surface - K5 Learning** **4T1d Hours to Minutes - Surface - K5 Learning**

Activity	Start Time	End Time	Elapsed Time
Library visit	9:15 A.M.	9:55 A.M.	
Hockey practice	4:25 P.M.		40 minutes
Help with supper		7:10 P.M.	35 minutes

				3. How many minutes is 1 hour? (*ARPDC created*) and (mathigon.com) **NOTE:** To convert minutes to second or hours to minutes the students need to multiply by 60. Students are able to multiply a single digit by a double digit but NOT two double digit numbers. To convert seconds to minutes or minutes to hours the students need to divide by 60 but students only know dividing by a single digit. **Strategies:** 1. Use a clock to help students with conversions. 2. Stick to easy numbers (3 hours to minutes) or multiples of 15, 30, 60. 3. Decompose your number. For example: 45 minutes to seconds. (9 groups of 5 minutes) 4. Repeated Subtraction and Addition **Example:** How many minutes is a. 3 hours b. 2 hours 16 minutes c. 3 and a quarter hour (*ARPDC created*) **Example:** How many seconds is a. 5 minutes b. 10 minutes and 58 seconds (*ARPDC created*) **Note:** Since it is not an expectation for students to know how to divide by a two digit number in Grade 4 to convert minutes to hours and seconds to minutes, consider using repeated subtraction. **Example:** How many hours is a. 15 minutes b. 30 minutes c. 360 minutes (*ARPDC created*) **Example:** How many minutes is a. 120 seconds b. 560 seconds (*ARPDC created*) **Extension:** How many seconds is 4 hours and 4 minutes?	
		Apply addition and subtraction strategies to the calculation of duration. (e)	Calculate the duration of events applying addition strategies of time. Calculate the duration of an event applying subtraction strategies of time.	Review earliest to latest times to help students to know which time to start with.	4T1e Elapsed time - forward and backwards **15 mins increments - surface - K5Learning** 4T1e Bus Stop Exit Tickets **- Surface**

Example:

These times are all in the morning. Write down the times from earliest to latest.



Finding end times on a timeline. Tell students that you can find end times using timelines, too. Draw on the board:

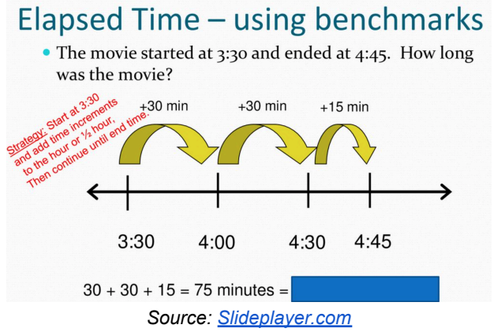
Sara starts her homework at 6:45. She works on math for 25 minutes.

Mark 6:45 at the beginning of the timeline. Tell students that you are going to mark the timeline in five-minute intervals. Draw small marks on the timeline, counting by 5s until you reach 25. Do not label the marks. Draw an arrow from the start time to the last mark. Tell students that you now have to find the end time by counting up by 5s from the start time. Count from 6:45 to 7 o'clock. Make the mark at 7 o'clock longer and label it. Continue counting until you reach the end time (7:10). Label the end time, as shown:

Activity:

(JumpMath (ME-26 Time Intervals p.119 - 121 and 4-6 Math Verb Resources)

Example:



Source: Slideplayer.com

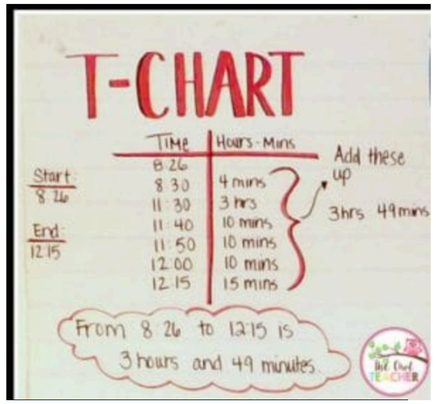
Nelson Pre-Assessment 5 - You may wish to use these as formative assessments in completion of this Skill and Knowledge:
Differences in Time - page 65
Calculating Lengths of Time - page 66

Example:
Use a number line to determine how much time elapsed.

