Lesson Plan

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Lesson Title: Arithmetics in the Real World - Word Problems
Grade Level and Course: Grade 4, Mathematics
Time Segment of Lesson: 50 minutes

Discrete or Integrated Skills

The teacher will utilize discrete skills in instruction. The focus is on reading, specifically reading to comprehend math word problems in order to solve them.

Note: This is a math class, not an English class. However, English language development is being supported for the students in all subject classes. The class is in English, so all language skills will be used and practiced throughout. However, the specific skill students will be focusing on and developing is reading. Students will need to use reading to meet the math objective for the class.

Information on the Student Population:

There are 14 students in the class. All of the students are Chinese, share Mandarin as their native language, and are studying English as a second language at an international school in China.

All the students read and write below grade level in English. However, their English levels vary from (Mid) Intermediate to (High) Intermediate for their age group in speaking and listening, based on the ACTFL framework (American Council on the Teaching of Foreign Languages, 2024).

All of the students in the class are either in their first or second year studying mathematics in English at this school. They have all performed above average in mathematics throughout their learning. This is based on data collected from their files including assessments and teacher feedback from their previous schools, in which they studied math in their native language, as well as assessments and report cards given at this school. They have all continued to perform above average in math since entering this international school, though appropriate levels of ESL support have been required.

All students are engaged and motivated to study mathematics in English during class. They are used to pair work routines.

Big Ideas to be Addressed in the Lesson:

Arithmetic expressions can be used to solve real world problems.
Mathematics has real world applications and this is the reason to study it.

Overarching Unit Goal(s):

Students can use the four arithmetic operations with all whole numbers up to three digits, including using column methods or other approaches to solve problems with bigger numbers. This includes division problems with a remainder.

Students can round answers to an appropriate degree of accuracy - nearest nearest whole number, nearest 10, nearest 100 and nearest 1000.

Students can interpret and solve word problems for the four operations, and whole numbers.

Students can add and subtract both positive fractions and positive mixed numbers with the same denominators, including in word problems.

Students can multiply a positive fraction, by a positive whole number, including in word problems.

Content Standard(s) Addressed in Lesson:

CCSS.Math.Content.4.OA.A.2

Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

CCSS.Math.Content.4.OA.A.3

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Literacy Skills Practiced in Lesson

Reading - Comprehension of short paragraphs outlining a real world-math problem. (**Key skill for development**).
Writing - Writing of mathematical expressions and equations. Drawing pictorial representations of the sentences in a real world mathematical situation, with word or short sentence labels as necessary.
Listening - Comprehending direct instruction from the teacher on the solving of problems, with visual support and modelling.
Speaking - Following the teacher to read problems aloud. Free discussion with classmates as they work together to read and then solve problems.

Objective(s) of the Lesson: Students will be able to ...

(Remember SMART - Specific, Measurable, Achievable, Realistic, and Time-bound)

- By the end of the class, students will be able to solve four word problems, two multiplication, with the numbers up to two digits, and two division problems with whole number answers, the dividend up to three digits, and the divisor, one digit. For the exit ticket the questions will be in mixed order.

Example questions:

- "We have 14 students in our class. Each student gets 45 achievement points this month. How many achievement points does the class get altogether?" (Multiplication)
- "You want to make cakes for the school cake sale. Each cake needs four eggs. We have bought 108 eggs in total. How many cakes can we make?"

21st Century Knowledge and Skills

21st Century Knowledge and Skills	Teaching Strategies
Technology literacy	Students practice using the Kahoot quiz on the iPad. This will involve logging into the iPad and using the tool effectively.

Flexibility	Students will work with different partners during the lesson.
Communication and collaboration	Students will work with classmates to answer questions. Here they will be encouraged to practice communicating in English. For communication, the entire class is English, to support language development.
Leadership	Students will be given the opportunity to teach each other.

Student Diversity and Differentiation of Instruction

Identify students who will need differentiated instruction for this lesson.

Student Diversity	Differentiation of Instruction
All students as ESL learners.	- In formulating questions to be used in the class, the active voice will be used instead of the passive voice, sentences will be kept to present simple tense and everyday language will be focused on from the school and other aspects of everyday life, as opposed to more specialised vocabulary that students might not be familiar with. These will support students in comprehending the questions (Cooper, 2023). - There is a mathematical word wall up in the class (Krick-Morales, 2013). Key words from the wall that will be relevant to this class are “times”, “multiplied by”, and “divided by”, “expression”, “calculation”, “multiplication” and “reasonable”.

	- Pre-teach the vocabulary words in the problems used in the class that students may not be familiar with (Robertson, n.d.). This has been done in the previous class, with a review set that was given for homework. - For the process of solving the questions, a clear process will be provided with visual supports to help students follow along, written on a large A1 sheet and visible to students throughout the class. (Robertson n.d.)
Slightly lower level English students.	- Paired up with higher level students during pair activity, who can support them with English and provide first language reference and translation as necessary. - Sit closer to the teacher during individual practice activities, including final exit tickets, so any prompting or support can be provided as necessary.
Higher level English students.	- Paired up with lower level students. This will stretch their own skills both of reading and speaking as they vocally discuss with their partner. They will use primarily English, but first language support can be used as necessary. - They can replace the teacher to lead the class through some of the whole class examples.

