Enclosures for Packet #1

indicates that this document should be photocopied by the Site Leader and distributed to all participants. This icon will also appear in the upper right hand corner of all pages that should be copied.

Site Leader Materials

Participant Materials

Administrative Materials

Workshop Content

* Please complete and return these forms in the enclosed self-addressed envelope as soon as possible.

Site Leader Materials

Assessment in Math and Science: What's the Point?

Site Leader "TO DO" List

When You Receive These Materials

☐ ***Check Your Materials***

We have provided you with a list of enclosures for Packet #1. Please read through the materials to familiarize yourself with them. If you are missing any materials, please contact Nicole Stark, Outreach Coordinator (see p. 1- 23).

☐ ***Reserve Your Site***

Find a meeting room in a location that receives the Channel satellite signal. The room should have a least one television monitor and a telephone (preferably cordless). You might also want to have a computer and/or a fax machine so you can send email and fax messages during the broadcasts as well as speak live on the telephone. Reserve the room for the eight workshop dates.

☐ ***Sign Up Participants***

Promote the workshop series to your colleagues in your school and/or district. Make copies of the enclosed *Participant Registration Form* and have committed participants fill out the form. Collect the completed forms (*Participant Registration Form*).

☐ ***Register Your Site and Yourself***

Fill out the enclosed *Site Registration Form* and the *Site Leader Registration Form.*

☐ ***Mail or Fax Registration Forms***

When you have collected all the registration forms (*Participant Registration Forms, Site Registration Form* and the *Site Leader Registration Form),* please return them to us as soon as possible in the enclosed self-addressed envelope.

It is important that we receive these forms as soon as possible so that we can add you and your colleagues to *Channel-Talk*, the workshop email discussion list. (See p. 1-20).

Two Weeks Before the Workshop

☐ *Photocopy and Distribute Materials*

Please photocopy the print materials marked with ☐ in the upper right hand corner, and distribute them to all registered participants. Explain that this is the first of three packets of materials and that the materials for Workshops #1 to #8 will follow in the coming weeks.

☐ *Check the Satellite Signal*

Find out who is responsible for technical matters at your site, and have that person check the satellite signal ahead of time to make sure that you will be able to find it easily on the days of the workshops.

Satellite Signal and Coordinates
Galaxy 4 , 99 degrees WL
Transponder 12
Horizontal Polarity
Ku band 1189.375 MHz
Channel 901

Satellite Receiver Requirements
General Instruments Digicypher II
Model 4200 V (SCPC Format)

☐ *Distribute the Directions*

If the viewing site is not in the participantsÕ own school, you may need to distribute instructions on how to get there, where to park, and where to go after arriving. It may be helpful to include a phone number in case people get lost.

The Day Before the Workshop

☐ ***Check the Satellite Signal***

It is important for the Òtechnical personÓ to check the satellite coordinates one last time to make sure you are able to receive the Channel. If you are in snow country, please make sure the dish does not have any snow on it because this will affect reception of the signal.

☐ ***Confirm Your Meeting Room***

Check to make sure that the room you have reserved will be available on the date and time of the workshop. Be sure that there will be adequate seating for your participants.

☐ ***Confirm with Participants***

You might want to call or email registered participants to remind them of the workshop time and place. Also remind them to bring their print materials, their homework assignment (see p. 1-35 for the pre-workshop assignment for Workshop #1), and some paper and a pen or pencil.

The Day of Each Workshop

Bring Extra Materials

We recommend that you bring a few extra copies of the print materials for those who may need them. You should also bring some extra paper and pens or pencils.

Set the VCR

If you are taping the workshops, please set the timer of the VCR to allow for a few extra minutes at the beginning and end of the workshop. Remember that the workshops will be broadcast live twice Ñ once from 3:15 pm to 5:15 pm EST , and again live from 6:15 pm to 8:15 pm EST. Also, please review the licensing information and procedures for taping the workshops (p. 1-9).

Take Attendance

Please have participants sign an attendance roster before each workshop. For those who are seeking graduate credit for their participation, you will be asked by the institution to verify attendance. Also, we will need to know how many workshops each participant attended so that we can send accurate certificates of participation to those who request them.

Call the Audiobridge

The audiobridge is a two-way telephone system that allows you to speak live with the people in the studio, and them to speak with you. To participate on the audiobridge, please call the audiobridge operator (**800-222-0055**) as early as possible (up to thirty minutes prior to the workshop) to let us know that your site will be joining us live. It is likely that your site has only one available phone, so you should spend some time thinking about how comments from various participants will be communicated once your call is taken on the air. Options include using a portable phone or passing notes to one person who speaks for the site.

Site Registration Form

About Your Site

1. Site Leader Name _____

2. Building or School Name _____

3. Street Address _____

City _____ **State** _____ **Zip Code** _____

About Your Participation

4. How will your site be viewing the Workshops? (please check one**)**

☐ **Live** 3:15 - 5:15 pm EST ☐ **Live** 6:15 -8:15 pm EST ☐ **Taped** _____
(when?)

5. How many participants will be at your site? _____

6. If you are participating live, to which of the following equipment will you have immediate access for interaction during each workshop? (check all that apply)

☐ Telephone ☐ Fax machine ☐ Email

☐ VCR ☐ Internet

7. Please provide any additional comments you feel may be useful to us in planning our interactivities:

_____

_____

_____

_____

_____

Thank you for taking the time to give us this information.

Site Leader Registration Form

* Please remember to collect all *Participant Registration Forms* and return them, along with this form and the *Site Registration Form,* in the enclosed self-addressed envelope.

Site Leader Information

Name _____

Job Title _____ **Grade Level** _____ **Subject** _____

Email Address _____

☐ ***Sign Me Up*** **for the Workshop email discussion list!**
See page 1-20 for additional information

Organization/Institution Information

Institution _____

Street Address _____

City _____ **State** _____ **Zip Code** _____

Phone ( ) _____ **Fax** ( ) _____

Home Address

Street Address _____

City _____ **State** _____ **Zip Code** _____

Phone ( ) _____ **Fax** ( ) _____

Thank you for taking the time to give us this information.

Licensing and Duplication Information

If you plan to record, duplicate or rebroadcast any or all of the Assessment Workshops, please review the following information. There are no fees for these licenses.

You will need to complete the appropriate licenses and create and include any necessary attachments. The following provides a guidelines to help you determine which licenses are appropriate for your particular situation.

Off-Air Recording

For **single copy** recording from the broadcast. Schools, organizations, and home viewers recording and playing the tape should use this license.

Duplication

For **mulitple copies** of a program from broadcast. Schools and organizations wishing to create multiple copies of broadcasts should use this license. Include a list of programs duplicated in an attachment (Attachment A).

Rebroadcast

For **rebroadcast** of programs over cable, DBS, ITFS, closed circuit television, or other broadcast media. Organizations and television stations with rebroadcast capabilities should use this license. Include a list of programs rebroadcast in an attachment (Attachment A) and a list of recipients of rebroadcast and general audience description in an attachment (Attachment B).

Please send **two** original, signed copies of each signed license to:

The Annenberg/CPB Math and Science Project
Attn: Channel Licenses
901 E Street , NW
Washington, DC 20004
(800) 556-4376

A counter-signed original will be returned to you for your files.

Off-Air Recording License for Annenberg/CPB Channel Programs
(please type or print)

Licensee/Organization_____
Address_____
City_____State_____ Zip Code_____
Contact Person_____
Title_____Phone_____
Email _____ Fax _____

Terms and Conditions

1. Licensee shall have the right to record off-air one copy of the program(s) which the licensee agrees to submit, and retain the copy of the program(s) for the life of the tapes for use in North America only at no charge.

2. The recorded programs may be used for non-fee based educational and instructional purposes and may not be sold or used as part of a profit-making activity.

3. Full series from the attached list used as a credit-bearing telecourse require an additional telecourse use license, which is available from the PBS Adult Learning Service.

4. Recorded programs must retain all original logos and credits.

5. Duplication of programs requires a separate duplication license.

6. Rebroadcast of program(s) requires a separate rebroadcast license.

7. The Annenberg/CPB Math and Science Project shall have the right to revoke this license upon written notification.

8. Both parties to this License shall at all times be deemed to be performing as independent parties and not as agents or employees of the other party and the acts and omissions of a party hereto shall be deemed to be those of the party conducting the act or omission. Both parties agree to indemnify, save and hold harmless the indemnifying party and its officers, agents, and employees against any and all claims, losses, expenses, or liability arising from the negligence of the indemnified party.

In agreement to the foregoing, the authorized representatives sign below.

By_____Date_____
For Licensee

By_____Date_____
For The Annenberg/CPB Projects

Please return **two** original signed copies of this document along with Attachments A and B to the following address.

Or, fax a signed copy of this document and appropriate attachments to (202) 783-1036. A signed original will be returned for your file.

Duplication License for Annenberg/CPB Channel Programs

(please type or print)

Licensee/Organization_____
Address_____
City_____State_____ Zip Code_____
Contact Person_____
Title_____Phone_____
Email _____ Fax _____

Terms and Conditions

1. Licensee shall have the right to duplicate copies of the program(s) indicated in Attachment A, which the licensee agrees to submit, for use in North America only at no charge. (Attach a copy to this license with the specific programs checked.)

2. Licensee may retain the copies of the material for the life of the tape(s).

3. The duplicated programs may be used for non-fee based educational and instructional purposes and may not be sold or used as part of a profit-making activity.

4. Licensee agrees to include as Attachment B a list of all recipients of duplicated copies.

5. This license grants public performance rights.

6. Programs may not be sponsored and may not be interrupted by commercials.

7. Duplicated programs may not be edited and must retain all logos, funding credits, and 800-number tags.

8. For permission to rebroadcast programs directly on cable, DBS, ITFS, or over closed circuit systems, a separate rebroadcast license is required.

9. This license does not grant permission to duplicate from hard copies purchased from the Annenberg/ CPB Math and Science Collection.

10. The Annenberg/CPB Math and Science Project shall have the right to revoke this license upon written notification.

11. Both parties to this License shall at all times be deemed to be performing as independent parties and not as agents or employees of the other party and the acts and omissions of a party hereto shall be deemed to be those of the party conducting the act or omission. Both parties agree to indemnify, save

and hold harmless the indemnifying party and its officers, agents, and employees against any and all claims, losses, expenses, or liability arising from the negligence of the indemnified party.

In agreement to the foregoing, the authorized representatives sign below.

By_____Date_____
For Licensee

By_____Date_____
For The Annenberg/CPB Projects

Please return **two** original signed copies of this document along with Attachments A and B to the following address.

The Annenberg/CPB Project
Attn: Channel Licenses
901 E Street NW
Washington, DC 20004

Or, fax a signed copy of this document and appropriate attachments to (202) 783-1036. A signed original will be returned for your file.

Rebroadcast License for Annenberg/CPB Channel programs

(please type or print)

Licensee/Organization_____
Address_____
City_____State_____ Zip Code _____
Contact Person_____
Title_____Phone_____
Email _____ Fax _____

Terms and Conditions

1. Licensee shall have the non-exclusive right to rebroadcast the programs indicated by Attachment A, which the licensee agrees to submit, for use in North America only on the following systems at no charge (check all that apply):

_____ cable _____ DBS _____ ITFS _____ closed circuit

_____ other (specify)

2. Licensee using cable or broadcast shall provide a channel or cablecast signal information.

Channel number _____ Cable system _____.

3. Program(s) may not be sponsored and may not be interrupted with commercials and may not be broadcast for a fee.

4. Rebroadcast programs may not be edited and must retain all logos, funding credits and 800-number tags.

5. Use of the program(s) shall be non-exclusive to Licensee and Licensee shall not otherwise license, authorize or permit broadcast or rebroadcast of the programs.

6. Cable and DBS licensees agree to include as Attachment B a general description of their audience(s).

7. All other licensees agree to include as Attachment B a list of all recipients of rebroadcast including sitesÕnames and addresses.

8. The Annenberg/CPB Math and Science Project shall have the right to revoke this license upon written notification.

9. Both parties to this License shall at all times be deemed to be performing as independent parties and

not as agents or employees of the other party and the acts and omissions of a party hereto shall be deemed to be those of the party conducting the act or omission. Both parties agree to indemnify, save and hold harmless the indemnifying party and its officers, agents, and employees against any and all claims, losses, expenses, or liability arising from the negligence of the indemnified party.

In agreement to the foregoing, the authorized representatives sign below.

By_____Date_____
For Licensee

By_____Date_____
For The Annenberg/CPB Projects

Please return **two** original signed copies of this document along with Attachments A and B to the following address.

The Annenberg/CPB Project
Attn: Channel Licenses
901 E Street NW
Washington, DC 20004

Or, fax a signed copy of this document and appropriate attachments to (202) 783-1036. A signed original will be returned for your file.

Participant Materials

Assessment in Math and Science:
What's the Point?

List of Enclosures

Participant Materials

Administrative Material

Workshop Content

* Please complete and return this form to your Site Leader as soon as possible.

Participant Registration Form

* Please return this form to your Site Leader as soon as possible.

Participant Information

Name_____

Job Title_____ **Grade Level**_____ **Subject**_____

Email Address _____

☐ ***Sign Me Up*** **for the Workshop email discussion list!**
See page 1-20 for additional information

Site Information

Site Leader Name_____

School/Site _____

Organization/Institution Information

Institution _____

Street Address_____

City _____ **State**_____ **Zip Code** _____

Phone ( ) _____ **Fax** ( ) _____

Home Address

Street Address _____

City _____ **State** _____ **Zip Code**_____

Phone ( ) _____ **Fax** ( ) _____

Thank you for taking the time to give us this information.

How to Participate During Live Workshops

If you are watching the workshops live, you can communicate with the host, content guide, and guest teachers in the following ways:

Live Audiobridge

The audiobridge is a two-way telephone system that allows you to speak live with the people in the studio, and them to speak with you.

To participate on the audiobridge, please call the audiobridge operator (**800-222-0055**) as early as possible (up to thirty minutes prior to the Workshop) to let us know youÕll be joining us live. We encourage you to stay connected throughout the entire program by leaving your phone off the hook. However, it is not necessary to have someone manning the phone at all times. During the Workshop, the audiobridge operator will receive incoming calls and will tell you who will be speaking next. You will be told just before your call is taken on the air.

It is likely that your site has only one available phone. Think about how comments from various participants will be communicated once your call is taken on the air. Options include using a portable phone or passing notes to one person who speaks for the site.

Please keep in mind the following suggestions when participating on the audiobridge:

¥When your site wants to ask a question, the person at the site should pick up the phone and say: ÒAudiobridge Operator, (name of your site) has a question or comment.Ó
¥When you are speaking, please keep your phone as far from the television set as possible and the television volume at a moderate level to avoid feedback.
¥While waiting to speak on the audiobridge, please continue to follow the Workshop.
¥ If using a portable phone, please keep it near its base to avoid static.
¥ Please keep conversation away from the phone unless you are speaking to the on-camera presenter or to the audiobridge operator.

Email

If you have access to a computer, you can send comments via email to: **channel@learner.org**
These comments will be read aloud and incorporated into the discussion. Be sure to include your name and site.

Fax

Similarly, comments can be sent via fax to: **(617) 252-5709.**
Be sure to include your name and site.

Technical Difficulties

If you experience technical difficulties during the Workshop, please call:

Satellite Trouble Line: (800) 528-7749

Participating in the Workshops On-line

The Assessment Workshops workshops may be viewed in a variety of ways. Some participants will watch the broadcasts live, others will watch them taped; some will watch alone or in pairs, others will watch with a large group of teachers. But however you plan to use the workshops, we want to provide you with ample opportunity to discuss the issues and questions raised in the workshops with the Content Guides, the Channel staff, and Workshop participants across the country.

Channel-Talk: A Workshop Email Discussion

To provide a communication network, we have created Channel-Talk. Channel-Talk is an email-based discussion (a moderated listserv) for the Assessment Workshops. By signing-up for Channel-Talk, you will receive in your email all Workshop-related messages. You can also email your comments to Channel-Talk, and your comments will be sent (upon the approval of the moderator) to all the other participants who have signed up for Channel-Talk.*

Workshop-related announcements, news, reminders, and updates will be posted to this email list, in addition to all comments and discussions. We invite and encourage you to use this discussion forum as a means of continuing the conversations about assessment-related issues beyond the weekly broadcasts. Specific post-workshop discussion topics will be posted by the Content Guides and the Channel staff each week.

You will automatically be added to Channel-Talk upon registration by checking the *Sign Me Up* box on your registration form. If you did not sign up on the form and would like to be added to the email discussion list, please follow the instructions below. Directions for removing your name from the list are also included.

* For those who do not have access to email, the Channel also offers a Web-based discussion on the Channel home page at: www.learner.org/channel

Sending Your Messages

Send your messages to:

Channel-Talk@learner.org

Your message will go to all participants who have signed up for the list, the Content Guides, and Channel staff.

Subscribing to Channel-Talk

To subscribe, send an email message to:

channel-talk-request@learner.org

This message should contain ONLY the following:

subscribe channel-talk <Your Name>

For example:

subscribe channel-talk Amanda Ochoa

Unsubscribing to Channel-Talk

To unsubscribe, send an email to:

channel-talk-request@learner.org.

This message should contain ONLY the following:

unsubscribe channel-talk <Your Name>

For example:

unsubscribe channel-talk Amanda Ochoa

The Channel Web Site

Explore the Channel Web site for support and information throughout the Workshops. YouÕll find the latest about the Workshop and the Channel on:

www.learner.org/channel

Live Chat

During the Workshop series, we will offer an opportunity to interact directly with the Content Guides through a live chat on the Web site. Topics and dates will be announced during the Workshops and on the Web site. Be sure to tune in.

Workshop Information

Up-to-date schedules, announcements, and materials
As new materials are developed or changes are madethroughout the series, we will post the information .

Registration Materials and Print Materials
A complete set of registration and print materials are available on-line for printing or downloading.

Homework solutions and graphics presented during the Workshops
The answers to assignments and problems posed during the Workshops are shared on on the Web site each week.

Contributions from participants
Throughout the Workshops, we receive comments, solutions, and innovative ideas from teachers. Whenever possible, we try to share these solutions on the Web site.

Web-based discussion
A Web-based forum for discussion is available for those without email access. The discussions on the Web are similar to the ones on *Channel-Talk*.

Other Resources

Video previews from the Annenberg Collection
The Channel Web site also offers streaming video clips from the Math and Science Collections. Find out what else is broadcast on the Channel.

SAMI
Science and Math Intiative - an extensive collection of Internet resources for educators, parents, and life-long learners.

Guide to Math and Science Reform
A comprehensive on-line, searchable database of information on reform initiatives, resources, and organizations relating to math and science reform.

Contact Information

Comments & Questions

Nicole Stark
Outreach Coordinator

(800) 556-4376 ext. 753

Voice Mail (617) 496-7676

Email channel@learner.org

Postal Mail
The Annenberg/CPB Channel
Interactive Workshops
c/o MCET
One Kendall Square, Bldg. 1500
Cambridge, MA 02139-1562

Fax (617) 252-5709

The Channel Web Site

http://www.learner.org/channel

The Channel maintains an Interactive Workshops section on the Channel Web site specifically for *Assessment in Math and Science: What's the Point?* Check there for updates, solutions for homework, and announcements. All print materials are available on the Web site.

The Web site also maintains a Web-based discussion for participants and Content Guides to discuss the Workshops.

Email Discussions

You can be automatically added to the email list by checking off *Sign Me Up* on your registration form. Or you can send a message to Channel-Talk-request@learner.org. The body of the message should contain only your name and your email address. Be sure to remove any signature files.

Channel Talk **channel-talk@learner.org**
Subscribe to this to be added to the Channel's listserv discussion group. This is an interactive mailing list. (See page 1-20 for more information.)

Technical Concerns and Questions

Satellite Trouble Line (800) 528 - 7749

Satellite Information
Galaxy 4, Transponder 12
99 Degrees WL
Ku band 1189.375 MHz
Horizontal Polarity

Satellite Receiver Requirements
General Instruments
Digicyper II
Model 4200 V
SCPC Format
Channel 901

Colorado State University Graduate Credit

Would you like to earn graduate credit for your participation in *Assessment in Math and Science: What's the Point?*, a Workshop Series for K-12 Teachers?

The Center for Science, Mathematics, and Technology Education (CSMATE) at Colorado State University is offering 2 graduate level credits to distance learners viewing all eight sessions of the Annenberg/CPB Channel© Interactive Teacher Workshop on Assessment: Feb. 24 - April 14, 1998.

Here is what you have to do:

- Complete the attached Colorado State University registration form.

- Include a payment of $90.00. Checks and Money Orders should be made payable to Colorado State University.

- Mail the registration form and payment to:

  Annenberg/CPB Assessment Workshop
  Colorado State University
  Division of Continuing Education
  Spruce Hall
  Fort Collins, CO 80523-1040

- You can also register by calling Louise Moreno at 1-800-525-4950. Be sure to reference the Annenberg Assessment Course and have your credit card information available.

- Registration Deadline is March 3, 1998 for mailing, or March 8, 1998 for calling.

- Course Requirements are as follows:

  -View all eight teleconferences at your local downlink site or on video tape.

  -Document your participation by maintaining a journal in which you record your reactions and responses to the ideas presented in each of the teleconference sessions. Typically, you will write one or two handwritten pages of your thoughts after each session.

  -Write a 3-5 page paper which explains one aspect of your classroom assessment strategy you would like to improve and some ideas you have for accomplishing this.

  -For your project, choose one assessment technique that you have seen during the workshop and would like to try. Draft a lesson or unit assessment plan that uses this technique. Implement this plan in the classroom. (If you are not a classroom teacher, feel free to modify the project to fit

your interests, for example, you could work with your own children if a parent, or with a small group of students in an informal learning setting.) Submit the plan, some evidence of implementation (pictures of performance assessments in action, exemplary student work, or a rubric and anchor papers), and a paper summarizing the results and your impressions.

- The journal, paper, and project must be postmarked by May 4, 1998. If you are unable to view a broadcast due to transmission, weather or scheduling problems by this deadline, **do not delay mailing your coursework.** Please simply include a note in your journal explaining the situation and your credit will not be affected. Mail to:

Barry Carroll, Program Director
The Center for Science, Mathematics, and Technology Education
301 Natural and Environmental Sciences Building
Colorado State University
Fort Collins, CO 80523-1802

Make sure to clearly mark each item with your name and address. Materials will not be returned, so please keep a copy for your own records.

- **Grading will be on a pass/fail basis.**

If you have any questions or concerns, please contact Barry Carroll at (970) 491-1700, FAX: (970) 491-2005, E-mail: barry_carroll@csmate.colostate.edu, or at the above address.

COLORADO STATE MAIL-IN REGISTRATION FORM

Graduate Credit for Annenberg/CPB Channel Interactive Assessment Workshops

Please Print All Information

Full Legal Name _____ Social Security #_____

Ethnic Origin (Optional)___

A = Asian
B = Black, Non Hispan
H = Hispanic
I = American Indian
W = White, Non Hispanic

Class Level (Credit courses only) _____

Undergraduate: 11 = Freshman (0-29 credits)
21 = Sophomore (30-59 credits)
31 = Junior (60-89 credits)
41 = Senior (90@ credits)
44 = Post Bachelor

Graduate: 51 = Not Admitted to Graduate School
52 = Admitted to Masters Program
61 = Admitted to Ph.D. Program

Birthdate (e.g., 12/31/52) _____ Gender: Female __ Male __

Street Address _____

City _____ State_____ Zip _____

Home Phone _____ Office Telephone _____

Total tuition/fees due for NS 696V Group Study is $90.00

Payment:

__ Enclosed is a check or money order (payable to Colorado State University)

__ Please charge my MasterCard, VISA, American Express, or Discover

Credit Card #: _____ Expiration Date: _____

I certify that, to the best of my knowledge, the information furnished here is true and complete without intent of evasion or misrepresentation. I understand that if it is found to be otherwise, it is sufficient cause for rejection or dismissal.

Signature _____ Date _____

Mail by March 3, 1998 to: Attn: Annenberg/CPB Assessment Workshop
Colorado State University
Division of Continuing Education
Attn: Registration
Spruce Hall
Fort Collins, CO 80523-1040

Students wanting to withdraw from this course must do so in writing by April 14, 1998. In order to receive a refund (total tuition/fees minus a $20 withdrawal fee) we need to receive a written withdrawal notice postmark by March 3, 1998.

Division of Continuing Education
Colorado State University

Workshop Synopses

1 Will This Be on the Test?

Knowing vs. Understanding

Tuesday, February 24, 1998 - Content Guide: Michael Hibbard

Understanding is more than simply knowing. This workshop will set the stage for the entire series by examining what it means to understand, and will explore how teachers can design a set of performance tasks to fairly and accurately assess the levels of understanding that their students have or have not achieved.

2 WhatÕd I Get?

Scoring Tools

Tuesday, March 3, 1998 - Content Guide: Michael Hibbard

Well-designed performance tasks give teachers the information necessary to evaluate the depth of students' understanding — but how can teachers determine quality work? This workshop will demonstrate how teachers can construct assessment tools to use as benchmarks against which to measure student understanding. The role of students in the construction of scoring tools and the process of assessment will be a primary focus.

3 Is This Going to Count?

Embedded Assessment

Tuesday, March 10, 1998 - Content Guide: Monica Neagoy

Assessment does not compete for valuable teaching time; it is teaching time. This workshop will show how embedding assessment into everyday curriculum turns performance tasks into learning activities, and allows teachers to shape subsequent instruction according to what their students have and have not understood.

4 I DidnÕt Know This Was an English Class!

Connection Across the Disciplines

Tuesday, March 17, 1998 - Content Guide: Monica Neagoy

One measure of students' depth of understanding is the connections they can make across disciplines. This workshop will explore ways in which teachers can encourage these connections by designing performance tasks which build on other disciplines.

5 You WILL Be Tested on This!

Standardized Testing

Tuesday, March 24, 1998 - Content Guide: TBA

Most teachers are under pressure to get their students to perform well on state and national tests, but sometimes it seems that too much attention is paid to these tests. This workshop will consider how teachers can use standardized tests to focus their teaching so that student performance improves in the classroom as well as on these external measures of success.

6 That Would Never Work Here!

Seeing Assessment Reform in Action, Part I

Tuesday, March 31, 1998 - Content Guide: Mary Neuman and Jude Pelchat

What does assessment reform actually look like? This workshop will follow the stories of Barbara, a math teacher in Whittier, California, and Scott, a science teacher in Louisville, Kentucky, as they share how they are incorporating assessment into their teaching practice. Emphasis will be placed on the colleague support structure — teachers sharing ideas with and getting help from other teachers.

7 That Would Never Work Here Either!

Seeing Assessment Reform in Action, Part II

Tuesday, April 7, 1998 - Content Guide: Mary Neuman and Jude Pelchat

Involving students in assessment is often the key to engaging them in learning. This workshop will continue to follow Barbara and Scott as they use assessment to encourage their students to improve their performance. Providing opportunities for students to assess their own work and that of their peers will be the focus of this workshop.

8 When I Was in School...

Implementing Assessment Reform

Tuesday, April 14, 1998 - Content Guide: Michael Hibbard

Changing old ways is not easy. Communication is the first step toward encouraging support for new assessment strategies. This workshop will focus on the importance of collaboration among teachers, administrators, and especially parents, when implementing assessment reform in a school or district.

About the Content Guides

K. Michael Hibbard, Ph.D.

Mike earned a B.S. in biology from the University of Kansas, a M.S. in biology from Purdue University, and a Ph.D. in science education from Cornell University. He has taught elementary and high school science, served as a high school principal, and is now the Assistant Superintendent of Schools in Region 15 Middlebury and Southbury, Connecticut, where he leads a successful ten-year effort to improve student performance on national, state, and local tests and performance assessments. Mike writes and consults on the topics of performance-based learning and assessment and long-term change.

Monica Neagoy

Monica Neagoy has been teaching mathematics and innovative teaching strategies to pre-KÐ12 teachers at Georgetown University since 1985. She designs, directs, and teaches workshops on a host of topics and approaches. In addition, she provides services to public and private schools in the Washington, D.C. area, including one-time workshops for teachers, interactive presentations for students, and district-wide teacher education programs on math reform. She has a Ph.D. in Mathematics Education from the University of Maryland. Her exposure to many cultures, her mastery of several languages, and her professional involvement in the arts and sciences provide her with a unique perspective on teaching and learning.

