Powers of 2	Number of Folds	Number of Equal Parts
2^0	0	1
2^1	1	2
2^2	2	4
2^3	3	8

(and so on)

Then Chuck gave his audience the "13 Cookies Problem" - 13 cookies to be arranged in 6 equal rows, no doubling up, no cookies to be broken. Hint: there is something in most kitchens to which mother and the rest of the family make frequent reference. When you discover this, you will know what to do to arrange the 13 cookies.

Names for 2: Chuck gave us one simple name for 2 and asked his audience to suggest all the other names they could think of.

$2 = 1 + 1$ $\quad 2 = 1/2 + 1\ 1/2$ $\quad 2 = 3\ 3/4 - 1\ 3/4$

$2 = \sqrt{4}$ $\quad 2 = 2^0 + 2^0$ $\quad 2 = \sqrt[3]{8}$ (and so on)

He closed his first talk with the suggestion, "Why not start with the complex and move step by step to the simple. By doing this, you pick up students as you move along instead of dropping them off as you move from simple to complex."

INVOLVEMENT - The Only Way to Fly

Charles E. Allen

Reported by *Bob Hood*, Calgary

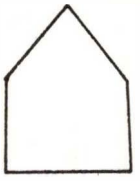
This session was divided into three parts. The first 20 minutes were used to prepare the audience for a 30-minute demonstration class, which was to be followed by a 30-minute session entitled "Allen Raps with Audience".

Chuck told the audience that a group of Grades VII, VIII and IX students were going to be brought into the lecture hall and he would put on a demonstration lesson. He told the audience that at certain times he would want the lights out and asked someone who was near the lights to turn out the lights as quickly as possible when he called "lights". With a little practice he got the speed of response which he wanted.

When the students were ushered in, Chuck introduced his demonstration by reference to "Mod Squad" which he did not mention by name, but by hints and suggestions he got the students to name "Mod Squad". They agreed that to be members of "Mod Squad", you had to be alert and think fast.

He then started off with some transparencies on the overhead projector. One started with a drawing of a domino. He asked them to think of a number of dots in each side of the half domino. He told them to multiply the number of dots on the left by 5 and to that product add 8; this sum was to be doubled, and to that doubled sum the right number of dots was added, and from that sum 16 was subtracted. The first student who noticed something was to hold up his hand. Some of the students saw what was happening right away, and they were told they could join "Mod Squad". When Chuck wanted to change to another part of the demonstration, he called "lights".

He also used a tape recorder on which he had taped instructions such as these: "The man standing in front of you today is not the real Mr. Allen but a robot which has been programmed to carry out certain instructions." The tape went on to tell the robot to hold up what he had in his hands. (It looked like a circular tape, something like a steel measuring tape.) The recorder asked the class, "What original names would you call this figure?" It was a circle. They came up with circle, doughnut, zero, the letter O, wheel, and one student called it a roundee. Then the recorder instructed the robot to change the shape; he changed it to the form  and the students were asked for names - one student came up with "infinity". The next shape was a regular pentagon, and students came up with "house", "pentagon". When the robot held it upside down, they were not so sure what to call it. (It was when the tape was put in the shape of a pentagon that we saw that it was jointed so that there were five equal segments.)



The next part of the recording was a question: "Do you think the robot can make a four-sided figure out of this five-sided figure?" Some thought so, others not. "What do you call the four-sided figure?" "Can a three-sided figure be made from the four-sided figure?" "Yes" and "no" came from the students. "What do you call the three-sided figure?" "Can you make a two-sided figure?" "Lights".

Chuck then went back to the overhead with some transparencies of clock faces, and by turning them to various positions, he got the students to tell him the time. This was done "rapid-fire" and Chuck joked with the students as he went along so that not only students but the teacher-audience were often laughing heartily.

The conclusion of the demonstration took the form of what older teachers would call "rapid calculation". When a student got an answer correct, he was sent to the chalkboard to put down his name, and he was told that he could leave the room when he got another question right. If he made an error, he was sent to erase his name. After about 6 or 8 had left, Chuck told the remaining students that he could not let them go until they had a correct answer. He then asked them something simple like "2 + 2". They all got it and went out laughing.

The rap session started with Chuck telling the teachers that it was usually considered unnecessary to say that it was a good lesson. One question asked was,

"Don't you think that some students would stop trying because they found the pace too fast for them?" Chuck said that was possible, but if the difficulty of the questions was varied, students would find that there were questions which they could do and they would be encouraged to answer by telling the others, "Now you have qualified for 'Mod Squad' and you must remain quiet because we have now sent you on a special assignment, and you don't know what we are doing here."

The laugh was on the whole group when the lights went out during the rap session and no one had called "lights". It turned out that there was a power failure in the building, and, as it was a hot afternoon and as the session room was hot, we were allowed to leave early.

(Any mathematics association looking for an interesting speaker will find Charles E. Allen one of the best.)

Letter to the Editor

Dear Colleague,

The ERIC Center for Science, Mathematics, and Environmental Education is making a concentrated effort during the coming year to collect non-commercial and teacher-made materials for mathematics laboratories, K-9.

We are particularly interested in locating materials that can be easily adapted to direct classroom use. However, lists and references to other sources (commercial as well as non-commercial) will also be of value to teachers.

We would appreciate contacts with creative classroom mathematics teachers who may have developed laboratory worksheets or experiments.

The ERIC system is supported by the U.S. Office of Education as a means of disseminating both educational research and promising materials and programs in education. Products of the ERIC Clearing-houses are not copyrighted.

If you would like further information about the ERIC system, or about the mathematics laboratory project, please contact me. I will keep contributors informed about handbooks and materials compiled by the project.

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