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"Fore" Physics

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Quickies

If you have an idea that facilitates science teaching, jot it down and send to Editor, *Iowa Science Teachers Journal*, Biology Department, University of Northern Iowa, 50613. Be sure to include the name of your school and position. Here are some recent contributions.

"Fore" Physics

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I have developed an activity which I would like to share, in the hope that it might prove educational as well as enjoyable. In Chapter 1 of the *Project Physics*[1] there is a brief history of photography, which in itself is quite interesting, but one picture specifically lends itself to additional study. The photograph of the golfer provides the basis for this activity. The students are asked to work in small groups to determine the speed of the ball. At first they must find a scale factor for the picture. They are told to find at least three scales and that the value of the three should be relatively close. (In practice it comes out around 24:1.) They then must measure the distance travelled by the ball and finally find its speed. I usually require the answer to be in mi/hr. Students tend to *know* intuitively what answers are logical, and the practice in converting units is very good, especially early in the year. The speed is usually found to be about 145 mph.

The activity provides a wide variety of experiences for my classes. For example: If a group assumes the man to be six ft tall and then gets a scaling factor from that of 30:1 I ask "How tall would he actually have to be to still be six ft tall bending over like that?" Some of the more reliable keys to the scale factor might be size of the golf ball, distance from knee to heel, length of golf club. One must remember that if the object photographed was not perpendicular to the camera, it will appear shorter than normal.

Another source of concern is that the first golf ball is much larger and brighter than the others, probably the result of many exposures. Also the distance between the first two balls is not the same as between the second two, since the ball hadn't travelled for a full 1/100th sec in the first case. I'm sure you will find more examples of what at first seem to be paradoxes.

This activity gives my classes a chance to use a vernier caliper (to measure objects in the photo as well as the real golf ball), a meter stick (for the golf club or man's height), factor dimensional analysis and their own ingenuity. My classes always enjoy it, though not without some frustration. I hope yours find it equally motivating.

Reference

1. Holton, G., F. J. Rutherford and F. G. Watson. 1975. *Project Physics*. Holt, Rinehart and Winston, Inc.