Formative and Summative Assessments- include open ended questions that will lead students to think deeply about the content and will also build on prior knowledge.

Formative Assessment	Summative Assessment

Entry questions in book - multiplication and division. Students show these up to the teacher when finished.	There is no summative assessment in this lesson. Six lessons later, students will take an end of unit test. Later, they will take an end of semester test.
Questions to be worked on in pairs. Students match signs to the problems and then solve them.	
Kahoot! quiz.	
Mini whiteboard questions.	
Final exit ticket.	

Teaching Strategies and Related Student Activities (Include Web 2.0 activities and innovative strategies,as appropriate):

Steps in Mini-Lesson	Details	I do/we do/you do
Class warm up	- Two multiplication problems (two digits by two digits) and two division problems (three digits by one digit) are on the board. - Students write the answers to these in their books. Briefly go through these as a class after. This is a review of a previously covered skill - start a lesson with a review of previous learning (Roshenshine, 2012). It also activates thinking and skills required for this lesson.	You do. We do.

Review of process for solving a word multiplication or division problem, as introduced last class.	Note: Throughout the class, the ideas of models and guided practice are provided (Rosenshine, 2012). Also applied is the idea of alternating between problems with solutions provided and problems students must solve. (National Council on Teacher Quality, 2016) Tell students today's objective. Remind them that we will continue practicing the process introduced last class. Have the process with required visuals on a whiteboard, separate to the main IWB board. Students stand up to say together. Although, reading not speaking is the focus of the class, reading out loud incorporates continued speaking development. Step 1: Read the problem and think about what it means. Step 2: Read each sentence. Draw a picture for it. Step 3: Read again. Decide what operation it is. Step 4: Write the expression. Step 5: Perform the calculation. Step 6: Think about the question. Does the answer look reasonable? Step 7: Check each step.	We do.

Teacher modelling, followed by teachers and students do together.	Have four problems on the board. The first two, one multiplication and one division, the teacher does, explaining his thought process and how he is working through the steps. The second two, also one multiplication and one division, the teacher does with help from the students. Ask the students what the next step is at each stage. Then ask the students how to do each stage, emphasizing the answer.	I do. We do.
Students practice matching and solving question activity in pairs.	Students work in pairs. Heterogeneous: student with stronger English paired with student who needs more English support. Each pair gets a set of four slips, each with a question on it, and four pieces of paper, each with an appropriate operation symbol on it, for multiplication and division. They work together to solve the four problems, matching the appropriate operation card at the same time. There are two multiplication and two division questions.	You do.
Further whole class modelling, followed by Kahoot quiz.	Students return back to their original seats. The teacher models the answers for the four questions students have just answered, so that again, the students can see the process clearly modelled.	I do. You do, then we do.

	Next we move on to a Kahoot! quiz. Students work on this individually on their iPads. Four questions in total. Two multiplication and two division, mixed randomly. After each question, model the process together.	
"Speed-dating" activity.	Desks are arranged in a circle.There are two students at each desk, one sitting on the inside, and one sitting on the outside of the circle. Each table has five word problems written down on a sheet. The sheets are all the same. The students sitting together, work together on the first problem. Then the inside students rotate so that students are in new pairs. The new pairs work together on the next problem. This continues until all questions have been completed. While students are working on this, the teacher monitors and takes notes of any challenges to review with the class afterwards.	You do.
Final modelling and mini whiteboard activity.	Students back to their seats. The teacher models the two most challenging questions from the previous activity. Next, two final practice questions on mini whiteboards, one multiplication and one division, again, mixed randomly. After each question, all students show their whiteboard up together. Go through as a class.	I do. You do, then we do.

Class conclusion and exit ticket.	Put away mini whiteboards and then do some breathing exercises to calm down. Remind students of what we have covered today and give overall feedback. Tell them that we will do a final exit ticket before we leave the class. Students complete the exit ticket, which is four final questions, two multiplication and two division.	I do. You do.

Materials and Resources for Lesson

Materials, Technology, and Websites	Required Preparation
Poster showing the steps of our process.	Create a poster on the computer, print in A1 to have on the separate whiteboard.
Kahoot! quiz with four questions.	Prepare quiz.
Two question sheets, one with five questions for "speed-date" activity (7 in total) and one with four questions for the exit ticket (14 in total).	Write questions and prepare a sheet.
Four further questions each question in the set on a cut up sheet. (x7) Sets of four paper slips, two with the multiplication sign and two with the division sign. (x7) *This is for the first pairs activity.*	Write questions and prepare and cut sheets.
One mini whiteboard for each student, one iPad for each student.	Students have these stored in their desks.

References

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