

Overview

During this lesson, students will solve word problems involving addition and subtraction of time intervals in minutes. Students will integrate and exhibit learning by creating and addition/subtraction game.

Key Information

Level 1: (Ages 8-9) US Grades 2 or 3

Time: 45/90 minutes

Warm-Up	5 minutes
Mini-lesson	10 minutes
Worked Example	7 minutes
Challenge 1	7 minutes
Challenge 1 - Debug	5 minutes
Challenge 2	7 minutes
Tidy Up / Exit Ticket	4 minutes

Lesson Topics

- **Math** (Estimation and Data)
 - Solve word problems involving addition and subtraction of time intervals in minutes
- **Art and Design**
 - Explore and use mechanisms, devices and materials for imaginative activity that leads to original and creative outcomes
- **Design and Technology**
 - Generate, develop, model and communicate ideas through talking, drawing and mock-ups
- **Computing**
 - Inputs, outputs, abstraction, debugging
- **English Language Arts**
 - Use information gained from illustrations and text to demonstrate understanding
 - Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area

Learning Objectives

- **As a result of this lesson, students will be able to**
 - Solve word problems involving addition and subtraction of time intervals in minutes.
 - Design an addition/subtraction game
 - Enable students to identify, work through and overcome difficulties and learning misconceptions

Materials

- Popsicle sticks with activities and timings recorded on them
- Blank sheets of paper for writing math problems
- SAM Labs Kit
- SAM Labs Student Workbook

Warm Up - Estimation

5 minutes

What can the teacher do before school?

Objective: Students will add time to the nearest minute to solve real world problems.

Procedures: Teacher tells students that on the way to school today, she had to make a decision. It was 7:00 am and she only had one hour to get to school. She wanted to stop to get paint and markers for the class. It takes her 20 minutes to drive to school without stopping. She estimates it would add 15 minutes to her trip if she stopped at the paint store and another 16 mins if she stopped for markers. Does the teacher have time to stop for paint and markers? How do you know? Students have 2 mins to try to solve. Teachers have students volunteer to share answers and strategies. Teacher helps students to see that adding and subtracting time is important for solving real world problems.

Link forward: Student use addition and subtraction to estimate how to best utilise an hour

Mini-lesson

10 minutes

What activities can you accomplish in an hour?

Objective: In groups of three, students will identify a set of activities that they can do in an hour, leaving as little extra time as possible.

Procedures: Students are asked to imagine that it is 4:00 pm and they need to be home at 5:00 pm. Groups of students are then given a canister of popsicle sticks with an activity and time length for the activity. In groups of 3, students decide how many activities they can combine within the hour of time they have with to time to arrive back home.

Activity ideas:

- Play soccer with friends (24 min)
- Play a game of go-fish (15 min)
- Ride a bicycle to the park (17 min)
- Walk home (10 minutes)
- Watch a video on the internet (12 min)
- Visit a friend or family (35 min)
- Jump rope with a friend (17 min)
- Listen to a song (5 min)
- Read a book (12 min)

Keywords

- Time
- Calculate
- Hour
- Minute
- Second
- Millisecond

Let's Discuss: *How many minutes and seconds make up an hour? In your workbook or with a partner, record, discuss, or share one of the strategies you used to solve the problem.*

Link forward: Students will design an addition/subtraction game to practice and verify their solutions. (The timer students design is intended to motivate them to practice their addition and subtraction.)



Worked Example

7 minutes

Create a simple timer

Instructions	Workspace	Notes for Teachers
<p>Step 1. Turn on and pair</p> <ul style="list-style-type: none"> • Button (/Key Press) • RGB LED block <p>Drag these blocks onto the Workspace and connect them.</p>		<p>The teacher says, "Now, we are going to build a timer which we'll be using in a game to test our addition and subtraction skills. In your small groups work together to create a counter with an alert".</p> <p>The teacher says, "The input in this system is our Button/Key Press. The output in our system is the RGB LED. Does anyone know why?" (When you press the button, the light will turn on.)</p>
<p>Step 2. Add the Interval block between them.</p>		<p>This is the first time students will be getting to know Interval block so spend time relating it to what they're doing in math. The teacher says, "Interval is a lot like what we learned in the warm-up and mini-lesson--it allows things to occur at set times".</p>

