

Grade Level/Course:
Grades 3 and 4

Lesson/Unit Plan Name:
Adaptation Through Addition

Rationale/Lesson Abstract: Students will use hands on materials to simulate how birds with different beaks eat and survive in an ecosystem. Students will use multiple methods of addition to calculate amount of food that birds have consumed with their different beaks.

Timeframe:
2 days

Common Core Standard(s):

3.NBT.2 Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

4.NBT.4 Fluently add and subtract multi-digit numbers using the standard algorithm.

Next Generation Science Standards

3-LS3.B: Variation of Traits

3-LS3-1 Different organisms vary in how they look and function because they have different inherited information.

3-LS3-2 The environment also affects the traits that an organism develops.

4-LS1.A: Structure and Function

4LS1-1 Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)



Instructional Resources/Materials:

Materials:

For table groups of four students:

Pictures of birds with different beak sizes (pelicans, seagulls, sandpipers, hummingbirds, finches, woodpeckers).

Set of items simulating bird beaks including eyedroppers, chopsticks, tweezers, spoons, clothespins, popsicle (or craft sticks).

Set of items simulating bird food including a glass of water, cooked spaghetti, uncooked rice, rubberbands, uncooked beans, gummy worms.

One small paper plate for each student to collect their food.

Notetaking paper and clipboards to record their findings and later do the math.

Lesson/Activity:

First conduct a discussion with students about inherited traits and those that develop due to adaptations to the environment. Teacher will define inherited traits and adapted traits for students. Students can give examples of things they have inherited from their parents -- eye color, hair color, skin color. Adapted traits are things that they learned from their friends like how to play games or tasting new foods.

Now talk about inherited traits of animals -- kind of bird, size of beak, size of legs, types of nests it builds. Often birds and other animals have to change or adapt to new environments. They have to develop new traits. Bird beaks are an example of inherited and adapted traits for survival.

Inquiry Discussion:

The amount and type of food that a bird eats is dependent upon many things including what kind of beak it has. Distribute set of pictures to each group of different birds. Put questions on the board for table group discussions. 1) What kind of foods do you think each bird eats? 2) What evidence can you gather from the shape and size of the beak to back your answer up? 3) What else can we tell from these pictures? After table discussion, have students share out their responses.

Tell students that in this activity, they will get to pretend to be one kind of bird based upon which beak they choose at several tables. They will have 30 seconds to feed in their initial table group. They have to place the food in their "belly" which is a paper plate.

At the end of 30 seconds, they will stop, count the pieces that they have collected on their plates and record the number of items and the beak they used. Students will then return the materials to the tray for the next group to use. (You may have to do this with them for the first try.)

Next direct students to move to the next table. This time they have to pick up a different “beak”. Again, give them 30 seconds and then have them record how much food this beak picked up. Return food to table.

Repeat this activity as long as there is time -- until students have gone to each table. If there is time, you can have students go to another table. You can have them do this at each table as long as they switch their beak each time. After they have each tried the bird beaks and made their final calculations, have them return to their original table groups. You will have to remove the beaks and food from the tables to facilitate the de-brief and next part of this lesson.

In their table groups, have students share which beaks picked up the most food, what the food looked like and why they think this occurred. Teacher questions on board would be helpful to guide table discussions.

Questions could include: “What beak was the most successful for you? Why do you think that? Do you have any evidence to prove that your beak was successful? What adaptation did this bird make to successfully gather food? Have students compare their numbers and finish up their notetaking sheet.

Second Activity/Lesson

This activity leads into a math lesson about the associative property of addition. You will probably have to break up this lesson into two days. If so, remind the students that this lesson came from their bird beak experiment by handing out the pictures of birds for students to look at again.

In this lesson, students will review their numbers and add them using the associative property of addition.

Students should have a group of 3 to 5 numbers depending upon how many times the table groups moved.

Before you start, explain that students are going to learn how to add their numbers several different ways today.

Using the Associative and Commutative Properties

I (teacher) do:

First, you as the teacher will put some numbers up on the board:

$$12+18+6+35$$

Teacher should explain that numbers will be added up by using the associative property of addition. Also the commutative property of addition means that we can add these numbers in any order.

$$= 12+18+6+35$$

(first let's decompose the numbers using place value)

$$= (10+2) + (10+8) + 6 + (30+5)$$

next let's put like place values together with the associative property

$$= (10+10+30) + (2+8+6+5)$$

Using mental math, I can add up the tens

$$= 50 + 10 + 11$$

$$= 60 + 11$$

$$= 71$$

My birds collected 71 pieces of food.

