

# Rounding the Ballpark

Estimate



# Anchorage School District

## TTL 2.0

### Unit of Instruction

#### **Unit Title**

Rounding the Ballpark

#### **Subject(s) Addressed - Please check all that apply**

- |   |   |
|---|---|
| <input type="checkbox"/> English/Language Arts      | <input type="checkbox"/> Skills for a Healthy Life    |
| <input checked="" type="checkbox"/> Mathematics     | <input type="checkbox"/> Arts                         |
| <input type="checkbox"/> Science                    | <input type="checkbox"/> World Language               |
| <input type="checkbox"/> Geography                  | <input checked="" type="checkbox"/> Technology        |
| <input type="checkbox"/> Government and Citizenship | <input type="checkbox"/> Employability                |
| <input type="checkbox"/> History                    | <input type="checkbox"/> Library/Information Literacy |

#### **Author**

C. Lance Smith

#### **Unit Synopsis/Description**

This lesson is designed to show students how to make estimations. Student will use several activities, will benefit from technology, and must consider the purpose of estimation. The unit is intended for primary students ,kindergarten thru second grade, but is not limited exclusively to those grades.

To help you to better understand this unit it is important to realize it was built from a child-centered perspective using a backward design process and its purpose has two parts. Firstly, the unit is made of activities that are computer based to guide the student and assist the student at their pace of understanding. Secondly, this unit creates the opportunity for the adult to facilitate learning and communicate with the student as the activities are being completed. The adult is considered an integral part of the unit. The adult is expected to check the work and offer individual and small group explanations as well as examples to aid the students success.

The unit can be served through a lab, in a classroom with small clusters, or at home with adult help. Each student working at their level.

In short this unit is not intended to replace a teacher, but instead provide and facilitate a common project ending in mutual academic success.

#### **Unit Duration**

2 weeks for most students-< Child-centered timeline>

#### **Enduring Understanding(s)**

Students will be able to identify the difference between exact computation and approximation.

#### **Essential Question(s)**

What is your ballpark guess of a ballpark frank?

#### **Alaska Content Standards(s)**

- Perform basic arithmetic functions, makes reasoned estimates, and select and use appropriate methods or tool for computation or estimation including mental arithmetic, paper and pencil, a

- calculator, and a computer (m.a.3)
- Use technological tools for learning, communications, and productivity (t.a.2)
- Use local and world-wide networks (t.a.3)
- Solve problems both individually and with others (t.c.2)

### **Alaska Performance Standard(s)**

- Make reasonable estimates of “how many” and “how much”; estimate the results of simple addition and subtraction problems; (ages 5-7) M.A.3

### **Culminating Performance Task**

A multipart activity on the computer requiring an adult to check for accuracy offering opportunity to help students during ‘teachable moments’. The student will have graduated to a real world activity of word problems they may encounter at the local roller skating rink as well as on a test. Ten word questions will be posed, requiring estimation and rounding to answer multiple-choice questions (matching to indicate the correct answer). The task is a project for the student, a sort of puzzle. It will be complicated because there will be contextual cues and numerical symbols to draw quantity information from. The culminating task will require the student to build and show the process, which results in the correct answer. The text will be read to the student via audio recording, requiring headphones, aiding poor readers. None of the activities self-correct, removing the ‘gamer’ method of trying the answer until the machine says ‘yes’.

### **Interim Assessment Tool(s) - Formative Assessment**

**(Quizzes, tests, reflections, observations, work samples, dialogues, academic prompts, etc.)**

Activities as work samples, observation- as student completes and meets the activity with at least a three using the activity rubric they can move on to the next lesson. If the student needs review they can move backward for practice.

### **Student Self-Assessment**

Students will self-assess themselves by their successful completion of each task.

### **Sequence of Teaching and Learning Experiences**

<b>Activity</b>	<b>Timeline</b>
<ol style="list-style-type: none"> <li>1. 30 second hook video</li> <li>2. Essential Question Discussion</li> <li>3. <i>How many</i> activity –simple (10)</li> <li>4. <i>How many</i> activity –rounding up (10)</li> <li>5. Estimation simple addition (10)</li> <li>6. Estimation simple subtraction (10)</li> <li>7. Culminating Task (real world word problems) (10)</li> <li>8. A Ballpark Frank feast</li> </ol>	As the student is ready they will transition to next lesson, with adult supervision

### **Accommodations**

All reading will be read using audio through use of headphones. A computer is necessary. A teacher or assisting adult is necessary.

