



Essential Elements for Elementary Science

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ESSENTIAL EIGHT (Elementary)

Name- _____

The purpose of this “get acquainted” activity is to start thinking about the different areas of intelligence. Participants are to mix freely and try to get seven different people to sign the blanks (each participant may sign her/his own sheet once). In order to record a name in the blank, the person signing must actually perform the task (not just say that she/he can do it). Teachers may want to use pictures for younger children.

Find Someone Who Can:

_____ Recite a poem from memory.

_____ Finish this numerical sequence: 16, 2, 14, 4, 12, 6, 10 ____, and explain the logic behind it.

_____ Name 4 ways to sort rocks into categories.

_____ Recall at least one dream from the last 3 weeks.

_____ With hands on head stand on one foot with eyes closed for at least 6 seconds.

_____ Hum the first line of *Silent Night* on key.

_____ Name 6 strengths or talents he/she has.

_____ Name five very close friends.

Checklists for Assessing “How Students Are Smart”
Adapted by Debbie Silver
from *Multiple Intelligences in the Classroom* by Thomas Armstrong

Name of Student- _____

Check all the items that apply:

Linguistic Intelligence (Word Smart)

- 1. Is a good reader.
- 2. Enjoys word games.
- 3. Is a good joke teller/ storyteller.
- 4. Has a good vocabulary for age.
- 5. Enjoys listening activities.
- 6. Likes to write stories and/or poems
- 7. Communicates with others in a highly verbal way.
- 8. Appreciates rhymes, puns, and/or nonsense words.
- 9. Has a good memory for words, stories, details.

Other linguistic strengths:

Logical-Mathematical Intelligence (Number Smart)

- 1. Asks a lot of questions about how things work.
- 2. Has a good sense of cause and effect.
- 3. Finds math games interesting.
- 4. Can see and repeat patterns easily.
- 5. Enjoys working puzzles and brain teasers.
- 6. Understands computer programming.
- 7. Is a logical thinker.
- 8. Can estimate things involving numbers with relative ease.
- 9. Can work math concepts in head.

Other logical-mathematical strengths:

Visual-Spatial Intelligence (Picture Smart)

- 1. Reports clear, visual images (or dreams).
- 2. Can envision objects from more than one perspective.
- 3. Daydreams more than peers.
- 4. Likes to draw and/or create art projects.
- 5. Has a good eye for detail and color.
- 6. Is good at spatial games like chess and Tetris.
- 7. Likes movies, slides, or other visual presentations.
- 8. Can move between 2-dimensional and 3 dimensional representations with ease.
- 9. Can read and/or create maps.

Other visual-spatial strengths:

Bodily-Kinesthetic Intelligence (Body Smart)

- 1. Is very coordinated.
- 2. Exceptionally mobile: moves, twitches, fidgets, taps when seated for long.
- 3. Enjoys working with clay, fingerpaint, and other tactile media.
- 4. Can mimic others' gestures, posture, and movements
- 5. Must touch anything new or interesting.
- 6. Loves to take things apart and put them back together.
- 7. Uses dramatic body movements for self-expression.
- 8. Enjoys running, hopping, climbing, wrestling, or similar activities.
- 9. Exhibits fine motor control (crafts, painting, etc.).

Other bodily-kinesthetic strengths:

Musical Intelligence (Music Smart)

- 1. Can detect music that is off-key, off-beat, or disturbing in some way.
- 2. Remembers melodies of songs.
- 3. Taps rhythmically as he/she works or plays.
- 4. Sensitive to environmental noise (rain on the windows, etc.).
- 5. Plays a musical instrument and/or sings in a choir.
- 6. Has a good singing voice.
- 7. Responds favorably when music is played.
- 8. Sings songs that he/she has learned.
- 9. Unconsciously hums much of the time.

Other musical strengths:

Interpersonal Communications Intelligence (People Smart)

- 1. Establishes meaningful peer relationships.
- 2. Seems to be a natural leader.
- 3. Empathizes with others.
- 4. Likes to play with others.
- 5. Shows good teamwork skills.
- 6. Others seek this student's company.
- 7. Has two or more close friends.
- 8. Frequently acts as a mediator and/or peace maker.
- 9. Enjoys teaching others.

