

Estimation Station

EI-4820
Grades K+
Ages 5+

Instruction and Activity Guide

Contents

- Jar (4 in. x 4 in. x 4 in.)
- Locking lid
- Display base
- Scoop (2 in. x 2 in. x 2 in.)
- Teacher's guide with reproducible Parent Letter

Teach your students to make reasonable estimations with the Estimation Station!



Using the Estimation Station

Day I: Making a Preliminary Estimation

Fill your clear jar with objects. They should all be the same, or very similarly sized/shaped, objects. It is not necessary to completely fill the jar. For younger students, use 20 or fewer larger objects. Hold up the jar (or even pass it around) and ask your students to guess how many objects they think are inside. Show the class an example of a single object and then pass it around so students can feel the size. Ask students to record their names and guesses on sticky notes and then post them where everyone can see.

WARNING:
CHOKING HAZARD—Small parts.
Not for children under three (3) years.

Guess or Estimate?

While these words may be used interchangeably, an estimate is often considered to be an *educated* guess based on additional information about the problem. As your students work through activities during the week, their initial guesses will become more refined estimates.

What Should I Put in the Estimation Station?

acorns, animal cookies, balls, beads, beans, bobby pins, bolts, bottle caps, brads, buttons, candy, cereal, cheese balls, chestnuts, chocolate chips, clothespins, corks, cotton balls, crackers, crayons, dice, dominoes, drinking straw halves, erasers, goldfish crackers, golf pencils, glue sticks, grapes, gumballs, hair clips, jacks, jelly beans, ketchup packets, kumquats, letter tiles, limes, macaroni, magnets, marbles,

marshmallows, math counters, nuts, packing peanuts, paper clips, pasta, pencil toppers, pennies, plastic gems, plastic bugs, playing cards, poker chips, pom-poms, popcorn, pretzels, puzzle pieces, rubber bands, safety pins, seashells, shallots, stickers, sponge toys, sugar cubes, sunflower seeds, toothpicks, toy building blocks, Unifix[®] cubes, unshelled walnuts, washers

Note: if you have put something perishable in the jar (e.g., grapes), you may need to refrigerate the jar overnight.

Day 2: Using the Scoop to Make a Closer Approximation

Explain to students that you are going to help them to make a more educated guess of how many items are in the jar. Fill the scoop with some of the objects. (If you have used large objects, very few may fit inside.) Show the scoop to the students and tell them exactly how many are in the scoop. (You may wish to count the objects into the scoop while the class is watching.) Show students that the scoop is half the length of the jar; demonstrate by holding the scoop next to the jar and showing that two would fit across it. Do the same with the width and height.

Explain that the jar can hold eight times as much as the scoop. To show this, dump out the contents of the jar and then use the scoop to add the contents back in. Use the markings on the side of the jar to show students the fractional amounts as you fill the jar.

Ask students to look at their guesses from the day before and allow them to revise their guesses based on what they learned about the scoop. If students choose to revise their guesses from yesterday, ask them to explain their reasoning.



Day 3: Analyzing the Class Data

| | | | | | | | | | | | | | | | | | |
|-------------|-------------|-----------|-----------|------------|------------|------------|-------------|------------|-----------|--------------|-------------|--------------|----------------|--------------|-------------|--------------|-------------------|
| Clara 10 | Erica 28 | Jim 40 | Tim 40 | Brad 40 | Emma 45 | Shea 45 | Chris 45 | Evan 45 | Ely 45 | Sanjay 45 | Josh 100 | Stacy 100 | Ernesto 100 | Sonia 100 | Lisa 250 | Rob 1,000 | Jess 1,000,000 |
|-------------|-------------|-----------|-----------|------------|------------|------------|-------------|------------|-----------|--------------|-------------|--------------|----------------|--------------|-------------|--------------|-------------------|

Ask students to put their estimation sticky notes in correct number order (from smallest to largest). If you have a hundreds chart, you can have the students place their sticky notes on the chart; some estimates may exceed 100, so designate a place for students to put those sticky notes. You can also put a length of adding-machine paper horizontally on your wall, number it at evenly spaced intervals, and ask students to place their sticky notes in the appropriate place.

With your class, use the students' estimates to identify:

- **maximum**—the greatest estimate
- **minimum**—the lowest estimate
- **range**—the difference between the maximum and the minimum
- **median**—the middle number
- **mode**—the estimate that appears the most number of times
- Older, more advanced students can also calculate the **average**.

With younger students, identify:

- the one-, two-, and three-digit numbers
- the place values of the digits
- which estimates are even numbers and which are odd

You can also have younger students line up in order of their estimates from lowest to highest number.