Challenge 1

7 minutes

Create a timer with an alert for an addition/subtraction game

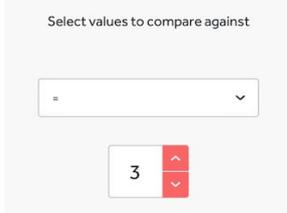
Instructions	Workspace	Notes for Teachers
<p>Step 1. Set the Interval block to '1 second'.</p>		<p>You can set Interval to occur by hours, minutes, seconds and or milliseconds. The teacher could reinforce concepts of time when explaining the differences in increments.</p>
<p>Step 2. Add the Counter and Compare block between the Interval and RGB LED blocks.</p>		<p>The Counter and Number block both need to be set to specified values for the system to work properly. Allow students to struggle with making it work, then ask them if they have any clues as to how to "debug" the system. Debugging is a process of identifying issues and working to fix them.</p>

Checks for understanding: What does the Compare block do in the system? What is the input for the system?

Challenge 1 - Debug it

5 minutes

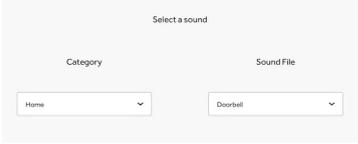
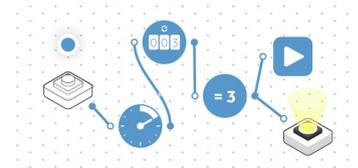
Why doesn't the system work?

Instructions	Workspace	Notes for Teachers
<p>Step 1. Open the Settings of the Counter block and set it to 'Restart' and '0-3'.</p>		<p>The Counter block allows students to identify a number to count up to (0-100).</p>
<p>Step 2. Open the Settings of the Compare block and set to '3'. Now, test it!</p>		<p>The Compare block sends a true value when a specific number is reached. In this system, when the button is pressed 3 times the light will turn on. Then, the system is reset.</p>

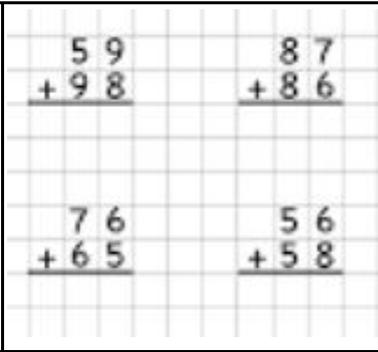
Challenge 2

7 minutes

Add a Sound Player to your timer

Instructions	Workspace	Notes for Teachers
<p>Step 1. Add the Sound Player block to the Workspace.</p>	 <p>SOUND PLAYER</p>	
<p>Step 2. Open the Settings icon and set the sound.</p>		<p>The Sound Player block will help students keep track of how many questions they got correct. There are a plethora of sounds to select so you may want to choose the sound all students utilise to keep the pace of the lesson.</p>
<p>Step 3. Connect the Sound Player to the Number block. Test it!</p>		<p>Encourage students to try their system a few times</p>

Lesson 1.5 - Time's Up!

<p>Step 4. Write single and double-digit addition and subtraction questions for your partners. And put them in the canister. Each student chooses a question. For every question your classmate gets correct, press the button. Once you get three, the timer will sound! Keep track of how many your team gets correct!</p>		<p>In this example, students write the questions for their classmates but you could have these pre-written by yourself or students. There should be a sufficient number of simple and difficult questions. The group with the highest count wins!</p>
<p>Extension Ideas:</p> <ul style="list-style-type: none"> • Include a timer in your system so there's a time limit to students' responses 		

Checks for understanding: *What are the main inputs and outputs of our system? What does the Counter do in our system?*

Tidy Up / Exit Ticket

4 minutes

Reinforcing the learning objectives of the lesson, students can reflect on key takeaways by completing and submitting an exit ticket.