Mary Neuman

Mary Neuman is the project director of the Math/Science Fellows program at the Annenberg Institute for School Reform, Brown University. She has extensive experience teaching Chemistry, Biology, Physical Science, Mathematics, and Environmental Science at the elementary, secondary, and university levels. Dr. Neuman co-authored the book titled *Teaching the Gifted and Talented in the Science Classroom,* wrote a monograph titled *Investigations: Integrating Curriculum and Changing Teaching Practice in Math and Science* for the AISRÕ Writing Within School Reform Series, and helped to shape a documentary and write the facilitatorÕ guide to accompany the video *Learning Science and Math Together*.

Judith (Jude) Pelchat

Jude is a non-practicing agronomist (Ph.D., Purdue University) who, since August, 1997, has worked as a Senior Associate in professional development at the Annenberg Institute for School Reform, Brown University. Since 1988, Jude served as a consultant for the Coalition of Essential Schools and focused her efforts most intensively within the Math/Science Fellows Project directed by Mary Neuman. JudeÕ career has consisted of a mixture of teaching and research. Her teaching experience has included biological sciences and environmental sciences in secondary schools, soil science at the university level, and theatre arts at a suburban high school; her research experience has been in renal research and agronomic research. JudeÕ primary interest is exploring alternatives in the teaching of secondary sciences and mathematics.

Workshop Components

Guest Teachers

Several teachers will be present in the studio for each workshop. These teachers will engage in group discussions throughout the workshop just as you will discuss ideas with participants at your own site.

Activities and Discussion

Throughout each workshop, the content guide will present activities and questions for you to do and discuss with the other participants at your site. We recommend that you bring some paper and a pen or pencil to each workshop so you can jot down your thoughts and ideas.

Pre-Workshop Assignments

At the end of each workshop, the content guide will present an assignment for you to do in preparation for the next weekÕs workshop. Instructions for these assignments are listed in the print material for each workshop. *(Please note that the Pre-Workshop Assignment for Workshops #1 is enclosed in this packet of materials.)*

Suggested Classroom Strategies

The print material for each workshop includes a list of related strategies for you to try in your classroom. We have tried to provide a variety of strategies -- some may be more age-appropriate for your students than others.

Post-Workshop Questions

In addition to the questions that will be posed during each workshop, we will provide you with several questions to think about after each workshop. You might discuss these questions with other participants at your site, ponder them on your own, or answer them in your journal.

On-line Discussions and Web Site

In between workshops, we will provide an email discussion for you to ask questions of the Content Guides and other participants, and to communicate with the Channel. Post Workshop discussion specific to the workshops will be posted here. The Channel Web site also offers an area specifically for the Assessment Workshops. Refer to this area for up-to-date information about the Workshops.

Journal

We recommend that you keep a journal throughout this workshop series. The journal will help you identify the ideas that are most important to you and will help you apply those ideas to your own teaching.

Consider using a double-entry journal:

On the left side of the paper, you will summarize an idea that you feel is important to you. Put no more than two ideas in the left column on each page.

On the right side of the paper, you will make notes for yourself about how you will use that idea in your teaching.

When you make an entry in the left column, you may make some notes in the right column at that time. And you also may come back to that page and add more notes as the series of workshops progresses. Because you have only put two good ideas on each page in the left column, you will have plenty of room to add notes.

Double-Entry Journal

Workshop # and Date	Ideas from the Workshop	Ways I Might Make Use of These Ideas

Pre-Workshop Assignment for Workshop #1

1. Please bring a set of **math or science standards** with you to the first workshop. These may be standards that you currently use, or they may have been used to help shape the curriculum that you use. They may have been developed by your school, your district, or your state, or they may be from one of the national standards groups.

   Groups in the United States who have developed standards include:

   ¥The National Council of Teachers of Mathematics (NCTM)
   ¥The National Assessment of Educational Progress (NAEP)
   ¥The National Science TeachersÕAssociation (NSTA)
   ¥The American Association for the Advancement of Science (AAAS)
   ¥The New Standards Project

   You will be using your standards throughout Workshop #1, as well as for some of the subsequent workshops, so we recommend that you bring them with you to every workshop.

2. Please bring to Workshop #1 a **project or open-ended task** that you use in your class that requires students to use math or science content that they have learned in your class. There are no requirements for the project or task that you choose. It could be anything from a one-day assignment to a three-week long project. The idea is that you bring to this workshop a lesson from your own curriculum that will have meaning to you.

3. Please **answer the following question:**
   What science or math standards are most closely related to the project or open-ended task that I have chosen?

Enclosures for Packet #2

indicates that this document should be photocopied by the Site Leader and distributed to all participants. This icon will also appear in the upper right hand corner of all pages that should be copied.

Workshop Materials

Worksheets for Workshops #1 and #2

Workshop #1
February 24, 1998 ¥ Content GuideÐMichael Hibbard

Will This Be on the Test?

Knowing vs. Understanding

Worksheets for Workshop #1 can be found on pages W1-W41.

Pre-Workshop Assignment for Workshop #1

* Please notes that this assignment is *slightly different* from the previous instructions given in Packet #1 (p. 1- 32). The differences are indicated in bold.

1. **During the course of this eight-week series, you will have an opportunity to try new assessment strategies with a set of lessons that you plan to teach later in the spring. Come to the workshop with a specific unit in mind that you want to work on.**

2. **From the unit you have selected,** choose a project or open-ended task that requires students to use math or science content they learn in your class. This project or task can be anything from a one-day assignment to a three-week project. The idea is to bring a lesson from your own curriculum that will have meaning to you.

3. Please answer the following question:

   What is the science or math content that you want your students to understand as a result of the project or open-ended task you have chosen?

4. Please bring a set of math or science standards with you to the first workshop. These may be standards that you currently use, or they may have been used to help shape your curriculum. They may have been developed by your school, your district, or your state, or they may be from one of the national standards groups.

   Groups in the United States who have developed standards include:

   - The National Council of Teachers of Mathematics (NCTM)
   - The National Assessment of Educational Progress (NAEP)
   - The National Science Teachers Association (NSTA)
   - The American Association for the Advancement of Science (AAAS)
   - The New Standards Project

   You will be using your standards throughout Workshop #1, as well as for some of the subsequent workshops, so we recommend that you bring them with you to every workshop.

About the Workshop

What is important for students to understand about science and math? How do we judge the depth of their understanding? Starting from content standards in science and math, we will examine strategies for creating classroom performance tasks that serve two purposes: helping your students learn, and helping you assess their level of understanding. These performance tasks require the student to demonstate content information, thinking skills, communication skills, and work habits.

Suggested Strategies For Assessing Understanding

1. With reference to the worksheet about what we mean by understanding called *Dimensions of Understanding* (p. W-1), find projects or performance tasks that you use that relate to some of the 10 aspects of understanding on the list.

2. Refer to the project or open-ended task that you chose in item 2 of the pre-workshop assignment, and the science or math concept that you identified in item 3. Select one aspect of understanding of the science or math concept. How does the project or task get at this understanding?

3. Using the worksheet entitled *Action Verbs Define Thinking Skills* (p. W-5), identify the verbs that you use most often in your projects or performance tasks. Select two other verbs from the list to use in your upcoming project or performance task.

4. Decide on the format or formats for the final product of your project or performance task. Categorize those formats according to writing, constructions, oral presentation, graphics, multimedia, or other.

Post-Workshop Discussion Questions

1. On the *Dimensions of Understanding*, (p. W-1) list, which types of understanding should be given more attention. How would you do that?

2. Do the projects or performance tasks you do with your students seem to be worth the time they take? Are those projects or tasks well-connected to the important content of your course? Are the length and complexity of the project or task usually worth the information you gain about how well students understand the math or science content? How could you improve the quality of your projects or tasks?

3. If you had the feeling that a student really had deep understanding of the math or science

content, but was not able to express that understanding through your projects or tasks, what would you do?

4. It has been said that writing is the most important way to show what you know. What are some arguments for and against that position?

Related Resources

Archbald, D. & Newmann, F. (1988). *Beyond Standardized Testing: Assessing Authentic Achievement in the Secondary School.* Reston, VA: National Association of Secondary School Principals (NASSP).

Bredekamp, S. & Rosegrant, T. (Eds.) (1992). *Reaching Potentials: Appropriate Curriculum and Assessment for Young Children.* Washington, DC: National Association for the Education of Young Children (NAEYC).

Brandt, R. (Ed.) (1992). *Readings from Educational Leadership: Performance Assessment.* Alexandria, VA: Association for Supervision and Curriculum (ASCD).

Burke, K. (1993). *How to Assess Thoughtful Outcomes.* IRI/Skylight Publishing: Palatine, IL.

Congress of the United States (1992). *Testing in American Schools: Asking the Right Questions.* Washington, DC: Office of Technology Assessment.

Curriculum and Evaluations Standards for School Mathematics (1989). Reston, VA: National Council of Teachers of Mathematics (NCTM).

Diez, M., Castenell, L., Wegener-Soled, S., Galluzzo, G., Hinkle, D., Murray, F., Trentham, L., & Kunkel, R. (1993). *Essays on Emerging Assessment Issues.* Washington, DC: American Association of Colleges for Teacher Education (AACTE).

ERIC Review (Winter 1994). *Performance-Based Assessment.* Washington, DC: Educational Resources Information Center (ERIC).

Hammond, L.D., Ancess, J., and Falk, B. (1995). *Authentic Assessment in Action: Studies of Schools and Students at Work.* New York, NY: Teachers College Press.

Hart, D. (1994). A*uthentic Assessment: A Handbook for Educators.* Menlo Park, CA: Addison-Wesley Publishers.

Herman, J., Aschbacher, P., and Winters, I. (1992). *A Practical Guide to Alternative Assessment.* Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R., Pickering, D., and McTighe, J. (1993). *Assessing Student Outcomes: Performance Assessment Using the Dimensions of Learning Model.* Alexandria, VA: Association for Supervision and Curriculum Development.

McDonald, J., Barton, E., Smith, S., Turner, D., and Finney, M. (1993). *Graduation by Exhibition: Assessing Genuine Achievement.* Alexandria, VA: Association for Supervision and Curriculum Development.

McTighe, J., and Ferrara, S. (1994). *Assessing Learning in the Classroom.* Washington, DC: National Education Association.

Mitchell, Ruth. (1992). *Testing for Learning: How New Approaches to Evaluation Can Improve America's Schools.* New York: The Free Press.

Neill, M., Bursh, P., Thall, C., Yohe, M., and Zappardino, P. (1995). *Implementing Performance Assessments: A Guide to Classroom, School, and School Reform.* Cambridge, MA: FAIRTEST: The National Center for Fair and Open Testing.

Perrone, V. (Ed.) (1991). *Expanding Student Assessment.* Alexandria, VA: Association for Supervision and Curriculum Development.

Rotham, R. (1995). *Measuring Up: Standards, Assessment, and School Reform.* San Francisco, CA: Jossey-Bass Publishers.

Stiggins, R.J. (1994). *Student-centered Classroom Assessment.* New York, NY: MacMillan Publishing Company.

Stiggins, R.J., Quellmalz, E., and Rubel, E. (1988). *Measuring Thinking Skills in the Classroom.* West Haven, CT: National Education Association.

Wiggins, G. (1993). *Assessing Student Performance: Exploring the Purposes and Limits of Testing.* San Francisco, CA: Jossey-Bass Publishers.

Workshop #2
March 3, 1998 ¥ Content GuideÐMichael Hibbard

What'd I Get?

Scoring Tools

Worksheets for Workshop #2 can be found on pages W2-W69.

Pre-Workshop Assignment for Workshop #2

1. Using the approach presented in Workshop #1, revise the performance task that you designed in preparation for that workshop, or design a new one.

2. Please bring with you to Workshop #2 a sample of student work on a project or open-ended performance task that you assigned this year.

About the Workshop

Students give us information about what they understand and what they can do through their writing, oral presentations, constructions, actions, and graphics. One of our important jobs is to learn how to look for evidence of understanding in student work. We can use assessment tools of various sorts, including rubrics and analytical lists, to analyze student work. We will learn how to make and use these assessment tools. We will also explore how to coach students to use these tools to assess their own work and take more responsibility for their learning.

Suggested Classroom Strategies

1. Work with your students to construct an assessment tool for one important type of product such as a graph, a written explanation of the solution to a math problem, or a drawing with written explanation of a science concept.

2. Work with other teachers to collect several examples of excellent work your students have done such as a graph, a written explanation of the solution to a math problem, or a drawing with written explanation of a science concept. Use these examples of excellent work along with an assessment tool the next time you assign a performance task that involves this type of product.

3. Play the game “Find the Flaw” with your students. Show your students a purposely flawed example of some work you are going to ask them to do, such as a graph, a written explanation of the solution to a math problem, or a drawing with written explanation of a science concept. Have your students work in cooperative groups to find the flaw and fix it.

Post-Workshop Discussion Questions

1. What are the advantages and disadvantages of the following types of assessment tools?

   - holistic rubric
   - analytic rubric
   - analytic list

2. What strategies will be successful in coaching students to be accurate self-assessors?

3. How can self-assessment lead to increased responsibility on the part of students?

4. How should the following be addressed with assessment tools?

   - the content of the task
   - the thinking skills used
   - the communication skills used
   - the quality of the craft skills used
   - work habits

5. How can assessment tools be modified to meet the needs of students with various needs?

6. Should there be one standard of quality for all students in your class, grade level, or course, or should standards be set according to each individual student’s performance?

Related Resources

Please refer to the list of resources on pages 4-5 in Workshop #1.

Workshop #3

March 10,1998 ¥ Content GuideÐMonica Neagoy

Is This Going to Count?

Embedded Assessment

Pre-Workshop Assignment for Workshop #3

1. ÒEmbedded assessmentÓ and Òintegrated assessmentÓ are phrases you have probably read about in assessment literature or heard about in teacher circles. What do you understand embedded assessment to mean?

2. Please bring with you to Workshop #3 some examples of embedded assessment that you practice in your classroom. Also bring some examples that are *not* embedded assessment (these can be in written and/or oral form). Share your examples and non-examples with others at your site, and find out how your concept of embedded assessment is similar to, or different from those of your colleagues.

3. Please read the enclosed articles from the *Mathematics Teacher* and *Arithmetic Teacher* journals (included at the end of this WorkshopÕs print materials after page 11) and be sure to bring the article with you to Workshop #3.

About the Workshop

The goal that Òstudent assessment be integral to instructionÓ (NCTM 1989, p. 190) is consistent with the *Evaluation* (NCTM, 1989) and *Assessment* (NCTM, 1995) Standards. Almost every instructional activity, say the Standards, can be an assessment opportunity for the teacher as well as a learning opportunity for the student. Even the *Professional Standards* advocate embedded assessment: ÒWell-chosen tasks afford teachers opportunities to learn about their studentsÕ understandings even as the tasks also press the students forward,Ó (NCTM 1991, p. 27).

This workshop will address the imperative in current educational reform that **assessment be viewed Ñ and designed Ñ as an integral part of instruction** . We will draw briefly upon recent research to describe some selected current assessment practices and needed changes in the United States and abroad. Then, after defining high-frequency, key phrases such as Òembedded assessmentÓ and Òperformance-based assessment,Ó we will examine some concrete examples in which assessment provides not only a window to studentsÕthinking, but also a compass for instruction. These examples will take on various forms: it may be a video clip of a teacherÕs classroom in which she or he is modeling one or more aspects of embedded assessment; it may be a studio/site discussion in which teachers share successful embedded-assessment practices; it

may be a hands-on activity in which we take the time to brainstorm the most important criteria for performance tasks, and then develop one for a particular topic.

We will discuss a variety of teaching strategies, in greater or lesser detail, that may help you begin the challenging process of converting isolated, individual, passive, paper-and-pencil, and post-instruction assessment of facts and skills to embedded, collaborative, active, and multi-formed assessment of what students think, understand, know, and can do in mathematics or science. These strategies will include methods of observing student progress, organizing and implementing group-work, writing as a means of knowing, analyzing student discourse, and encouraging student self-assessment.

The workshop will end with reflections on the implications and advantages of embedding assessment into curricula in general, and instruction in particular: What are the challenges? What is in it for teachers? What is in it for students? How will it affect teaching and learning in the long run? How might it change Ñ down the road Ñ peopleÕs appreciation of the nature of mathematics and science?

Hopefully, it will become obvious by the end of this workshop that the best time for assessing what children know and can do is *during* instruction while the students are actively involved in the learning process, constructing their own knowledge and finding their own solutions, and not *after* instruction, when students passively fill in bubbles or blanks on a test sheet, showing that they understand the test designerÕs solutions. Also, you will hopefully see beyond the introductory statement, ÒAlmost every instructional activity can be an assessment opportunity for the teacher as well as a learning opportunity for the student,Ó and expand it to ÒAlmost every instructional activity can be an assessment opportunity for the teacher as well as a learning opportunity for the student, *and* almost every instructional activity can be a learning opportunity for the teacher as well as an assessment opportunity for the student.Ó

Suggested Classroom Strategies

The following strategies help transform assessment tasks into learning activities. In particular, they help: (1) students learn about their own progress, (2) teachers learn about the progress of individual students, (3) teachers learn about their own teaching and curriculum, and (4) both teachers and students develop a greater appreciation of what it means to ÒdoÓ and ÒknowÓ mathematics or science.

- **Teacher observation during instruction** (elementary math or science lesson)
  In the case of whole-class instruction, for instance, this could include assessment of group concept formation (teacher uses students' different ways of thinking about "X", as expressed in their verbal answers to a question, and classifies them in an organized way to form a concept map of "X".) Clearly, teachers also gain insight into individual concept formation.

- **Journal Reading to Inform Instruction** (middle school math or science lesson)
  We read a lot about journal *writing*, but *reading* aloud and sharing journal entries regarding specific content areas can be enlightening for both teachers and students. Suppose a teacher asks the students to spend the last 5-10 minutes of class writing about what they have just learned: What did you learn today? Explain the main points of today's lesson. On what points are you still confused? If the teacher begins the following class with "journal reading," the insight gained from students' verbal explanations will allow him or her either to review certain points, or to proceed with the lesson as planned. In addition to informing instruction, journal reading gives students the opportunity to "communicate" their own ideas and understandings, and learn from those of others.

- **Teacher Observation During Group Work** (middle or high school math or science)
  The teacher assigns a task, problem, or investigation to his or her class, which is divided up into cooperative-learning groups. Each member of a group is assigned a particular role. The investigations encourage exploration, organization, communication, creativity, and active involvement. The evaluation criteria incorporate those same processes. The teacher's role as "roving observer" affords an opportunity to observe students in the process of thinking, doing, and communicating. The teacher's role as "guide on the side" provides assistance that might come in the form of questions to prod students to extend their thinking, or review to help students recall pertinent information. Whether through questions, or answers, or mere silent observation, teachers are finding out in a meaningful way who understands what. Additional assessment is provided by the final presentation of the group's solution or product.

Post-Workshop Discussion Questions and Activities

1. When is it necessary to get feedback during a lesson, rather than at some later date? (Give three or four cases.)

2. Research shows that there are topics that teachers notoriously leave for "the end of the year," and, most often, these topics are superficially or never covered (e.g., probability and statistics). Applying what you learned about performance tasks and embedded assessment, articulate ways in which we could ameliorate this situation. Apply your suggestions to a topic that you haven't yet taught in great depth because you leave it for "the end of the year."

3. Carry out a classroom observation experiment, during whole-class or group instruction, and then write what you learned from it: about students, about yourself, about teaching, about learning, about the topic in question, etc. Then share your experiment with your colleagues. Encourage them to transform their informal observations into formal assessment.

4. During the workshop, we spoke of student self-assessment. Develop a self-assessment task for your students on a topic that you consider important. What are the three most important things you want to find out about what students think about themselves in relation to this topic? Use a different format from those discussed in the workshop. Reflect on what you learned about your students' learning by either writing in your journal or discussing it with your colleagues.

Related Resources

Brandt, Ronald S. *Readings from Educational Leadership: Performance Assessment.* Alexandria, VA: Association for Supervision and Curriculum Development, 1992.

Connecticut State Department of Education. "Performance Task Sampler." Document produced as part of the Connecticut Common Core of Learning Assessment Project. Hartford, CT: Connecticut State Department of Education, 1991.

Hart, Diane. *Authentic Assessment: A Handbook for Educators.* Menlo Park, CA: Addison-Wesley, 1994.

Kuhs, Therese M, ed. *A Viewer's Guide: Mathematics Assessment, Alternative Approaches.* Reston, VA: The National Council of Teachers of Mathematics, 1992.

Lesh, Richard, and Susan J. Lamon. "Assessing Authentic Mathematical Performance." In *Assessment of Authentic Performance in School Mathematics*, edited by Richard A. Lesh and Susan J. Lamon. Washington, DC: American Association for the Advancement of Science. 1992.

Marzano, Robert J., Debra Pickering and Jay McTighe. *Assessing Student Outcomes: Performance Assessment Using the Dimensions of Learning Model.* Alexandria, VA: Association for Supervision and Curriculum Development, 1993.

Mathematical Sciences Education Board, National Research Council. *Measuring Up: Prototypes for Mathematics Assessment.* Washington, DC: National Academy Press, 1993.

Mathematical Sciences Education Board, National Research Council. *Measuring What Counts: A Conceptual Guide for Mathematics Assessment.* Washington, DC: National Academy Press, 1993.

National Council of Teachers of Mathematics. *Curriculum and Evaluation Standards for School Mathematics.* Reston, VA: The Council, 1989.

National Council of Teachers of Mathematics. *Professional Standards for Teaching Mathematics.* Reston, VA: The Council, 1991.

National Council of Teachers of Mathematics. *Assessment Standards for School Mathematics.* Reston, VA: The Council, 1991.

Stenmark, Jean K, ed. *Mathematics Assessment: Myths, Models, Good Questions, and Practical Suggestions.* Reston, VA: National Council of Teachers of Mathematics, 1991.

Webb, Norman L., and Arthur Coxford, eds. *Assessment in the Mathematics Classroom: 1993 Yearbook.* Reston, VA: The National Council of Teachers of Mathematics, 1993.

Workshop #4

March 17,1998 ¥ Content GuideÐMonica Neagoy

I Didn't Know This Was an English Class

Connections Across Disciplines

Pre-Workshop Assignment for Workshop #4

1. New strategies for curriculum and assessment design must include ways to link mathematics and science problems to issues students care about. These can include projects in school, in the community, or in society; they can also include educational, environmental, social, cultural, or artistic dilemmas students might have to face, in which mathematical and scientific reasoning play an important part.

   After questioning your class for a topic of high priority and concern to them, take the topic to one or two other teachers (if in secondary school, to teachers who teach other subjects.) Spend some time brainstorming a performance task that would take the students to the heart of the matter of concern. The following questions should guide your discussion:

   - What is (are) the big idea(s) we wish to address?
   - What "school subjects" are these ideas connected to?
   - What "real-life subjects" are these ideas connected to?
   - How can we make these connections explicit?
   - Is this task thought-provoking?
   - Will this task answer some questions and raise others?
   - Will this task expand students' knowledge and awareness?
   - Is this task feasible?
   - Is this task open-ended?
   - Are mathematics and science necessary to answer some questions?
   - Will this task enhance student perceptions of mathematics and science?

   After designing this special performance task, assign it to your class, organized in groups.

   Bring your comments about the process to Workshop #4 and share your learning with your colleagues.

2. Please read the article from *Mathematics Teaching in the Middle School* (included at the end of this Workshop's print materials after page 16).

About the Workshop

When teachers are asked, ÒWhat do you hope that your students will retain from all you have taught them, ten years down the road?Ó, they usually come up with answers similar to these:

- ¥ a critical mind
- ¥ an inquisitive mind
- ¥ a logical mind
- ¥ inductive and deductive reasoning
- ¥ critical thinking
- ¥ creative problem solving
- ¥ the application of skills
- ¥ the scientific method

These are attributes, processes, and strategies that are independent of a particular topic of study. If educational reform is calling on teachers to make connections in the curriculum they teach, it is only logical that these connections be reflected in the assessment tasks they administer. The above criteria should be present in assessment tasks across the disciplines.

Workshop #4 will explore a variety of connections, including the ones mentioned above. After exploring the importance of connections, and connections as a problem-solving tool in mathematics and science, we will look at a series of connections, in curriculum and consequently in assessment:

- ¥ connections within mathematics
- ¥ connections between mathematics/science and other school disciplines
- ¥ connections between mathematics/science and the real world.
- ¥ connections across the curriculum at a certain level (e.g., elementary school curriculum)

We will brainstorm together and model the design of performance tasks in mathematics and science that borrow from other disciplines. We will visit teachersÕ classrooms (via video clips) where an interdisciplinary approach is being used to teach and/or to assess.

When mathematics and science assessment is no longer viewed as a series of short, stereotyped, predictable questions set in artificial contexts, but rather experiences in which math or science is used as a powerful language, method, and tool to solve non-routine, interesting, real-world problems, studentsÕ awareness and appreciation of the nature of these sciences will change for the better, and their attitudes toward the subjects will improve.

Suggested Classroom Strategies

The following alternative assessment strategies can be applied across the disciplines, and will be discussed and/or modeled in greater detail in Workshop #4:

¥ Conduct one-on-one interviews
¥ Have students keep journals
¥Develop student portfolios
¥Assign group, investigational tasks
¥ Get students involved in the assessment process
¥ Use video to capture students communicating and presenting
¥ Use student-error analysis with the whole class (keeping the authors anonymous)

The following performance tasks create dialogue and excitement, require creativity and decision making, and make a host of connections.

Make Order out of Disorder (middle and high school)

Whether it is audio or video tapes at home, books in a school library, or food in a grocery store (or whatever large set of items that students can identify with), the project assignment (performance task) consists of designing an organizational structure for the entire set of items. Students must include a written explanation to justify their organizational strategies and final plan. The project culminates in an oral Òshow and tellÓ presentation to the entire class, in which students should be encouraged to use a variety of media. (This task not only connects several disciplines, but it connects several disciplines to the *real world*!)

Brainstorm Webs (elementary and middle school)

Students and teachers are becoming more and more acquainted with the World Wide Web. Why is it called a web? What is a web page? After discussing the link between ÒconnectionsÓ and ÒwebÓ, ask the students to brainstorm a web (also called concept mapping) for a number, a shape, an idea, a word, a name, or a symbol (or any item of your choice.) Placing the initial item at the center of the page, have students create a brainstorm web of items, connected to the initial item in some orderly, logical way. The web can make use of a variety of media. Students must be able to explain the logic of their connections.

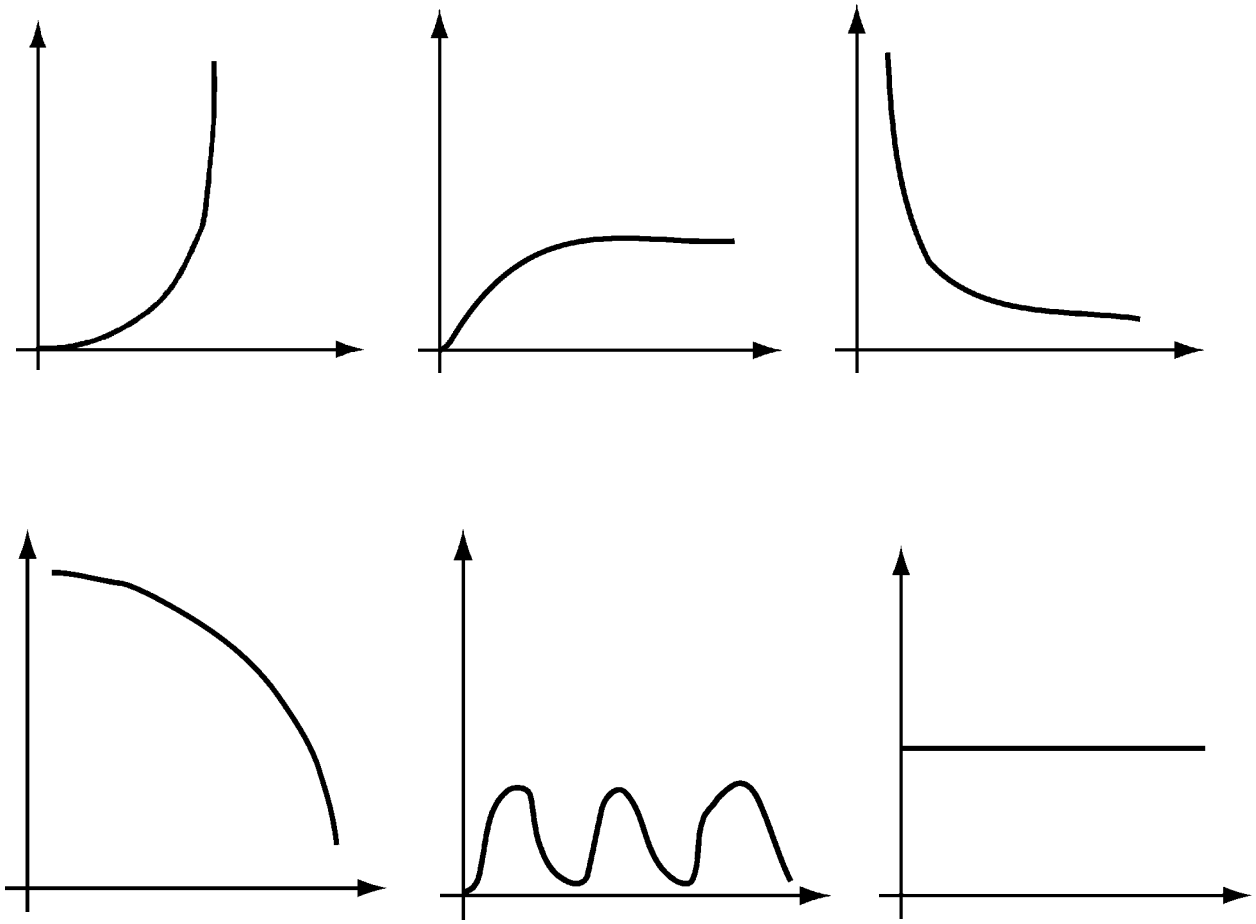
Creating webs encourages student-student dialogue as well as student-teacher dialogue; it fosters creative and critical thinking; it doesnÕt have one right answer, it has an infinite number; it has no real ÒendÓ to the process; it helps students use what they know to figure out what they donÕt know; it demonstrates connections among multiple topics.