Write the following sentence on the board:

The number of items in the jar is greater than _____ and less than _____.

Pick two appropriate sticky notes (perhaps the minimum and maximum) and place them in the blanks. If there are no sticky notes that apply to one of these blanks, then fill in a number yourself.

Allow students to revise their estimates (if they choose) based on this information. If students choose to revise their estimates, ask them to explain their reasoning.

Marshmallow Estimate Data



Maximum: 1,000,000

Minimum: 10

Range: 99,990

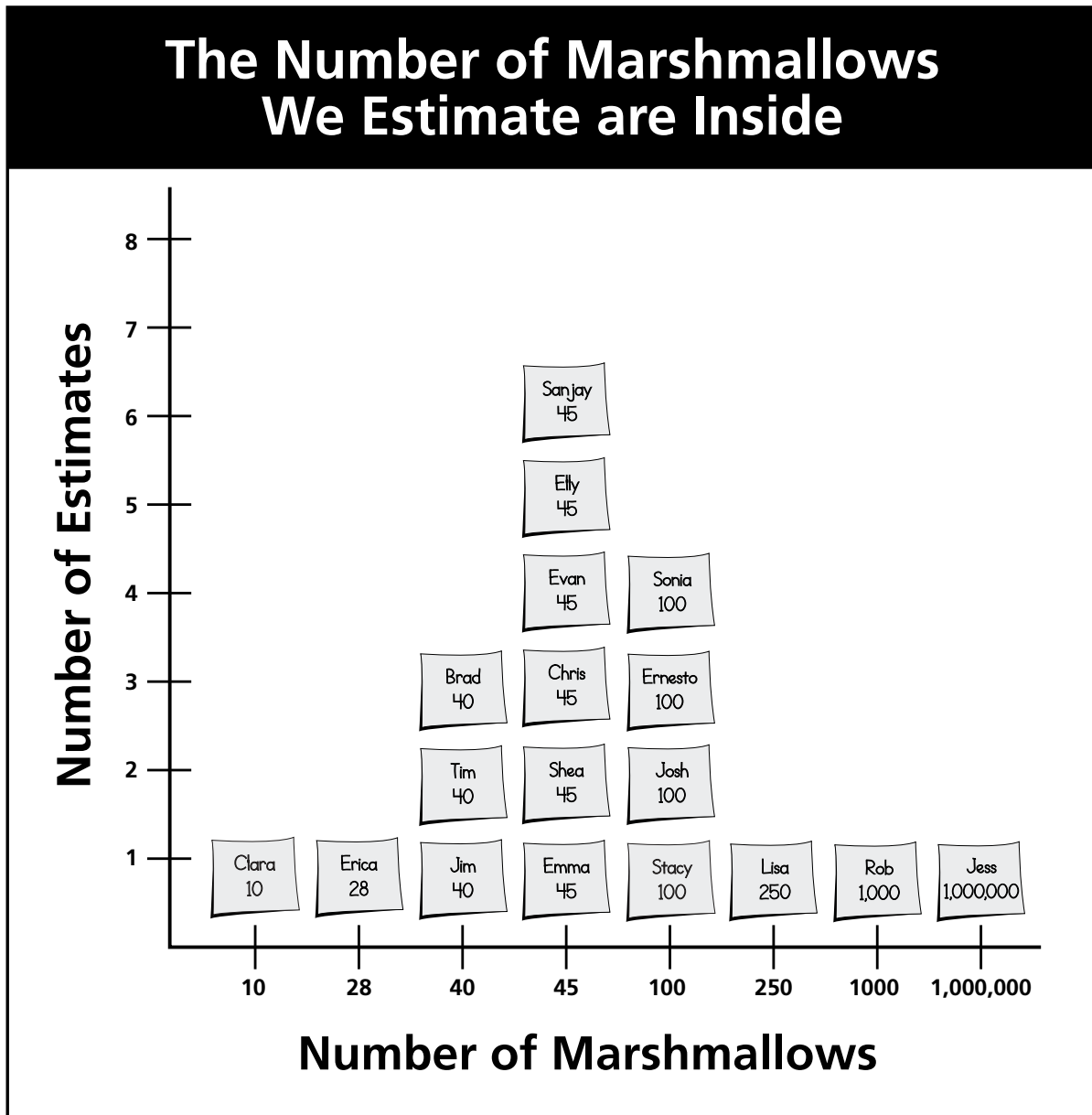
Median: 45

Mode: 45

The number of items in the jar is greater than  and less than .

