



SCI eTIPS for Teachers

Tips for Teaching IPS and FM&E

A Publication of Science Curriculum Inc.

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Welcome back to the new school year!

We hope that the year is off to a good start for you and your students!

This publication only goes out to those people for whom we have a valid email address. If you know of others who would benefit from these mailings, please encourage them to register their email address by going to <http://www.sci-ips.com/newsletter.html>.

We hope that you find the tips contained in this issue useful. If you have other Introductory Physical Science (IPS) or Force, Motion and Energy (FM&E) tips that you would like to share, email them to news@sci-ips.com. We will review and publish the best, giving you credit for your contribution.

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Developing Good Science Reading Skills

STUDENT: *I don't understand.*

TEACHER: *What don't you understand?*

STUDENT: *Everything!*

Every teacher has had this experience. The student is both confused and unable to form a specific question. More often than not, if the topic of discussion is a science reading assignment, this is due to a lack of science reading skills.

Good science textbooks, such as *IPS* and *FM&E*, are very different from novels, poetry, magazines, and even other textbooks. They are conceptually dense and extremely sequential, so small gaps in understanding can quickly snowball into more serious confusion. Consequently, it is safest to assume that your students do not come to you with the skills necessary to be successful science readers.

Fortunately, there are some fairly simple steps that you can take to advance your students' science reading skills and avert exchanges such as the one stated above.

Gain a sense of your students' general reading abilities and allow time for them to practice their science reading skills in class.

At the beginning of the school year, review your students' previous reading test scores. To get a quick preliminary sense of how well your students read, have them each read a couple of sentences or a paragraph aloud in class on the first day that they have their textbooks. Continue to have students read and discuss the non-lab text sections aloud in class as the year progresses. This practice can become less frequent as students develop their science reading skills, but it should never be totally abandoned.

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Developing Good Science Reading Skills

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Ask questions of students as they read aloud or when reviewing a reading assignment.

What does that word mean? What does that sentence tell you? How does this tie in with what you read previously? How is what is shown in the figure the same or different from what you did in the lab? How was the fourth column of the table calculated? What is plotted on each axis of the graph? What are the units? What do the data points tell you? Is there a trend to the data?

These are just a few of the questions that you can ask to gauge students' understandings of what they have read. In addition, in the Eighth Edition of *IPS Teacher's Guide and Resource Book*, formative assessment questions are provided and keyed to specific paragraphs in the non-lab reading sections. These questions allow for a quick class or individual response that can tell you whether the material was understood.

Emphasize that good science reading is not an "auto-pilot" activity.

Good science reading is done not just with the eyes; it is done with brain engaged and pencil and paper nearby. Encourage students to think about each sentence and write down questions as they read. This can be done with sticky notes placed at specific spots in the text or students can write the questions in their lab notebooks.

Students often eschew writing and simply think "I'll ask about that in class." But more often than not, they forget the question before having the opportunity to ask, even though in the back of their mind they still remember that they *had* a question. This can create a dangerous situation come test time when the uncertainty created by the unanswered question can blow itself out of proportion and result in "blanking out" on the test. If the question is written down, it is more likely to be remembered and posed in class.

Even if students cannot formulate specific questions, they should make note of the page, the paragraph, the sentence, or even the word that is causing them trouble. With this direction, you'll be better able to pinpoint and clear up small misunderstandings before they turn into major issues.

Model the good reading practices that you want your students to follow.

As students read aloud, or as you read to the class, have a pencil and paper nearby. Make a point of jotting down ideas that come to mind and/or questions that you want to ask students. As you read aloud, be sure to divert and discuss figures when they are referenced.

IPS and FM&E textbooks provide students with an opportunity to study well-written scientific material. But even the best-written science textbooks are ineffective if we do not help students develop the skills necessary to read them properly. The steps outlined here will begin this process.

(This article is the first in an occasional series addressing strategies for helping students become more effective science readers. If you have strategies that you are willing to share, please write us at news@sci-ips.com .)

Visit us in Baltimore and Denver!

If you are planning to attend the NSTA National Meeting in Baltimore, be sure to stop by our booth!

Dates: Thursday, November 2 through Saturday, November 4

Location: Baltimore Convention Center

Booth: #911

You can also find us at the Colorado Science Conference.

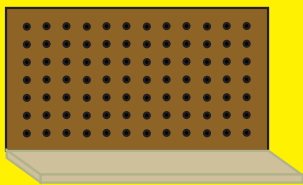
Dates: Thursday, November 16 and Friday, November 17

Location: Denver Merchandise Mart Exhibit Hall

Booth: #110

For up-to-date conference information, visit <http://www.sci-ips.com/events.html> .

Equipment Corner - Pegboards



Ever think about building your own equipment? If you have, pegboards may be the place to start. And, of course, we have some pointers! But, beware! Unless you can find the right materials, it may end up being more trouble than it's worth!