Answer:

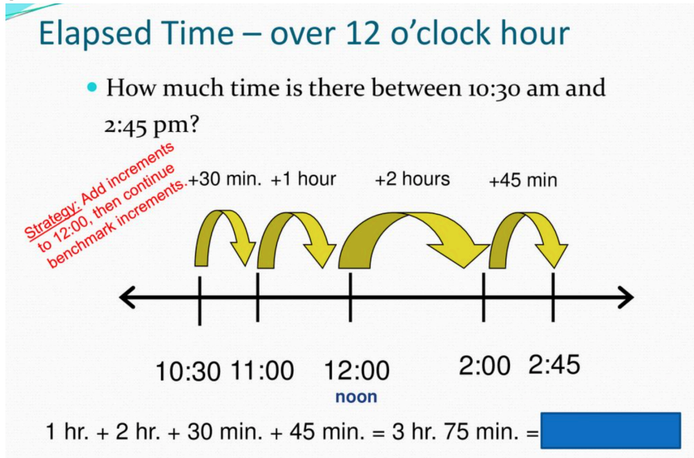
Source: ***Doodlelearning.com***

Example:
What is the duration of time from 8:26 am to 12:15pm? Use a T-chart.
Answer:



Source: ***theowlteacher.com***

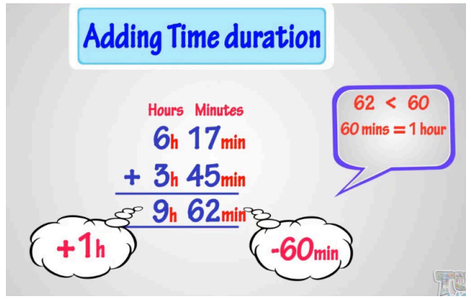
Example:



Source: Slideplayer.com

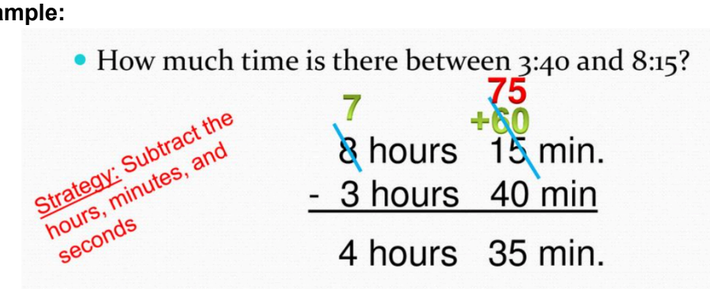
Example:
I spent 6 hours and 17 minutes on Saturday on a project. Then I spent 3 hours and 45 minutes on Sunday to finish it. How much time did I spend altogether?

Answer: Using the addition method



Source: (Addition and Subtraction of Time | Math | Tutway - YouTube)

Example:



Source: Slideplayer.com

		Compare the duration of events using standard units. (f)	Compare the duration of events using seconds, minutes, and hours.	**Clarification:** The standard unit of time is seconds. However, this skill and procedure wants you to compare using the same units of time. **Activity: Estimation of Comparing** 1. Think of four different activities you might do in a day. Draw a picture of you doing these four different activities, one in each box. 2. Cut each box out and arrange them in order from the activity that takes the shortest amount of time to the activity that takes the longest amount of time. 3. For each activity, cut a piece of streamer to represent how long the activity might take. Stick your streamers on the bottom of each picture. Your streamers should easily show whether your activities take a short amount of time or a long amount of time. **Example:** Use >, <, = to complete the statements. a. 55 minutes 1 hour b. Two thirds of an hour 45 minutes c. 80 seconds 1 minute 30 seconds d. 5 hr 34 min 36 s 5 hr 36 min 50 s *(ARPDC created)* **Example:** Order the times below from the shortest time to the longest time. 83 seconds 1 minutes 16 seconds 43 seconds 2 minutes 40 seconds 146 seconds **Example:**   Which time is closer to noon?	**4T1f - My Day in Review - Deep** **4T1f - Timeline Worksheet**

<table>
<tr><td></td><td></td><td></td><td></td><td>Infusing Indigenous Knowledge into Curriculum (Grades 1-12) : <u>Main</u> Website
• <u>Grade 4 Time</u>

Canoe Travelling: There are many ways of traveling on Haida Gwaii. Look at traveling by car, by boat and school bus. Calculate the estimated time it would take to travel from one end of the island to the other using each mode of transportation.</td><td></td></tr>
<tr><td></td><td></td><td>Solve problems involving duration.
(g)</td><td>Solve problems involving duration.</td><td>There are many real life duration problems. This should be spiraled throughout the year when appropriate.