Day 4: Graphing the Estimates

Make a bar graph of the estimates using your students' sticky notes. Draw a horizontal and vertical axis on the board or on a large sheet of paper. Label the horizontal axis with students' estimates. Label the vertical axis with numbers; the highest number should be the number of mode estimates. Space the numbers so that a sticky note will fit between each one.



Day 5: Counting the Items in the Jar

Today the students are going to find out how many items are in the jar!

Agree on a counting strategy and then count the items:


1. Ask the class, "How can we find out exactly how many items are in the jar?" Ask students what counting strategy they would like to use—e.g., counting by ones, twos, fives, tens, etc.
2. Dump out the jar and ask a student to come up and group the objects according to the chosen counting strategy (groups of one, two, five, or ten). The class can then count together as a group (e.g., 2, 4, 6, etc. or 5, 10, 15, etc.).
3. After the class has counted about a quarter of the objects, pause and ask if any students want to change their estimates; if any students choose to do so, ask them to explain their reasoning.
4. When you have finished counting, record the total on the board along with the counting strategy used. (e.g., We counted by 1s. Total: 23 items)

Use a different counting strategy to show that they'll arrive at the same answer:

5. Then, tell the students they are going to use another counting strategy (e.g., counting by 5s). Poll the class to see how many think they will get more, fewer, or the same number when counting by 5s.
6. Then ask a student to come up and count the items by 5s. Discuss how to count the "leftovers" if the counting strategy does not work out evenly (e.g., 5, 10, 15, 16, 17).
7. Record this answer on the board along with the counting strategy. Show students that they got the same answer even though they used different counting strategies. You can repeat this activity several times to show students that they will always get the same total no matter how they count them.

Photograph the student with the closest estimate holding up the filled jar with his/her guess. Post the photo on the wall along with the actual number of items that were in the jar. In this way, students can look back at various items and their answers, which will help them make better estimates in future weeks.

The student with the closest estimate gets to take home the empty jar to fill with objects. If that student has already taken home the jar, then select another student to take home the jar. Send the parent letter home with the student.

| Counting Strategy | Total Number of Marshmallows in Jar |
|---|-------------------------------------|
| 1s  | 28 |
| 2s  | 28 |
| 5s  | 28 |



Repeating the Activity with the Same or Similar Objects

You can repeat this activity with different items or even with the same items but a different number of them.

For example, if you used corks last week, this week put in fewer corks. It may help to show the photograph of last week's jar. Ask students, "How has the number of corks changed from last week?" (more, fewer, halved, doubled). Then ask, "Do you think there are more or fewer corks in the jar this week?"

Consider using similar items of different sizes two weeks in a row. For example, fill the jar with large marshmallows one week and small marshmallows the following week. Be sure to fill the jar to the same level both weeks. Ask students, "How has the size of the marshmallows changed from last week?" (larger, smaller, no change). Then ask, "Since the marshmallows are smaller, do you think there are more, fewer, or the same number of marshmallows in the jar as compared with last week?"

Parent Night

This is a great activity for Parent Night, Open House, Family Math Night, Back to School Night, etc., because adults enjoy this activity too. Ask parents to write down their names and estimates. In class, find out which parent was the closest! Kids enjoy seeing how well their parents did.

Parent Letter

Students can bring the Estimation Station home and fill it with items. This gets the whole family involved and gives students a chance to practice counting at home. (Siblings may enjoy estimating too!) Send home the clear jar with the locking lid (minus the base) and the parent letter. Ask the student to bring back the filled jar along with the completed parent letter. Students enjoy keeping their number a secret during the week.

Use the parent letter on the following page to ask students to fill the Estimation Station with items from home. A Spanish version of the letter is also included.

Caring for your Estimation Station

The clear jar, lid, and scoop are dishwasher safe. Wipe the base with a damp cloth. Avoid getting the label on the base front wet.



Dear Parent or Guardian,

Our class is estimating! Every week, we fill our Estimation Station with objects and practice estimating and checking how many items are inside.

Your child brought home the Estimation Station today. Please find some small objects to put in the jar. Be creative in your choice of items. Here are some suggestions for possible items:



acorns, balls, beads, beans, bolts, bottle caps, buttons, cereal, clothespins, corks, cotton balls, crayons, dominoes, drinking straw halves, erasers, gumballs, jelly beans, marbles, marshmallows, packing peanuts, paper clips, pasta, pennies, pretzels, sugar cubes, washers

All of the objects should be the same. It is not necessary to completely fill the jar.

Help your child to count exactly how many items are in the jar. Write the number at the bottom of this page and ask your child to bring this paper back with the jar by _____ day/date. Please ask your child to keep this number a secret!

Sincerely,



Student name: _____

We put _____ in the jar.
number name of items



