



Why Guess When You Can Estimate

National Teacher Training Institute
Media-Rich Lesson Plan
by Sheryl Kohl

Grade Levels: grades 3 - 4 regular education
grades 5 - 6 students with special needs

Time Allotment: Three 45 minute class periods

Overview: Students will learn that to estimate they need to form an educated guess based upon one's knowledge. Students will practice estimating number of objects within a container and lengths of objects.

Subject Matter: Estimation

Learning Objectives:

Students will be able to:

- to form an estimate using acquired and/or prior knowledge
- accurately estimate length
- accurately estimate number of objects within a container
- use the sampling strategy to form an accurate estimate
- use a body part to assist in an accurate estimate of length
- use the layering strategy to form an accurate estimate

Standards:

From the National Council of Teachers of Mathematics Standards for grades 3-5, available online at

<http://standards.nctm.org/document/chapter5/numb.htm>

Number and Operations Standard for Grades 3-5:

In grades 3 - 5 all students should -

- develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results; and develop and use strategies to estimate computations involving fractions and decimals in situations relevant to student's experience.

From the Montana Standards for Mathematics, available online at

<http://www.opi.state.mt.us/index.html>

Content Standard 1:

All students should know, understand, and be able to engage in the mathematical process of problem solving and reasoning, estimation, communication, connections and applications, and using appropriate technology.

- By the end of grade 4, all students should be able to apply estimation strategies throughout the problem-solving process.
- By the end of grade 8, all students should be able to select and apply appropriate estimation strategies throughout the problem solving process.

Media Components:**Video**

PBS video series: *Cyberchase, episode 104, Snow Day to Be Exact*

Materials:**For each student:**

PBS Student Activity Master: Pool Party available online at
<http://pbskids.org/cyberchase/classroom/lesson2.html>

For each small group:

egg carton filled with dried beans, or similar item
see-through container filled with jellybeans, or similar item

Prep for Teachers:

Prepare the hands-on activities of the lesson by:

- cutting a piece of string, approximately 3 feet in length
- cutting a piece of string, between 14” - 20”
- preparing egg cartons filled with dried beans, one per small group
- preparing see-through containers with jellybeans, one per small group
- copying the Student Activity Master, Pool Party, available at <http://pbskids.org/cyberchase/classroom/lesson2.html>

When using media, provide students with a FOCUS FOR MEDIA INTERACTION, a specific task to complete and/or information to identify during or after viewing of video segments, Web sites, or other multimedia elements.

Introductory Activity:

Step 1: Show the students a piece of string (approx. 36”). Have the students guess the length of the string. Accept all answers. Record the answers for all to see. Request that all answers have a measurement label (i.e., inches, feet, centimeters, etc.).

Step 2: Insert PBS *Cyberchase*, episode 104, *Snow Day to Be Exact*, into your VCR. Provide your students with a FOCUS FOR MEDIA INTERACTION: Have the students record on a piece of paper what it means to estimate as explained by the character Matt.

START the tape at the point at which Matt points to the ski lift. He says, “Hey, the ski lift.”

(You may wish to PAUSE the tape after Matt explains the meaning of estimate, “Getting a number that’s close, rather than exact.”)

PAUSE the tape when the two girls are conversing, and Jackie asks, “Is that so bad?”

Step 3: Have the students read Matt’s definition of estimate as they recorded during the video clip.

(Getting a number that’s close, rather than exact.)

Record the definition in a place for all to see.

Step 4: Ask the students to look at the piece of string again. Ask them to estimate the length of the string in feet this time. Record all answers.

Learning Activity:

Step 1: Insert PBS *Cyberchase*, episode 104, *Snow Day to Be Exact*, into your VCR. Provide your students with a FOCUS FOR MEDIA

INTERACTION: How does the bird, Digit, use his own body to help estimate the number of barrels needed?

(He used his wingspan.)

START the tape at the point at which Matt stops himself before he falls into the hole. He exclaims, "There's a humungo hole in the ice!"

PAUSE the tape when Digit finishes measuring the hole using his wing span. Digit states, "We need three more layers."

Step 2: Ask the students what Digit used to estimate the depth of the hole. Explain to the students that one strategy of estimating is to use a body part as a means in which to estimate a length or distance. An estimate for feet is to use their forearm, fingertip to elbow.