Making Connections with Graphs (middle and high school)

For a long time, the primordial form of assessment has been the written word (Òpaper and pencilÓ). In mathematics, the traditional form of assessment has been, more specifically, the written symbol or number. Graphs, on the other hand, are powerful, visual pictures that tell a lot, with very few or no words. (Graphs are considered so important that ETS incorporated a section

on ÒCharts and GraphsÓ in the SAT exams.) Graphs are usually associated with mathematics, and sometimes with science. This performance task connects graphs to other disciplines and words to mathematics.

Select a set of two-dimensional graphs (an x-axis and a y-axis.) These graphs can be simple or complex, depending on the grade level (e.g., rising graphs, falling graphs, constant graphs, alternating graphs, or any combination therein. See figure below.)



(1) Have students find and describe a situation that can be modeled by each one of the graphs.

(2) [More advanced: you may choose a subset of the following.]
Have students find a situation in (a) mathematics, (b) physics, (c) chemistry, (d) language arts, (e) social science, (f) computer science, (g) history, and (h) health science that corresponds, more or less, to each of the graphs.

(3) Have each student make a graph that models a certain situation in his or her mind, and then quiz the class on the concrete or abstract situation it models.

Post-Workshop Activities Discussion Questions

1. How can you use the Internet in a performance and/or assessment task to enrich students' connections between the sciences and the arts? After you have thought about it (and perhaps discussed it with a colleague), design such a task and use it in your classroom.

2. Teachers are often reluctant to assign group work because (1) they think the high-ability student(s) in the group will end up doing all the work, and (2) it is difficult to assess the individual contribution of each member of the group, to the final product. How can the interdisciplinary nature of a performance task help resolve these issues?

3. One of the logical extensions of the *Connections Standard* (NCTM, 1989) is to encourage finding examples of mathematics in other countries and cultures. Children should be exposed to examples of mathematics from many cultures to appreciate their contributions and come to respect their different ways of thinking. Incorporate research projects into your math class. For example, divide students into groups, assign a different country to each group, and have them research one great contribution from that country, to the field of mathematics. Have the groups make classroom presentations that use a variety of media. (This is an exercise in *ethnomathematics.)*

Related Resources

House, Peggy A. and Arthur F. Coxford, eds. *Connecting Mathematics A cross the Curriculum: 1995 Yearbook.* Reston, VA: The National Council of Teachers of Mathematics, 1995.

Web Sites

Annenberg Institute for School Reform
http://www.aisr.brown.edu

The Coalition of Essential Schools
http://www.ces.brown.edu

(For additional resources, please refer to the list on page 11 in Workshop #3.)

Enclosures for Packet #3

indicates that this document should be photocopied by the Site Leader and distributed to all participants. This icon will also appear in the upper right hand corner of all pages that should be copied.

Workshop Materials

Worksheets for Workshops #5 Ð#8

Workshop #5
March 24, 1998 ¥ Content GuideÐMichael Hibbard

You WILL Be Tested on This!

Standardized Testing

Worksheets for Workshop #5 can be found on pages W-70 to W-96.

Pre-Workshop Assignment for Workshop #5

1. Please bring a sample of math or science items from a standardized test that is used in your school. If possible, include multiple choice items *and* open-ended items which require students to construct a response. (*If you cannot get copies of your schoolÕs standardized test, or if your school doesnÕt have a standardized test, we have provided several math and science test items from a variety of grade levels in the worksheets Ñ see pages W-70 to W-96. Select from these pages the item(s) that you will work with during this workshop.)*

2. Make a list of the special test-taking skills that you need to teach your students for them to be more successful on the test items youÕve chosen above. These test-taking skills should be related to the format of the questions on the test rather than to the content of those items.

About the Workshop

In what ways do standardized tests cause us anxiety and in what ways are these tests helpful in our work to improve student performance? During this workshop we will look at multiple choice and other "forced choice" items, as well as open-ended performance-type items on standardized tests. From an analysis of both types of test items, we will discuss strategies for designing classroom activities and tests that respond to the content and particular format of these standardized test items. Strategies include listing the content of the test items, identifying specific test-taking strategies needed, and motivating students to pay attention and do their best. Finally, we will look at ways of presenting data on student performance to students, parents, and others to describe both the degree to which students are attaining high goals and the degree to which students are improving their own past performance.

Suggested Strategies to Use Standardized Tests to Inform Our Teaching

Work with other teachers to study the **science and/or math part** of the standardized test used in your school and try the following:

- List the specific content that is tested by those standardized tests.
- Find the specific place(s) in your curriculum where you cover that content. Do you need to adapt your curriculum to include different content or change the sequencing of the content you do cover?
- Identify each type of format that the test uses to state a question or ask for a response from the student. What ÒtrickyÓ or unusual formats are used? How would you teach students to be comfortable with those formats?
- Identify specialized or unusual vocabulary used in these standardized test items. How would you weave those vocabulary words into your teaching?
- For open-ended responses, how are students required to give their response? Are drawings and written responses required? Do the scoring rubrics help you know what the scorers are looking for? What Òrules of the roadÓ would you give your students about how to make their written responses earn higher scores?
- Design both multiple choice and open-ended items for your curriculum that you can use in your classroom as a regular part of your instruction. These test items will incorporate all you have learned about how to make test items that are both useful to you and help your students improve their performance on standardized tests. Consider planning a sequence of tests over several months to gently nudge your students to pay attention to multiple choice and open-ended items and do their best work.

Post-Workshop Discussion Questions

1. In what ways are the items on the standardized test that is given to your students Òon targetÓ as far your curriculum is concerned?
2. What would a reporting system look like that told parents how well their sons and daughters were doing in reference to high goals, and how their childrenÕs performance has changed compared to their past performance?

3. Report cards, parent conferences, portfolios, and other such strategies help parents understand how their sons and daughters are progressing. What would a classroom newsletter look like that gave the parents of the students in your classroom specific and objective information about the quality of student performance in your classroom?

4. We can all complain about why students are not performing well. What specific actions can we take that will improve student performance Ñ including their performance on standardized tests?

Related Resources

Please also refer to the resources list for Workshop #1 on pages 4-5.

The following resources are published by Region 15 Public Schools, 286 Wittemore Road, Middlebury, CT 06762.

Books

A Teacher's Guide to Performance-Based Learning and Assessment.

Improving the Performance of All Students: A Partnership Between State Testing and Classroom Practice.

Video

Developing Performance Assessments

Collections of Performance Tasks and Assessment Tools

Performance Tasks and Assessment Lists for Science
- Elementary Grades Collection
- Middle Grade Collection
- High School Collection

Performance Tasks and Assessment Lists for Math
- Elementary Grades Collection
- Middle Grade Collection
- High School Collection

Performance Tasks and Assessment Lists for Literature
- Primary Grade Collection
- Elementary Grades Collection
- Middle Grade Collection
- High School Collection

Workshop #6
March 31, 1998 ¥ Content GuidesÐMary Hibert Neuman and Jude Pelchat

That Would Never Work Here!

Seeing Assessment Reform in Action, Part I

Worksheets for Workshop #6 can be found on pages W-97 to W-118.

Pre-Workshop Assignment for Workshop #6

1. Please read the articles from the *Journal of Staff Development* (ÒUsing Reflective Questioning to Promote Collaborative DialogueÓ and ÒInstructional GrowthÕ Through Peer CoachingÓ) enclosed after page 25, and bring them with you toWorkshop #6.

2. Having read these articles, what is your current understanding regarding the professional practices of Òcollaborative dialogueÓ and Òpeer coachingÓ? What do you perceive as the potential benefits and drawbacks of such practices? Please write the answers to these questions in your journal.

About the Workshop

Research by Michael Fullan (1993), Judith Warren Little, Milbrey McLaughlin and her colleagues (1990, 1993), as well as the TIMSS report cite the benefits of developing collegial, collaborative relationships among school personnel. The data show that teachers who belong to professional communities that support personal growth and learning report very high levels of commitment to teaching and to teaching all students.

In this program, we will follow the stories of Barbara, a math teacher in Whittier, California, and Scott, a science teacher in Louisville, Kentucky, as they share their experiences in developing assessment within their teaching practice. These educators work in cohesive, collegial environments with teams of colleagues who help them examine their teaching practices and devise teaching and assessment strategies to address the needs of all students. Barbara and Scott invite colleagues to examine their work in order to explore its strengths and weaknesses and to offer suggestions for change.

Sharing oneÕs work with colleagues and visiting each othersÕ classrooms can be perceived as risky and can produce much anxiety. Yet, in their willingness to Ògo publicÓ with their teaching and learning, Barbara and Scott will join us in the studio during this workshop as we observe their classrooms and provide responses to their work.

Suggested Strategies for Testing the Value of Peer Collaboration

In order to fully understand the process of working collaboratively with colleagues it is necessary to participate in such activities. Here are a few strategies you might try:

- Choose a partner from your school ÐÐ someone you trust and with whom you feel comfortable. Ask your colleague to observe your class for approximately 10 minutes. Prior to the observation, talk to each other about the context of the lesson and decide on a particular aspect of your practice on which you would like to receive feedback. Give your partner a question on which to focus, such as, ÒWhat types of questions do I ask Ñ Those requiring only recall? Those calling for analysis and application of prior knowledge? Etc.Ó or, ÒIn giving directions to my class, were my instructions clear and easy to understand? Why? Why not?Ó Ask your partner to collect specific data to be used in answering your question and to jot down probing questions that might enhance your thinking. Following the observation, discuss the data collected and the questions raised by your partner. Write in your journal about your own learning from this experience.

- To increase your observation and feedback skills, watch, with two or three colleagues, a videotape of someone teaching a math or science class. Script the videotape and collect data to share with the teacher. With your colleagues select a person to role-play the teacher. With each person taking a turn, share your feedback.

- Select two to three colleagues from your viewing site or your school and share one of your lessons or student work based on that lesson. As the presenter, start by giving a quick overview of the context of the work. You may want to highlight a particular issue or problem you are having. After your brief presentation your colleagues should ask you clarifiying questions. This is not a time for discussion; just answer the questions. Once the questions have been answered, the two or three teachers talk to each other about your lesson or the student work. The conversation should be about strengths and gaps. You as the presenter should remain quiet, listen, and take notes. The presenter then responds to the ideas suggested, followed by a whole group discussion. Once you have shared your work with colleagues, write about the experience in your journal.

Post-Workshop Discussion Questions

1. Recall a situation in which you worked collaboratively with a group of adults outside of your school. What elements, in the ways in which you worked within the group, made that a positive experience? What aspects of the collaboration did you find most difficult?

2. Think about your school setting. What needs to be in place in your school to allow you to participate in peer coaching and/or collaborative dialogue? Describe necessary changes in the schedule, in opportunities to communicate with your colleagues, etc. How would you establish the relationships necessary for effective collaboration?

3. It is easier to participate in a ÒriskyÓ experience when one has a support system. Select something that might be perceived as a risky experience, e.g., a significant change in practice involving assessment in your classroom. Find support among your colleagues and invite that support (e.g., a trusted colleague) to observe your implementation of the change in your classroom. Write about your experience.

Related Resources

Cushman, K. (1996, November) Looking Collaboratively at Student Work: An Essential Toolkit. *Horace,* (13) 2.

Darling-Hammond, L. (1998, February). Teacher Learning that Supports Student Learning. *Educational Leadership*, (55) 5, 6-11.

Fullan, M. (1993). *Change Forces*. New York: The Falmer Press.

Kruse, S. and Louis, K. S. (1995, Spring). Teacher TeamingÐÐOpportunities and Dilemmas. *Brief to Principals*. Center for Organization and Restructuring of Schools, (brief no. 11).

Lee, G. V., and Barnett, B. G. (1994, Winter). Using Reflective Questioning to Promote Collaborative Dialogue. *Journal of Staff Development*, (15) 1, 16-21.

Lieberman, A. (1995,April). Practices That Support Teacher Development. *Phi Delta Kappan,* 591-596.

Little, J. W. (1990). Teachers as Colleagues. in Lieberman, A. (Ed.). *Schools As Collaborative Culture: Creating the Culture Now.* New York: The Falmer Press.

Little, J. W., (1992). TeachersÕProfessional Development in a Climate of Educational Reform, paper prepared for the Consortium on Policy Research in Education. University of California, Berkeley.

Munro, P., and Elliot, Jack. (1987, Spring). Instructional Growth Through Peer Coaching. *Journal of Staff Development*, (8) 1, 25-28.

Neill, M., Bursh, P., Schaeffer, B., Thall, C., Yohe, M., Zappardino, P. (1998) *Implementing Performance Assessments-A Guide to Classroom, School and System Reform,* Cambridge, MA: The National Center for Fair & Open Testing.

Principles and Indicators for Student Assessment Systems, Cambridge, MA: National Forum on Assessment, c/o The National Center for Fair & Open Testing.

Rorschach, E., and Whitney. R. (1986, Winter). Relearning to Teach: Peer Observation as a Means of Professional Development. *American Educator.* 38-44.

Saphier, J., Gower R. (1997) *The Skillful Teacher*, *Building Your Teaching Skills.* Carlisle, MA: Research for Better Teaching, Inc.

Showers, B. and Joyce, B. (1996, March) The Evolution of Peer Coaching. *Educational Leadership,* (53) 6, 12-16.

Standardized Tests and Our Children: A Guide to Testing Reform, Cambridge, MA: The National Center for Fair & Open Testing.

Curriculum Material Reference

Pendleton, Y. J., and Farmer, J. D. (1997, July). Life: A Cosmic Imperative. *Sky and Telescope*, 94, 42.

Petersen, C. C. (1997, October). Welcome to Mars. *Sky and Telescope,* 94, 34.

Begley, S. (1997, July). PathfinderÕs Mission. *Newsweek,* p. 22.

URLs

Planetary Sciences at the National Space Science Data Center
http://nssdc.gsfc.nasa.gov/planetary/planetary_home.html

NASA Budgets
http://spacelink.nasa.gov/NASA.Overview/NASA.Budgets/.index- text.html

NASA Homepage
http://www.nasa.gov/

Mars Pathfinder-Welcome to Mars
http://mpfwww.jpl.nasa.gov/default.html

Office of Space Science Homepage
http://www.hq.nasa.gov/office/oss/missions/index.html

Mars Pathfinder Science Results
http://www.jpl.nasa.gov/marsnews/science.html

Mars Missions News & Information
http://www.jpl.nasa.gov/marsnews/science.html

Mars Pathfinder Fact Sheet
http://mars.primehost.com/mpf/fact_sheet.html

Information about the Rover
http://mars.jpl.nasa/rover/faqs_sojourner.html

Workshop #7
April 7, 1998 ¥ Content GuidesÐMary Hibert Neuman and Jude Pelchat

That Would Never Work Here Either!

Seeing Assessment Reform in Action, Part II

Worksheets for Workshop #7 can be found on pages W-97 to W-118.

Pre-Workshop Assignment for Workshop #7

1. Please bring a list of the ways you involve students in assessing themselves and other students. Are there any strategies that have worked better than others? Why? Be prepared to share your comments with colleagues.

2. Please bring with you to Workshop #7 the unit or lesson plan that you have been working on throughout this series.

About the Workshop

Engaging students in the assessment of their performance and linking instruction and assessment helps students to improve their achievement. There are numous ways to accomplish this. For example, you might involve students in developing performance criteria, encourage students to evaluate their own or each otherÕs performance, or share evaluation criteria with students at the start of a lesson or unit. In this program we continue to follow Barbara and Scott as they use assessment to encourage their students to improve their performance.

Suggested Classroom Strategies

1. Select an activity such as graphing, writing a lab report, designing an experiment, or writing out in words how to solve a mathematics problem. In small groups, ask the students to brainstorm criteria for producing an effective product. Using the criteria developed by the students, have the students carry out the activity. Let them assess their work using the criteria they developed.

2. Select one of the activities presented in Workshop #7 (those in which students critique their own work or the work of other students) Ñ preferably one that you have not used before. Try the activity in your classroom and write in your journal about whatever you learned from this experience.

Post-Workshop Discussion Questions

1. We have connected assessment directly to instruction by involving students in the development of criteria. Do you agree with this practice? Why or why not?

2. As you think about asking students to assess themselves and each other, what are some of the concerns and issues raised? Share your concerns with a colleague and brainstorm possible ways to deal with these concerns.

3. In using performance based assessment and group tests, how can you incorporate individual accountability?

4. We have argued that it is very important for students to accurately assess their own achievement, and that this practice will motivate students to want to achieve. Do you agree or disagree with this statement, and why?

Related Resources

Darling-Hammond, L., Ancess, J., and Falk, B. (1995). *Authentic Assessment in Action: Studies of Schools and Students at Work*. New York NY: Teachers College Press.

Hart, D. (1994). *Authentic Assessment: A Handbook for Educators*. Menlo Park, CA: Addison-Wesley Publishers.

Herman, J. L., Aschbacher, P. R., and Winters, L., (1992). *A Practical Guide to Alterntive Assessment.* Alexandria, VA: Association for Supervision and Curriculum Development.

Johnson, B., (1996). *The Performance Assessment Handbook, Volume 2 Performances and Exhibitions.* Princeton, NJ: Eye on Education.

Neill, M., Bursh, P., Schaeffer, B., Thall, C., Yohe, M., Zappardino, P. (1998) *Implementing Performance Assessments-A Guide to Classroom, School and System Reform,* Cambridge, MA: The National Center for Fair & Open Testing.

Newmann, F. M., Secada, W.G., and Wehlage, G. C. (1995). *A Guide to Authentic Instruction and Assessment: Vision, Standards and Scoring.* Madison, WI: Wisconson Center for Education Research, University of Wisconson.

Principles and Indicators for Student Assessment Systems, Cambridge, MA: National Forum on Assessment, c/o The National Center for Fair & Open Testing.

Saphier, J., Gower R. (1997) *The Skillful Teacher*, *Building Your Teaching Skills.* Carlisle, MA: Research for Better Teaching, Inc.

Standardized Tests and Our Children: A Guide to Testing Reform, Cambridge, MA: The National Center for Fair & Open Testing.

Stiggins, R.J. (1994). *Student-centered Classroom Assessment*. New York: MacMillan Publishing Company.

Wiggins, G.P. (1993) *Assessing Student Performance*: *Exploring the Purposes and Limits of Testing*. San Francisco, CA: Jossey-Bass.

Workshop #8
April 14, 1998 ¥ Content GuideÐMichael Hibbard

When I Was in School...

Implementing Assessment Reform

Worksheets for Workshop #8 can be found on pages W-119 to W-124.

Pre-Workshop Assignment for Workshop #8

1. Please make a list of the changes in curriculum, instruction, and testing/assessment that have occurred during your tenure as a teacher. Then answer the following questions about those changes:

   ¥Which ones have lasted? Why do you think those particular changes lasted?

   ¥Which ones have had the greatest influence on improving student performance? Why?

   ¥Which change was handled in the most professional way in your school or school district? What specific actions made you feel positive?

2. Read the article ÒBuildingTeacher PortfoliosÓ from*Educational Leadership* enclosed at the end of these workshop materials (p. 31).

About the Workshop

Good ideas are not worth much if we cannot implement them in our classrooms. We are often frustrated by a change process that comes at us too fast and with too little support and then disappears after a year or two. We learn to Òhold our breath and duckÓ each time a Ònew ideaÓ emerges. During this workshop we will discuss the characteristics of change processes that *do* work. We will study the role principals, parents, and students play in the change process, but we will emphasize what we can do alone or with one or two colleagues without much support from the administration. The goal of this workshop is for you to leave with a few specific actions that you can take to improve student performance in math and/or science in your classroom.

Suggested Strategies

Throughout this series, you have been working with a unit of instruction that you will use as a regular part of your instruction. Within that unit you have been creating a performance task that will serve both as a learning activity for your students and an opportunity for you to assess the ways and degrees of their understanding. Continue working on that unit and its performance task. Some steps along that path are:

1. Decide on what you want your students to learn and the type(s) of understanding you are after. It helps to select a very specific target for student performance. Examples include:

    - Improve the accuracy of plotting of data and the use of clear and accurate labels on a bar graph (or a line graph or circle graph).
    - Improve the use of writing that contains three clear and accurate main ideas and at least three accurate supporting details for each main idea. (Specify the main idea according to the content of your unit.)
    - Improve the analysis of a word problem that the student does before beginning to solve that problem.
    - Improve the use of the thinking skill Òinfer with supporting data.Ó
    - Improve the studentsÕability to ask questions that show that they are applying what they know to learning about a related topic.

2. Make a list of the specific actions you can take in your own classroom to reach the target you identified above for improving student performance. Organize your list in these categories:

    - What to include in the curriculum and how to sequence those elements
    - Instructional strategies
    - Ways to include students actively in the change you are attempting to make
    - Instructional materials to use
    - Creative ways to use time
    - Changes you would make in tests and assessment
    - Plans to have fun while improving student performance
    - On a calendar, make a plan to implement your ideas. Start small.

3. Plan the assessment task(s) you will use.

    - Construct the multiple choice or other forced-choice test items you will use.
    - Construct the open-ended task. Ask yourself these questions:
        (a) Does this task get at the math or science content it is intended to target?
        (b) Does this task get at the type(s) of understanding it is intended to elicit?
        (c) Is this task at the right level of complexity?
            Ñ What thinking skill verbs are used?
            Ñ How long will the task take?

- Ñ Are there intermediate steps towards the final product?
- Ñ Are students skilled enough with the format of the final product called for by this task?
- Ñ Are the studentsÕ work habits up to this task?

(d) Can students do well on this task if they do not know the math or science?

4. If possible, work with one or two colleagues. You may each have your own targets for improving student performance or you may have the same target. Bounce ideas off one another. Plan to meet regularly Ñ about once every two weeks Ñ to share accomplishments and describe your next steps.

5. Plan for ways to involve your principal.

6. Plan for ways to involve students in helping to set the goals to improve their performance in the target areas you have identified.

7. Plan for ways to gain the support of parents.

Post-Workshop Discussion Questions

1. How could you use the ÒScouts, Pioneers, and SettlersÓ model in your school?

2. How could you help your principal lead an effective change process?

3. How could students and parents be partners in the change process in a positive way?

4. What are the Òrules of the roadÓ (no more than seven) you would give to yourself to help you carry out a change process in your classroom that would improve the performance of your students?

5. How could you form collaborations among teachers in your school to help each other plan and implement changes that will improve student performance?

Related Resources

Please refer to the resources list for Workshop #1 on pages 4-5 and for Workshop #5 on page 20.

Worksheets

Workshop #1

DIMENSIONS OF UNDERSTANDING

1. The learner uses information that is accurate, well chosen, and sufficient.

2. The learner asks questions that show insight.

3. The learner uses thinking skills that show active problem solving and processing of the content.

4. The learner takes more than one perspective.

5. The learner makes connections between what is being learned and what is already known.

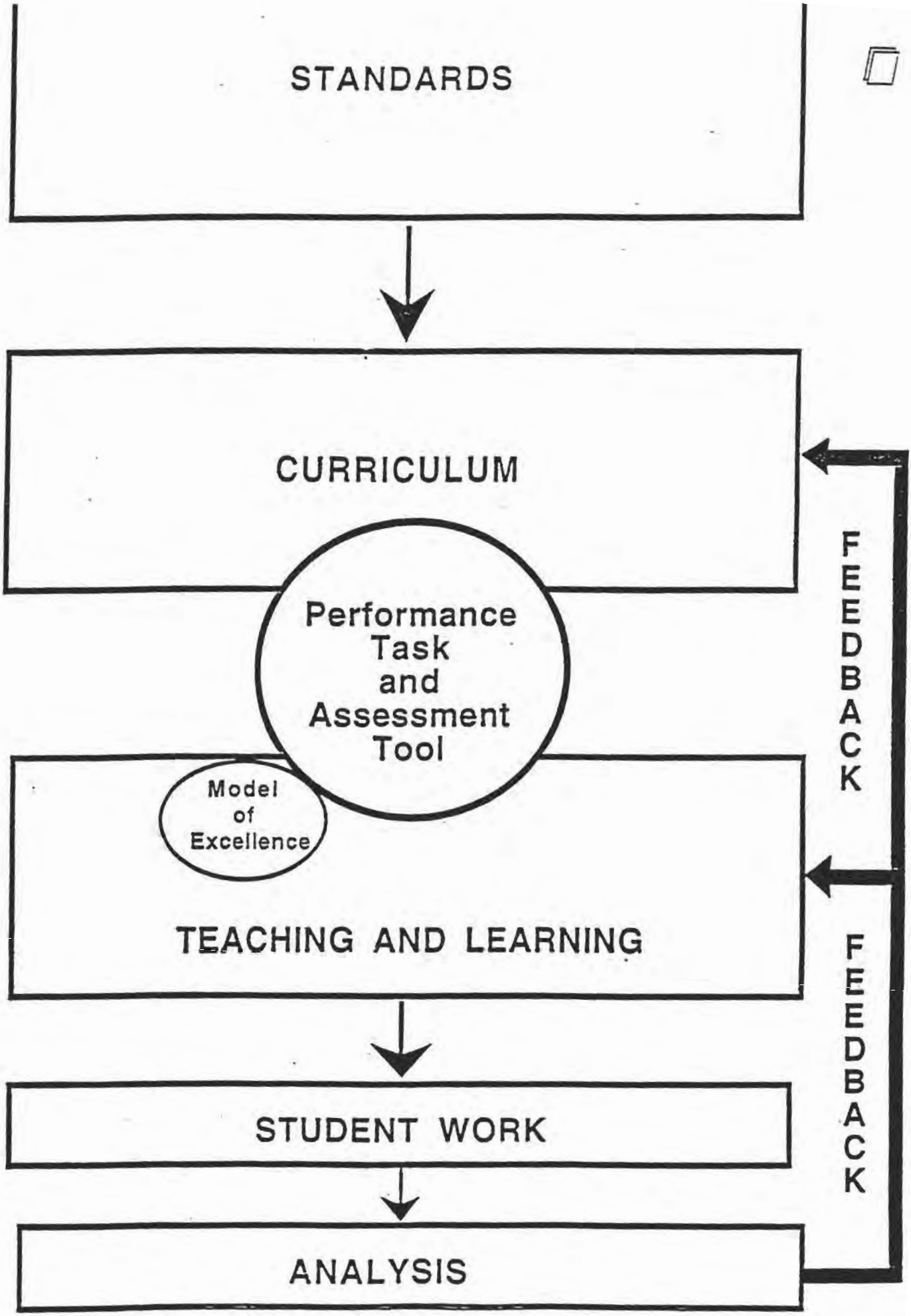
6. The learner finds new information to add to what is being learned.