Other interpersonal communication strengths:

Intra-personal Awareness Intelligence (Self Smart)

- 1. Displays a sense of strong will.
- 2. Enjoys playing or working alone.
- 3. Has high self-esteem.
- 4. Has a good sense of self-direction.
- 5. Does not mind being different from others.
- 6. Has a realistic view of his/her strengths and weaknesses.
- 7. Is able to deal effectively with successes and failures.
- 8. Has an interest or talent that is not readily shared with others.
- 9. Seems to “march to the beat of a different drummer.”

Other intra-personal awareness strengths

Naturalistic Intelligence (Nature Smart)

- 1. Likes to identify and classify living and nonliving things in nature.
- 2. Cares for pets or animals.
- 3. Understands repeating patterns in nature and the universe.
- 4. Seems more “in tune with nature” than peers.
- 5. Would rather be outside than inside.
- 6. Has a demonstrated appreciation for a part of the natural world (i.e. dinosaurs, clouds, rocks, etc.)
- 7. Likes to garden and/or appreciates plants.
- 8. Understands and appreciates the environment.
- 9. Loves to collect things from nature.

Other naturalistic strengths

M. I. And Your Science Classroom

(adapted from J. Abruscato's Teaching Children Science, 2001)

Logical-mathematical (Number/Puzzle Smart)

- Emphasize the underlying patterns children observe in science activities.
- Have students think about the steps involved in all deductions and activities.
- Stress numbers, measuring, and other mathematical concepts whenever possible.

Linguistic (Word Smart)

- Begin concept studies with popular children's books.
- Emphasize writing down predictions, observations, and writing in science journals.
- Encourage students to keep personal science dictionaries.
- Connect creative writing activities to science concepts.

Musical (Music Smart)

- Use songs, raps, and music selections to accompany the introduction of new concepts and/or to practice vocabulary.
- Encourage students to make up their own songs using science concepts.

Visual/Spatial (Picture Smart)

- Encourage students to use models and pictures to demonstrate understanding.
- Present new material through videos and pictures.
- Connect graphs to information whenever possible.

Bodily/Kinesthetic (Body Smart)

- Provide ample opportunities for students to use science materials and equipment.
- Whenever possible, have students demonstrate new learning through movement and dance. (i.e. acting out the metamorphosis of a butterfly).

Interpersonal (People Smart)

- When doing a cooperative activity help students "de-brief" not only their findings but also how well they worked together.
- Provide opportunities for students to share their findings, discoveries, and questions with their classmates.

Intrapersonal Awareness (Self Smart)

- Encourage the use of personal journals and reflective activities.
- Allow students to choose solitary, independent work occasionally.

Naturalist (Nature Smart)

- Use activities from programs such as Project Learning Tree, Project WILD/Aquatic, and Project WET that link science to the natural world.
- Use natural objects or media using natural objects to illustrate points.

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Curriculum Planning

Mathematics

Use mathematics to solve problems, collect and analyze data. Create charts and graphs. Utilize geometry, symmetry, and/or analytical reasoning. Manipulate data.

Technology

Create a computer program or simulation. Generate a web page. Prepare a multi-media presentation. Consider implications of past and present technology. Create a video.

P.E./Health Education

Consider effects on health. Create a dance. Consider how the topic is reflected in movement and sports.

Foreign Language

Explore roots. Research backgrounds. Identify global implications and connections. Incorporate a different language in project.

Social Studies

Explore historical contexts. Research historical reasons for current events. Take the point of view of different cultures. Consider effects of climate and topography.

Language Arts/Reading

Write about it. Read about it. Talk about it. Listen to others. Persuade others. Write a research paper. Engage in a debate. Consider other points of view. Create a skit or play.

Vocational Education

Fashion a product. Run a business. Consider effects on careers historically and/or for the future. Examine related foods. Create costumes.

Art/Music

Design advertisements, posters or commercials. Write and produce a song. Consider how social aspects of the topic are reflected in art and music. Create a music and/or art montage.

Science

Examine effects on local or world environment. Conduct a science experiment. Consider how science affects the topic. Research scientific implications. Create a classification key.