Example:
You read a book for ⅔ of an hour. If you started at quarter past 9, what time did you finish?

Example:
Sally went for a 45 minute run. She started at quarter to 4. What time did she finish?
(ARPDC created)

Example:
Google “running time” your favorite movie. You have a school night curfew of half past eight. What time do you need to start the movie? (Use a clock to differentiate)
(ARPDC created)

Example:
What activity in your life would take approximately 2 hours and 15 minutes to complete?
(ARPDC created)

Example:
Here is a schedule of activities for the trip to the Outdoor Nature Centre.

<table><tr><th>Activity</th><th>Time Period</th></tr><tr><td>Snowshoeing</td><td>1:00 – 1:50</td></tr><tr><td>Bird-watching</td><td>2:00 – 2:30</td></tr><tr><td>Snack time</td><td>2:40 – 2:55</td></tr><tr><td>Snow sculpture</td><td>3:00 – 3:55</td></tr></table>
Which activity takes the most time? How much time does it take?
Which activity would take the least amount of time?
How much time do bird watching and snow sculpture take together? Is this more than an hour or less than an hour?
How many more minutes does snow sculpting take then bird watching?
It takes 40 minutes to ride from school to the nature centre. At what time should the class leave school?
About what time will the class arrive back at school after the trip? How do you know?

Answer:
Snowshoeing takes 50 minutes.
Bird watching takes 30 minutes.
Snack time takes 15 minutes.
Snow sculpture takes 55 minutes.
(Math Makes Sense 4. Pearson Publishing, p. 138)

Example:
If you played soccer from 2:15pm to 3:30pm, how many hours and fractional-part of an hour,did you play?</td><td><u>4T1g Time On a Bus</u> - Surface

<u>4T1g Math Libs</u> - Deep

<u>4T1g Travel Word Problems</u> - Deep - K5 Learning

<u>4T1g Going To The Movies Word Problems</u> - Deep - K5 Learning</td></tr>
</table>

Resources

Mathology

[Link to Grade 4 Curriculum Correlation]

Mathology Activities
- Measurement Unit 2: Time 6: Exploring Duration
- Measurement Unit 2: Time 7: Solving Problems Involving Duration
- Measurement Unit 2: Time 8: Consolidation

Mathology Practice Workbook 4
- Unit 10: Questions 6 - 13 (pp. 65 - 68)

Mathology Interactive Tools
- Clocks

Existing Textbooks

Math Focus 4 - Chapter 10 - Lessons 1,2 3
Math Makes Sense 4 - Unit 4 - Pages 128 - 138

Websites & Resources to Support *Learning*

Manipulatives: Analog Clocks, Online Interactive Clock, Interactive Clock for Kids, Interactive Clock with analog and digital display (Fractions), Open Number Lines (Duration of time), Mathigon Clocks, **Teaching Clock** (topmarks.co.uk)

Math Centers: Telling Time and Elapsed Time Strategies (peppyzestyteacherista.com) - More details about the benchmark method

Website: Teacher Resources and Tasks (Brainingcamp)
Website: 20 Elapsed Time Word Problems (Thought.co)
Website: Word Problems for Duration (And Strategies) (thirdspacelearning.com)
Website: Exploring Time with Fraction Circles (Montessori from the Heart)
Website: How to Calculate Elapsed Time (doodlelearning.com)
Website: Strategies to Teach Elapsed Time (theowlteacher.com)
Website: Converting Units of Time (turtlediary.com) - Games, worksheets, and videos with all different concepts of time.
Video: Time: Finding the Duration (centurytech)
Video: Fractions on a Clock Face | Fractions of Time (Math for All)

Math UP

Grade 4 AB_Time
- Lesson 1: Fractions of an hour
- Lesson 2: Relating Seconds, Minutes, and Hours
- Lesson 3: Determining Elapsed Time

NCETM (teacher guides and resources)

NCETM - Measurement
(Unit 11 Time - 1 week; Year 4)

Websites and Resources to Support *Planning*

Inclusion - An inclusive approach to maths teaching
Inclusion - Good Practices on Inclusive Curricula in Mathematics Sciences
Differentiation: Preview vocabulary and pre teach to students. Use various forms of media to present vocabulary including simplified explanations, visuals in the form of diagrams to label and connect concepts.