7. The learner identifies mistakes within the content or its presentation by another person.

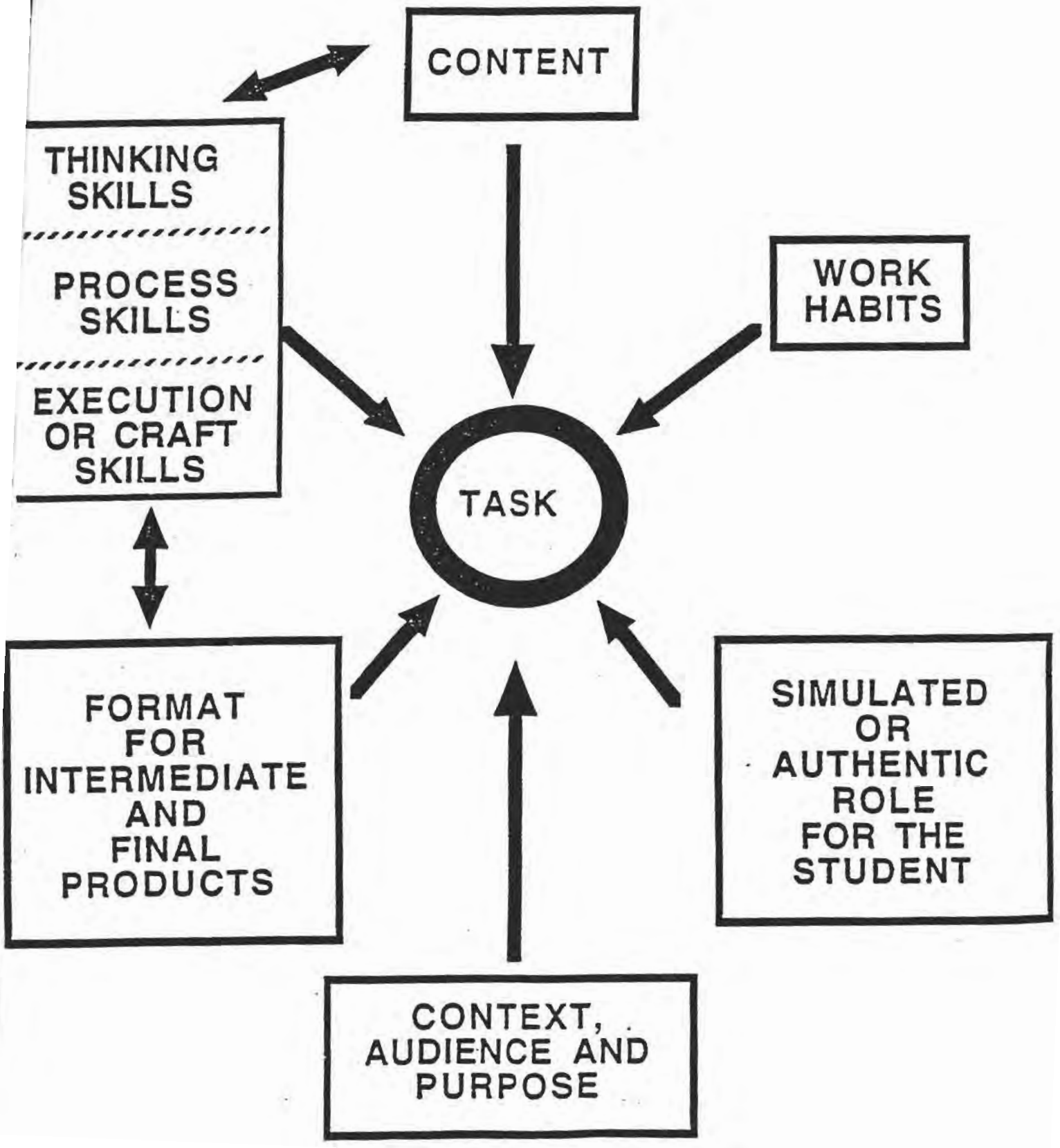
8. The learner makes sense out of the unexpected.

9. The learner communicates in a variety of formats to a variety of audiences on the topic.

10. The learner carries-out self-assessment and goal-setting to improve both the processes and products of learning.


STANDARDS
CURRICULUM
Performance Task and Assessment Tool
Model of Excellence
TEACHING AND LEARNING
STUDENT WORK
ANALYSIS
FEEDBACK
FEEDBACK

ELEMENTS OF A PERFORMANCE-BASED LEARNING/ASSESSMENT TASK



FRAMEWORK FOR A PERFORMANCE TASK

BACKGROUND

The background sets-up the "situation" to establish a reason that this student is creating the product(s) and/or performances for this audience.

The background section establishes the role for the student.

TASK

The task section defines the format(s) of the final product(s), and therefore, what craft skills will be used. Intermediate products may be specified or left up to the learner to select as part of the performance task.

The task section identifies the content focus for the student's work.

The task section identifies the level of "comprehending information" skills to be used through the "thinking skill" verbs used in one or more of the following categories:

- Initial Understanding
- Developing An Interpretation
- Making Connections
- Taking A Critical Stance

AUDIENCE

The audience section defines who the audience is. This section may describe the audience or leave that work up to the student as part of the performance task.

PURPOSE

The purpose section defines the purpose (impact) the final product is to have on the intended audience.

PROCEDURE

The procedure section provides the MINIMUM structure necessary for the student. The more "performance mature" the student, the less structure is presented.

When the student is more "performance mature," part of the student's work is to plan more or all of the procedure for the work to be done.

ACTION VERBS DEFINE THINKING SKILLS

INITIAL UNDERSTANDING

Calculate
Compute
Describe
Display
Identify
Label
List
Locate
Make
Match
Sequence
Show
Summarize

DEVELOPING AN INTERPRETATION

Analyze
Apply
Categorize
Challenge
Classify
Compare
Conclude
Contrast
Decide
Defend
Describe Patterns
Describe Relationships
Design
Devise
Draw Conclusions
Extrapolate
Generalize
Guess
Hypothesize
Infer
Justify
Make Analogies
Predict
Prioritize
Synthesize
Use Metaphors

MAKING CONNECTIONS

(between what you already know and the new information)

Add To
Categorize
Compare
Contrast
Generalize
Revise
Support

CRITICAL STANCE

Check
Criticize
Evaluate
Identify Error
Judge
Rate
Support

SOME OPTIONS AS TO THE FORMAT FOR THE PRODUCT OF A PERFORMANCE TASK

GRAPHIC ORGANIZERS:

Venn Diagrams
Concept Maps
Time Lines
Story Webs
Flow Charts
Classification Keys
Cycles
Decision-Making Flow Charts
Character Analysis Frameworks
Cause and Effect Sequence or Webs
Effect and Cause Sequence or Webs
Pro/Con or Strength/Weakness Charts

OTHER ORGANIZATIONAL PRODUCTS:

Note Cards
Outlines
Diaries
Observation Logs
Plans
Goals and Objectives
Data Charts and Tables
Double Column Entry Journals
Designs for Experiments
Time and Task Management Plan (for group work or individual work)
Assessment Lists

GRAPHS:

Bar Graphs
Line Graphs
Pie Graphs
Bar and Whisker Graphs
Histograms
Pictographs
Scatter grams
Stem and Leaf Graphs

WRITTEN PRODUCTS:

Words
Sentences
Paragraphs
Friendly Letters
Essays
Business Letters
Themes
Letters to the Editor
Reports
Persuasive Letters.
Books
Consumer News Letters
Chapters
Book Reports
Sequels
"Missing Chapters"
Fairy Tale
Myths
Short Stories
Fables
Explanations
"How To" Directions
Resumes
Self-Reflective Analyses
Explanations
Analogies
Metaphors
Poems
Memos
Autobiographies
Biography
Proposals
Questions
Tests
Menus
Recipes

GRAPHICS AND OTHER VISUALS WITH AND WITHOUT TEXT:

Posters	Cartoons
Pamphlets	Brochures
Drawings	Blue Prints
Paintings	Sculptures
Maps	Displays
Bumper Stickers	Home Pages
Videos	Hypermedia Programs
Book Jackets	Collages
Photographs	Photo Essays
Models	Schematics
Advertisements	Banners
Scrapbooks	Portfolios
Storyboards	Bulletin Boards
Dioramas, Trioramas,	Quadoramas

CONSTRUCTED PRODUCTS:

Models	Tools
Machines	Apparatus
Sculptures	Costumes
Museum Displays	

PERFORMANCES:

Speeches	Debates
Interviews	Panel Discussions
Skits	Dances
Music	Puppet Shows
Newscasts	

OTHER:

Group Work	Conflict Resolution
Food	

SOME OPTIONS FOR THE AUDIENCE FOR THE PRODUCT OF A PERFORMANCE TASK

The Classroom Teacher
Another Adult In The School
A Juvenile Family Member
A Government Official
An Author
A Political Candidate
A Scientist
An Artist
A Museum or Gallery Visitor
A Boss
The Principal Or Other Administrator
An Adult Family Member
A Classmate
A Business Person
A Famous Person In History
An Editor
An Engineer
A Private Foundation
A Judge
An Employee
Students In The School Or Another School (same age, younger, older)
A Member Of An Advocacy Group
A Character In A Book, Poem, Movie, Or Video
The Consumers Of A Product Or Service

SOME PURPOSES FOR THE IMPACT OF A PRODUCT OF A PERFORMANCE TASK ON A TARGET AUDIENCE

Inform
Teach
Coach
Defend
Persuade
Inspire
Evaluate
Summarize
Entertain
Draw Attention To
Critique

SOME ROLES FOR STUDENTS TO TAKE OR SIMULATE

Student
Scientist
Lawyer
Athlete
Biographer
Detective
Literary Critic
Travel Agent
Politician
Inventor
Animal
Atom
Cell
Citizen
Engineer
Judge
Artist
Autobiographer
Police Person
Newscaster
Zoo Keeper
Famous Person
Eye Witness
Plant
Molecule
Organ
Consumer
Trades Person
Business Person
Author
Reporter
Fire Fighter
Tour Guide
Tutor
Director of an Art Gallery or Museum
Advertiser
Fictitious Person or Character
Machine
Body System

92 Write a story problem that can be solved using the number sentence
12 - 5 = □

93 Draw a triangle.

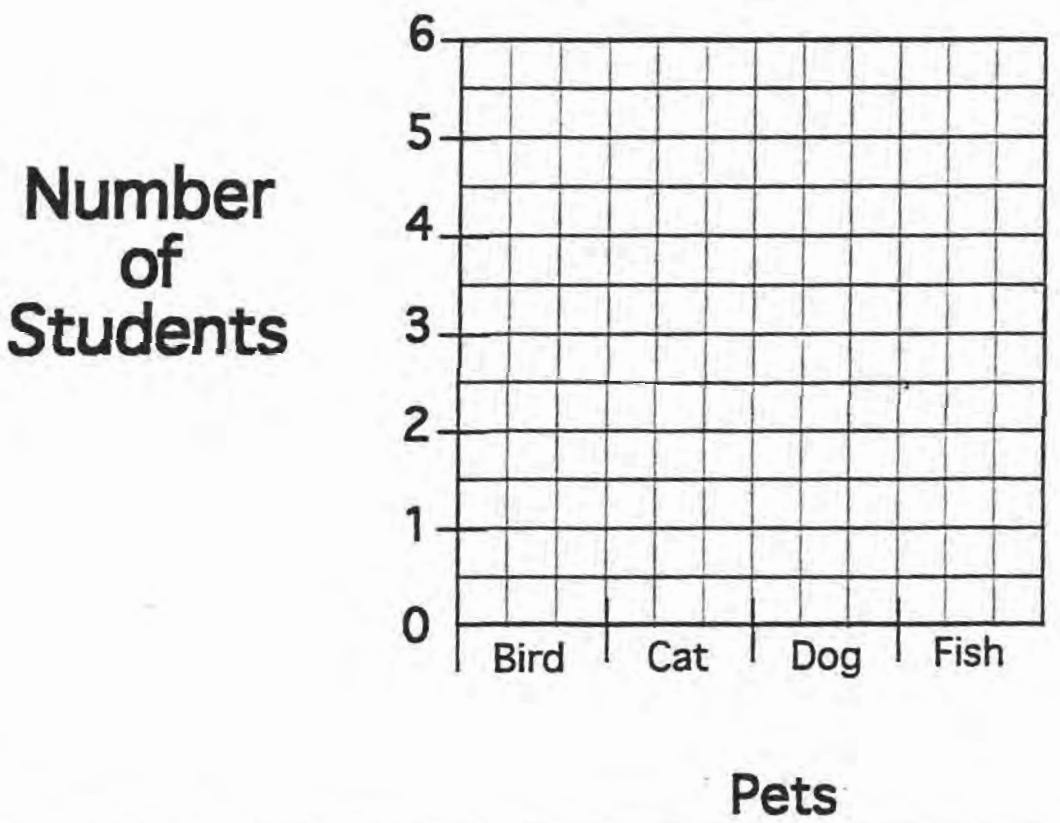
94 Draw a rectangle.

95 Complete the BAR graph using the following information.

Family Pets

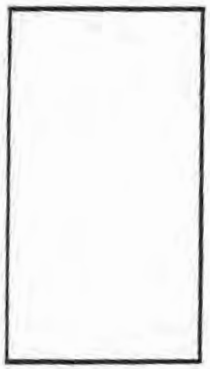
Pets	Number of Students
Bird	2
Cat	4
Dog	6
Fish	3

Family Pets



Answer problems 135 and 136 on page 10 of your answer booklet.

135 Draw one line of symmetry for this figure.



136 Draw a parallelogram. Write one or two sentences to describe this figure.

Answer problems 89-94 on pages 7-10 of your answer booklet.

) Write the number that should come next in this pattern. Then write a sentence to explain how you decided what to write.

120, 105, 90, 75, _____

0 Draw the polygon that comes next in this sequence. Write a sentence to explain how you decided what to draw.

91 Al bought 3 baseball caps. Each sells for $21.95. Write a number sentence to find the total amount Al spent.

92 Antonio baby-sat for 5 hours on Sunday. He earned $22.50. Write a number sentence to find the amount Antonio earned per hour.

93 Ira is comparing the number of small business franchises. Draw and label a BAR graph that shows the number of each franchise shown in the table below.

NUMBER OF FRANCHISES 1990	
McDonald's	7919
Jazzercise	4407
Dairy Queen	5214
7-Eleven	3010

94 Betty thought it would be a good idea to save $10 each month. Draw and label a LINE graph that shows the amount of money Betty would have saved from January to July.

CAPT Mathematics Open-Ended Cluster: "Concentration of Medication in the Bloodstream"

Concentration of Medication in the Bloodstream

The effect of certain pain-killing medications can be described by mathematical formulas. Doctors often use the formulas and their graphs to show how the concentration of medication in the bloodstream changes as time passes. This information can be used to decide when additional doses should be given.

In the formulas represented in questions 1 through 5, t represents the time in hours since the medication was given, and **C** represents the concentration of the medication in milligrams per liter of blood.

1. **Graphing the Concentration**

The concentration formula for one of these medications is shown below:

$$C = \frac{2t}{t^3 + 1}$$

Use the formula to find the missing concentration in the table provided in the answer booklet. Round your answer to the nearest tenth and enter it into the table. Then plot the points and sketch the graph on the grid that is provided in the answer booklet.

Remember to show your work and write your answer in your answer booklet.

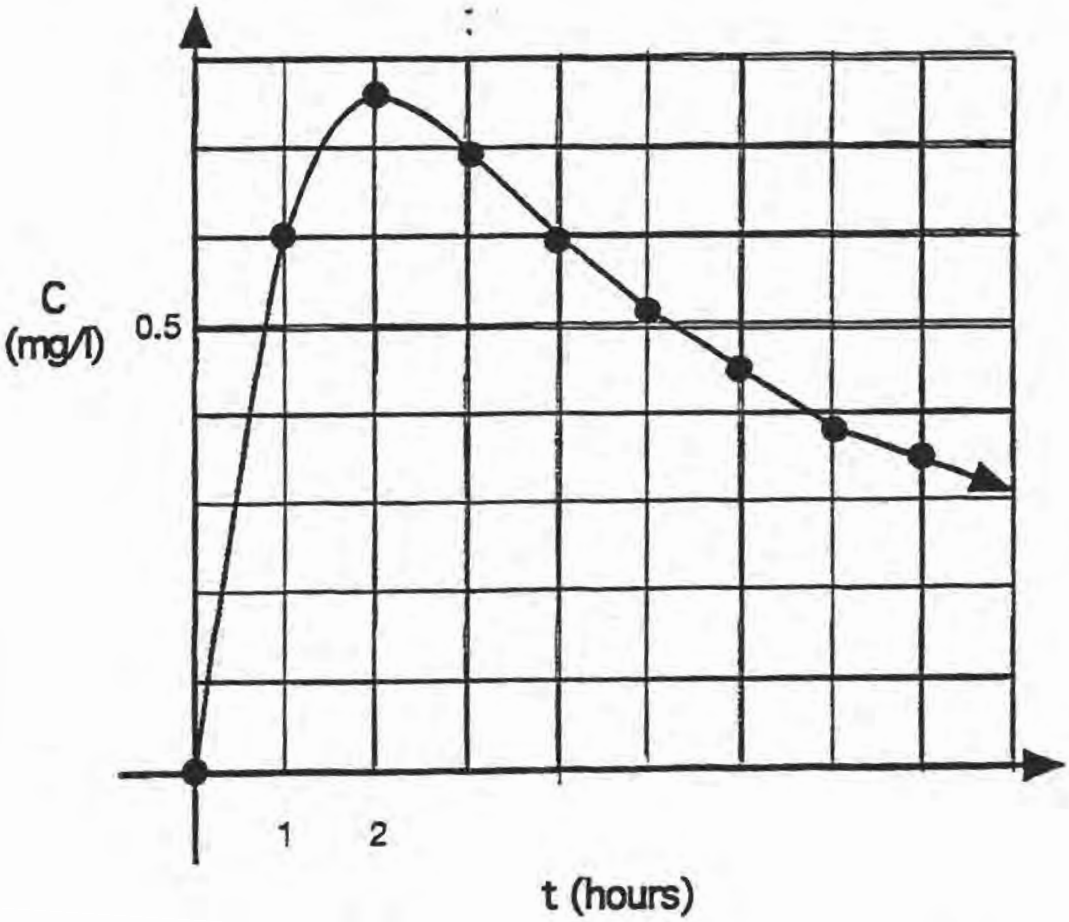
— RELEASED ITEM —

Concentration of Medication in the Bloodstream (continued)

Use the information below to answer questions 2-3.

To analyze the effect of another medication, a doctor displayed the graph of its concentration over time on a graphing calculator. The concentration formula for this medication is

$C = \frac{3t}{4+t^2}$ The graph is shown below.



RELEASED ITEM

Concentration of Medication in the Bloodstream (continued)

2. Drawing Conclusions

What conclusions about the concentration of medication in the bloodstream can you make for this period of time included on the graph? Use the graph to support your conclusions.

Remember to show your work and write your answer in your answer booklet.

---

3. Concentration Over Time

Suppose that the doctor gives only one dose of the medication. Use the graph and the formula to explain what happens to the concentration of the medication after the time period shown on the graph (e.g., $t > 9$ hours. Support your conclusion by substituting two or more values for time.

Remember to show your work and write your answer in your answer booklet.

— RELEASED ITEM —

Concentration of Medication in the Bloodstream (continued)

4. **Aspirin Relief**

When aspirin is taken orally, the amount of relief that it provides can be modeled by the equation

$$r=4t-t^2$$

where r is the amount of relief provided and t is the number of hours that have elapsed since taking the aspirin.

After how many hours is the obtained relief at a maximum? Explain your reasoning.

[You may use any method to determine your answer, but be sure to show the mathematics you use to determine your answer. The graph is provided for your convenience.]

Remember to show your work and write your answer in your answer booklet.

Do Not Write Here

– RELEASED ITEM –

Concentration of Medication in the Bloodstream (continued)

5. The Blood Test

Olympic Clinic Blood Test Schedule (Appointment Required)	
1 p.m.	5 p.m.
2 p.m.	6 p.m.
3 p.m.	7 p.m.
4 p.m.	8 p.m.

An olympic athlete must have his blood tested for the presence of illegal substances. At 6 P.M. on the evening before the test, an athlete took a prescription medication whose concentration formula is

$$C = \frac{3}{t^2}$$

Because the medication can interfere with the blood test, its concentration must be less than 0.01 mg/l when the athlete's blood is tested,

Of the times shown in the Blood Test Schedule, what is the earliest time at which the concentration of the medication will be below the required level? Show the mathematics you use to determine your answer.

Remember to show your work and write your answer in your answer booklet.

— RELEASED ITEM —

CAPT Science Performance Task

Ice Cold

Today you will be investigating the interaction of ice with two different forms of salt, and you will be asked to decide which form of salt, if either, is more effective for melting ice. During this activity you will work with a partner (or possibly two partners). However, you **must** keep your own individual lab notes because after you finish you will work **independently** to write an article about your experiment.

The Problem

In winter, sidewalks and front steps can become dangerously slippery when they are coated with ice. People often spread salt on steps and walks to help melt the ice.

Some people use ordinary table salt to prevent accidents on icy walks, while other people use rock salt. Does one work better than the other?

Your Task

Today you and your partner will design and conduct an experiment to investigate what happens when salt and ice come together and to determine if one form of salt (table salt or rock salt) is better for melting ice on steps and sidewalks.

You have been provided with the following materials and equipment:

Table salt (approximately 60g)	Paper cups (2)
Rock salt (approximately 60g)	Plastic spoons (2)
Ice cubes (approximately 500g)	Thermometers (2)
Tap water	Weighing paper (2 sheets)
Graduated cylinder	Access to a balance
Beakers (2)	Safety equipment
Paper towels for cleanup	Access to a calculator
Access to a clock or watch with a second hand	

Steps to Follow

1. In your own words, state the problem you are going to investigate, and write your statement of the problem on the page provided.

   There are several ways to investigate this problem. If you decide to determine the temperature of the ice, mix **plenty** of ice cubes with a very small amount of water in a beaker. Then, measure the temperature of the ice water.* In order to get an accurate measurement, the bulb of the thermometer should be immersed in water at the bottom of the beaker. **Caution: Do not use a thermometer to stir the ice and water mixture.**

2. Design an experiment to solve the problem. Write your experimental design on the page provided. Show your design to your teacher before you begin your experiment.

3. After receiving approval from your teacher, work with your partner to carry out your experiment. Your teacher's approval does not necessarily mean that your teacher thinks your experiment is well designed. It simply means that in your teacher's judgment, your experiment is not dangerous or likely to cause an unnecessary mess.

4. While conducting your experiment, take notes on the pages provided. Space is also provided for charts, tables or graphs. Your notes will **not** be scored, but they will be helpful to you later as you work independently to write about your experiment and the results. You **must** keep your own notes because you will not work with your partner when you write your article.

Later, you will work independently to write about your investigation in the form of a newspaper article that tells Connecticut citizens which type of salt is better for melting ice on steps and sidewalks. Turn the page and take a few minutes to read "Directions for Writing Your Article."

When you have finished your experiments, your teacher will give you instructions for clean-up procedures, including proper disposal of all materials.

(Students are provided with four blank pages for their notes.)

* The temperature of the ice water mixture will approximate the temperature of the ice.

Directions for Writing Your Article

You will have approximately 30 minutes to summarize your experiment(s) and the results in the form of a newspaper article that tells Connecticut citizens which type of salt, if either, is better for melting ice on steps and sidewalks. You may use the lab notes you took while working with your partner. You may wish to write a first draft of your article on scratch paper, but your final copy **must** be written on the following pages in this booklet. Space for charts, tables or graphs is provided.

Your article should include the following:

- **A clear statement of the problem** you investigated. A well-stated problem includes a clear identification of the independent and dependent variables that were studied.
- **A description of the experiment(s)** you carried out. A well-designed experiment should match the statement of the problem, control for important variables, and be clear and complete enough so that someone else could easily replicate or repeat the experiment. A control should be included when appropriate.
- **The results of your experiment(s).** All data should be accurate, complete and organized in charts or graphs as needed. All charts and graphs should be properly labeled.
- **Your conclusions from the experiment(s).** All conclusions should be related to your original statement of the problem and fully supported by data.
- **Comments about how valid you think your conclusions are.** In other words, how much confidence do you have that your results are accurate? In order for a conclusion to be valid, it must be fully supported by data and be the result of a well-designed and controlled experiment. Any factors that contribute to a lack of confidence in the results should be discussed.

(Students are provided with four blank pages for their report.)

— RELEASED ITEM —

CAPT Experimentation Questions

Ice Cold

A class of students wanted to answer the question: Which is better for melting ice — ordinary table salt or rock salt? One group of lab partners filled three identical beakers with ice and water. Next, they added table salt to the first beaker, rock salt to the second beaker, and nothing to the third beaker. Then they used thermometers to measure the temperature in each beaker. The table below shows their results.

Contents of Beaker	Temperature After 5 Minutes
Ice water and table salt	–7°C
Ice water and rock salt	–12°C
Ice water without salt	0°C

1. Why did this group bother to check the temperature of a beaker of ice water that had no salt added to it?

2. Do you have enough information to replicate this group's experiment? If you think you do, tell what information you have. If you think you do not, tell what other information you would need.

— RELEASED ITEM —

A second group of lab partners in the same class approached the problem differently. They put 10 ice cubes into beaker #1 and 10 ice cubes into beaker #2. Then they sprinkled one scoopful of table salt onto the ice in beaker #1 and one scoopful of rock salt onto the ice in beaker #2. They did not measure the temperature of the contents of the two beakers, but after 2 minutes they poured off the melted water and then weighed the two beakers and their contents.

They obtained the following results.

Mass of Beaker #1 and Contents	Mass of Beaker #2 and Contents
255 g	250 g

3. What valid conclusions can you draw from this group's experiment and results? Explain fully.

4. What, if anything, could this group have done to improve their experiment? Explain fully.

CAPT Open-Ended Question for the Assessment of Conceptual Understanding and Applications

Helium Balloon

A child releases a balloon that is partially inflated with helium into the air. What do you think will happen to the size of the balloon as it rises? Explain fully why you think so.

This item assesses students' understanding of the effects of pressure and temperature changes on a gas. The item also assesses students' understanding of the relationship between pressure and temperature, and altitude. These two factors will affect the size of the balloon in two different ways. As the helium balloon rises the pressure outside the balloon will decrease, causing the balloon to expand. In addition, the temperature of the helium in the balloon will decrease as it rises in altitude, causing the balloon to decrease in size.

— RELEASED ITEM —

erformance Task Title: **Creature Features**

CURRICULUM STANDARDS

CONTENT:

Living organisms have life functions and the structures that have evolved to carry out those life functions have been shaped by the environment.

THINKING SKILL(S):	Focus question connecting content to the thinking skill(s)
•Making and supporting a hypothesis •Making connections between what you are learning and what you already know •Written communication (exploratory writing) •Drawing (technical drawing in science)	What do you think the natural habitat of this creature was?

WORK HABIT(S): Attention to detail
Finishing work on time

FORMAT of PRODUCT(S) and/or PERFORMANCE(S):

Written, scientific explanation supported by drawings

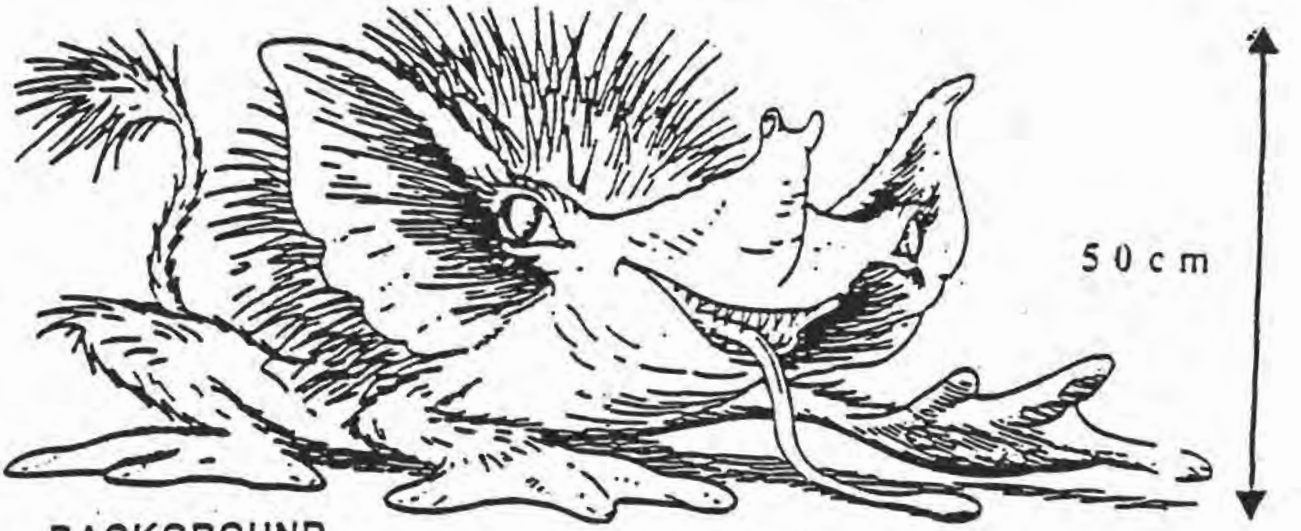
AUDIENCE: Other scientists

PURPOSE(S) (INTENDED IMPACT) Inform

ROLE of LEARNER in this TASK: A scientist

INDIVIDUAL and/or GROUP WORK Individual

CREATURE FEATURE



BACKGROUND

A strange, stuffed creature has just been found in a old crate in the basement of the Museum of Natural History. No notes, labels, or records of any kind have been found to provide any information about where the creature came from or how it ended up in a crate in the basement. A careful inspection has verified that the creature is not a hoax. You have just been assigned to study the creature provide a scientific opinion as to the natural habitat of this creature.