We do:

Now let's do one together. Call on a student who would benefit from support and take his/her numbers next. This is our "We do." You may also want to take another "We do" before releasing students to do their own. Explain that there are many ways to decompose and associate the numbers which doing these problems.

You try:

Direct students to add their own problems up. Put a challenge problem on the board for early finishers. Walk around the room and see how students are doing with associative property problem.

You can either have students share out their problems and solutions -- including the reasoning behind why they did solve their problem that way -- in table groups or full class at document camera.

Showing the Partial Sum Method

Take teacher's same numbers and list them vertically on the board.

$$\begin{array}{r} 12 \\ 18 \\ 6 \\ +35 \\ \hline \end{array}$$

Remind students about the partial sum method where we add up each place value separately. It doesn't matter if we start with tens or ones place. Let's start with 10s.

$$\begin{array}{r}
 12 \\
 18 \\
 6 \\
 + 35 \\
 \hline
 50 \\
 + 21 \\
 \hline
 71
 \end{array}$$

Now let's add the ones.

Is that the same sum we reached in our problem above? (Yes!)

We do:

Take one student's numbers and work together with class to show side-by-side algorithms. Start with associative property and decomposition, and then move to partial product.

You try:

Take your numbers from the bird beak activity and solve the addition problem again using partial product.

When students are finished, they should present their partial product method in their table groups or math teams.

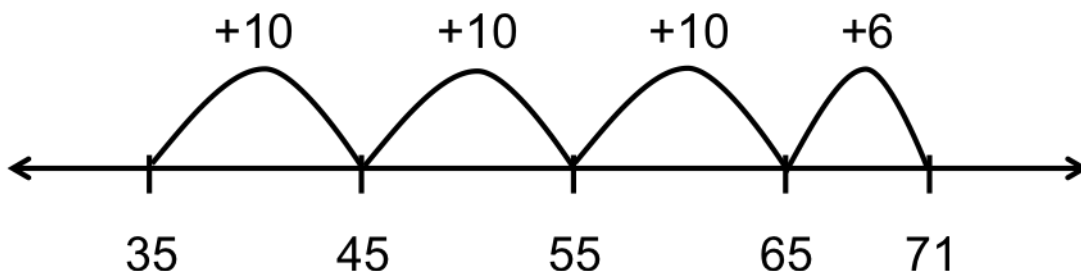
Number Line Method:

I Do:

Now let's take the same addition problem and solve it using a number line. Have students take out their rulers and draw a line on the page. Since this is an "open" number line, let's decide what number to start with. Even though we can start with any number, why don't we begin with the largest number. What number is that? (choral response: 35)

$$\begin{aligned}
 & 35 + 18 + 12 + 6 \\
 = & 35 + 10 + 8 + 10 + 2 + 6 \\
 = & 35 + 10 + 10 + (8+2) + 6
 \end{aligned}$$

Example:



We Do:

Using equity sticks or another fair method, pick a student and have them share their numbers for a beak. Students will then work together to put solve this problem on a number line.

You Try:

Students will pick one set of numbers and solve the addition problem on a number line.

Assessment:

Observation of student work and group discussions. Two exit slips -- one for the science activity and one for the math. Also student completion of Bird Beak Recording Chart.

Exit Slip First Day

Name: _____ Date: _____

Which beak was the most successful in picking up food? Justify your answer by describing the bird beak and the type of food it picked up. What kind of habitat do you think your bird lives in?

I think that _____

_____. The reason I

believe this is _____ . My bird

probably lives _____ .

Draw a picture of your most successful bird beak:

Exit Slip 2nd Day.

Name: _____ **Date:** _____

Solve each problem using two methods:

$$22 + 31 + 8 + 13 + 7$$

$$9 + 14 + 42 + 28 + 6$$

Name: _____ Date: _____

Carry this chart with you to each table and record the total number of food items you pick up with each beak. Remember you will only have one beak per table for a 30 second time limit.

Bird Beak Recording Chart

Bird Beak	Table 1	Table 2	Table 3	Table 4	Table 5
Tweezers					
Chopsticks					
Eyedropper					
Spoon					
Clothes pins					
Craft sticks					