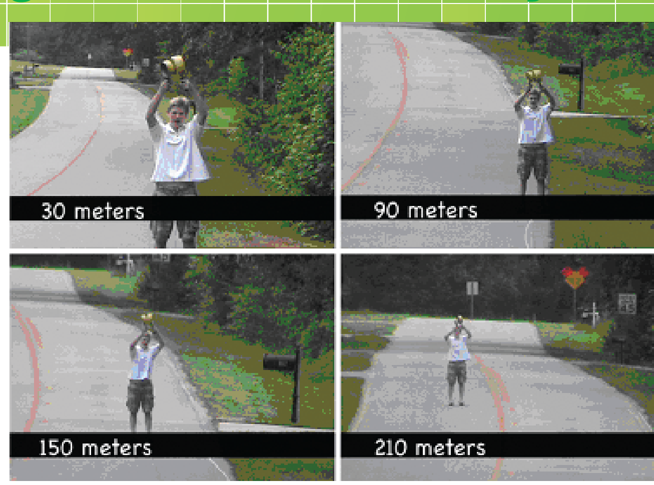
Video Allows Young Scientists New Ways to Be Seen



Science is frequently a visual endeavor, dependent on direct or indirect observations. Teachers have long employed motion pictures in the science classroom to allow students to make indirect observations, but the capabilities of digital video offer opportunities to engage students in active science learning.

Not only can watching a digital video clip capture students' attention, it can also help students explore concepts and gain understanding through explanations within the video. Viewers can compare what happens as variables are changed in sequenced scenes, or they may be challenged by questions in overlaid titles or voice-overs. Other videos can be used to elaborate or to apply concepts discussed in class to new situations. For example, after doing activities related to average velocity, students can watch a video that shows the velocity of a car traveling at 55 mph as viewed from a car next to it traveling at the same velocity. A sequence of these types of shots would introduce the students to the concepts of relative velocity and frame of reference.

Computing technologies combined with digital video allow students to conduct analyses that once were limited to scientists. Students can measure motion and time using video of events. Video of a specific event can be synchronized with related data. Students can take measurements and make inferences from popular Hollywood movies to see if the scenes are probable or even possible. Stop-motion animations can assist students in understanding scientific processes or mechanisms.

By John C. Park

Creation of digital movies can facilitate investigation of a science topic using the students' social context.

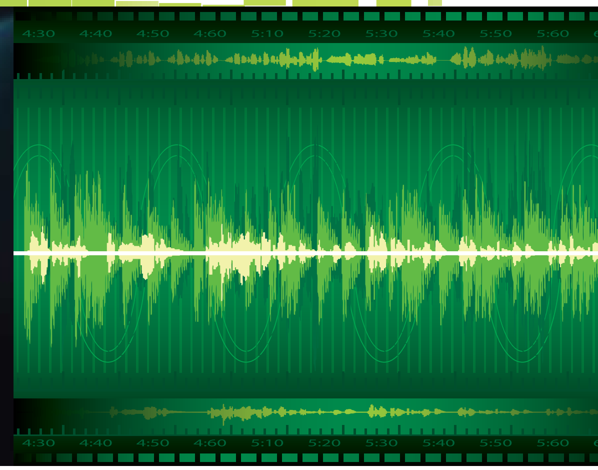
Content should always be a central focus, but if we can encourage students to explore materials that other students helped create and are interesting to them, we may get the best of both worlds. For example, middle school students in one project were asked to slap cooking pots together to make a loud, sharp noise. We videotaped the event at 30, 60, 90, 120, 150, 180, 210, and 240 meters away, hoping to illustrate the difference in the speed of light (seeing the event) and the speed of sound (hearing the event).

This activity was an effective hypothesis generator. Why did the distance have to become quite large before we noticed the difference in the speed of sound? A second movie was made, this time using two-way radios at the student location and the camera location. This movie can be used to find the time between receiving the sound through the radio and through the air. Knowing this and the distance, we could find the speed of sound. We investigated much more, however.

Learning can happen in the very process of capturing and editing video of events that depict science concepts. Based on the number of videos being uploaded to websites such as YouTube, it's clear that students want to be seen. Thoughts that dominate the adolescent mind include "Look at me," and "Look at what I can do." Using this as motivation, we can encourage students to be the stars in events that display concepts in science. Students can create movies to express their knowledge of a specific event. They can videotape events for which they have no explanation, but use the media to challenge others to figure out why the events happened as they did. They can also stage an event for others to collect data, find patterns, and generate predictions.

Digital video multiplies the ways in which video can enhance science learning. For the past century, film, videocassettes, and DVDs have been presented as self-contained lessons, often replacing the teacher for the duration of the presentation.

Digital video can change this paradigm, allowing students to become



active participants in science activities. Creation of digital movies can facilitate investigation of a science topic using the students' social context. This form of participatory media requires new ways of thinking about schools and schooling. The tools are emerging. Now we need to consider effective teaching strategies for their use.

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