TASK

Your task is to write a scientific explanation of where you think that this creature lived. You may use drawings to help make your points.

AUDIENCE

The audience for your paper is other scientists who work at the Museum and the University. These scientists will want some strong *proof* for any opinion you might have.

PURPOSE

The purpose of your work is to use your knowledge of science and writing skills to convince other scientists of your opinion.

PROCEDURE

1. Make an outline of the main ideas of your opinion.

2. Provide support for each of your opinions.

3. Write your explanation. You many use drawings to help you make your point.

4. Use the assessment list for the Creature Feature.

COOKING OATMEAL

It is Sunday morning and it is your turn to cook breakfast for the family. Everyone wants hot oatmeal. Dad eats a big bowl full (three servings), Mom eats a medium bowl full (two servings) and you and your two brothers eat a small bowl full each (one serving each.)

You take the box of oatmeal from the shelf and begin to read the recipe on the top of the box. (That box top is shown here.)

1. How many servings of oatmeal will you need to cook?

2. How will you use the recipe to decide how much water, salt, and oats to use?

3. How much water, salt, and oats will you need to use to cook enough oatmeal to feed you and the rest of your family?

4. What measuring tools would you use as you prepare breakfast. Select from this list of kitchen measuring tools and explain your choices.

   1 cup, 1/2 cup, 1/4 cup
   1 tablespoon, 1 teaspoon, 1/2 teaspoon, 1/4 teaspoon

Show all of your work on the page with the box top. Label all of the values

Content Standard 5: Measurement

Students will make and use measurements in both customary and metric units to approximate, measure and compute lengths, areas, volumes, mass, temperatures and time.

Performance Standard for grades K-4

Select and use appropriate standard and non-standard units of measurements to solve problems.


IF INNER FRESHNESS SEAL IS MISSING OR BROKEN, DO NOT USE!
OATMEAL
QUICK-1 MINUTE
SERVINGS 1 2 3
WATER 1 cup 1-3/4 cups 2-1/2 cups
SALT(optional) dash 1/8 teaspoon 1/4 teaspoon
OATS 1/2 cup 1 cup 1-1/2 cups
STOVE TOP 1. Boil water and salt. 2. Stir in oats. 3. Cook about 1 minute over medium heat; stir occasionally.
For Creamier Oatmeal: Combine water, salt and oats. Bring to boil. Cook about 1 minute over medium heat; stir occasionally.
MICROWAVE (one serving) 1. Combine water, salt and oats in medium microwaveable bowl.
2. Microwave 1-1/2 to 2 minutes.
3. Stir before serving.

PERFORMANCE TASK

TITLE: Comparing the Caterpillar and Me

BACKGROUND: You have seen the parts of a caterpillar. Some parts are for moving. Some parts are for eating. You have learned a lot about how the parts of a caterpillar help it live.

People have parts that help them live also. How are your parts like the parts of a caterpillar?

TASK: Your job is to draw a picture of a caterpillar and a picture of yourself. You will label the parts that are the same. You will also draw lines to show which parts of the caterpillar are like your parts.

AUDIENCE: The audience for your work is your Kindergarten Buddy.

PURPOSE: The purpose of your work is to show how living things are the same.

PROCEDURE:

1. Use the Assessment List for Comparing a Caterpillar to Me.
2. Draw a caterpillar.
3. Draw yourself.
4. Label the parts of the caterpillar and your parts that are the same.
5. Draw a line from the caterpillar part to the part on your body that are the same.
6. Check and self-assess.
7. Hand in work for teacher assessment.

REGULAR WATER CYCLE

BACKGROUND

The Water Cycle is one of the most important things that happens in the world. We are making a Hall Of Fame for science and the Water Cycle should go in it.

TASK

Your job is to make a diagram and write a paragraph that explains the Water Cycle.

AUDIENCE

The audience for your work will be the people who visit the public library. We will display our Science Hall Of Fame there.

PURPOSE

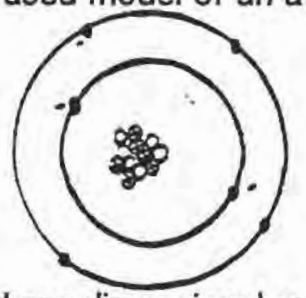
Your job is to teach other people about the Water Cycle.

PROCEDURE

1. Read the assessment list about diagrams and writing.
2. Plan your diagram.
3. Make a final copy of your diagram.
4. Write a paragraph about what you are showing in your diagram.
5. Use the assessment list to assess your own work.

Grade 5 Science- Unit 1: Matter Is Made Of Parts
Performance Assessment Task
"Better Than Bohr?"

Background: You have studied the parts of an atom and how atoms are made. You have seen and made a variety of models which represent atoms. The Bohr model is the most commoniv used model of an atom. Here is a Bohr model of a carbon atom:



Task: Your job is to create a three dimensional model of a carbon atom which is better than Bohr's model! While Bohr's model is **accurate in its basic parts and shells,** it is **inaccurate in size, space relationships, and movement.**

Audience: The local chapter of The American Chemical Society will be our audience.

Purpose: Our purpose is to help scientists represent atoms more accurately.

Procedure:

1. Review your notes about the parts of an atom and how an atom is made.
2. Read the "Helpful Tips About Atoms" sheet.
3. Brainstorm some ideas on how you could show an atom's parts as "close to real" as possible, but so people could see it clearly. Use any materials .... and be creative.
4. Plan out your model on paper, prepare a materials list, and collect the necessary supplies.
5. Build your 3-dimensional model, Don't be afraid to make revisions to your atom model.
6. Write a list on an index card of all of the reasons why your carbon model is better than Bohr's model (minimum of 2 reasons).
7. Make a short oral presentation to introduce your model and reasons behind it. This presentation should attempt to convince other scientists that your model is the best way to represent an atom! The class video-tape will be sent to the American Chemical Society for consideration.

WETLAND COMMISSION HEARING

BACKGROUND

We have been studying our water shed. Wetlands are one important part of a water shed. Our town has a group of people called the Wetland Commission who protect the wetlands. Sometimes people want to build on the wetlands in our town and the Wetland Commission has a hearing to decide if they will be allowed to build there.

Look at the map that shows the stream, the wetlands, the road, and the place where the person wants to build.

TASK

Your task is to explain what will happen in this water shed if that piece of wetland is filled in and a house is built there. Your job is to write a letter to the Wetland Commission explaining what you think will happen in the water shed.

AUDIENCE

Your audience is the people on the Wetland Commission.

PURPOSE

The purpose of your letter is to inform the Wetland Commission.

PROCEDURE

1. Study the map. The contour lines that show the relative elevation of the land are not shown on this map. Your first task is to predict where the low points and high points would be and show them on this map.

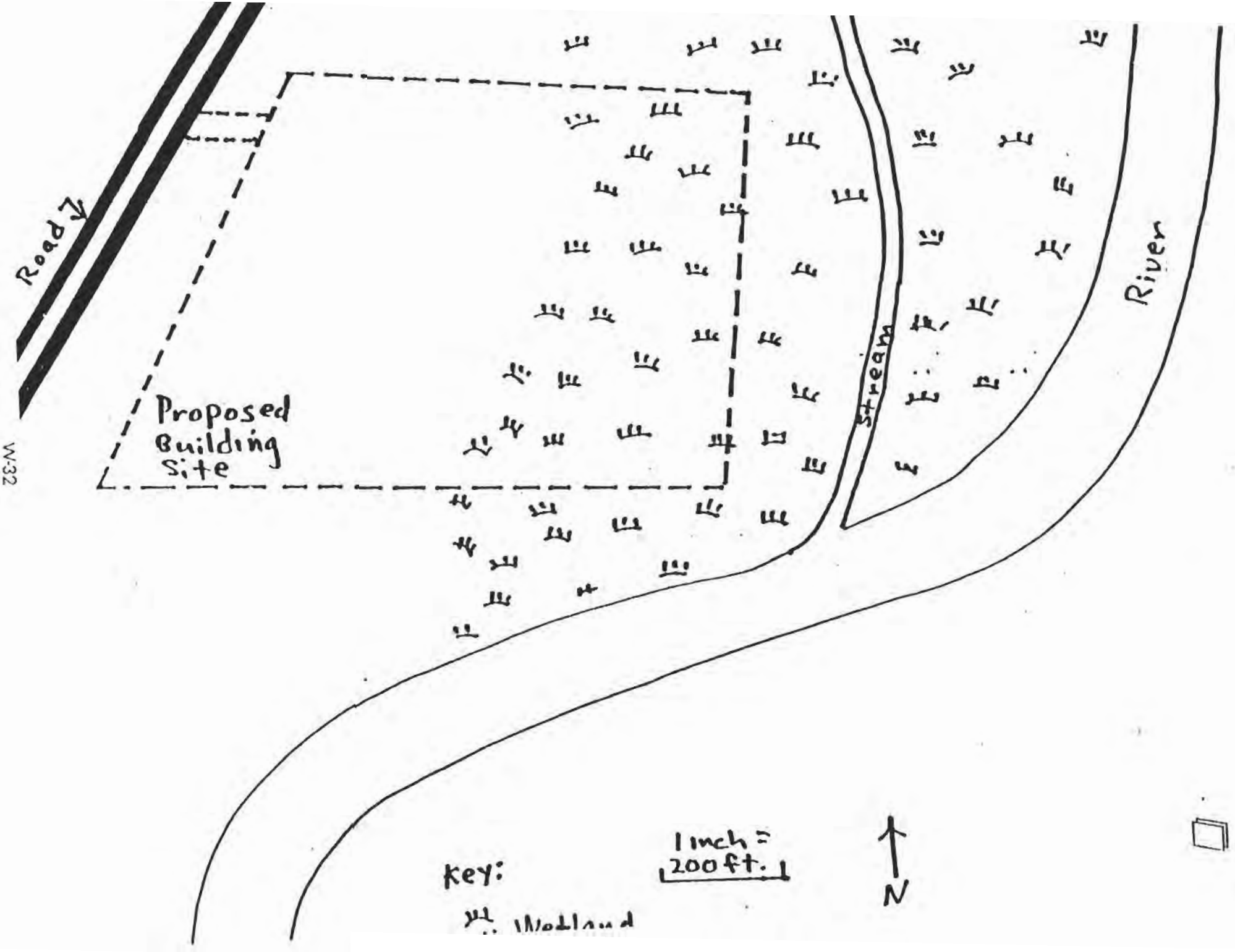
2. Use arrows to show the directions of the flow of water through the area of the water shed shown on this map.

3. Read the assessment list for an informative business letter.

4. Use a graphic organizer to make a plan for your letter.

5. Write your letter.

6. Use the assessment list to assess your work.


Road
Proposed Building Site
Stream
River
1 inch = 200 ft.
N
Key:
Wetland

IS RUBBER ELASTIC?

BACKGROUND

e-las-tic-ity	*n. pl.* 1. The condition or property of being elastic; resiliency; flexibility. 2. Physics, a. The property of returning to an initial form or state following deformation. b. The degree to which this property is exhibited.
Hooke's Law	The amount that a body bends or *stretches out of shape* is in direct proportion to force acting on it.

Helga Hooke, great granddaughter of Robert Hooke, President of the Reliable Rub ber Band Company, has been ordered by the National Bureau of Standards to certify that the rubber bands produced by her company are truly elastic. She must have several samples tested and verify that they do conform to Hooke's Law. To do this she hires you, the Pomperaug Independent Underwriters Testing Laboratories.

TASK

You must determine if several samples of Reliable Rubber Band products are truly elastic by designing an experimental strategy and testing the samples. After completing your testing, write a report, complete with documentation, to the National Bureau of Standards reporting your findings. A copy of your report should also be submitted to Helga.

AUDIENCE

The director of the National Bureau of Standards and Helga.

PURPOSE

The purpose of your report as an Independent Laboratory is to certify that the rubber bands tested **do** or **do not** conform to Hooke's Law when subjected to stretching.

PROCEDURE

1. Use the assessment list for *Is Rπubber Elastic?*
2. Organize your thinking by stating in your own words: 1) the problem, 2) the information given, and 3) the hypothesis that you form.
3. Write a procedure you will follow to collect your data. Be sure to use metric units for weight and length.
4. Carry out your procedure. Organize your data in the form of a table.
5. Graph the data collected.
6. Analyze your data and graph. Organize your thoughts so that your explanation incorporates the data.
7. Write a letter to the National Bureau of Standards certifying the properties of the rubber bands. (Be sure to send a copy to Helga.)

MOVING WITH MATH

Act out these words. When it is your turn, your teacher will say one of these words and you will move your body to show what these words mean.

Some sample words are:

Behind, In Front Of, Beside, On Top Of, Under

Circle, Line, Square, Triangle

Open, Closed

Content Standard 6: Spatial Relationships and Geometry

Students will understand and use spatial relationships and basic concepts of geometry to construct and describe geometric models, and recognize and use geometric patterns.

K-4 Performance Standards

Describe, model, draw, and classify shapes.

MORE THAN HALF?

You and your classmates will work with your teacher to make many bar graphs that show interesting facts about your class. Have fun with these graphs. Some ideas for the graphs are:

- Number of boy and girls
- Students with birthdays during the school year or during the summer
- Students who have ridden on an animal at the zoo such as an elephant or a camel

For each graph you will complete the following sentences if you can:

More than half of the students _____ .

Less than half of the students _____ .

If you can not answer these questions for a graph, explain why you can not give an answer.

(Note to the teacher: One or two graphs should show an equal number of students in each of the two columns.)

Content Standard 4: Ratios, Proportions, and Percents

Students will understand and use ratios, proportions, and percents.

K-4 Performance Standard

Use and differentiate fractional parts and rations when comparing quantities.

HOW LONG WILL I HAVE TO WAIT IN THIS LINE?

There are a million people in front of you in line to get an ice cream cone. You want one so much that you will stand in line until it is your turn. If the robot ice cream server takes one minute to serve each customer, how old will you be when it is your turn. Give your age in years, months, weeks, and days.

Assume that you start standing in line right now and do not leave the line until you get served.

Show all of your work.

Write your answer as a complete sentence.

Content Standard 1: Number Sense

Students will demonstrate number sense by using numbers for counting, measuring, comparing, ordering, scaling, locating, and labeling.

Performance Standards for grades K-4

Use real-life experiences, physical materials, and technology to construct number meanings for whole numbers, commonly used fractions, and decimals.

Develop a sense of magnitude of whole numbers, commonly used fractions, and decimals.

MATHEMATICS

The Budget Mystery

In 1990, the maintenance budget for a school was $30,000 out of a total budget of $500, 000. In 1991, the figure was $31,200 out of a total budget of $520,000. Inflation between 1990-1991 was 8%.

Parents complained that the money spent on maintenance **INCREASED**.

The maintenance manager complained that the money on maintenance **DECREASED**.

The principal claimed that, in fact, there has been **NO CHANGE** in spending for maintenance.

1. Write what the parents could say to justify their claim of an increase.

2. Write what the maintenance manager could say to justify his claim of a decrease.

3. Write what the principal could say to justify her claim of no change.

4. Do you agree with the parents, the maintenance manager, or the principal? Pick the position that you must strongly support, and unite a persuasive letter to the Board of Education to convince them you are correct.

Students will get one page to respond to <u>each</u> question and show their work.

Content Standard 2: Ratios, Proportions, and Percents

Students will understands and use ratios, proportions, and percents.

Performance Standard, Grades 9 - 12

Use ratios, proportions, and percents to solve real world problems.

ZOO PROBLEM

BACKGROUND

You were recently hired by the Vaugosstine Zoo to feed the animals, You are amazed at how much food the animals consume and after saying so to your parents, they claim they spend more money to feed you than the zoo does to feed one animal. Your mother says she spends $200 per week to feed the family - that's you, Mom , Dad, and your brother Tom. Your curiosity is raised and you gather the following information. The zoo purchased 214,964 kg of meat last year at $2.53 per kg and 325,268 kg of grains at $1.29 per kg. The 375 animals that you feed eat a combination of meats and grains.

TASK

Your task is to determine who is more expensive to feed - yourself or an animal at the Zoo.

AUDIENCE

The audience for your task is you and your family.

PURPOSE

The purpose of this task is to resolve the disagreement within your family over who is more expensive to feed - a zoo animal or a teenager.

PROCEDURE

1. Use the assessment list for the Zoo Problem.

2. Organize your thinking by listing:

   (a) the facts you know
   (b) the facts you need to know
   (c) the assumptions you must know

3. Think about the steps you must follow to accomplish the task. Write a sentence or two explaining how you will do the problem.

4. Carry out your procedure.

5. Show work for each step. Label and organize your work.

6. Decide who is more expensive to feed - you or a zoo animal. Write a sentence expressing your answer.

Content Standard 2: Operations
Students will add, subtract, multiply and divide with numbers for counting, measuring, comparing, ordering, scaling, locating and labeling.

Performance Standard, Grades 5 - 8
Develop, use and explain procedures for performing calculations with integers, whole numbers, decimals and fractions.

ENLARGING AND REDUCING

The photocopy machine in your school can make enlargements from the original size and it can also make reductions. The maximum enlargement is 125% of the original size. The maximum reduction is 65% of the original size.

Use diagrams and written explanations to show your solutions to these problems.

1. What exactly does the 65% and the 125% represent?

2. Suppose someone has left the copy machine on 80% and after making a copy of your original, you threw your original away by mistake. What setting should you use to return the 80% reduction back the original size of your original?

3. Suppose that you start with an original that measures 8 1/2 inches wide and 11 inches long. You want a copy that will be as close as possible to 5 1/2 inches long. What sequence of operations will you carry out with this machine to get that reduced copy?

4. Suppose that you start with an original that measures 8 1/2 inches wide and 11 inches long. You want a copy that will be as close as possible to 12 inches wide. What sequence of operations will you carry out with this machine to get that reduced copy?

Content Standard 4: Ratios, Proportions, and Percents

Students will understand and use ratios, proportions, and percents.

Performance Standard for grades 9-12

Use ratios, proportions, and percents to solve real-world problems.

AIDS FALSE POSITIVES

One of the most controversial public policy health issues is whether or not to conduct large-scale AIDS testing of the general population. We know that about 1/2% or about 1 in 200 people actually have AIDS in the US population. We also have an AIDS test that is 98% reliable, meaning that only 2% of all the tests are wrong. So suppose we use this test on 10,000 randomly chosen US citizens. Consider and answer the following questions :

1. **How many of these 10,000 people would be expected to actually have AIDS?**
2. **How many of these 10,000 people would be misdiagnosed based on the test results? Would these errors be false positives and false negatives? Explain.**
3. **Calculate what percent of those who test positive for AIDS actually have AIDS in this population of 10,000 people?**
4. **Explain why many health professionals recommend AGAINST general AIDS testing.**
5. **What would happen if everyone in this population of 10,000 people who tested positive for AIDS was retested? What is the probability that someone in this population WITHOUT AIDS would get two positive test results?**
6. **Explain the relationship between the rate of incidence of AIDS and the magnitude of false positives.**

REMEMBER: ABSTINENCE IS THE SAFEST SEX!

Content Standard 7: Probability and Statistics

Students will understand and use basic concepts of probability and statistics to collect, organize, display and analyze data, simulate events and test hypotheses.

Performance Standards for grades 9-12

Design, conduct, and interpret the results of statistical experiments.

Use relative frequency and probability to represent and solve problems involving uncertainty.

COFFEE TIME

Use a large (at least 30 cup) coffee maker for this experiment. Gather data that compares the time to fill an eight ounce coffee cup with the height of the water (do not use hot coffee) in the coffee maker. Create a graph with this data.

Analyze this data and arrive at a mathematical model that explains this relationship. Use the data to create a formula that expresses time in seconds as a function of height in inches.

Discuss how well this model and the formula you created match the original data. Explain any discrepancies found.

Use the formula to predict how long it will take to fill one of these coffee cups when the water is at a known height.

Predict the height of the water in the coffee maker when you know how long it takes to fill the coffee cup.

Is this knowledge useful? Why?

Content Standard 9: Algebra and Functions
Students will understand and use algebraic skills and concepts, including functions, to describe real world phenomena symbolically and graphically, and model quantitative change.

Performance Standards for grades 9-12
Model and solve problems that involve varying quantities with variables, expressions, equations, inequalities, absolute values, vectors, and matrices.

Develop, explain, and use and analyze procedures for operating on algebraic expressions and matrices.

Worksheets

Workshop #2

Scoring Rubric for Mathematics Open-Ended Items

Each score category contains a range of student responses which reflect the descriptions given below.

Score 3
The student has demonstrated a full and complete understanding of all concepts and processes embodied in this appreciation. The student has addressed the task in a mathematically sound manner. The response contains evidence of the student's competence in problem-solving and reasoning, computing and estimating, and communicating to the full extent that these processes apply to the specified task. The response may, however, contain minor arithmetic errors that do not detract from a demonstration of full understanding.

Score 2
The student has demonstrated a reasonable understanding of the essential mathematical concepts and processes embodied in this application. The student's response contains most of the attributes of an appropriate response including a mathematically sound approach and evidence of competence with applicable mathematical processes, but contains flaws that do not diminish countervailing evidence that the student comprehends the essential mathematical ideas addressed by this task. Such flaws include errors ascribable to faulty reading, writing, or drawing skills; errors ascribable to insufficient, non-mathematical knowledge; and errors ascribable to negligent or inattentive execution of mathematical processes or algorithms.

Score 1
The student has demonstrated a limited understanding of some of the concepts and process embodied in this application. The student's response contains some of the attributes of an appropriate response, but lacks convincing evidence that the student full comprehends the essential mathematical ideas addressed by the task. Such deficits include evidence of insufficient mathematical knowledge; errors in fundamental mathematical procedures; and other omissions or anomalies that bring into question the extent of the student's ability to solve problems of this general type.

Score 0
The student has demonstrated merely an acquaintance with the topic. The student's response is associated with the task in the term, but contains few attributes of an appropriate response. There are significant omissions or anomalies that indicate a basic lack of comprehension in regard to the mathematical ideas and procedures necessary to adequately address the specified task. No evidence is present to suggest that the student has the ability to solve problems of this general type.

This rubric is used to score student responses to open-ended math task on the Connecticut Academic Performance Test given to grade 10 students.

MATH PROBLEM-SOLVING RUBRIC FOR TYPES OF ERRORS MADE

SCORE 5 The student makes no errors.

SCORE 4 The response contains flaws that do not diminish countervailing evidence that the student fully comprehends the essential mathematical ideas addressed by this task. Such flaws include errors ascribable to faulty reading, writing, or drawing skills; and errors ascribable to insufficient, non-mathematical knowledge.

SCORE 3 The response contains one minor arithmetic error that does not detract from a demonstration of full understanding of the problem.

or

The response contains one error of labeling units.

SCORE 2 The response contains flaws that do not diminish countervailing evidence that the student comprehends the essential mathematical ideas addressed by this task. Such flaws are acquirable to negligent or inattentive execution of mathematical processes or algorithms.

SCORE 1 The response indicates that the student has insufficient mathematical knowledge. There are errors in fundamental mathematical procedures and omissions or anomalies that bring into question the extent of the student's ability to solve problems of this general type.

SCORE 0 The response indicates that the student has no idea how to solve this type of problem. Any arithmetic or mathematical procedures used appear to be randomly applied.

Adapted from the scoring rubric for mathematics open-ended items used on the Connecticut Academic Performance Test (CAPT) given to grade ten students.

MATH PROBLEM-SOLVING

Rubric Scale

Dimension	Highest Rating			Lowest Rating
Understanding the Problem	The student shows complete understanding and insight into the problem.	The student shows a high degree of understanding of the problem.	The student shows some understanding of the problem.	The student shows no understanding of the problem.
Selecting And Carrying-out A Strategy of Problem-Solving	The student selects and carries out a logical mathematically sound strategy. The strategy is elegant and shows much insight.	The student selects and carries out a logically and mathematically sound strategy. But it may contain elements not completely on-target.	The student selects and uses a strategy which has some mathematical logic. But it is off the mark for this problem.	The student seems not to have a plan. The work shows no logical strategy.
Using Appropriate Informantion And Computing Accurately	The student identifies and uses all necessary information and makes no errors of computation.	The student identifies and uses current information but makes minor errors of computation that do not detract much from the answer.	The student over-looks or uses some incorrect information and errors of computation detract from the answer.	The student uses incorrect information, insufficient information, and/or makes substantial errors of computation.
Communicating The Work And The Answer Clearly	The student's work on the problem and the communication of the answer is clear, organized, neat, and very easy to follow.	The student's work is mostly neat, organized, and can be followed with reasonable ease.	Disorganization and a lack of neatness in the student's work significantly hinder the reader's ability to understand the work.	The student's work is sloppy, disorganized, and generally impossible to follow.

MATH PROBLEM-SOLVING AND COMMUNICATING

Specific Rating According To The Dimensions Of Math Problem Solving And Writing

DIMENSIONS	HIGH	MEDIUM	LOW	VERY LOW
UNDERSTANDING THE PROBLEM				
1. Relevant information that is known is identified.	___	___	___	___
2. Information that is needed is identified.	___	___	___	___
3. Needed information is obtained or reasonable estimations or assumptions are made.	___	___	___	___
SOLVING THE PROBLEM				
4. Data are used accurately.	___	___	___	___
5. Sufficient data are used.	___	___	___	___
6. Computations are completed accurately.	___	___	___	___
7. Sufficient computations are made (and shown.)	___	___	___	___
8. Rounding or estimating are used appropriately.	___	___	___	___
9. Information is clearly labeled.	___	___	___	___
10. Mathematically logical approach is evident.	___	___	___	___
11. Graphs, charts, tables, drawings, or other graphics are used to support the development of a solution.	___	___	___	___
COMMUNICATING THE RESULTS				
12. The written explanation is easy to follow.	___	___	___	___
13. The written explanation contains enough of the math to satisfy the reader that the answer is well supported.	___	___	___	___
14. Graphs, charts, tables, drawings, or other graphics are used to support the written explanation.	___	___	___	___
15. Sense of audience is clear in written explanation.	___	___	___	___
16 Mechanics of English are correct.	___	___	___	___
17. The work is neat and presentable.	___	___	___	___

Scoring Rubric for Science Open-Ended Items

Each score category contains a range of student responses which reflect the descriptions given below.

Score 3

The response is an excellent answer to the question. It is correct, complete, and appropriate and contains elaboration, extension, and/or evidence of higher-order thinking and relevant prior knowledge. There is no evidence of misconceptions. Minor errors will not necessarily lower the score.

Score 2

The response is a proficient answer to the question. It is generally correct, complete, and appropriate although minor inaccuracies may appear. There may be limited evidence of elaboration, extension, higher-order thinking, and relevant prior knowledge, or there may be significant evidence of these traits but other flaws (e.g., inaccuracies, omissions, inappropriateness) may be more than minor.

Score 1

The response is a marginal answer to the question. While it may contain some elements of a proficient response, it is inaccurate, incomplete and/or inappropriate. There is little if any evidence of elaboration, extension, higher-order thinking or relevant prior knowledge. There may be evidence of significant misconceptions.

Score 0

The response, although on topic, is an unsatisfactory answer to the question. It may fail to address the question, or it may address the question in a very limited way. There may be no evidence of elaboration, extension, higher-order thinking, or relevant prior knowledge. There may be evidence of serious misconceptions.