Adapted from J. Maute, 1992

Teacher Demonstration Checklist

In deciding whether a particular activity or demonstration is consistent with good science teaching, the following checklist (adapted from J. Abruscato's *Teaching Children Science*, 2001, p. 83) may prove helpful:

- ___ 1. Did the teacher have all the necessary materials ready? Did the demonstration take place without unnecessary delay?
- ___ 2. Was the demonstration straightforward and free from confusing complexities or details?
- ___ 3. Could all the students observe the demonstration without problem?
- ___ 4. Was the teacher prepared and confident? Was it obvious the teacher had practiced and was knowledgeable about all aspects of the concepts being conveyed?
- ___ 5. Was the teacher able to build suspense with the demonstration? Were the students surprised by an unexpected or dramatic result?
- ___ 6. Was the demonstration made with attention to the safety of all involved? Did the teacher model correct safety procedures? (i.e. wearing safety glasses, using a mitt, etc.)
- ___ 7. Did the demonstration directly relate to the topic of study and/or essential science understandings?
- ___ 8. Was the appropriate amount of time allocated for this demonstration? Was time given for drawing conclusions?
- ___ 9. Did the students have an opportunity to give reactions, ask questions, make statements?
- ___ 10. Did the demonstration provide an important learning experience for the students?

Activities for Teaching Sound

FOR FREE EXPLORATION:

Bin 1 small musical instruments

Bin 2 rubber bands, forks, spoons, screws, nuts, bolts, combs, straws, empty boxes and containers (some round), cardboard tubes, pot lids, tuning forks, wooden mallets, waxed paper, plastic wrap.

Bin 3 Opaque containers each containing an object or objects, re-sealable bags with a collection of objects similar to those in containers, empty containers.

Encourage students to interact with the materials in the bins and to add to them if they like.

Introduction Of Sound:

- Read *I Have a Sister, My Sister is Deaf* by Jeanne Whitehouse Peterson. Discuss how a deaf child might know that a dog is growling or a radio is playing.

- Place a clear container of water on the overhead projector. Tap a tuning fork on your heel or the palm of your hand and then place it in the water. Observe what happens. Discuss the fact that sounds produce vibrations.

- Place beans or rice on the surface of a drum and then tap the drum. Discuss what this demonstrates.

- Use various objects hidden from view to make sounds and see if the students can identify what is producing each sound.

How Sound Travels:

- Have students hang a coat hanger upside down. Help them tie a piece of string to each end of the bottom of the coat hanger. Have them wrap the other end of the strings a couple of times around the ends of their index fingers. Ask them to place their index fingers in their ears. Have a partner use a pencil to lightly tap the hanger. Ask students to describe the sound they hear.

- To demonstrate how sound travels through water, place an alarm clock in a sealed bag and hold it submerged in a pail of water. Students can press one of their ears against the pail or into the water to listen for the sound.

- Have students place one ear on a desk while another student taps the opposite end. Ask them what they experience. Read a story or show a picture of a frontiersman with his ear to the ground. Ask them why they think a person would do this.

- Provide a variety of containers such as tin cans, plastic cups, styrofoam cups and alternatives to string such as wire, rope, or elastic so that the students can build several types of “telephones” to test which materials are the most effective. Have students observe which materials make the best telephones.

- Seal a freezer bag of sand (firmly sealed with no air in it), a bag of water (with no air in it), and a bag with just air blown into it. Have students place the bags one at a time on a flat surface. Ask them to put one ear gently on the bag on the table. Put one finger in the other ear. Have them lightly tap or rub the table with the eraser end of a pencil. Have them rank the bags by which helped them best hear the sound.

EXPLORING PITCH:

- Have students create homemade guitars with shoeboxes or empty tissue boxes by stretching different width rubber bands across the container. Arrange the rubber bands in order from highest to lowest pitch. Can they make a generalization about how the width influences the pitch?

- Have students create their own kazoos by attaching a 5 cm square of waxed paper over one end of a cardboard tube with a rubber band. Punch a small hole (diameter of a pencil) into one side of the tube about 3 cm from where the waxed paper is attached. Students can hum into the tube and feel the vibrations if they lightly touch the waxed paper.