Resources Developed by School Divisions/Educational Institutions

Edmonton Catholic Pacing Guides

Edmonton Catholic Curriculum Crates

LearnAlberta Curriculum

Alberta Teachers Association Library General Mathematics Resources

Mathematics and Numeracy - New Curriculum Toolkit

Gizmos

New Learn Alberta (Teacher Login Required)
Elapsed Time

Video: Telling Time (Math Antics) Video focusing common units of time.

Video: Elapsed Time: How to Solve Elapsed Time on a Number Line (theESOLodyssey)

Pinterest Activity: Fractions of Time (eisforexplore.blogspot.com)

Activity: About Time – An activity set to help understand Time (ofamilylearningtogether.com)

Activity: Elapsed Time Amazing Race (Thinking of Teaching) - Detailed plans on how to set up this activity in your classroom

Worksheets: Applications of Fractions to Tell Time (Online Learning Math)

Worksheets: Time Based Word Problems Worksheets (15Worksheets.com)

Worksheets: Time to Nearest Minute and Elapsed Time (iknowit.com) - Online questions

Worksheet: Time Teller (roomrecess.com) - Online questions quizzing half hours, quarter hours, elapsed time in hours, and elapsed time in minutes.

Game: Giraffe Pull Time (mathplayground.com) - Can you read an analog clock and know what time it is? (This is in fraction time)

For access to additional resources login to Gizmos account. Request an account alberta@explorelearning.com

Indigenous Lesson Plans and Resources

Samples lessons from telugu waay "Waadluxan Mathematical Adventures" (Aboriginal Resources for Teachers, BC)

Numeracy Promising Practices videos, Empowering the Spirit, by Alberta Regional Professional Development Consortia (ARPDC)

Shared Learnings, Integrating BC Aboriginal Content K-10, BC Ministry of Education, p. 45

Math Catcher Outreach Program: Mathematics through Aboriginal Storytelling, from Simon Fraser University

Math First Peoples Teacher Resource Guide, First Nations Education Steering Committee (FNESC) and First Nations Schools Association (FNSA)

Problem Solving

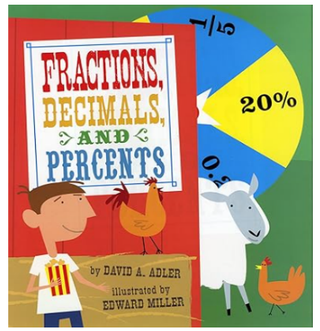
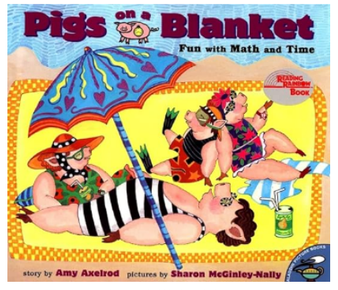
Grade 4 Math Tasks (Calgary Board of Education) - These tasks were curated by the Calgary Board of Education. Tasks listed in these documents support teaching and learning related to the learning outcomes from the 2022 Mathematics Curriculum for Grade 4.

Click to jump!

KUSP 4T1

Literature Connections

Literature Connections

Title Author	Format (Picture Book, Novel, Non-fiction, other)	Publisher ISBN	Notes
Fractions, Decimals and Percents by ***David Adler*** Step right up! Come take part in the county fair, where you'll see fractions, decimals, and percents everywhere. Gobble up a fraction of pie, boost your batting average in the arcade,and take a percent off the price of a toy. Learning about equivalent parts equals a whole lot of fun in this straightforward introduction to a challenging concept. **USA book showing American Money. Note to state decimals as zero decimal # and not "point #".** This book is best read in stages as you cover the material and then in its entirety at the end of the unit. The examples would be great to share with students up front so they see how fractions, decimals and percentages are used in daily activities.	Picture Book	Holiday House; Illustrated edition (January 1, 2011) 10-0823423549, 13- 978-0823423545	 YouTube - Ms Sar's Read Aloud
Pigs On A Blanket by ***Amy Axelrod and Sharon McGinley-Nally*** Mr. Pig, Mrs. Pig, and the piglets are hot, hot, hot and they really want to go to the beach. But time is running out for the Pigs! Will they be able to count the seconds, minutes, and hours and enjoy a swim in the ocean?	Picture Book	Aladdin 10-0689822529 13-978-0689822520	 YouTube by Nikki Kenny