ANALYTIC RUBRIC FOR EXPOSITORY WRITING

LEVELS OF QUALITY

DIMENSION	LEVEL 4	LEVEL 3	LEVEL2	LEVEL 1
CONTENT ACCURACY	Main ideas and supporting details are appropriate and accurate.	Some minor errors are made but they do not detract from the overall quality of the response.	One or two substantial errors are made.	The response is entirely off track.
CONTENT SOPHISTICATION	Higher order thinking is clearly evident. Thoughtful synthesis analysis, and/or critical evaluations and made.	Some higher order thinking is evident.	Only literal understanding level thinking is evident and is goes beyond merely listing.	Information stated at the "list level" of thinking.
SUPPORTING GRAPHICS	Graphics such a drawings and diagrams are accurate, clear, and integrated into the text. The graphics and the text work together smoothly.	Graphics are accurate but are not well integrated into the text.	Some errors are made in the graphics.	Substantial errors are made in the graphics.
SENSE OF AUDIENCE	Vocabulary, examples, graphics, sentence structure, and other mechanisms show that the writer has a clear understanding of how to make an impact on the target audience.	The writer uses those strategies in a way that shows some understanding of how to impact the target audience.	The writer seems to have only a rudimentary understanding of how to communicate specifically with the target audience.	There seems to be no understanding of audience.
FOCUS	The writing is focused on the topic throughout.	The writing is focused on the topic most of the time. Minor "side trips" do not detract from "train of thought."	The writing loses focus enough to distract or confuse the reader.	The writing is unorganized.
ORGANIZATION	The sequence of information helps the reader to easily follow the response. There is a clear beginning, body and ending.	Minor glitches in organization result in only minor distraction to the reader. There is a clear beginning, body, and ending.	The sequence of information is disorganized and hard to follow. The organization of beginning, body, and ending is not clearly present.	There seems to be no organization. The structure of beginning, body, and ending is absent.
EDITING	There are no errors.	Minor errors exist but do not distract the reader.	Numerous errors do distract the reader.	A great number of errors are made that make the response nearly unreadable.

Note: Each dimension is assessed separately from all other dimensions.

EXPOSITORY WRITING Paper Code: _____

Statement Of The Topic: _____

_____

_____

Intended Audience: _____

Overall Rating: S T U V W X
High Low

Specific Rating According To Dimensions Of Expository Writing

Dimension	High	Medium	Low	Very Low
1. Clear Controlling Idea or Theme on Topic	___	___	___	___
2. Main Ideas Accurate and Sufficient	___	___	___	___
3. Supporting Details Accurate and Sufficient	___	___	___	___
4. Sophistication in Use of Information: Shows Higher-order Thinking	___	___	___	___
5. Organization	___	___	___	___
6. Fluency	___	___	___	___
7. Sense Of Audience	___	___	___	___
8. Mechanics Of English	___	___	___	___
9. Neatness and Presentation	___	___	___	___

Comments:

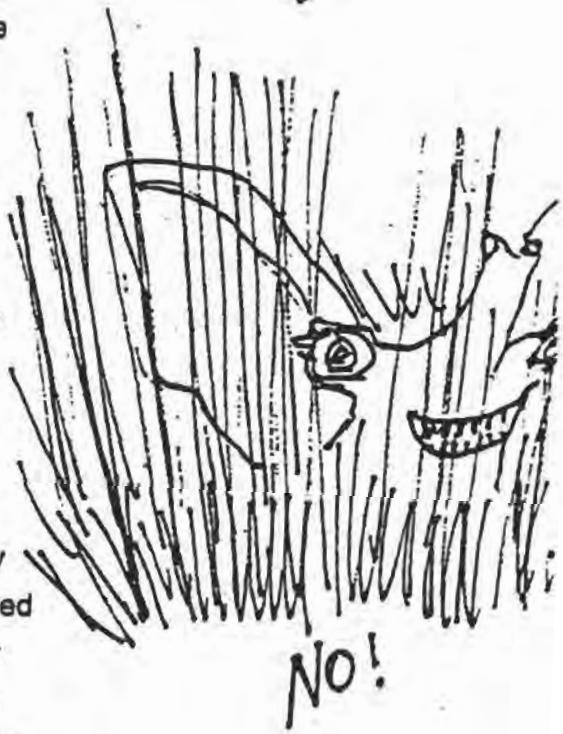
PERFORMANCE TASK ASSESSMENT LIST
CREATURE FEATURE

Element	Assessment Points Possible	Points Earned Assessment By: Self	Teacher
1. A clear opinion has been stated as to the natural habitat of the creature.	10	___	___
2. At least five pieces of evidence are stated to substantiate the opinion.	20	___	___
3. The relevance and importance of each piece of evidence is explained.	20	___	___
4. An explanation is made as to how all the pieces of evidence "add up" to supporting the identification of the probably natural "home" of the creature.	10	___	___
5. Relevant personal experiences and previous learning is brought in to provide support.	10	___	___
6. Labeled drawings are used to help present the evidence.	5	___	___
7. Scientific words, when used, are explained.	5	___	___
8. The writing, through its vocabulary, examples, and tone, is written as a paper from a scientist to other scientists.	5	___	___
9. The mechanics of English are used correctly.	5	___	___
10. The work is neat and presentable.	5	___	___
11. The work is completed on time.	5	___	___
Total	100	___	___

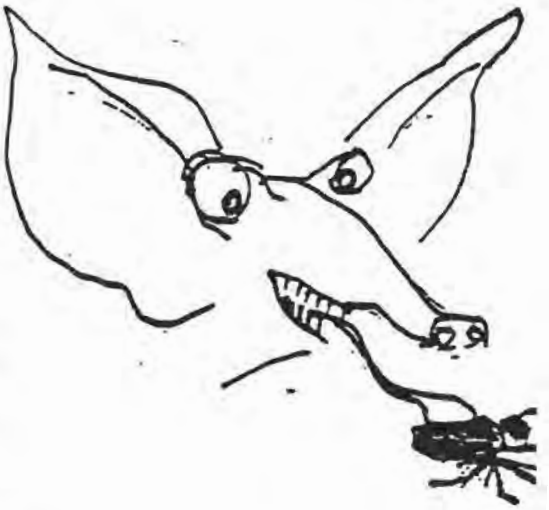
Fellow Scientists,

I have studied this strange creature which you found in the basement of the museum and I have come to a conclusion that there are two strong possibilities as to the original natural habitat of this mammal. One possibility is that the Creature lived in a wet, marshy environment, but I hypothesize that this creature probably lived in a hot and sandy desert. I will support my hypothesis by describing characteristics of the Creature's morphology that make it well-suited to this desert environment and not as well suited to a marsh. I will also describe the role this organism played in its local food web.

E#1 First, I will explain why I think that the creature lives in a hot sandy desert environment. The creature has large, flat, webbed feet which help it to walk on the loose sand without sinking. These feet are similar to the large, flat and soft feet of a camel. Also, large, flat, webbed feet would be a benefit to an animal living in a marsh. The feet alone do not provide strong evidence for whether the Creature lived in a desert or marsh.

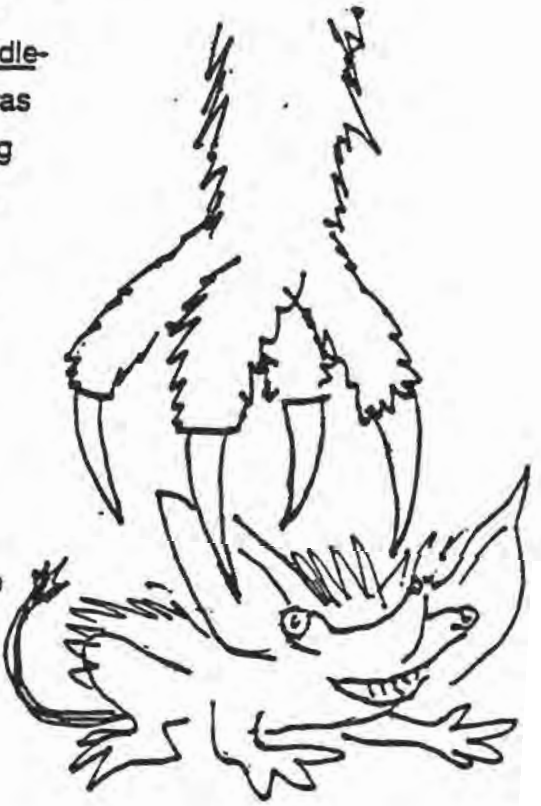


E#2 However, the ears do provide strong evidence supporting the desert as the natural habitat of this Creature. The large ears help it get rid of extra body heat like the ears of an elephant. In the hot part of the day, this Creature probably held its ears out in a fully extended way to maximize heat loss. At night, when the desert is cold, the ears can be folded in close to the body to minimize heat loss. The big ears would not work for an animal living in the water because they would cause too much resistance as the creature moved through the water or among the reeds and other water pants which would be abundant in a marsh. The ears would continually get caught on the plants and be in the way as the Creature went after food or tried to get away from its predators. Together, the feet and ears support my hypothesis that the desert was the Creature's natural habitat.



Now that I have established the desert as the Creature's natural habitat, let me turn my attention to where in the food web this Creature was located. All animals must find food and this creature was probably a secondary consumer eating primary consumers such as mice and insects which in turn eat plants which are the producers. That long nose helped it sniff around among rocks and other hiding places for food. The big eyes are like those of an owl which allow the creature to find its food in dim light in the cool night when small animals and insects become more active. The creature has long hind legs which help it leap at its prey. An animal this large (about the size of my small dog) would probably creep towards small rodents and large insects it hear scurrying around over the sand at night and then leap at them and either grab them with its needle-like teeth or grab them with its long tongue which was probably covered with sticky saliva. Desert dwelling insects like Dung Beetles have hard exoskeletons, and those sharp, pin-like teeth would be useful in grabbing the insect once it had been pulled to the mouth by the long, sticky-ended tongue.

E#3
E#4
E#5
E#6
E#7
E#8



Finally, this creature was not on the top of the food chain. It probably was hunted by larger animals. But to keep from getting eaten, it had big ears to pick up the sound of something sneaking up on it. Its eyes are out at the end of stalks and the creature uses them to look all around. That long nose can be stuck up into the air to pick up the scent of other creatures. Also, the creature had sharp spines on its back and on the end of its tail which are weapons for protection.

Thank you for considering my opinions. I would be happy to discuss this information with you further.

PERFORMANCE TASK ASSESSMENT LIST
CREATURE FEATURE

Element	Assessment Points Possible	Points Earned Assessment By: Self	Teacher
1. A clear opinion has been stated as to the natural habitat of the creature.	10	10	10
2. At least five pieces of evidence are stated to substantiate the opinion.	20	20	20
3. The relevance and importance of each piece of evidence is explained.	20	20	18
4. An explanation is made as to how all the pieces of evidence "add up" to supporting the identification of the probably natural "home" of the creature.	10	10	5
5. Relevant personal experiences and previous learning is brought in to provide support.	10	10	10
6. Labeled drawings are used to help present the evidence.	5	5	3
7. Scientific words, when used, are explained.	5	5	4
8. The writing, through its vocabulary, examples, and tone, is written as a paper from a scientist to other scientists.	5	4	3
9. The mechanics of English are used correctly.	5	5	4
10. The work is neat and presentable.	5	5	5
11. The work is completed on time.	5	5	5
Total	100	99	87

Excellent progress!

I only saw one place where you did this.

no labels

B+

PERFORMANCE TASK ASSESSMENT LIST
for
Comparing a Caterpillar and Me

1. Did I draw a detailed picture of a caterpillar?

Terrific OK Needs Work

2. Did I draw a detailed picture of me?

Terrific OK Needs Work

3. Did I label the parts of the caterpillar and the parts of me?

Terrific OK Needs Work

4. Did I draw lines to show which parts of the caterpillar were like my parts?

Terrific OK Needs Work

5. Is my work neat and organized?

Terrific OK Needs Work

PERFORMANCE TASK ASSESSMENT LIST
REGULAR WATER CYCLE

T = Terrific Job O = OK Job W = I need to work harder on this.

1. THE DIAGRAM OF THE WATER CYCLE

   T I showed at least five important parts of the Water Cycle.

   O I showed four parts of the Water Cycle.

   W I showed three or fewer parts of the Water Cycle.

2. ARTISTIC TECHNIQUES

   T I used color, shapes, and other techniques I used in art to make my diagram interesting and very easy to understand.

   O The artistic techniques I used help some.

   W The artistic techniques I used do not help much.

3. LABELS ON MY DIAGRAM

   T All of the important parts of my diagram are labeled.

   O Some of the important parts are labeled.

   W Few or none of the parts are labeled.

4. WRITTEN PARAGRAPH

   T The sequence of my ideas is organized to tell the story of what is happening in the diagram I drew. Each part is very clear.

   O My sequence is mostly clear.

   W My sequence is not very clear.

5. ACCURACY OF THE SCIENCE INFORMATION IN THE DIAGRAM AND WRITING

   T The scientific information is entirely correct.

   O There are some minor errors.

   W There are one or more major errors.

Did I do my best work?

Terrific OK Needs Work

The one thing I could do to improve my work solving is:

Classroom Assessment List
"Better Than Bohr?"

Element	Assessment Points: Possible Points	Earned Points: Self	Earned Points: Teacher
1. Planning was complete. A sketch and materials list were completed.	10	___	___
2. The 3-D model is accurate in parts and location of parts.	20	___	___
3. The 3-D model is sturdy and attractive.	10	___	___
4. The 3-D model shows at least 2 improvements over the Bohr model.	20	___	___
5. Two or more reasons why 3-D model is better than Bohr's model are listed. Reasons are clear and understandable.	10	___	___
6. Oral presentation was convincing and scientifically correct.	10	___	___
7. Oral presentation was loud, clear, and enthusiastic.	5	___	___
8. Written work is neat and correct in spelling and grammar.	5	___	___
9. Creative thinking is evident.	10	___	___
Total	100	___	___

PERFORMANCE TASK ASSESSMENT LIST
LETTER TO THE WETLAND COMMISSION

ELEMENTS	ASSESSMENT POINTS Points Possible	Assessed By: Self	Teacher
1. I accurately showed where the low points and high points would be on the land shown on this map.	____	___	___
2. I explained how I knew where the low points and high points would be.	____	___	___
3. I used arrows to show the directions of the flow of water on the parts of the water shed shown on this map.	____	___	___
4. I explained how I knew which ways the water moved through this part of the water shed.	____	___	___
5. I completed a graphic organizer that showed my main ideas and supporting details for the information in the letter I would write.	____	___	___
6. I used the correct format for a business letter.	____	___	___
7. I defined a wetland and explained its importance to the water shed.	____	___	___
8. I explained the consequences of removing wetlands from the water shed.	____	___	___
9. I predicted what I think would happen if this particular wet land was built on.	____	___	___
10. My writing is organized and flows from beginning to end.	____	___	___
11. Each main idea has several supporting details.	____	___	___
12. The mechanics of English are perfect.	____	___	___
13. I finished my work on time.	____	___	___
Total	____	___	___

PERFORMANCE TASK ASSESSMENT LIST
IS RUBBER ELASTIC ?

ELEMENT	ASSESSMENT POINTS Points Possible	Self	Teacher
DEFINING THE TASK			
1. The problem is clearly stated in the students own words.	2	____	____
2. The hypothesis is a simple declarative statement that reflects the observations.	2	____	____
3. The dependent and independent variables are identified correctly.	2	____	____
4. The hypothesis clearly states a relationship between the variables.	2	____	____
5. Predictions emerge from the hypothesis.	2	____	____
STRATEGIES FOR EXPERIMENTATION			
1. The experimental design tests the prediction.	2	____	____
2. The methodology and procedures for the experiment are linked sequentially.	2	____	____
3. The experimental procedure is so complete and precise that another person could carry it out.	4	____	____
4 . In accordance with conventional scientific practice, the metric system is used where ever possible.	2	____	____
5. The experiment incorporates proper controls.	4	____	____
6. Awareness of the margin of "error" is demonstrated and a thoughtful discussion of keeping error to a minimum is made.	2	____	____
7. A complete list of required materials is provided.	2	____	____
8. An appropriate strategy to use, repeated trials, and measurements are described.	4	____	____

9.	An appropriate title for the data table is provided	2	____	____
10.	The information on the data table is appropriately organized and labeled.	2	____	____
11.	The data reflects an adequate number of trials and manipulations of the independent variable.	2	____	____
12.	The data table is neat and presentable.	2	____	____

ANALYSIS OF RESULTS

1.	An appropriate type of graph is used.	2	____	____
2.	Appropriate starting points and intervals are used for each axis.	2	____	____
3.	There is a title for the graph which clearly states the relationship between the variables.	2	____	____
4.	An appropriate scale is used on each axis depending on the range of data for that axis.	2	____	____
5.	Axes are clearly labeled.	2	____	____
6.	The independent variable is on the (X) axis and the dependent variable is on the (Y) axis.	2	____	____
7.	The data are plotted accurately.	2	____	____
8.	The graph should reflect uncertainty of measurement.	2	____	____
9.	Trends or lack of trends are depicted.	2	____	____
10.	An appropriate key or legend is included.	2	____	____
11.	The whole graph uses the space given well.	2	____	____
12.	The graph is neat and presentable.	2	____	____

COMMUNICATING THE RESULTS

1.	The analysis makes use of all the data.	2	____	____
2.	The hypothesis is evaluated with respect to the data collected and analyzed.	4	____	____
3.	The analysis is accurate and thoughtful.	4	____	____

4.	The summary gives a reasonable interpretation of the data.	4	____	____
5.	The relationships (trends) between the variables are clearly and accurately described.	4	____	____
6.	Sources of error are correctly identified.	4	____	____
7.	Discussion of suggested laboratory revisions and questions raised by the experiment are present.	4	____	____
8.	Thoughtful mastery of language is evident including the use of: appropriate vocabulary, language mechanics, and complete sentences.	4	____	____
9.	The writing is organized and focused.	2	____	____
10.	The writing is neat and presentable.	2	____	____
	Total:	9 8	____	____

PERFORMANCE TASK ASSESSMENT LIST
ACTING OUT GEOMETRY

1. Did I move my body to show what IN FRONT means?

Terrific OK Needs Work

2. Did I move my body to show what UNDER means?

Terrific OK Needs Work

3. Did I use my body to show what OPEN means?

Terrific OK Needs Work

4. Did I use my body to show what a CIRCLE is?

Terrific OK Needs Work

5. Did I use my body to show what a SQUARE is?

Terrific OK Needs Work

PERFORMANCE TASK ASSESSMENT LIST

MORE THAN HALF?

1. Did I complete the "More than half" sentences about the graphs?

Terrific OK Needs Work

2. Did I complete the "Less than half" sentences about the graphs?

Terrific OK Needs Work

3. If I found some graphs for which I could not complete these sentences, did I write an explanation?

Terrific OK Needs Work

4. Did I use complete sentences when I wrote?

Terrific OK Needs Work

5. Did I check my spelling and make some improvements?

Terrific OK Needs Work

PERFORMANCE TASK ASSESSMENT LIST

HOW LONG WILL I HAVE TO WAIT IN THIS LINE?

ELEMENTS		ASSESSMENT POINTS Points Possible	Assessed By: Self	Teacher
1.	I figured out my age as of today in years, months, weeks, and days.	____	____	____
2.	I figured out how much time would pass in a million minutes..	____	____	____
3.	I showed all of my work in detail.	____	____	____
4.	My work is organized.	____	____	____
5.	All values are labeled.	____	____	____
6.	I figured out how old I would be in years, months, weeks, and days.	____	____	____
7.	I used a complete sentence for my answer.	____	____	____
8.	My work in neat, presentable, and easy to follow.	____	____	____
	Total	____	____	____

Did I do my best work?

Terrific OK Needs Work

The one thing I could do to improve my math problem solving is:

PERFORMANCE TASK ASSESSMENT LIST

COOKING OATMEAL

ELEMENTS	ASSESSMENT POINTS Points Possible	Assessed By: Self	Teacher
1. I figured out how many servings of oatmeal are needed to feed my family.	___	___	___
2. I explained how I would use the recipe on the box top to figure out how much water, salt, and oats I would need.	___	___	___
3. I figured out how much water I would need.	___	___	___
4. I figured out how much salt I would need.	___	___	___
5. I figured out how much oats I would need.	___	___	___
6. My calculations are correct.	___	___	___
7. I showed all of my work in detail.	___	___	___
8. My work is organized.	___	___	___
9. All values in my work are labeled.	___	___	___
10. I selected measuring tools to use.	___	___	___
11. I explained why I selected those kitchen measuring tools.	___	___	___
Total	___	___	___

Did I do my best work?

Terrific OK Needs Work

The one thing I could do to improve my math problem solving is:

PERFORMANCE TASK ASSESSMENT LIST
MATH PROBLEM SOLVING

The Budget Mystery
Analysis of Each Position

ELEMENT	ASSESSMENT POINTS Points Possible	Earned: Assessment By Self	Teacher
1. The parents' claim is supported through			
A. The selection of appropriate budget data	____	____	____
B. Appropriate procedures used on that data	____	____	____
2. The maintenance manager's claim is supported through:			
A. The selection of appropriate budget data	____	____	____
B. Appropriate procedures used on that data	____	____	____
3. The principal's claim is supported through:			
A. The selection of appropriate budget data	____	____	____
B. Appropriate procedures used on that data	____	____	____
4. Enough computations are shown to convince the reader that the problem-solver has done a careful and complete job of solving the problem.	____	____	____
5. Values in computations are accurately labeled.	____	____	____
6. Appropriate math vocabulary is used and explained.	____	____	____
7. The work is neat and organized.	____	____	____
8. The mechanics of English are correct.	____	____	____
Total	____	____	____

PERFORMANCE TASK ASSESSMENT LIST
MATH PROBLEM SOLVING

The Budget Mystery
The Persuasive Letter

ELEMENT	ASSESSMENT POINTS Points Possible	Earned: Assessment By Self	Teacher
1. The position is clearly stated.	____	____	____
2. The explanation of the position is supported by accurate, clearly labeled computations.	____	____	____
3. A chart or graph is used to support the position.	____	____	____
4. The main point of each of the opposing points of views is stated and refuted.	____	____	____
5. Connections to other similar real-life money issues are used to support the position.	____	____	____
6. A sense of audience is maintained throughout the letter.	____	____	____
7. Ideas are organized and follow a logical sequence.	____	____	____
8. Transitions between ideas are smooth.	____	____	____
9. A powerful concluding statement is made.	____	____	____
10. The mechanics of English are correct.	____	____	____
11. The letter is neat and presentable.	____	____	____
Total	____	____	____

PERFORMANCE TASK ASSESSMENT LIST

ZOO PROBLEM

ELEMENT	ASSESSMENT POINTS Points Possible	Points Earned: Assessment By Self	Teacher
UNDERSTANDING THE PROBLEM			
1. The student lists given information.	____	____	____
2. The student notes information which must be obtained.	____	____	____
3. The student identifies information which must be assumed.	____	____	____
SOLVING THE PROBLEM			
4. A mathematical sound strategy is presented.	____	____	____
5. The student's reasoning can be easily followed.	____	____	____
6. The student's work is organized in a sequential format.	____	____	____
7. Work is shown for each step of the problem.	____	____	____
8. Calculations are correct.	____	____	____
9. Answers are rounded correctly.	____	____	____
10. All values are labeled.	____	____	____
COMMUNICATING THE RESULT			
11. The final answer is stated in sentence form.	____	____	____
12. The concluding sentence is clear and easily understood.	____	____	____
13. The mechanics of English are correct.	____	____	____
Total	____	____	____

PERFORMANCE TASK ASSESSMENT LIST

ENLARGING AND REDUCING

ELEMENTS	ASSESSMENT POINTS Points Possible	Assessed By: Self	Teacher
1. I restated the problem in my own words.	____	____	____
2. I listed all the known information that is relevant to solving this specific problem.	____	____	____
3. I made a list of information I need to find or make estimations about in order to solve this problem.	____	____	____
4. I defined 65% and 125% accurately as those values apply to this problem.	____	____	____
5. I showed that I understand the concept of enlarging and reducing from an original document on a photocopier.	____	____	____

THE FOLLOWING ELEMENTS ARE USED TO JUDGE THE OVERALL WORK ON THIS SET OF PROBLEMS.

6. My calculations are accurate and I presented enough calculations to show how I solved each problem.	____	____	____
7. I used a logical and complete sequence of diagrams with written explanations to show how I solved each problem.	____	____	____
8. All of my units are labeled correctly.	____	____	____
9. My answers are correct.	____	____	____
10. My writing is concise and clear.	____	____	____
11. My work is organized and neat.	____	____	____
Total	____	____	____

PERFORMANCE TASK ASSESSMENT LIST

AIDS FALSE POSITIVES

ELEMENTS	ASSESSMENT POINTS Points Possible	Assessed By: Self	Teacher
1. I restated the problem in my own words.	____	____	____
2. I listed all relevant information that is known regarding this problem.	____	____	____
3. I showed understanding of how to determine the percents of numbers.	____	____	____
4. I showed understanding of probability through my clearly labeled calculations and my written explanations.	____	____	____
5. I used graphs to help explain my ideas.	____	____	____
6. I showed understanding of the use of the principles of probability in dealing with real problems which involve important human values and strong emotions.	____	____	____
7. My writing is concise, organized, and easy to read.	____	____	____
8. Mechanics of English are correct.	____	____	____
Total	____	____	____

PERFORMANCE TASK ASSESSMENT LIST

COFFEE TIME

ELEMENTS	ASSESSMENT POINTS Points Possible	Assessed By: Self	Teacher
1. I restated the problem in my own words.	____	____	____
2. I listed all relevant information that is known regarding this problem.	____	____	____
3. I helped to test the time it takes to fill the eight ounce cup when the water is at different levels in the coffee maker.	____	____	____
4. I made a well labeled graph using these data.	____	____	____
5. I identified the variables relevant to solving this problem and I assigned each variable a symbol.	____	____	____
6. I created a formula appropriate to this problem.	____	____	____
7. I substituted values into the formula correctly.	____	____	____
8. I carried out the operations correctly to solve the equation.	____	____	____
7. I tested my formula by using it to predict how long it would take to fill the cup when the water was at a known height.	____	____	____
8. I tested my formula by using it to predict how full the coffee maker is when I know how long it takes to fill the cup.	____	____	____
9. I explained any discrepancies.	____	____	____
10. I wrote clear, concise, organized explanations.	____	____	____
Total	____	____	____

Worksheets
Workshop #5

Index for Worksheets for Workshops #5

From the Connecticut State Department of Education

From the Massachusetts Comprehensive Assessment System

Assessment Lists

28 Which means the same as 73?

ⓕ 700 + 30
ⓖ 70 + 3
ⓗ 30 + 7
ⓘ 7 + 3

---

29 Use your counters, if needed, to solve the problem.

12 − 9 =

ⓐ 3
ⓑ 7
ⓒ 13
ⓓ 17

---

30 Use your counters, if needed, to solve the problem.

15 − 6 =

ⓕ 9
ⓖ 10
ⓗ 11
ⓘ 12

---

31 Use your counters, if needed, to solve the problem.

12 − 7 =

ⓐ 4
ⓑ 5
ⓒ 6
ⓓ 7

32 Use your counters, if needed, to solve the problem.

14 − 8 =

ⓕ 6
ⓖ 7
ⓗ 12
ⓘ 22

---

33 Which number is LESS than each of the following numbers?

54 46 52 48

ⓐ 44
ⓑ 50
ⓒ 52
ⓓ 49

---

34 Which number is GREATER than each of the following numbers?

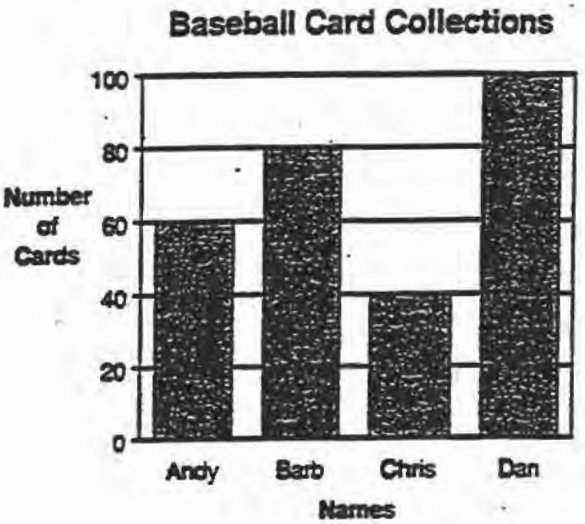
71 47 55 69

ⓕ 78
ⓖ 58
ⓗ 70
ⓘ 49

Source: The Connecticut State Department of Education

–Released Item–

Use the graph below to answer question 49.



49 Who has collected MORE than 80 baseball cards?

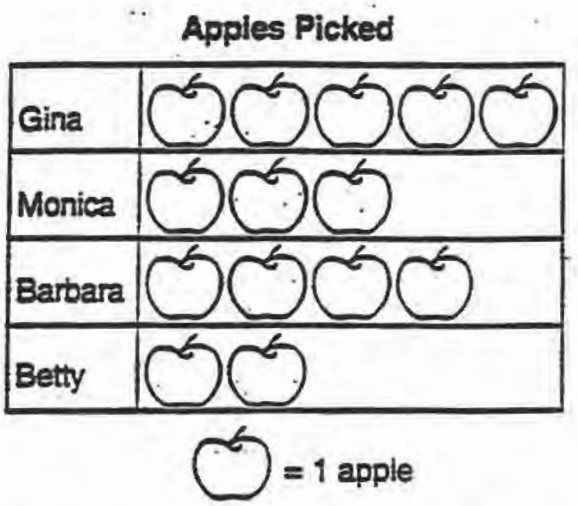
ⓐ Andy

ⓑ Barb

ⓒ Chris

ⓓ Dan

Use the graph below to answer question 50.