Measurements:

Standard *IPS* pegboard measurements are as follows:

Back: 12 inches high x 19 inches wide x 1/8 inch thick with holes 1/2 inch on center

Base: 6 inches deep x 19 inches wide x 5/8 inch thick

Parts:

The pegboard to be used should have holes drilled every 1/2 inch. Note that this is half the spacing and four times the number of holes that are in standard, readily-available pegboard. The extra holes are necessary to provide versatility and safe equipment positioning options for *IPS* experiments.

If you cannot obtain pegboard with 1/2 inch hole spacing, it would probably be a good idea to buy commercial equipment. There are 912 holes in the pegboard we have! If you bought the standard pegboard and thought you could drill the extra holes yourself, realize that you would have to drill 684 holes just to make the back for a single pegboard assembly!

The base should be cut from dense particleboard and should be no less than 6 inches deep to prevent tipping.

Three “pan-head” type screws will be needed to assemble the back to the base. Be sure to use a washer that is larger than the screw head to prevent the screw from pulling through the pegboard. Screws should be at least 1 1/2 inches long (a 2” screw is even better!) to deter them from pulling out of the base.

Assembly:

Do not use nails to assemble the pegboard! They will pull loose and leave you with an unsafe, wobbly back.

Drill three guide holes along the back edge of the base to accommodate the three screws – one at the center of the back edge and one approximately 1.5” from each end. (The exact position of each of these holes will depend on where the corresponding holes are in the back piece.)

Assemble the two pieces, being careful not to overtighten the screws. If the pegboard assembly does not sit flat and stable on a lab table, special tacks or adhesive “feet” can be obtained from a hardware store to act as levelers.

If you do decide to purchase rather than build your pegboards, please consider one of the vendors who have agreed to meet *IPS* specifications. Contact info for two such vendors can be found at <http://www.sci-ips.com/ips/materials.html>.

New Resource Articles for Teachers

It is a truism — teachers need to know more than their students! It is also true that teachers need to know more than what is in the textbook. For that reason, our website contains articles that go beyond the topics treated in *IPS* and *FM&E*. Rather than being intended for use with students, they are background resources for teachers.

Two such articles by *IPS* and *FM&E* co-author H. Graden Kirksey have recently been added to our website — “The Enormous Size of Avogadro’s Number” and “Mole Day and the Meaning of the Mole.” The “Mole Day” article is especially timely since October 23 is not far off!

To access these and other teacher resource articles, visit

www.sci-ips.com/ips/articles.html.

Workshop Dates for Summer 2007

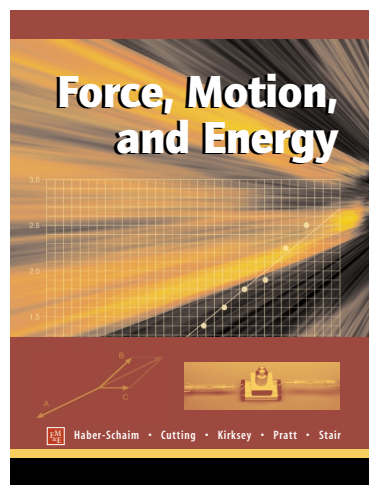
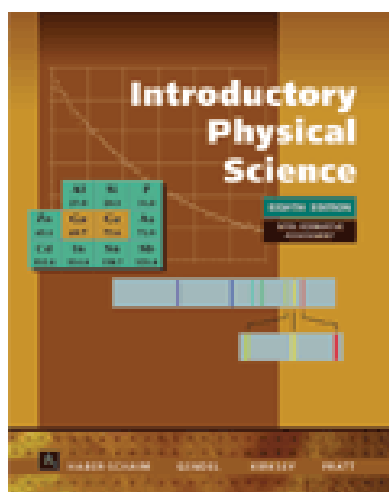
The instructors of our July IPS and FM&E workshops – Peter Gendel, Graden Kirksey, and Bob Stair – would like to thank the 40 workshop participants from 11 states and Denmark who made the 2006 *IPS* and *FM&E* Summer Workshops such a tremendous success! There were even a couple of people who had attended previous workshops and still came back for more!

It's never too early to start planning for your professional development next summer. The following workshops will be offered at Colorado School of Mines in Golden, CO:

<i>Introductory Physical Science</i> Workshop (Chapters 1-5)	July 8-13, 2007
<i>Introductory Physical Science</i> Workshop (Chapters 6-10) (To register for this workshop, you must have taken a Chapter 1-5 workshop.)	July 15-20, 2007
<i>Force, Motion, and Energy</i> Workshop	July 15-20, 2007
Constructing Tests for Science Courses Workshop	July 8-13, 2007

Remember, SCI provides a workshop credit equal to 5% of copyrighted materials sales for teachers from the purchasing school or school district. These credits are good for up to three years, so depending on your school's three-year record of purchases, you may be able to attend an approved *IPS* or *FM&E* workshop at greatly reduced cost or no cost at all to you or your school!

A regional workshop in eastern Massachusetts is also planned and others may be added. As plans develop, information will be posted to our website (www.sci-ips.com) or you can call 888-501-0957.



For more information and resources, visit www.sci-ips.com .