- Have students create their own whistles by flattening the end of a drinking straw and cutting it to look like a pointed arrow. Students then flatten the other end and put it between their teeth (with lips folded over teeth). They blow into the straw to create a unique sound that can be altered by changing the length of the straw.

- Allow students to align bottles with varying amounts of water in an order that creates a musical scale. Challenge them to play a song using their newly created instruments.

- Have students extend a ruler about 10 cm off a flat surface (desk or table). While holding the end on the flat surface stable with a heavy book they can gently flip the loose end and listen to the sound. Ask them to vary the length of the overhanging ruler and record their results. Have them try this sequence and try to figure out the tune (**14, 14, 10, 10, 9, 9, 10, 11, 11, 12, 12, 13, 13, 14 cm**).

Further Ideas and Interdisciplinary Connections:

ART

- Ask students to choose high pitch or low pitch. Have them draw only objects that make the pitch they choose.
- Have students listen to a certain musical selection. Have them create a picture that comes to mind when they hear that kind of music.
- Read *Emily's House* by Niko Schauer and have students make a collage of pleasant and/or unpleasant sounds.

LANGUAGE ARTS

- Have students write a paragraph about an object that produces high pitched sounds. Have them explain how they think that happens.
- Show students how to create sound chimes with string and different metal objects (forks, spoons, nails, nuts, bolts). Then have them write the directions in their own words.
- Have students listen to the mystery sounds or musical tape shared by the teacher. Ask them to write words that tell describe each sound.
- Have students play a game of charades or mime certain common terms.
- Allow students to record a story of their choice using their own sound effects.
- Read aloud children's literature that pertains to sound (like *The Magic School Bus in the Haunted Museum: A Book About Sound* (Scholastic, 1995). Relate the relevance of the material presented in the book to the concepts studied in class.
- Read *Whistle for Willie* by Ezra Jack Keats. Ask students to try to whistle. Pair up whistlers with non-whistlers and have them explain how their techniques contribute to success.
- Choose a story with which the children are familiar and that suggests a variety of sounds. Encourage the students to create sound effects to go with the story as the teacher reads.

MUSIC

- Read *The Orchestra* by Mark Rubin and Alan Daniel. Have students create their own musical instruments and create a performance.
- Select a word for the students to chant. Establish hand signals for loud, soft, fast, and slow. Conduct the chant using the hand signals to vary the sounds.

- Ask older band students to visit your class with their instruments to show children how sounds are produced and altered in various instruments.
- Ask students to listen to recorded music and to identify instruments by their pitch.
- Allow students to make recordings of themselves playing the instruments they made along with a tape or CD of their favorite music.
- Allow students to record various sounds they make on a tape recorder. Challenge them to create a mystery activity for others.

Math

- Create simple sound patterns by clapping, snapping, and tapping.
- Ask students to number their bottle caliope and then write down the numbers that will allow others to play a tune.

PE

- Using a few objects to make sound patterns, have students do specific movements to particular sounds. For example, they hop when you ring a bell, stop when you tap sticks, and run when you blow a whistle.
- Have students use responsive body movements to different sounds. Play different kinds of music and allow them to create dance movements to each sound.

SOCIAL STUDIES

- Read *What's That Noise?* By Michele Lemieux. Invite a naturalist to talk about different animal sounds with students or have a short video available for students to watch about animal sounds.
- Make a list of jobs that involve listening to sound such as piano tuner, musician, and doctor. If possible have one of these professionals visit the classroom to discuss how sound affects his/her work.
- Check for naturalist activities on sound if you have the curriculum guides from these programs:

-Project Learning Tree	http://www.plt.org
-Project WILD	http://www.projectwild.org
-Project Aquatic WILD	http://www.projectwild.org
-Project W.E.T.	http://www.projectwet.org/

CONSIDERATIONS FOR CHOOSING THE BEST HANDS-ON ACTIVITIES

(from “A Teacher’s Guide to Choosing the Best Hands-on Activities.” by Betsy Feldkamp-Price, Peter Rillero, and Erica Brownstein. (1994). *Science and Children*, pp 16-19.