50 How many apples did the four girls pick altogether?

① 5

② 12

ⓑ 13

ⓓ 14

14 Which clock shows 1:00?

ⓐ 

ⓑ 

ⓒ 

ⓓ 

15 Which clock shows half-past 5?

ⓐ 

ⓑ 

ⓒ 

ⓓ 

16 What time does this watch show?

ⓐ 7:30

ⓑ 8:00

ⓒ 8:30

ⓓ 9:30

–Released Item–

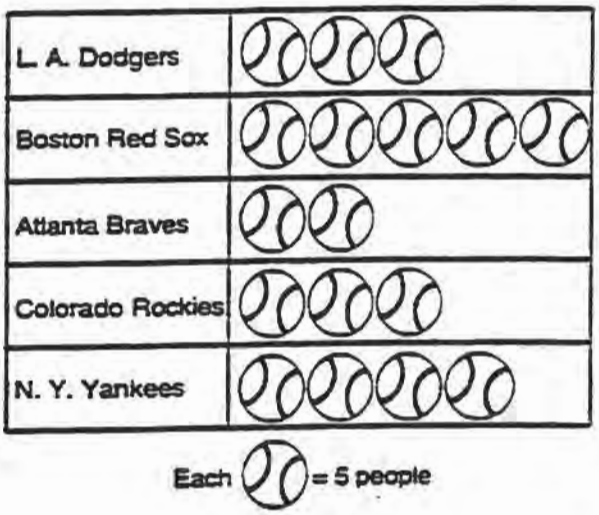
Source: The Connecticut State Department of Education

64 The shaded portion of this picture represents which number?

f 2.2
g 2.02
h 2
j 0.02

Use the graph to answer question 65.

The graph shows the results of a survey about favorite major league baseball teams.

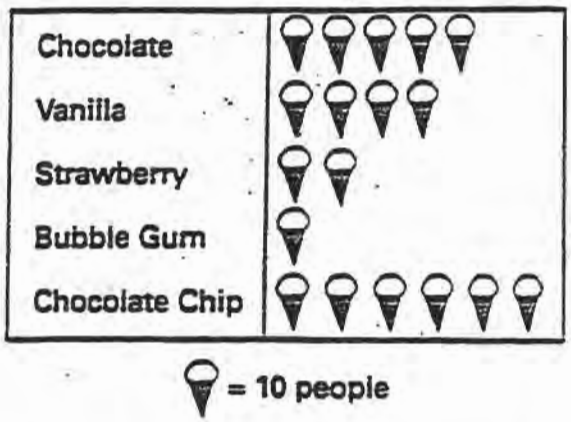


65 *How many MORE people* like the N.Y. Yankees than the Atlanta Braves?

a 2
b 10
c 15
d 20

Use the graph to answer question 66.

The graph shows the results of a survey about favorite flavors of ice cream.



66 Which 2 flavors combined were chosen by FEWER people than chocolate?

f Vanilla and chocolate chip
g Vanilla and strawberry
h Strawberry and bubble gum
j Bubble gum and vanilla

Use the table to answer question 67.

The table below shows the amount of lumber produced in 1960 and 1980.

LUMBER PRODUCTION
(in millions of boards)

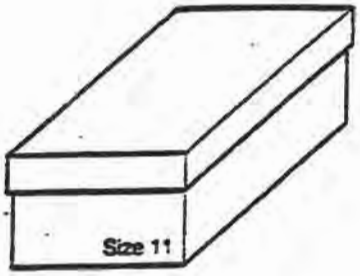
ITEM	1960	1980
Douglas fir	8832	10,092
Pine	3169	3943
Redwood	1000	1172
Oak	2789	3684

67 By how many millions of boards did production increase for pine from 1960 to 1980?

a 172
b 774
c 826
d 895

–Released Item–

Source: *The Connecticut State Department of Education*



115 Alexander bought a pair of athletic shoes. The box was which geometric figure?

a Rectangular prism
b Pentagon
c Cube
d Triangular prism

---

116 In baseball, home plate is made of white rubber in the shape shown below. What shape is home plate?

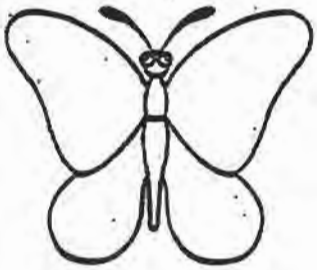
f Decagon
g Hexagon
h Pentagon
j Octagon

---

117 Many letters in the alphabet have lines of symmetry. In which pair of letters below does each letter have at least 2 lines of symmetry?

a D and I
b C and H
c A and E
d H and X

118 Rich has a butterfly collection. How many lines of symmetry does this butterfly have?



f 0
g 1
h 2
j Infinite

---

119 Andrea is carpeting her bedroom. The length of the room is 9 feet and the width is 7 feet. How many square feet of carpeting will she need?

a 16
b 56
c 63
d 72

---

120 Nathan's yard is 120 feet long and 53 feet wide. What is the perimeter of his yard?

f 346 ft
g 240 ft
h 173 ft
j 106 ft

Source: The Connecticut State Department of Education

–Released Item–

CAPT Mathematics Grid-in Cluster

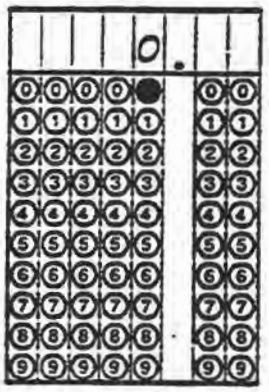
Fame and Fortune

The agent for a group of musicians has presented the following two contracts for their first CD recording:

Contract A: The recording company will pay them $1.50 per CD sold, but the group must pay $50,000 production costs from their profits.

Contract B: The recording company will pay them $0.50 per CD sold, with no charge for production costs.

1. What is the difference in profit (if any) between options A and B when 50,000 CDs have been sold?

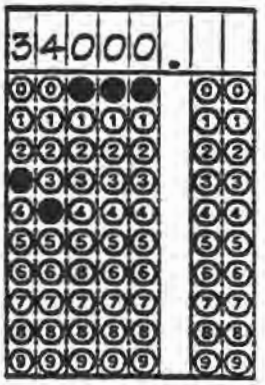


---

2. The group was optimistic about sales of their CD, so they chose option A. After the CD had been on sale for two weeks, they received this letter from the recording company:

   Congratulations: Payments to your account have covered the production costs and left you a net profit of $1000. A check for that amount is enclosed.

   How many CDs were sold in the first two weeks?

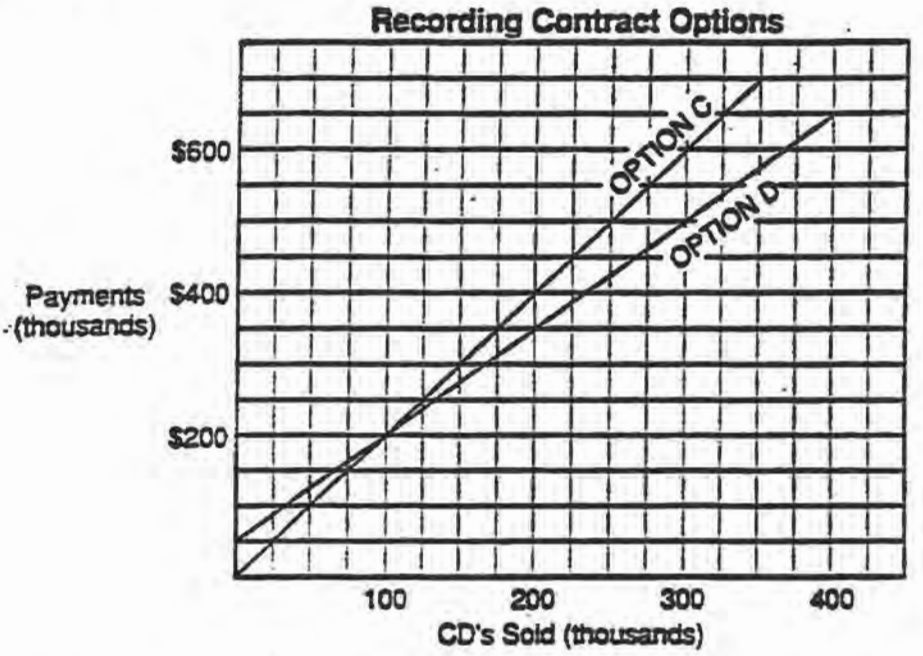


—Released Item—

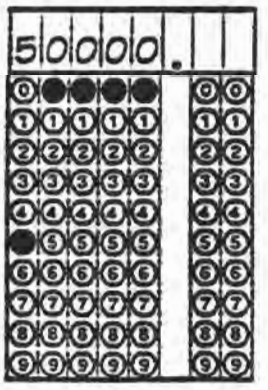
Source: The Connecticut State Department of Education

Fame and Fortune (continued)

After the success of their first CD, the group is offered the choice of one of the following two options for a better contract. One option even includes a signing bonus. (A "signing bonus" is given for signing a contract even before any CD sales have been made.) The graph below represents the payments of the two options.



3. Under the option that includes a signing bonus, how much is the bonus?

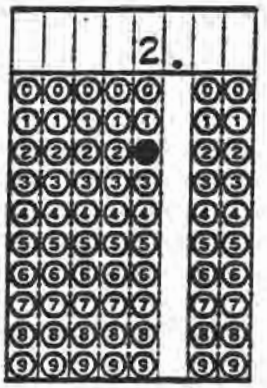


Source: The Connecticut State Department of Education

—Released Item—

Fame and Fortune (continued)

4. Under Option C, how much is the payment per CD sold?



Math Assessment List

MATH PROBLEM-SOLVING AND COMMUNICATING

Specific Rating According To The Dimensions Of Math Problem Solving And Writing

DIMENSIONS	HIGH	MEDIUM	LOW	VERY LOW
UNDERSTANDING THE PROBLEM				
1. Relevant information that is known is identified.	___	___	___	___
2. Information that is needed is identified.	___	___	___	___
3. Needed information is obtained or reasonable estimations or assumptions are made.	___	___	___	___
SOLVING THE PROBLEM				
4. Data are used accurately.	___	___	___	___
5. Sufficient data are used.	___	___	___	___
6. Computations are completed accurately.	___	___	___	___
7. Sufficient computations are made (and shown.)	___	___	___	___
8. Rounding or estimating are used appropriately.	___	___	___	___
9. Information is clearly labeled.	___	___	___	___
10. Mathematically logical approach is evident.	___	___	___	___
11. Graphs, charts, tables, drawings, or other graphics are used to support the development of a solution.	___	___	___	___
COMMUNICATING THE RESULTS				
12. The written explanation is easy to follow.	___	___	___	___
13. The written explanation contains enough of the math to satisfy the reader that the answer is well supported.	___	___	___	___
14. Graphs, charts, tables, drawings, or other graphics are used to support the written explanation.	___	___	___	___
15. Sense of audience is clear in written explanation.	___	___	___	___
16 Mechanics of English are correct.	___	___	___	___
17. The work is neat and presentable.	___	___	___	___

CAPT Mathematics Open-Ended Cluster

Affording a Car

Use the information below to answer questions 1, 2, and 3.

Liam is planning to buy a car. He saw a car he liked in the newspaper ad shown below. He also gathered additional information about the price of gasoline, insurance costs and auto loan payment schedules which are also shown below.

FOR SALE. Two-year old **Ventur.** $6000. 25 miles per gal. Auto, a/c, many extras. Excellent cond. Maintenance—$300 per year avg. Call •555-2373 after 5 PM.

ConnAm Insurance Company
Automobile Insurance

Model	Age	Annual Rate
Ventur	2 yr	$720

ECON GAS
Regular Unleaded 1.24\frac{9}{10}$/gal.

Federal United Bank							5-year loans	
Amount of Loan	$4400	$4600	$4800	$5000	$5200	$5400	$5600	$5800
Monthly Payment	$93	$98	$102	$106	$110	$115	$119	$123

Liam has saved $1500. He also earns $250 a month from his part-time after school job. Liam uses the worksheet shown on the next page to help him decide whether or not he can afford to purchase and maintain the Ventur described in the ad.

Source: The Connecticut State Department of Education

–Released Item–

Affording a Car (continued)

Car Purchase Worksheet for Ventur

1.

A. Initial Expenses	
Registration	
Sales Tax (6%) of _____	
Down Payment	
Total	

2.

B. Monthly Expenses	
Gasoline	
Insurance	
Maintenance	
Loan Payment	
Total	

1. Calculations

2. Calculations

Source: The Connecticut State Department of Education

Affording a Car (continued)

1-2. Worksheet

1. Liam first needs to calculate how much of his $1500 savings he would have left for a down payment after paying for registration and sales tax. Registration fees are $240 and sales tax is 6% of the $6000 purchase price of the car.

   In your answer booklet, calculate how much Liam will have left for a down payment. Then complete the Car Purchase Worksheet, Section A: Initial Expenses, with your figures.

Remember to show your work and write your answer in your answer booklet.

---

2. Liam needs to estimate his monthly car expenses to see if his $250 a month earnings are enough to purchase the $6000 car. Here is what Liam figures:

   - the car will get about 25 miles per gallon;
   - he will drive about 1000 miles per month;
   - his insurance will be about $720 per year;
   - his maintenance costs will be about $300 per year; and
   - he will take a 5-year loan on the full cost of the car minus the down payment he can make.

Use the above information and the Federal United Bank loan repayment table and the cost of gasoline to calculate each of Liam's monthly expenses. In your answer booklet, complete the Car Purchase Worksheet, Section B: Monthly Expenses, with your figures.

Remember to show your work and write your answer in your answer booklet.

---

3. The Purchasing Decision

Considering all of your calculations, explain whether or not Liam can afford to purchase and maintain the Ventur and tell how you arrived at this conclusion.

Remember to show your work and write your answer in your answer booklet.

Affording a Car (continued)

4. Kate's Car

Liam's older sister, Kate, is also thinking about buying a car. The car she would like to purchase costs $8200. Liam suggested that she fill out a Car Purchase Worksheet like the one he used, based on her insurance rate and her estimate of monthly expenses. Her Car Purchase Worksheet is shown below.

Car Purchase Worksheet		for Comet	
A. Initial Expenses		B. Monthly Expenses	
Registration	$240	Gasoline	45
Sales Tax (6%) of 8200	492	Insurance	40
		Maintenance	20
Down Payment	2400	Loan Payment	123
Total	3132	Total	228

Kate's weekly take-home pay from a part time job is $60. She has $3200 saved in her savings account. Based on the information in Kate's Car Purchase Worksheet, what advice about buying the car should Liam give his sister?

Remember to show your work and write your answer in your answer booklet.

Source: The Connecticut State Department of Education

–Released Item–

DIMENSIONS OF THE SCIENTIFIC PROCESS

DIMENSION	RATING HIGH	MEDIUM	LOW	VERY LOW
1. The reason for conducting the experiment is explained.	___	___	___	___
2. The audience for the final report is identified.	___	___	___	___
3. The criteria to be used to judge the quality of the experiment and final report are identified.	___	___	___	___
THE FOLLOWING STEPS ARE CARRIED OUT, BUT NOT NECESSARLY IN THIS ORDER:				
4. Asks interesting questions relevant to the task.	___	___	___	___
5. Makes observations.	___	___	___	___
6. States an hypothesis.	___	___	___	___
7. Identifies independent variables relevant to the hypothesis.	___	___	___	___
8. Finds and uses valid and reliable information.	___	___	___	___
9. Controls variables.	___	___	___	___
10. Conducts multiple trials.	___	___	___	___
11. Reduces error.	___	___	___	___
12. Collects and organizes data.	___	___	___	___
13. Processes and analyzes data.	___	___	___	___
14. Displays data.	___	___	___	___
15. Evaluates the hypothesis.	___	___	___	___
16. Generalizes or extrapolates from the data.	___	___	___	___
17. Makes a final report to the audience specified.	___	___	___	___
18. Critiques the quality of the experimental design and the work to carry out the experiment.	___	___	___	___
19. Asks follow-up questions that may lead to further experiments.	___	___	___	___

CAPT Science Performance Task

Keep It Hot

Have you ever bought a hot drink in a paper cup and found that it was cold before you finished drinking it? Is there anything that can be done to a paper cup to help keep a hot drink warm? Wrapping the cup to insulate it might help, but what should you use to wrap the cup?

Your Task

You will design and conduct an experiment to explore the insulating abilities of different materials for keeping a liquid in a paper cup warm. During this activity you will work with a lab partner (or possibly two partners). You must keep your own individual lab notes because after you finish, you will work independently to write a lab report about your experiment.

You have been provided with the following materials and equipment. It may not be necessary to use all of the equipment that has been provided. You may use additional materials or equipment if they are available.

---

6 paper cups with lids
1 sheet of cloth
2 sheets of black construction paper
2 sheets of white construction paper
1 large sheet of aluminum foil
1 liter of hot water
Access to a clock or watch with a second hand
2 large styrofoam cups with lids to carry hot water
Splash-proof goggles and aprons
2 thermometers
Graduated cylinder
Scissors
Ruler
Tape
Paper towels for cleanup

Source: The Connecticut State Department of Education

–Released Item–

Steps to Follow

1. **In your own words, clearly state the problem you are going to investigate.** Include a clear identification of the independent and dependent variables that will be studied.

2. **Design an experiment to solve the problem.** Your experimental design should match your statement of the problem, should control variables, and should be clearly described so that someone else could easily replicate your experiment. Include a control if appropriate.

   Write your experimental design on the page provided. Show your design to your teacher before you begin your experiment.

   Note: The hot water used in your experiment should be in the range of 60° to 70° Celsius. The water should not be heated above 70°C for safety reasons.

3. **After receiving approval from your teacher, work with your partner to carry out your experiment.** Your teacher's approval does not necessarily mean that your teacher thinks your experiment is well designed. It simply means that in your teacher's judgment your experiment is not dangerous or likely to cause an unnecessary mess.

4. **While conducting your experiment, take notes on the attached pages.** Include the results of your experiment. All data should be organized in tables, charts or graphs, which should be properly labeled.

   Your notes will **not** be scored, but they will be helpful to you later as you work independently to write about your experiment and results. You **must** keep your own notes because you will not work with your partner when you write your lab report.

   When you have finished your experiment, your teacher will give you instructions for cleanup procedures, including proper disposal of all materials.

(Students are provided with four blank pages for their notes, as well as a grid for tables, charts or graphs.)

Directions for Writing Your Laboratory Report

Working on your own, summarize your experiment and results. Use your own notes that you took previously while working with your partner. You may wish to write a first draft of your report on scratch paper. Space for your final report is provided on the following pages in this booklet. You will have approximately 30 minutes to complete your report.

Your report should include the following:

- **A clear statement of the problem you investigated.** Include a clear identification of the independent and dependent variables that were studied.
- **A description of the experiment you carried out.** Your description should be clear and complete enough so that someone else could easily replicate your experiment.
- **The results of your experiment.** All of your data should be organized in tables, charts or graphs, which should be properly labeled.
- **Your conclusions from the experiment.** Your conclusions should be fully supported by data.
- **Comments about how valid you think your conclusions are.** In other words, how much confidence do you have in your results and conclusions? Any factors that contribute to a lack of confidence in the results or conclusions should be discussed. Also, include ways that your experiment could be improved if you were to do it again.

(Students are provided with four lined pages for their reports, as well as a grid for tables, charts or graphs.)

CAPT Experimentation Questions

Keep it Hot

A class of students performed a series of experiments to determine which of several materials would be most effective for insulating a paper cup.

One group of lab partners tested four different materials: black paper, white paper, aluminum foil and cloth. The following table shows their results.

Insulating Material	Temperature of Water in Cups at Start of Experiment	Temperature After 5 Minutes	Temperature After 10 Minutes
Black Paper	70°C	60°C	52°C
White Paper	50°C	45°C	40°C
Aluminum foil	85°C	70°C	60°C
Cloth	60°C	54°C	48°C

1. This is the group's statement of the problem: "We wanted to see which of four materials would be good for wrapping around a cup." Is this a clear statement of the problem? Explain why or why not.

2. The students concluded that the white paper was the most effective insulator because the cup wrapped in white paper showed the smallest drop in temperature. Is this group's conclusion valid? Explain why or why not.

Source: The Connecticut State Department of Education

–Released Item–

Another group in the class tried to use various materials and combinations of materials. The following table shows their results.

Insulating Material	Temperature of Water in Cups at Start of Experiment	Temperature After 5 Minutes	Temperature After 10 Minutes
4 thicknesses of black paper	80°C	74°C	70°C
4 thicknesses of white paper	80°C	75°C	71°C
4 thicknesses of aluminum foil	80°C	72°C	66°C
4 thicknesses of cloth	80°C	73°C	67°C
1 thickness each of black paper, white paper, aluminum foil and cloth	80°C	78°C	76°C

3. What valid conclusions can you draw from these results? Explain your answer.

4. Do you have enough information to replicate this group's experiment? If you think you do, tell what information you have. If you think you do not, tell what other information you would need.

Sample Questions

MULTIPLE-CHOICE QUESTIONS:

13. Imagine that you have been given three cups, each containing a white substance. Your teacher tells you that one cup contains salt, one cup contains sugar, and the other cup contains sand. Which test would MOST LIKELY help you tell which cup has sand in it?

A. Weigh a little of the material from each cup.

B. Measure the temperature of each material.

*C. Try to dissolve each material in water.

D. Hold a magnet near each material.

14. Which of the following is an example of a CHEMICAL change?

A. a piece of wood being used to make toothpicks

*B. a plant using water and carbon dioxide to make food

C. a pond freezing in the winter

D. a field of long grass being mowed

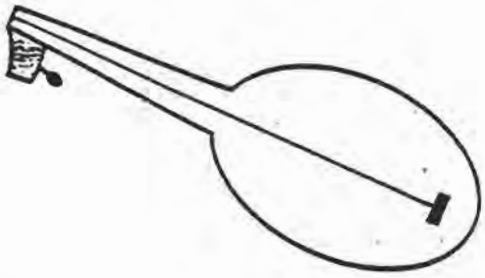
Source: The Massachusetts Comprehensive Assessment System: Science and Technology

–Sample Item–

Sample Questions

OPEN-RESPONSE QUESTION:

18 The instrument shown below is made of one string stretched on a wooden paddle. The string is attached to a key which turns to tighten or loosen the string. Sound is made by plucking the string.



a. Describe what you would do to the instrument to produce a HIGHER-pitched sound.

b. Describe what you would do to the instrument to make a LOWER-pitched sound.

c. What would happen to the sound if you changed the string to a THICKER one?

d. Identify one other change that could be made to the instrument to change the sound it produces.

Sample Questions

MULTIPLE-CHOICE QUESTIONS:

10. Imagine a mobile is hanging by a string from the ceiling and is totally motionless. Which statement about forces acting on the mobile is true?

A. Only the downward force of gravity is acting on the mobile.

*B. The sum of the downward forces on the mobile equals the sum of the upward forces on it.

C. Only the upward force of string is acting on the mobile.

D. There are no forces acting on the mobile because it is motionless.

11. A ball is thrown straight up into the air with a velocity of 10 m/sec. What is the main reason that the ball will eventually slow down, stop, change direction, and fall back to the ground?

A. The friction of the air acts on the ball.

*B. Force due to gravity is opposite to its original motion.

C. No motion can continue indefinitely.

D. The ball loses part of its mass as it goes higher.

Sample Questions

OPEN-RESPONSE QUESTION:

12 Danielle enters a science contest in which she is to design and build a catapult that will throw a 300-gram wooden ball from a designated point on a field. The challenge is to have the ball land as close as possible to a target several meters away.

a. Describe two forces that Danielle will have to consider in her design.

b. Describe ways she can take those forces into account in her design.

Sample Questions

MULTIPLE-CHOICE QUESTIONS:

16. A liter of gasoline contains 40 million joules of energy. The average energy output of an automobile engine powered by a liter of gasoline is 12 million joules. What happens to the rest of the energy?

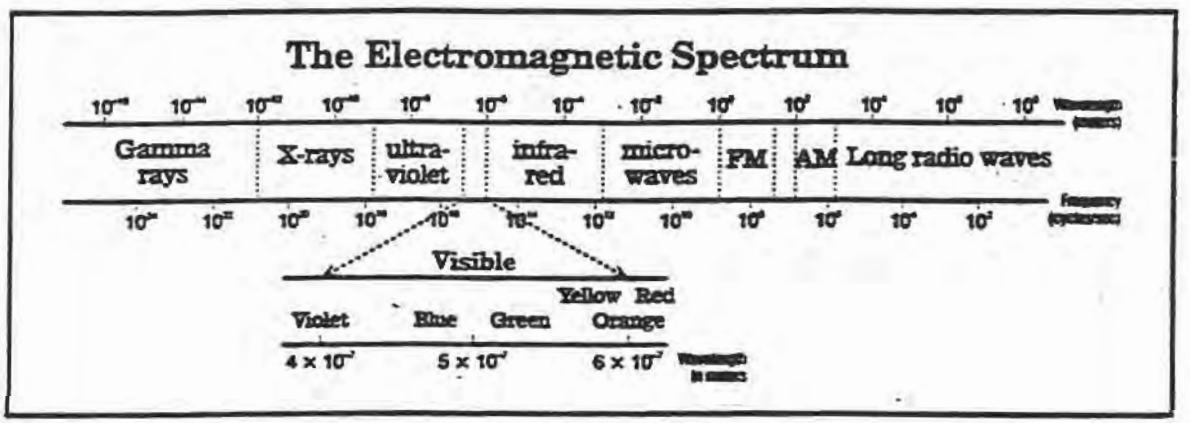
A. It is destroyed.

*B. It becomes heat energy.

C. It is lost as carbon dioxide.

D. It becomes potential energy.

17. *Use the diagram below to answer the question.*



Compared to gamma rays, X-rays have

A. shorter wavelength and lower energy.

B. longer wavelength and higher energy.

C. shorter wavelength and higher energy.

*D. longer wavelength and lower energy.

Source: The Massachusetts Comprehensive Assessment System: Science and Technology

–Sample Item–

Sample Questions

OPEN-RESPONSE QUESTION:

18. The first law of thermodynamics states that energy is neither created nor destroyed, but can be transformed from one type to another. Explain how this law applies to an ecosystem. In your explanation, be sure to discuss the roles of producers and consumers.

(Note: Question 18 also relates to the first and fourth assessment expectations found on page 142.)

Worksheets
Workshops #6 and #7

Index for Worksheets for Workshops #6 and #7

Scott

Barbara

Lessons in Space Exploration

Week of October 6: My Favorite Planet

- Group of 2-3 researched and presented a planet to the class
- Scoring guide

Week of October 13 and October 20: Atmospheres and Gravity

- Demonstrations of temperature extremes
- Graphing of force and distance relationships

Week of October 27: Cassini Project

- Discuss mission to Saturn
- Use text-based discussion
- Write pro/con letter to editor

Week of November 3: "Lorenzo's Oil" and Science Ethics

- Watch "Lorenzo's Oil"
- Discuss issue of who controls information, who has access

Week of November 10: Mars Exploration

- Use PBL fact finding
- Formulate questions to address
- Use resources/internet to research questions

Week of November 17: Mars continued

- Interject Frankenstein readings for science ethics
- Use text-based discussion for ethics issue

Week of November 24: Exhibition

- Town meeting representing all positions (scientist, community, government, reporters, others?)
- Individual component

Pathfinder Exploration Project

In this project the class will present a press conference as a final exhibit concerning the Mars' Pathfinder project. Members of the class will serve in various roles of the press conference. Information for these roles will come from magazines, newspapers, Internet sites and other sources.

The assessment of the project will consist of several parts as described below:

Daily Journal: (35 points)
At the end of each class ssession, each student should write about the day addressing these questions:

- What one fact did I learn today?
- How did the day go?
- My impression of the project so far.

Be sure to date each entry.

Press Conference Brainstorming List: (10 points)
This list will be generated in class.

Press Conference Role Description: (10 points)
Each student should generate a short description of the role they will play in the press conference and what facts they will focus on. This description should be specific to their role and be related to the mission of the Pathfinder.

Press Conference Preparation: (25 points)
Each student is responsible for using class time to prepare for their role in the press conference. Students should use class time well and not prevent others from working. **NOTE: The purpose of the time in class is to get ready for the exhibitions. If you are not present you will not earn these points. If you do not work in class you will not earn these points.**

Press Conference Video Practice Session: (20 points)
Each student should do a practice session which will be taped. After viewing the tape, each student will write a "review" of their performance. The review will include description of good points and areas to improve.