### **Author Reflections**

#### **Why is this a good Unit?**

This is a good unit because it speaks to the content and performance standards as well as assists traditional lessons where standardized testing has indicated students’ struggle. The unit is good, because it allows an entire class to work as independent individual learners towards an enduring understanding. The beginning lessons of estimation at this age generally focus on broad ideas about estimation. Immediately most people think about the candy in the jar, or, “Estimate how many will fit, are blue, etc” scenarios, but this unit brings students real world and standardized test questions instead. This unit allows manipulation of materials and manipulation of ideas, in the child’s mind.

The child is in control of the problem solving and therefore responsible for the success. The adult role in this unit becomes that of a facilitator and resource.

### **Materials Needed**

- Computer, web access for activities, teacher (adult) to work with student(s), time in a lab or 4 computers in class to build a center, home computer, Headphones, Flash MX to build lesson, Dreamweaver or .html authoring tool to post and format activity, Adobe Acrobat to build unit shell and, Flashplayer6 to view lessons- approximately 30 minutes per lesson.

### **Resources**

- Activities will web based and authored to meet the activity purpose
- Matching using mouse
- Will not self-correct
- 



Project or Culminating Task Scoring Guide attached



Handout(s) attached

### **Planning Learning Experiences and Instruction**

#### **Knowledge and skills students need in order successfully complete culmination task:**

##### **Students need to know:**

- When to round up or down
- Quantities to 20
- Count by tens
- Simple addition
- Simple subtraction

##### **Students need to be able to:**

- Control a mouse
- Use a scroll bar
- Raise hand to ask for help

## **Scoring Guide-Lesson Plan Intro**

All activities are worth 10 points, requiring at least a three using the activity rubric to move on to the next activity at the teachers discretion. It is important the student is given as much independence through the lesson as possible. The adult should refrain from being a 'quick answer' to the activities by coaching the student to slow down and think. If the student struggles with the current or following activity the adult at their discretion can decide to go back with the student to the previous activity, provide explanation with the current or previous activity, or help the students with prerequisite skills necessary to meet the goal of successfully completing the activity.

## **Activity 1**

## **Simple19**

### **Concepts-Description**

The activity is worth ten points for successful completion.

This activity starts with simple numbers asking the student if the number should be rounded up or down. The student indicates the answer with a correct arrow. There is embedded hints to assist the student. The student chooses the question order and answers by matching accordingly. There are embedded hints to assist the student.

### **Procedure**

1. Write 'Estimation Rules' on the board.
2. Write 'ballpark' on the board
3. Explain the difference between exact and 'ballpark' answers
4. Explain rounding is part of 'estimation rules'
5. Explain the 1 thru 4 rule and 5 thru 9 rule of rounding.
6. Write on the board: 1, 2 ,3 ,4 and an arrow pointing down and 5, 6, 7, 8, 9 and an arrow pointing up. This will help remind the students.
7. Show an example

### **Closure**

Remind students they are building skills so that they can estimate and estimation is only used for 'ballpark' accuracy.

### **Assessment**

Teacher observation, individual student response, individual activity complete. Has the students known information about rounding up or down increased or improved in accuracy?

Using a Rubric:

- 4 Independent
- 3 Needs Verbal Assistance
- 2 Needs additional practice or extended explanation
- 1 Needs one on one, is unable but tries
- 0 Refuses

### **Thinking Skills**

Observing, discovering patterns, decision making

## **Activity 2**

## **Tens**

### **Concepts-Description**

The activity is worth ten points for successful completion.

This activity uses simple numbers between eleven and nineteen. This time there are no arrows but the number ten to indicate 'rounding down' and the number twenty to indicate 'rounding up'. The student chooses the question order and answers by matching accordingly. There are embedded hints to assist the student.

