You'll want to have whiteboards in your classroom on the first day of class, when you use the modeling method of instruction. You'll probably need from 12 to 50 whiteboards and 20 to 50 dry erase markers.

AN INEXPENSIVE whiteboard IS MARLITE, or kitchen/bathroom tileboard or economy board. It can be bought at building materials stores, hardware stores, and home improvement stores like Home Depot or Loews. It comes in 4' x 8' sheets. Have them cut it into 6 equal pieces, each 24" x 32". They charge per cut; but for teachers they may do it for free. Be careful to get Marlite, not vinyl tileboard! (A google search calls it Marlite FRP: “Fiberglass-reinforced plastic (FRP) panels are a laminate surface wall and ceiling panel that is ideal for wet environments like bathrooms. Fiberglass is mixed with plastic to produce panels that are tough, durable and water-resistant”.)

I visited Home Depot in summer 2007 and jotted down the product name and number of the boards. It was: Thrifty white tileboard by Eucatex North America. C 346-428.

WHITEBOARDS USA makes, sells, and ships Marlite whiteboards. Carl Wenning, a modeler/university faculty, developed the extensive website http://www.whiteboardsusa.com, which has many helpful ideas. See the weblink at "Resources for the modeling classroom").

MORE EXPENSIVE BOARDS:

Excellent quality whiteboards, with handle on the long side and rounded corners, can be purchased in multiples of six from PLAYSCAPES, INC., in Wisconsin. (800) 248-7529. Order online at http://playscapes.com/products/whiteboards.html. PLAYSCAPES whiteboards are very durable; they don’t scratch easily, they don’t discolor or stain easily. Teachers say that they last for 10 years. The trick is not to leave stuff on them for days; wipe with a rag or w/b eraser. Commercial cleaner or alcohol takes off stains. (Teachers’ comments on them are at "Resources for the modeling classroom").

CLEANING WHITEBOARDS:

Marlite boards last a couple of years (using them for 5 classes daily) before they get too scratched up and stained to use. If you wax the boards before you use them, that preserves them. Use Endust, Meguiars Mirror Glaze #26 or liquid car wax (Turtle Wax). You can clean stains with brake fluid. (Your school custodian may know these tricks.) Wipe them with a rag, paper towel, or whiteboard eraser, and don’t leave writing on them over the weekend.

Teachers say to clean them occasionally with window cleaner,"Simple Green" (it's non-toxic & biodegradable; buy a gallon, dilute it 5-fold, and dispense it in small spray bottles from the craft store), or isopropyl alcohol (from grocery store: 70%) on a paper towel. Isopropyl alcohol (rubbing alcohol) is the main ingredient of the commercial cleaners that you can buy.

A modeler wrote, "I always have to leave my whiteboards overnight with writing on them - I use 409 to clean them and it works great! My whiteboards are 8 years old and still look good." A modeler said, "When the dry erase marks get difficult to erase, clean the erasers with a hose vacuum cleaner." Wax them occasionally to guard against scratching.

HANDLES, EASEL
A handle is nice but not essential. Have the shop class use a router to make a hole that's 6" long x 1 1/2" wide, placed 1" below the top. Or drill a hole and use a saber saw (jig saw) with the highest quality size 18 blade. The high quality fine blade is needed to prevent tearing.

Instead of making the hole (or in addition), you could use an easel to place the boards on when the students do their presentation. Make an easel - it’s easy. Art stores have wooden ones. Or drill a small hole and hang the whiteboard from a hospital IV stand; these can be obtained in thrift stores or from people who have had long-term illnesses requiring IVs.

When you do circle whiteboarding (board meetings), have students set them upright on the floor, resting on their legs.

**DRY ERASE MARKERS:**

Teachers say that Sanford EXPO work the best. Blue and green leave fewest stains, blue, black, and red show up well - get broad or chisel point. If you can, have each student buy their own marker; it promotes responsibility (i.e., they replace the cap!).

One teacher buys a classroom set of markers and then has each student pay her for one. She gives them the choice of keeping it with their supplies or else taping their name on it and storing it in a coffee can in the classroom. Another modeler suggests making "color coded 'eraser' bandanas for each team. A couple of markers and a small spray bottle of 'Simple Green' cleaner can be tied inside the team bandana."

The "low-odor" markers are difficult to erase. They leave a stubborn residue.

If you accidentally use a PERMANENT marker on the w/b: to remove the stain, use hair spray, acetone, or fingernail polish remover; or write over the permanent marker with a dry-erase marker; wipe as usual.

Most modelers use rags rather than erasers.

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**WHITEBOARDING and circle whiteboarding (board meetings):**

At the ASU modeling legacy website (http://modeling.asu.edu) are several articles on questioning strategies (click on "Resources for the modeling classroom"). Read Brenda Royce's short article first!

Dwain Desbiens's doctoral dissertation on circle whiteboarding is a joy to read. If you lack time, read only chapter four. Same webpage. Also, read John Crookston's action research project.

The three QuickTime movies of Dwain using modeling discourse management are insightful! You can access them from the modeling homepage (modeling.asu.edu) ; click on "Remodeling University Physics". They show about 1.5 hours of instruction. If you can't download them (they are HUGE files!), watch the 15-minute version at http://vimeo.com/channels/modelingphysics.

(If you forget the URL, you can always link to it from the “weblinks for modelers” webpage.)

Colleen Megowan’s doctoral dissertation on discourse is readable and enlightening. Start by reading her recommendations in her last section.

For whiteboard use in college physics, read Dan MacIsaac’s article (link at "Resources for the modeling classroom").

Several compilations on whiteboarding are at http://modeling.asu.edu/listserv.html and at http://modeling.asu.edu/listserv1.html

**MODELING DISCOURSE** is framing ALL classroom discourse around models & modeling.
In 2008, David Hestenes wrote this insightful statement. (Note that he distinguishes modeling discourse from whiteboard sessions or whiteboarding. Modeling discourse is broader.)

“The teacher subtly guides students through the activities with **modeling discourse**, which means that the teacher promotes *framing all classroom discourse in terms of models and modeling*. The aim is to sensitize students to the structure of scientific knowledge, in both declarative and procedural aspects.

The culmination of student modeling activities is reporting and discussing outcomes in a **whiteboard session**. This may be where the deepest student learning takes place, because it stimulates assessing and consolidating the whole experience in recent modeling activities. **Whiteboard sessions have become a signature feature of the Modeling Method**, because they are flexible and easy to implement, and so effective in supporting rich classroom interactions. Each student team summarizes its model and evidence on a small (2ft × 2.5ft) whiteboard that is easily displayed to the entire class. This serves as a focus for the team’s report and ensuing discussion. Comparison of whiteboards from different teams is often productively provocative. The main point is that **class discussion is centered on visible symbolic inscriptions that serve as an anchor for shared understanding.”**