- 1. DOES THE ACTIVITY PROVIDE MEANINGFUL ACCURATE SCIENCE LEARNING?**
- 2. IS THE ACTIVITY WORTH THE TIME IT TAKES?**
- 3. IS THE ACTIVITY WORTH THE MONEY ITS COSTS?**
- 4. HOW SAFE IS THE ACTIVITY?**
- 5. HOW DIFFICULT IS THE ACTIVITY?**
- 6. DOES THE ACTIVITY WORK RELIABLY?**

I Have A Sister, My Sister is Deaf
By Jeanne Whitehouse Peterson
ISBN 0-06-023701-0



Science Concepts I Can Teach From This Book:

- 1.
- 2.
- 3,
- 4,
- 5.

Art Idea:



What Would You Miss Most?

If you woke up tomorrow morning and could no longer hear, what would you miss the most? Draw a picture of the thing or things you think you would most miss hearing.



Hanimals

By Mario Mariotti
Green Tiger Press
La Jolla, CA 92038

“The human hand is of great symbolic importance. With it we touch others, we bless, we pray, we speak, we greet, we nurture. Early men deliberately painted their hands on the walls of caves.”

DIRECTIONS:

-Use powdered tempera mixed with liquid starch (found at larger food stores and Wal Marts) and a squirt of liquid soap. Be sure to use enough paint to achieve a strong color). This is the foundation color for your animal. Apply with brush, cotton, or by immersion.

-Use acrylic paints for the details of your hanimals. Art brushes work well.

-Your creation's eyes can be glued into place (I use eyelash adhesive sold in drug stores and at Wal Mart). Dolls eyes are useful as well as buttons, marbles, game pieces, clay, and ping pong balls. They can also be painted directly onto the hand.

From Piaget's Ideas for Primary Grades:

- Provide natural objects such as leaves, stones, and twigs for the learner to manipulate.
- Provide opportunities for learners to begin grouping things into classes (living/nonliving, animal/plant, solid/liquid/gas).
- Provide experiences that give learners an opportunity to interact positively with peers.

Tips for Cooperative Learning in the Early Grades

Differences Between Cooperative and Traditional Learning Groups (adapted from J. Abruscato's Teaching Children Science, 2001)

Cooperative Learning Groups	Traditional Learning Groups
Positive interdependence	No interdependence
Individual accountability	No individual accountability
Shared leadership	One appointed leader
Shared responsibility	Responsibility only for self
Task and process emphasized	Only results emphasized
Social skills directly taught	Social skills assumed and ignored
Teacher observes and intervenes	Teacher ignores group functioning
Groups process their effectiveness	No time for group processing

- Do not assign a cooperative learning activity that could just as easily (or more easily) be done alone. Be sure to create a *positive interdependence* in the way you structure the activity.
- Provide time for small group-building activities that are designed to help students develop awareness of others, build communication skills, foster trust, and provide practice for interacting successfully with others.
- Participation can be encouraged by grouping reluctant students with more nurturing students.
- Be sure that assigned group work is well-thought-out, organized, challenging, and reasonable.
- Help groups learn to write their goals and agree on major steps *before* they begin working.
- Constantly move among groups monitoring, encouraging, and providing feedback.
- If the activity is fun, no other reward may be needed since intrinsic rewards are most fulfilling. However, teachers of young learners may choose to use:
 - verbal praise
 - singing a favorite song
 - an art activity
 - game time
 - other suitable reinforcers
 - activities may be videotaped as a reward

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Primary Science Assessment Techniques

Assessing Young Learners:

The lack of experiential background and reading/writing skills in primary students presents interesting challenges in trying to assess their understanding.

NSTA Pathways to Science Standards (1997), offers these tips:

- Have students create murals or dioramas to depict concepts.
- Allow students to sort items or pictures of items that demonstrate similar characteristics.
- Encourage role playing activities.
- Try using a variety of means to determine what students know and understand.

To assess whether a child understands a basic concept consider:

- Ask student to *respond* to a prompt (discrepant event or puzzling idea).
- Tell the child what *performance* you expect.
- Tell the child what *product* you expect.

Authentic Means of Assessing

•Portfolios

Portfolios are generally examples of collections of individual student work that indicate progress, improvement, accomplishment, or special challenges. Teachers collect and assess the student's work throughout the school year.