Final Exhibition: Press Conference on Tuesday, November 25th (*1st, 4th, and 5th*) or Wednesday, November 26th (*6th period*) (50 points)

- Each student plays their role convincingly.
- The opinions that are presented are supported with facts.
- Students do not disturb the presentations of others.

A more detailed description of grading will be given before the video practice session.

PRESS CONFERENCE

(sample outline of roles)

Director—
Representative—
Founder—
Creator—
Astronaut—
Controller—
Sponsor—

DIRECTOR—
opens the conference and introduces the people

REPRESENTATIVE—
gives a brief summary of who did the project and why

FOUNDER—
explains how he got the idea of the Pathfinder

CREATOR—
tell the type of technology used and how the Pathfinder works

ASTRONAUT—
talks about the flight plan to the planet Mars

CONTROLLER—
tells what went on after the Pathfinder landed

SPONSOR—
explains how they got the financial back up for the mission

DIRECTOR—
asks for any questions.... closes press conference

Pathfinder Exploration Project

FINAL EXHIBITION: PRESS CONFERENCE
(50 points)

Possible Outcomes

- Each student will understand the significance of their role.
- Each student will appreciate the roles of others and how they relate to their roles.
- Each student will give a good presentation of the information pertinent to their role, e.g. facts, statistics, drawings, models, etc.
- Students will use good oral presentation skills.
- Students can show signs of self-reflection and progress through their journal writings.

Exhibition Check List

- Students identify their role.
- Students report facts associated with their role.
- Students support opinions with facts.
- Students are active listeners of all participants.
- Students do not disrupt or disturb others.
- Students show connections to other roles by oral reference or writing.
- Students will use visuals (drawings, maps, models, etc.) to support/demonstrate their roles.
- Students will speak clearly.
- Students will speak slowly.
- Students will use their own words. All direct quotes should be referenced.
- Students should not read from their notes directly.
- Students' journals should be complete for each day.
- Students' journals should show signs of reflection on their involvement.

Pathfinder Presentation Scoring Rubric

Name: _____
Period: _____

Each of the following items will be assigned a numerical value from zero to four. Examples of the range of each item are provided. Zero means task was not done. An average of four is distinguished, three is proficient, two is apprentice, one is novice.

A. Includes required components:
- participant is present and role is clearly identified (4) _____
- participant is present and role is somewhat identified (3) _____
- participant is present and role is poorly identified (2) _____
- participant is present and role is identified incorrectly or never identified (1) _____

B. Serves as an excellent audience member:
- no disruptions of others, provides much feedback (4) _____
- no disruptions of others, provides some feedback (3) _____
- few disruptions of others, provides little feedback (2) _____
- few disruptions of others, provides no feedback (1) _____

C. Uses journals to show signs of reflection:
- journals done completely and thoughtfully each day (4) _____
- journals written each day, but lack insight (3) _____
- journals written most days, but lack insight (2) _____
- journals written few days and lack insight (1) _____

D. Provides examples / reasons to support answers:
- **Four** or more (4) _____
- **two to four** (3) _____
- provides less than **two** (2) _____
- provides **none** (1) _____

E. Is organized/understandable:
- readily understandable, logically organized (4) _____
- understandable, but not fully organized (3) _____
- understandable, but rather difficult to follow (2) _____
- unable to understand (1) _____

F. Contains accurate factual information:

- completely free of errors (4) _____
- less than three errors (3) _____
- less than five errors (2) _____
- contains more than five errors (1) _____

G. Is presented well:

- speaks clearly and uses notes but does not read them (4) _____
- speaks clearly and uses notes but reads from them (3) _____
- speaks rather "stiff" and reads completely from notes (2) _____
- reads poorly from their notes (1) _____

H. Is correct grammatically:

- free of grammatical errors (4) _____
- has one to three grammatical errors (3) _____
- has three to five grammatical errors (2) _____
- has more than five grammatical errors (1) _____

I. Contains visual support:

- uses *many* appropriate drawings, maps, pictures, charts to demonstrate their roles (4) _____
- uses *some* appropriate drawings, maps, pictures, charts to demonstrate their roles (3) _____
- uses drawings, maps, pictures, charts to demonstrate their roles, but connections are poor (2) _____
- uses *no* drawings, maps, pictures, charts to demonstrate their roles (1) _____

J. Demonstrates creativity:

- demonstrates considerable imagination (4) _____
- demonstrates some imagination (3) _____
- demonstrates little imagination (2) _____
- demonstrates no imagination (1) _____

TOTAL POINTS _____

In addition to the presentation, each student is required to submit a wrap-up component to their presentation. This piece will be the news article or report for the reporters. All others will produce a short, less than one page, description of their role in the press conference and their opinions of the event. These opinions should include their evaluation of their personal performance and the class as a whole plus any suggestions for changes or improvements.

Algebra I
EXPECTATIONS AND GOALS

Goals for Unit 3: Graphing

1. Find patterns and rules
2. Make a table from a rule
3. Draw graphs and solve problems using: rules, words and tables
4. Explore and use the x- y coordinate system
5. Explore families of equations and their graphs, focusing on linear and quadratic functions

Assessment: Quality work in the following areas

1. Classwork, homework, and working in groups
2. Two group presentations involving discovering or using a rule, making a table, and graphing a function
3. A formal demonstration of your learning (in pairs)
4. Both a group and an individual written assessment

Rubrics for scoring purposes will be developed for the following areas:

1. Investigating a function and creating a graph
2. Group presentations
3. Demonstration of your learning

UNIT 3 MATHEMATICAL IDEAS
(student-generated)

- plot points
- distributive property
- complete a table
- graph parabolas
- perimeter
- $\sqrt{x}$ of something
- scales on the graph
- y^x, $1/x$, x^2, and "a b/c" buttons; how to use the buttons on a calculator
- guess and check
- area of a circle
- graphing equations
- tables: graph and find equations
- circumference and radius
- patterns
- circumference and radius
- finding y=
- guess and check with equations
- combining like terms
- order of operations
- how does the rule affect the graph
- "error" on the calculator in terms of a table and graphing

GRAPHING RUBRIC

For a "4," students will:

- Plot all points correctly
- Draw the line or curve accurately
- Extend the line or curve as far as possible on the graph
- Label the line or curve with the rule (an equation, y =)
- Develop a table that is correct
- Develop a table with both positive and negative values for x (input)
- Develop an accurate and appropriate scale
- Label x and y axes
- Label x- and y-intercepts
- Plot points that are small (not too large)
- State coordinates of points in (x, y) form
- Use graph paper
- Use a ruler
- Use a pencil

CRITERIA FOR POSTERS AND PARTICIPATION

QUALITY POSTER

- correct information/all information
- creative (e.g., borders, colorful, neat)
- easy to read for everyone: clear, large printing
- shows evidence of time, preparation
- clear wording
- complete information
- everyone takes part in preparing

QUALITY LISTENING AND PARTICIPATION

- able to answer questions asked by the presenters
- ask questions
- eye contact
- focus on presentation (not playing with "stuff")
- alert!
- body language indicates good listening: nodding, responding to what is being said
- taking notes
- supporting presenters (not distracting them)

UNIT 3 EXHIBITION

1 Select two major mathematical ideas from the unit.

2 Choose two problems to represent these two major ideas.

3 Solve each problem and show work.

4 Explain the method used to solve each problem.

5 Prepare a presentation to share with the class.

6 Prepare visuals: one poster for each mathematical idea.

7 Evaluation: Presentation
You will be assessed on the following:
(a) mathematical ideas
(b) communicating the mathematical ideas
- presentation
- visuals: one poster for each idea
- audience: listening and participation

Unit 3 Evaluation Sheet Group Members: _____ _____ Block:_____

_____ _____

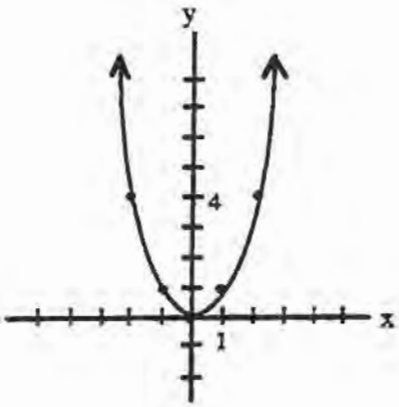
Score each group on their four areas. Scale is 1-4 (4 is highest)

Evaluating...	Description ("Students...")	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Mathematical Ideas	• present math ideas that are correct • present math concepts that are well-developed • give clear explanations of the math								
Communicating Mathematical Ideas....									
Presentation	• speak loudly and clearly for all to hear • explain everything well • are well-prepared — speak without hesitation • ask questions of the audience • have eye contact • are polite • stand where everyone can see • each clearly communicates a correct understanding of math • make sure the audience understands the math & checks after each part								
Posters	• present correct information and all info • show evidence of time and preparation • use creativity and care in neatness • use clear wording • make it easy for everyone to read — clear and large printing • all work together to prepare the poster and the ideas presented on it								
Listening/ Participation	• are able to answer questions asked by the presenters • ask questions of the presenters • use body language that indicates good listening: eye contact, nodding • supporting presenters (not playing or distracting them) • taking notes								

Name _____ Day _____ Block _____

Unit 3 Review

1. Use the graph below to complete the table. Then look for a pattern in your table to write an equation.



x				
y				

y = _____

Answer either #2 or #3

2. Circle the rule that describes the table below. Explain how you made your decision.

$y = -3x - 1$ $\quad$ $y = x - 2$ $\quad$ $y = -2x + 3$ $\quad$ $y = x - 7$

x	-4	-3	-2	-1	0	1	2
y	11	9	7	5	3	1	-1

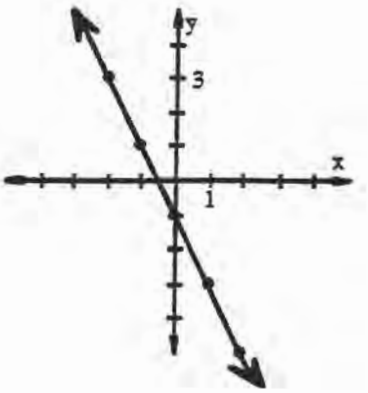
3. Use your pattern-detection skills to find a rule for the table below.

x	0	5	-2	10	-3	-1
y	1	16	-5	31	-8	-2

a) Write your rule in words.

b) Write your rule algebraically (y =).

4. Use the graph at right to answer each of the following questions.



a) Point A is on the line. If the x-coordinate of point A is -2, what is its y-coordinate? Label point A on the graph.

b) Point B is on the line. If the y-coordinate of point B is 2, what is the x-coordinate? Label point B on the graph.

c) Label the point where the graph crosses the x-axis. Call the point "C".

d) Estimate the coordinates of point C.

e) Identify any other point on the line and label it D. What are the coordinates of D?

5. Complete the following table. Then use the table to neatly graph the equation.

$$y = -2x - 2$$

x	2	1	0	-1	-2
y					

6. Tetrahedral dice have only four sides numbered one through four. Suppose you have two tetrahedral dice. What is the probability you will roll a sum of 6? Show how you organize your information to solve this problem.

7. A penny is 0.00072 meters thick. How tall would a stack of one billion pennies be? Write your answer in both standard form and in scientific notation.

8. Use the Distributive Property to rewrite each of the following expressions.

a) $-2(4 - x) =$

b) $-3 \cdot 6y + -3 \cdot 1 =$

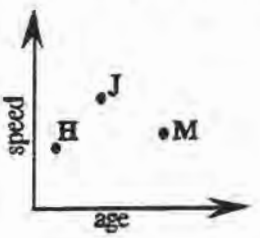
c) $x \cdot y + x \cdot 6 =$

d) $b(2a + c) =$

9. Make a Guess and Check table to solve the following problem. Be sure to state your answer in a complete sentence.

A rectangular garden has a length 2.5 meters more than its width. The perimeter of the garden is 45 meters. What are the length and the width of the garden?

10. Write a description of each of the three cars on the graph below comparing their speed and age. Decide with your group a possible make and year for each car.



Name _____ **Day** _____ **Block** _____

Unit 3 Individual Test

1. Complete each of the following tables, then use the table to neatly graph **TWO** of the equations **on graph paper**.

a) $y = 3x - 1$

x	2	0	1	-1		1.5
y						

b) $y = x^2 - 2x + 1$

x	-1	0	1	2	3
y					

d) $y = 3x + 1$

x	-2	0	1		0.5
y					

e) $y = -x$

x	-4	-2	0	2	3
y					

2. The figures below show progressively larger stacks or arrangements of cubes.

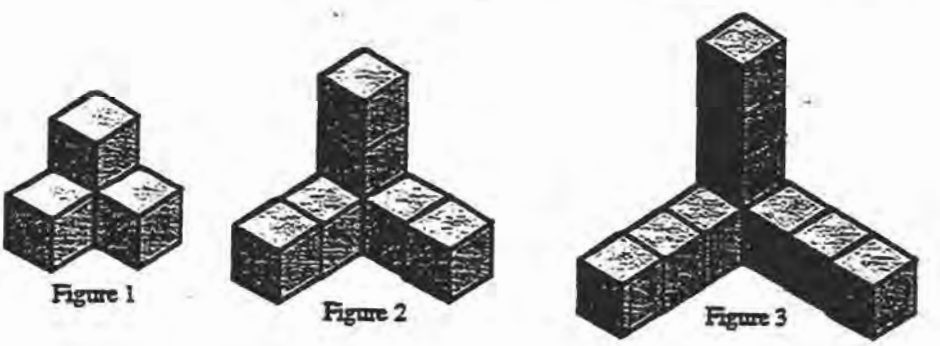


Figure 1 Figure 2 Figure 3

a) Copy and complete the table below.

Figure number, x	1	2	3	4	5	6
Number of cubes, y						

b) In terms of the arrangements of cubes, what is happening from one arrangement to the next?

c) Now examine the numbers in the table. In words, what is the pattern?

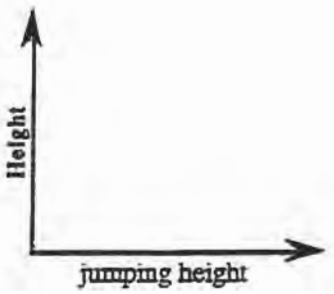
d) Write an algebraic rule to show the relationship between y, the number of cubes, and x, the figure number.

3. Make a Guess and Check table to solve the following problem.

A rectangle has perimeter 48 feet. The length is three times the width. Find the length and width of the rectangle. (Remember, the perimeter of a rectangle is the sum of all four sides.)

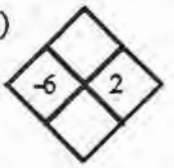
4. Mark and label a point for each of the following:

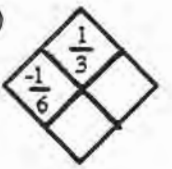
R—Ray, who is very tall but can't jump very high. S—Sarah, who isn't very tall but can jump very high. T—Terry, who is a bit taller than Sarah but jumps only a little better than Ray. U—Ursula, who is taller than Terry but can't jump at all (she's 85 years old).



5. Solve each of these Diamond Problems:

a)

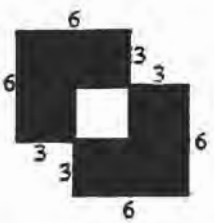

b)


c)


d)


<u>Complete either #6 or #7</u>. You do <u>not</u> need to do both problems.

6. Find the area of the shaded region. Show all subproblems.



7. Find the area of the shaded region. Show all subproblems.

8. Use the Distributive Property to rewrite the equations.

a) $4(x - 5) =$

b) $-3(6 - x) =$

c) $-7(2x) + -7(10) =$

d) $y(x) + y(3x) =$

9. Combine like terms.

a) $9x + 6 - 4x - 2x + 1 - 15$

b) $5(x + 1) + 2(x + 3)$

c) $(6x^2 - 2x + 5) + (2x^2 - 7x - 11)$

d) $7x^2 - 5 - 2x - 3 + 5$

10. Simplify the following expressions using the correct order of operations.

a) $12 - 18.5 + 15 + 6.3 - 1 + 28$

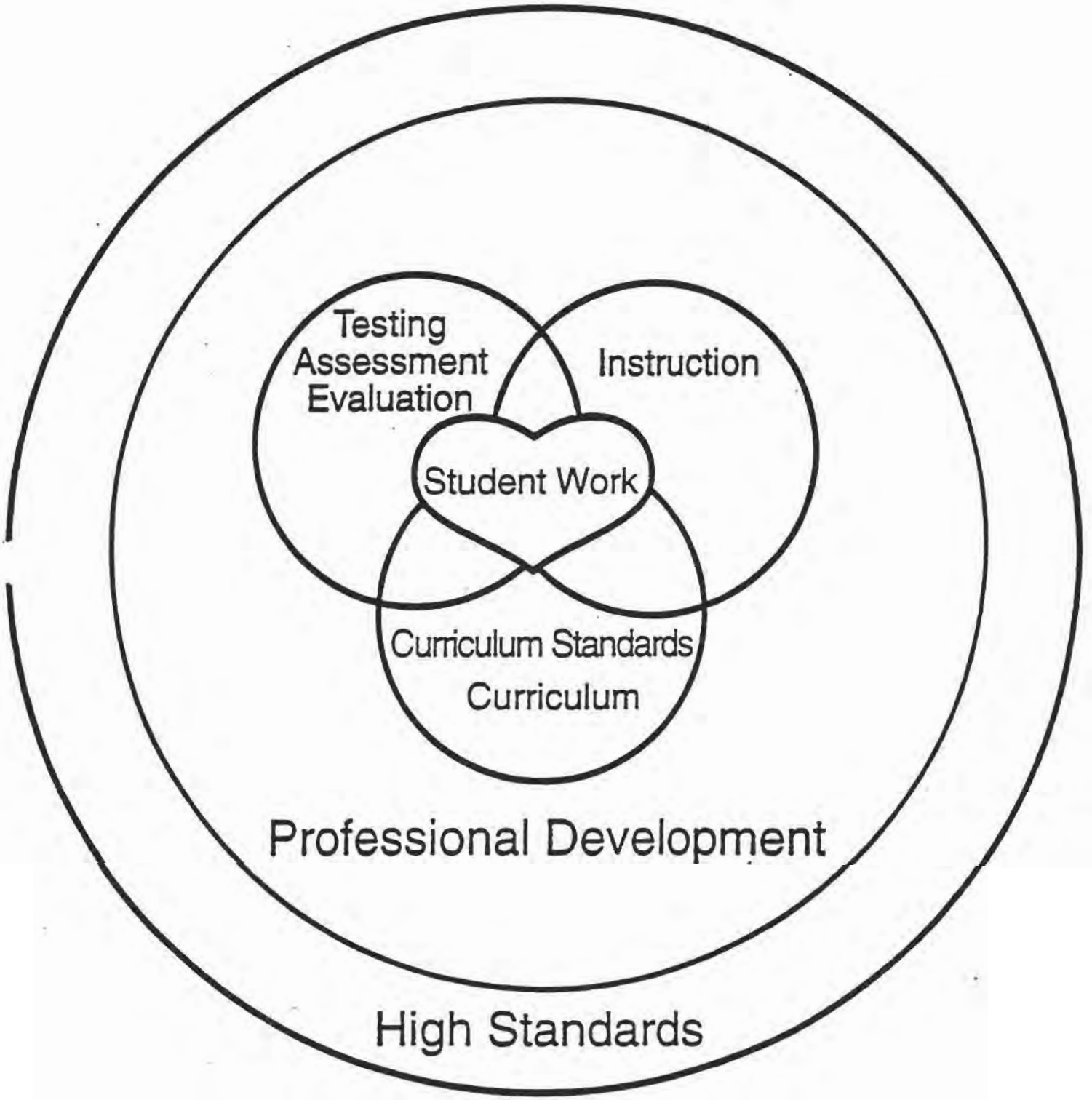
b) $(-4)(-2) - 6(2 - 5)$

c) $23 - (17 - 3 \cdot 4)^2 + 6$

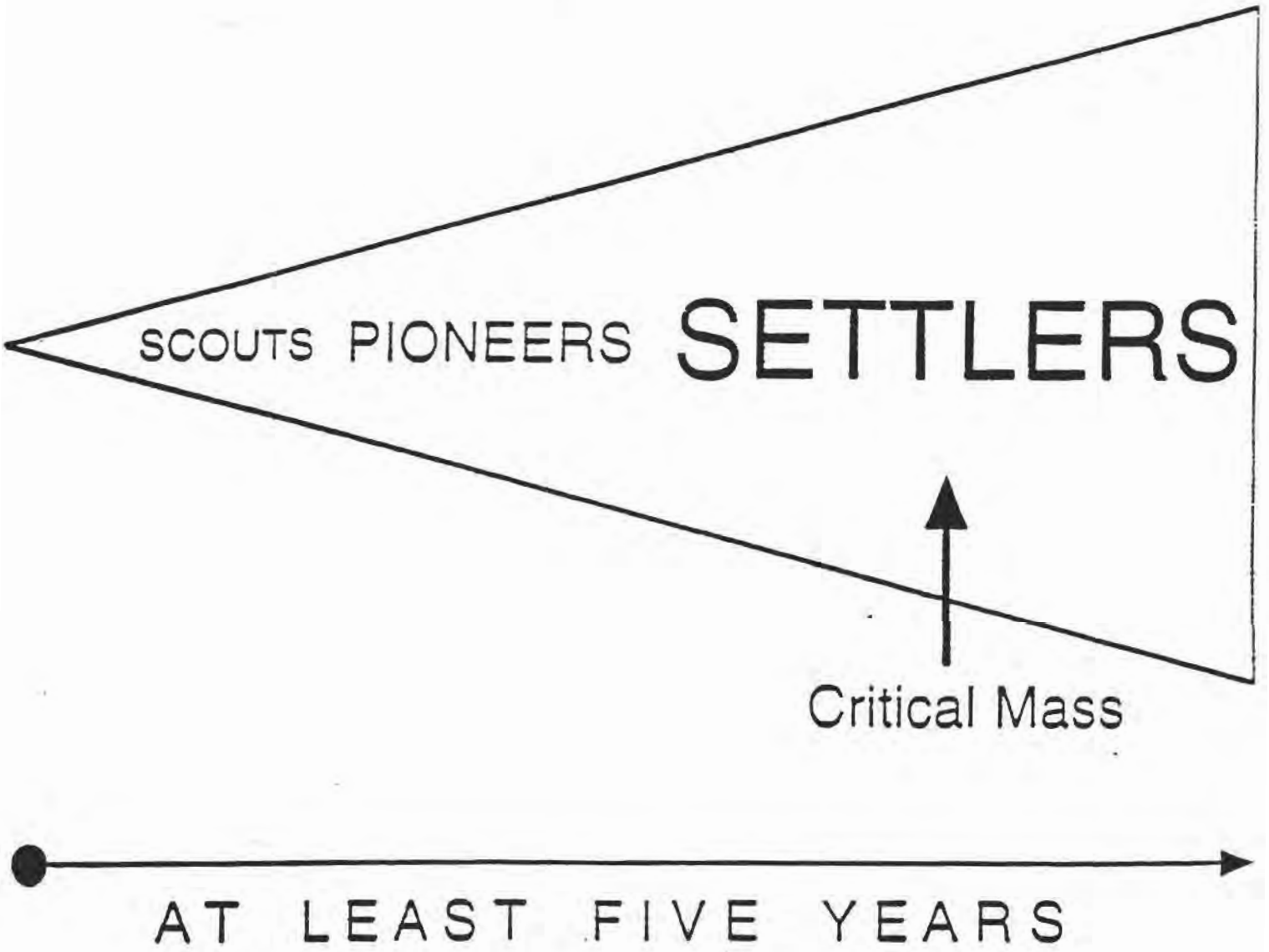
d) $14(2 + 3 - 2 \cdot 2) \div (4^2 - 3^2)$

Worksheets
Workshop #8

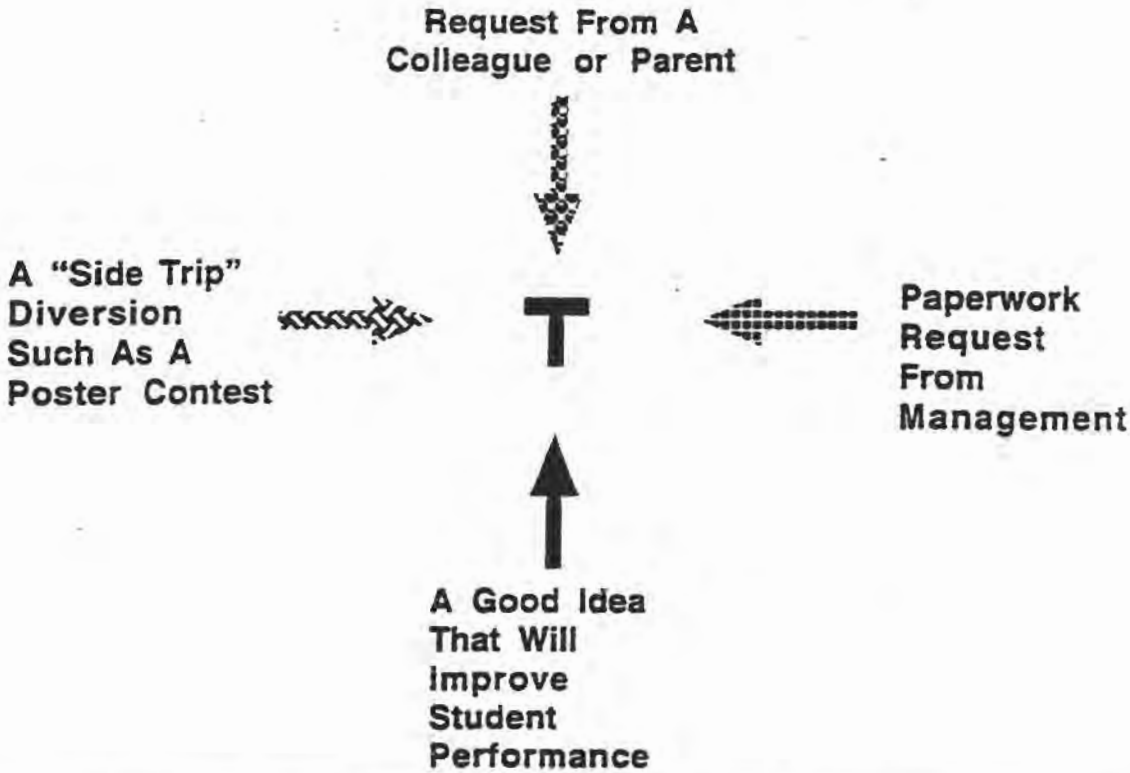
Index for Worksheets for Workshop #8


Testing
Assessment
Evaluation
Instruction
Student Work
Curriculum Standards
Curriculum
Professional Development
High Standards

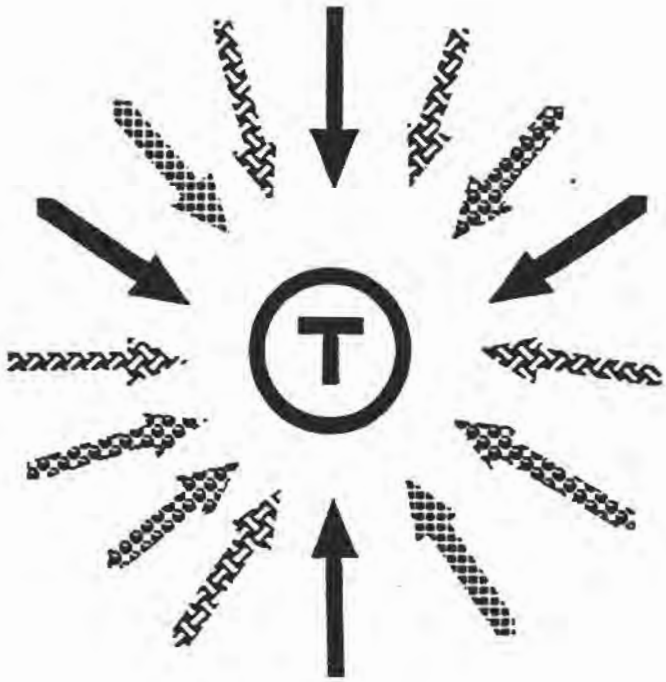
Working Together to Improve Student Performance



INPUT REQUIRING TEACHER'S TIME AND ENERGY



THE "ARMADILLO" REACTION TO INPUT OVERLOAD



ORGANIZATIONAL STRUCTURE FOR LONG-TERM CHANGE: Top-Down/Bottom-Up Collaboration Of Scouts, Pioneers, and Settlers Administrators