

VIDEO CAMERA



The use of the video camera to record events and to provide clear and reliable information for analysis, is far superior to other photographic techniques.

It has always been difficult to record the motion of objects during experiments. One tried and true method is to use black and white polaroid film to take stroboscopic photographs. The film is available within minutes but, due to the small size of the photographs, analysis is difficult.

On the other hand, the video camera provides results which can be easily measured and are accessible to every class member.

SETTING UP AND USING THE VIDEO CAMERA

C **it** is worth checking the following items before an experiment is set up

- If you are unfamiliar with the working of a video camera, check the instruction booklet which comes with it. *Allow an hour or more to familiarise yourself with the camera.*
- Make sure you have a new battery or a fully charged extra battery for the camera.
- Ensure that you have the correct connecting leads to go from the camera to the TV monitor and from the VCR to the TV monitor.

X Extra equipment for the suggested learning experiences includes:

- a VCR with still frame and frame advance
- a television set, with appropriate connections for the VCR and the camera.
- a blank video tape
- a blank overhead transparencies
- a meter rule
- paper and **texta** to make introductory annotations
- an overhead projector
- a timing device eg. a stopwatch, venner clock, radiation scaler or digital clock.
- a piece of black material to be used as a backdrop

Setting up the Video Camera

- Connect the VCR to the TV and check its functioning.
- Set up the experiment which is to be recorded in a position with good lighting - the overhead projector can be used as a strong source of side lighting.
- Use the black material as a backdrop to obtain a good contrast.
- Place the meter rule and timing device (*see above*) in the field of view.
- Prepare annotations to identify the event, the students, the date etc.

HANDY HINTS

- **The** video camera and television can be used to enlarge the results of almost any experiment, to make it easily observable by the whole class. For example, a video set up to view a cathode ray oscilloscope will display a much larger version clearly on the TV screen. This will make small-scale experiments, such as the mass of the electron kit, a more practical alternative for the classroom. In order to set this up, connect the video camera directly to the TV monitor and the event will be enlarged on the spot.

SUGGESTED LEARNING EXPERIENCES

Video cameras can be used to record and analyse many different events - particularly those in topics of motion, forces and collisions. In each case the procedure, as outlined below, will apply.

- Record the event on the video camera.
- Play it back through the view finder and check that the recording is suitable.
- If it is not suitable, re-record.
- Several events can be recorded quickly, incorporating changes to velocity, slope, mass etc. giving a related group of results.
- Use the **inbuilt** microphone to record comments and useful information.
- View the event(s) played back through the VCR and TV.
- Fix a blank overhead transparency to cover the TV screen.
- Trace the meter rule on to the overhead transparency.
- Using the still frame and frame advance of the VCR, go through the motion step by step, marking the positions of objects on the overhead transparency.
- Take a note of the time interval between the steps using the timing device displayed in the experiment
- Project the transparency on to large sheets of paper OR
- Photocopy the transparency so that each student can analyse the results.

This procedure can be used for the following experiences:

- 1. Motion in one dimension along a linear air track**
- 2. Motion in two dimensions on air or bead tables**
- 3. Projectile motion**
- 4. The motion of falling objects**
- 5. Circular motion**
- 6. Simple harmonic motion**
- 7. Collisions using trolleys**
- 8. Collisions on the linear air track**