**Procedure-**with small group or individuals use same procedure on a large sticky note or dry erase board

1. Write 'Estimation Rules' on the board.
2. Write 'ballpark' on the board.
3. Explain the difference between exact and 'ballpark' answers
4. Explain rounding is part of 'estimation rules'
5. Explain the 1 thru 4 rule and 5 thru 9 rule of rounding. then expand the rule by showing even though 13, or, 23 are larger numbers it is possible to apply the estimation rules by focusing on the number farthest to the right.
6. Write on the board: 11, 12 ,13 ,14 and an arrow pointing down to a ten and 15, 16, 17, 18, 19 and an arrow pointing up to a twenty. This will help remind the students.

### **Closure**

Remind students they are building skills so that they can estimate and estimation is only used for 'ballpark' accuracy. Remind them that later when they begin doing double digit addition, each number can be rounded to get quick answers.

### **Assessment:**

Teacher observation, individual student response, individual activity complete. Has the students known information about rounding up or down increased or improved in accuracy?

Can the student apply new understanding to new knowledge?

Using a Rubric:

- 4 Independent
- 3 Needs Verbal Assistance
- 2 Needs additional practice or extended explanation
- 1 Needs one on one, is unable but tries
- 0 Refuses

### **Thinking Skills**

Observing, discovering patterns, decision making, prior knowledge

### **Activity 3**

### **SumTens**

#### **Concepts-Description**

The activity is worth ten points for successful completion.

This activity includes simple addition problems adding numbers nine through twenty-eight. This time the student must match the 'real' problem with the adjusted 'rounded' problem before matching them with the 'estimated answer'. The student chooses the question order and answers by matching accordingly. There are embedded hints to assist the student.

**Procedure**-with small group or individuals use same procedure on a large sticky note or dry erase board

1. Write 'Estimation Rules' on the board.
2. Write 'ballpark' on the board.
3. Explain the difference between exact and 'ballpark' answers
4. Explain rounding is part of 'estimation rules'
5. Explain the 1 thru 4 rule and 5 thru 9 rule of rounding. But then expand the rule by showing even though 13, or, 23 are larger numbers it is possible to apply the estimation rules by focusing on the number farthest to the right.
6. Explain the real problems are really just two of the last activity numbers stacked on top of themselves.
7. Explain they will only have to find stacked rounded numbers that match.
8. Write an example.
9. After the example has been explained, explain the matching ballpark sum.

#### **Closure**

Remind students they are building skills so that they can estimate and estimation is only used for 'ballpark' accuracy. Remind the students they can use the same estimation rules to do subtraction.

#### **Assessment:**

Teacher observation, individual student response, individual activity complete. Has the students known information about rounding up or down increased or improved in accuracy? Can the student apply new understanding to new knowledge?

Using a Rubric:

- 4 Independent
- 3 Needs Verbal Assistance
- 2 Needs additional practice or extended explanation
- 1 Needs one on one, is unable but tries
- 0 Refuses

#### **Thinking Skills**

Observing, discovering patterns, decision making, prior knowledge

## **Activity 4**

## **SubTens**

### **Concepts-Description**

The activity is worth ten points for successful completion. activity includes simple addition problems adding numbers nine through thirty-two. This time the student must, as in the previous addition activity, match the 'real' problem with the adjusted 'rounded' problem before matching them with the 'estimated answer'. The student chooses the question order and answers by matching accordingly. There are embedded hints to assist the student.

**Procedure**-with small group or individuals use same procedure on a large sticky note or dry erase board

1. Write 'Estimation Rules' on the board.
2. Write 'ballpark' on the board.
3. Explain the difference between exact and 'ballpark' answers
4. Explain rounding is part of 'estimation rules'
5. Explain the 1 thru 4 rule and 5 thru 9 rule of rounding. then expand the rule by showing even though 13, or, 23 are larger numbers it is possible to apply the estimation rules by focusing on the number farthest to the right.
6. Explain the real problems are really just two of the last activity numbers stacked on top of themselves.
7. Explain they will only have to find stacked rounded numbers that match.
8. Write an example.
9. After the example has been explained
10. Conclude the example with a matching ballpark answer (difference). Being careful that the example stays on a horizontal row.

