

Computer Techniques

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## Scanning 3D Objects

### Using Your Scanner as a Quality Close-up Camera

#### QUALITY, VALUE AND USE

High quality images of creatures and other 3D objects can be obtained by scanning. As long as they don't move, aren't too big and don't harm the scanner, they can be scanned. I have extensive experience in close-up, 35mm, photography but scanning is easier and quicker for many small objects. Lighting is simple. An obvious advantage of scanning is the possibility of immediate electronic transfer which may be very important in scientific and school work. I have photocopied 3D objects with limited success. However, scanning gives high resolution, color images, and good depth of focus. The images obtained can be easily edited for color, brightness and contrast, and size. They can be saved and easily arranged, filed and retrieved when needed. The images are available for printing, slide shows, and more complex multimedia presentations.

#### TECHNIQUE

The technique is similar to any scan. Be careful not to scratch the glass holder of your flat bed scanner when placing a hard object on it. You may protect the glass with a new overhead transparency. Placement of the object is not crucial as you will be selecting from the "preview scan" before making the actual, high resolution scan. Many objects are thick and the surface is irregular. I leave the scanner open and cover the object with paper or cloth. I try different colors to get the best scan. You may want to experiment with the color and type of covering to get the best background and reduce any offensive shadows. Shadows may be a problem but sometimes they enhance the image giving it a 3D appearance. The color of the background may enhance or detract from the image you want to achieve. As in close up video and photography, I have found that medium blue, good quality construction paper, is usually best. I have also had success with an open scanner cover and the lights out. This provides a black background which is sometimes very effective, especially with tall objects which will not support a piece of background paper. Recently, I have found that turning out the lights may be unnecessary as the intensity of the room lights is often very low compared to the light of the scanner and so the background appears black.

#### SMALL CREATURES

I have had the idea of scanning small animals and plants for some time. A short time ago I found a web site on dragonflies and damselflies which revealed the outstanding qualities and usefulness of scanned objects. I have had problems obtaining good photos of these creatures in the field. Vein patterns as well as body color and patterns are crucial in their identification. The quality images displayed on the web site optimized these characteristics and were aesthetically stunning. Valuable scans of flowers leaves, twigs and other plant parts are easily made.

The procedure for dragonflies will be useful in working with any tiny, fragile creature. The following is an abbreviation of "Specimen Handling" presented on the dragonfly web page ( "Digital Dragonflies" at <[www.dragonflies.org](http://www.dragonflies.org)> ). The captured specimen is placed in a Ziplock plastic bag and then cooled in the refrigerator. After 30 minutes or more, the dragonfly is removed and placed upside down on the scanner bed. Refrigerating

for 4-6 hours does not seem to have any negative effects. (Freezing small animals would result in loss of color and much distortion.) Foam core or old mouse pads with the center cut out is placed around the specimen to prevent crushing and block stray light. Multiple layers are necessary with thick specimens. However, I have found that a piece of paper gently laid on the specimen usually works quite well. A top scan captures the head with most of the eyes, all of the wings, and top of thorax and abdomen. Then a scan is made with the specimen placed on its side and the wings folded. This side scan allows the colors of the face, legs and sides of the thorax and abdomen to be seen. Dragonflies, or any tiny creatures being scanned, may recover in a few minutes and may be returned to the refrigerator or released.

#### OTHER CREATURES AND 3D OBJECTS

Most of my experience so far has been with plant materials and non-living objects; shells, fossils, rocks and minerals. I usually make a preview scan first, use the "auto adjust", select the dpi (resolution) and then make the scan. I obtained better images when rocks and shells are moist but not wet. (Remember the pretty rocks and shells you picked up at the beach but when they dried you wondered why you had bothered to bring them home). I have used a new overhead transparency to protect the scanner's glass plate when scanning hard objects. There has been very little distortion. However, beware of any scratches on the sheet and watch for dust specks or sand grains as the plastic easily becomes statically charged. If you use your scanner to produce high quality images from prints this might be a problem. If you have several scanners, you may want to devote one to scanning objects other than photos, books or documents. Adequate scanners for most school work cost as little as \$80. Recently I have scanned jewelry, artifacts and small carvings. I will be spending more of my efforts on small animals, fossils, and other artifacts and discovering the most effective ways of scanning and then archiving them. Small animals may curl up when you catch them and then cool them so they may be difficult to work with. I have noticed this with such animals as millipedes, sow bugs, worms and various insect larvae. I am currently scanning buds, leaves and flowers, fruits and seeds to record developmental patterns

REF: "Digital Dragonflies" is sponsored by the entomology program at the Texas Agricultural Experiment Station in Stephenville, part of the Texas A&M University System. If you do some experimenting and would like to share what you have learned, please write to me and I will add your tips to this sheet.

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