Step 3: Have the students estimate the length of the string in feet, using their forearm as a means of estimating. Record all answers. Discuss differences in their prior answers and the estimates recorded this time. Point out to students, if necessary, that their estimates given the second time should be more accurate, as they now have a strategy in which to use.

Step 4: Have the students estimate a length of string (between 14" - 20") in inches. Record answers.

Step 5: Ask the students if they can think of a body part that could be used to estimate inches. Discuss answers and their appropriateness. Explain to students that their thumb, from tip to knuckle, is approximately one inch. Have the students again estimate the length of the string, this time using their thumb as a means of measuring. Record all answers. Discuss the difference in answers given the first time and second time. Point out to students, if necessary, that their estimates given the second time should be more accurate, as they now have a strategy in which to use.

Step 6: Give each small group an egg carton with dried beans. Have each student estimate the number of dried beans in the egg carton. Have each student within the small group agree on an estimate and record their answer.

Step 7: Insert PBS *Cyberchase, episode 104, Snow Day to Be Exact*, into your VCR. Provide your students with a FOCUS FOR MEDIA

INTERACTION: How does the team estimate the number of seals on the ice floats?

(They counted eight seals on one float as a sample, and then multiplied that number by six ice floats.)

START the tape at the point at which the kids come out of the tube. Matt exclaims, “Wow, look at all these seals!”

PAUSE the tape when the kids finish feeding the seals and Matt says, “Let’s do lunch.”

Step 8: Ask the students how the kids estimated the number of seals on the ice floats. Have the small groups again look at their egg cartons with dried beans. Have them count the beans in one section, using the section as a sample. Then have the students multiply that count by 12, as the estimate for the entire egg carton. Explain to the students that sampling, counting a small portion/section, is another strategy for estimating.

Step 9: Pass out the Student Activity Master, *Pool Party*, available at <http://pbskids.org/cyberchase/classroom/lesson2.html>. Have the students estimate the number of penguins in the pool. Have them write down the steps used to determine the estimate. Have students share their estimates and strategies used to estimate.

Step 10: Give each group a container of jellybeans. Have each student estimate the number of jellybeans in the container. Have all students within the small group agree on an estimate and record their answer.

Step 11: Insert PBS *Cyberchase, episode 104, Snow Day to Be Exact*, into your VCR. Provide your students with a FOCUS FOR MEDIA

INTERACTION: How does Inez estimate the number of jellybeans in her jar?

(Inez looked at the bottom layer and counted 5 jellybeans on each side. She multiplied 5 x 5 to arrive at the answer of 25 jellybeans in a layer. She then counted the number of layers and got 10. She then multiplied 25 x 10 to arrive at an estimate of 250 jellybeans in the jar.)

START the tape at the point at which the cat is drinking the milk. XXX says, “It’s going to be easy now.”

PAUSE the tape when Inez is petting her cat and says, “And enough for us.”

Step 12: Ask the students how Inez estimated the number of jellybeans in her jar. Have the small groups again look at their jar and estimate the number of jellybeans using the layering strategy used by Inez

Culminating Activity:

Step 1: Insert PBS *Cyberchase, episode 104, Snow Day to Be Exact*, into your VCR. Provide the students with a FOCUS FOR MEDIA

INTERACTION: have the students look for other strategies used in estimating.

(Using her thumb to estimate the height needed to reach the ski lift. Using the length of the sidewalk square to estimate the length of the line to the movie theater.)

START the video at the beginning and play it through in its entirety.

Cross-Curricular Extensions:

SCIENCE

- Have the students brainstorm examples in nature in which scientists estimate the number of animals/plants in an area. For example, the Department of Fish and Game estimates the number of fish in a lake to determine the number of fishing licenses to issue.
- Have the students log onto the web site Nova Online, How Many Pearls? available at <http://www.pbs.org/wgbh/nova/pearl/uncountable.html>

Community Connections:

- Invite a member of the Fish and Game Department to the classroom to explain to the students how they sample wildlife populations.
- Visit a site in which a population sample is being taken.

Student Materials:

PBS Student Activity Master: Pool Party available online at <http://pbskids.org/cyberchase/classroom/lesson2.html>