### **Closure**

Remind students they are building skills so that they can estimate and estimation is only used for 'ballpark' accuracy. Remind the students they can use the same estimation rules to help with real world problems at the roller rink or when they are at the store. Example: "You have twenty cents and want to buy three lollipops for eight cents each, will you have enough to buy all three?"

### **Assessment:**

Teacher observation, individual student response, individual activity complete. Has the students known information about rounding up or down increased or improved in accuracy?

Can the student apply new understanding to new knowledge?

Using a Rubric: 4 Independent  
3 Needs Verbal Assistance  
2 Needs additional practice or extended explanation  
1 Needs one on one, is unable but tries  
0 Refuses

### **Thinking Skills**

Observing, discovering patterns, decision making, prior knowledge

## **Culminating Activity**

## **WordCulminate**

### **Concepts-Description**

The activity is worth ten points for successful completion. AND a 'ballpark frank' feast for the student at lunch.

This culminating activity includes real world situations in the form of word problems adding and subtracting numbers. This activity is laid out similarly to the the previous addition and subtraction activities. This activity expects the student to match the word problem (audio), with the 'real' problem and the adjusted 'rounded' problem before matching them with the 'estimated answer'. The student chooses the question order and answers by matching accordingly. There're embedded hints to assist the student.

**Procedure**-with small group or individuals use same procedure on a large sticky note or dry erase board

1. Begin with the example problem used in the previous activity:

Example: "You have twenty cents and want to buy three lollipops for eight cents each, will you have enough to buy all three?"

2. Explain you will need to decide if the question is adding or subtracting.

3. Set up a math problem from the real world example.

4. Explain the real problems are really just two of the last activity numbers stacked on top of themselves.

5. Explain they will only have to find stacked rounded numbers that match.

6. Write an example.

7. After the example has been explained

8. Conclude the example with a matching ballpark answer (difference).

Being careful that the example stays on a horizontal row.

### **Closure**

Remind students they are building skills so that they can estimate and estimation is only used for 'ballpark' accuracy. Remind the students they can use the same estimation rules to help with real world problems at the roller rink or when they are at the store. Explain estimation is very helpful to see in a hurry if they are in the 'ballpark' during tests or in real life.

### **Assessment:**

Teacher observation, individual student response, individual activity complete. Has the students known information about rounding up or down increased or improved in accuracy? Can the student apply new understanding to new knowledge?

Using a Rubric:

4 Independent

3 Needs Verbal Assistance

2 Needs additional practice or extended explanation

1 Needs one on one, is unable but tries

0 Refuses

### **Thinking Skills**

Observing, discovering patterns, decision making, prior knowledge

Estimation Worksheet-Intended to record observations and dates of activity completion. Student can also print completed activities via web browser or save as a .pdf to disk or server if working on Apple OSX.

<b><i>Student Name</i></b>	<b>Simple 1 thru 9</b>	<b>Tens</b>	<b>Sum Tens</b>	<b>Subtract Tens</b>	<b>Word Culminate</b>
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					

## *Text and Content References*

### **Bibliography**

Gordon, D.T. (2003). *Better Teaching and learning in the digital classroom*. Boston: Harvard Education Publishing Group.

Wiggins, G. & McTighe, J. (2000). *Understanding by design*. Upper Saddle River, NJ: Prentice Hall.

Morrison, Gary R. (1999). *Integrating computer technology into the classroom*. Upper Saddle River, NJ: Prentice Hall.

Fuys, D & Tischler, R.W.. (1979). *Teaching mathematics in the elementary school*. Brooklyn College: Little, Brown and Company

National Library of Virtual Manipulatives for Interactive Mathematics,  
<http://matti.usu.edu/nlvm/nav/index.html> .Copyright Utah State University

2003. Date Last Accessed: 06/16/04

This site is the end result of a three year National Science Federation grant. Grade levels Pre-K-2, 3-5, 6-8, 9-12 are seperated further by skill areas from Abucus to Venn diagrams. The site uses Java scripting to deliver its manipulative lessons, so it is cross platform. Especially useful in a lab setting.