

SUGGESTED ACTIVITIES:

1. Estimate the number of beans or other objects in a set. Vary the number, size, and position of the objects.
2. Pair students off. Have one student draw a line segment on a sheet of paper for the other to estimate its length. Verify. Then trade responsibilities and repeat several times.
3. Estimate the length or heights of objects around the interior and exterior of the school. Verify and repeat.
4. Estimate and verify the weight of objects found around the home or school.
5. Estimate different lengths of time (one second, ten seconds, thirty seconds, one minute).
6. Estimate the amount of time it takes for an event to occur.

REFERENCES

Carin, Arthur A. and Robert B. Sund. Teaching Science Through Discovery. Columbus: Merrill Publishing Co., 1980, p. 21.

ARE YOU USING YOUR MATHEMATICS TEACHING TIME EFFICIENTLY?

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The following discussion between two high school students was overheard in their school cafeteria.

Pam: Oh, I hate my mathematics class. It's so boring. All we ever do is the same old thing.

Kelly: I love my mathematics class. It's always different every day!

Pam: How can that be? We are taking the same subject. All my mathematics classes have always been the same. The bell rings. The teacher takes attendance. We spend most of the classtime going over homework. Then we are quickly shown the new material to do for our homework. That's the way mathematics is always taught.

Kelly: That's not the way Ms. Sonner teaches. Everyday is different. As soon as we walk in there is something for us to work on. Either an interesting puzzle problem, or problems to do at the board, solutions of problems with steps missing, or homework solutions to write on overhead transparencies, or a two question quiz, or a homework quiz, or

Pam: What's a homework quiz?

Kelly: That's when Ms. Sonner writes two or three problem numbers on the board from our homework assignment. All you have to do is recopy the solutions to those problems from your homework to turn in. We only get 5 minutes so it makes you prepare all your homework for class each day, as you never know when it may occur.

Pam: But doesn't Ms. Sonner collect all your homework every day?

Kelly: Sometimes, but not usually. She says that she can get a good feeling of how well we are doing with spot checks, the questions at the beginning of class, and the quizzes. Besides that she doesn't have to spend all her time grading papers either. It's during the first 5 minutes that we are working on our own that Ms. Sonner takes attendance, checks with students about make-up homework, and that kind of stuff. Oh, yes, we have to keep all of our classnotes, homework, quizzes, and tests in a spiral notebook for the grading term. It's pretty neat. In the front we have to

keep listings of all homework assignments. All our homework is in the next section. The next part is for classnotes and sample problems, which have to be dated. The last part is for quizzes and tests. It makes it really easy to study for tests. Everything is in your notebook and easy to find. Besides, I can see what I have accomplished during the term. It makes me feel pretty good.

Pam: All I ever do with my homework, when we get it back, is throw it in the trash. By the time we get done going over and over it in class, I don't ever want to see the problems again!

Kelly: We don't spend much time in Ms. Sonner's class going over the old material like homework. Sometimes as we walk into class we are to make tally marks under the homework problems we want to see done in class. But the neat thing is that only the problems that have at least six tally marks are done in class. Ms. Sonner doesn't waste the whole class's time if just a few individuals have problems. She just gets to those individuals later in the period.

Pam: I wish my teacher would be able to spend some time helping me individually, but we are always in a rush. What do the other students do in class when Ms. Sonner works with individuals?

Kelly: We always have our own assignments or problems to do then.

Pam: What if you finish early?

Kelly: There are always some interesting problems, games, activities, or projects to do.

Pam: You sound like you actually like to do all the work?

Kelly: Oh, I do! The work we do in class or for homework always has a purpose. It makes you feel pretty positive about the work you do when you see the purpose of it and it's not used as a

penalty or threat. When I do the work, I can tell I am learning. It's nice, you know!

Pam: I wish! I never know when I am going to use the stuff we do in class.

Kelly: Ms. Sonner has files and files of applications and interesting problems. She says that she is always looking for new ideas. When she finds one, she puts it on an overhead transparency and a blackline master, then puts it in her files for the next year. Sometimes our assignment is to find and present applications to the class. I bet next year she uses some of the ones we did for her.

Pam: You have to present in front of the whole class?

Kelly: Sometimes in front of the whole class, sometimes just to a few students in a group, and sometimes just to one other student. I learn a lot when I have to prepare to do that, but that's the fun. We have to be responsible for our own learning.

Pam: Ms. Sonner sounds like she has a few teaching tricks up her sleeves.

Kelly: She sure does. Her newest trick is lamaboards. She has a piece of white cardboard laminated for each student in class. We each have an overhead marker, too. At certain times in class when Ms. Sonner asks a question, everyone writes the answer on their board, then we show our boards to her at the same time. This way she can ask the whole class one question, but receive an individual response from every student.

Pam: This sounds nice, but how do you get graded for all of this!

Kelly: That's different, too. Our notebooks are checked randomly by Ms. Sonner, but just for thoroughness, neatness, and organization. She only does one or two a day so it's not so much work for her to do. Our homework is usually not all collected and not given that much weight in our grade. Ms. Sonner says that homework is for practice; tests are where we are expected "to show our stuff."

Pam: Hey, I thought you didn't like mathematics last year.

Kelly: I didn't. I had a lot of mathematics anxiety. But Ms. Sonner is always praising and challenging me as an individual. I'm not a brilliant mathematician, but I do like to play around with problems now to see if I can solve them. I now look at mathematics like a crossword puzzle. I may not get everything correct, but it's interesting trying to solve it. I get a nice feeling of satisfaction doing mathematics now.

Pam: I get the feeling it's not the mathematics that turned you on, but the mathematics teacher.

Kelly: Yeah, I guess you're right.

REFERENCES

Enk, J. & Hendricks, M. Shortcuts for Teachers, Pitman Learning, Inc., Belmont, CA, 1981.

Johnson, D. R., Every Minute Counts, Dale Seymour Publications, Palo Alto, CA, 1982.



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