•Anecdotal Records

Carry a clipboard while observing students during free exploration or group work. Write down snippets of informal conversation relating to student achievement and progress. Record relevant statements that suggest understandings of misconceptions from discussions. Make observations about students and their activities in the learning centers.

1. Focus records on observations about cognitive, affective, and psychomotor skills. You can make a chart with these columns after student names.
2. Always write the student's name, date, and time of the observation.
3. Let students know you will be making notes about them. You can even encourage them to make notes about their own learning.
4. Review your anecdotal records in detail before each unit ending. Try to assess which kinds of activities best meet the student's needs.

•Affective Development Checklists

An often overlooked aspect of primary science is measuring the student's interest level. A checklist of favorable attitudes towards science can be scored on this or a similar checklist:

- ___ Is curious about new objects, organisms, and centers in the classroom.
- ___ Appreciates science fiction.
- ___ Asks to be involved in preparation for science activities.
- ___ Invents things.
- ___ Draws inventive scientific devices.
- ___ Draws natural objects or organisms
- ___ Asks to do more science-related activities.
- ___ Visits websites that are science-related.

- ___ Comments on science-related television programs and/or movies
- ___ Brings science-related materials to class
- ___ Questions but is tolerant of the ideas of others
- ___ Asks to help care for class animals or plants
- ___ Has a science-related hobby
- ___ Makes observant comments about the environment
- ___ Spends maximum time in science learning centers
- ___ Questions superstitions

•Science Conferences with Children

For this interview have two bottles filled with water, one has noticeably more water than the other.

Sample Interview questions:

1. What causes sound?
2. How does sound travel?
3. Does sound travel through air? How do you know?
4. Can sound travel through water? How do you know?
5. Does sound travel through the ground? How do you know?
6. (Point to the bottle that is holding less water) If you were to blow air across the top of this bottle, would it make a sound that is higher or lower than if you did it to the other one?
7. (Point to the bottle with more water) If you were to tap this bottle with an object, would it make a sound? Why or why not?
8. (Point to the bottle with more water) If you were to tap this bottle with an object would it make a sound that is higher or lower than the other bottle?

•Science Journals

Drawing and writing in journals “captures a dimension of students’ conceptual understanding that is different from that which is usually measured by other types of assessment. Children are able to record procedures and results from investigations as well as observations, hypotheses, and inferences about science phenomena.” (*NSTA Pathways to the Science Standards*, 1997, p.23).

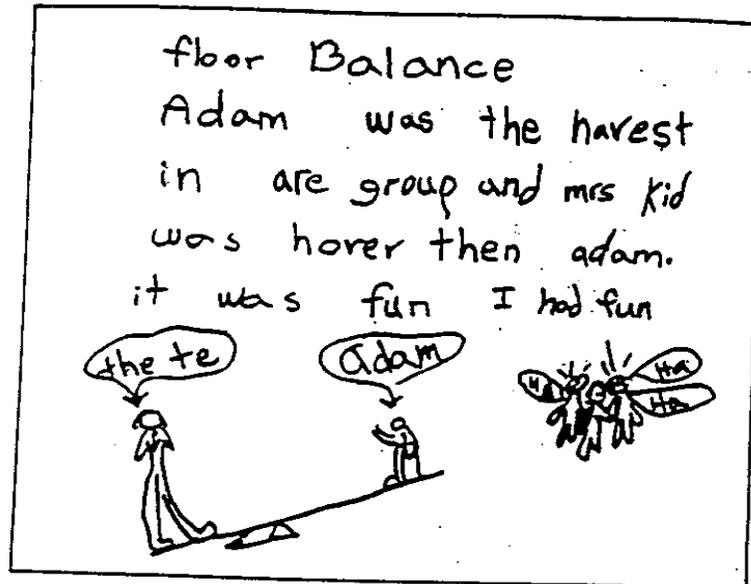
Encourage students to make daily entries in their science journals and provide them with time to do so. Regularly read and respond to the journals. Keep your own science journal; it’s good for modeling and also for helping you keep a record of when and what you did in science.

•Children’s Self-Assessment

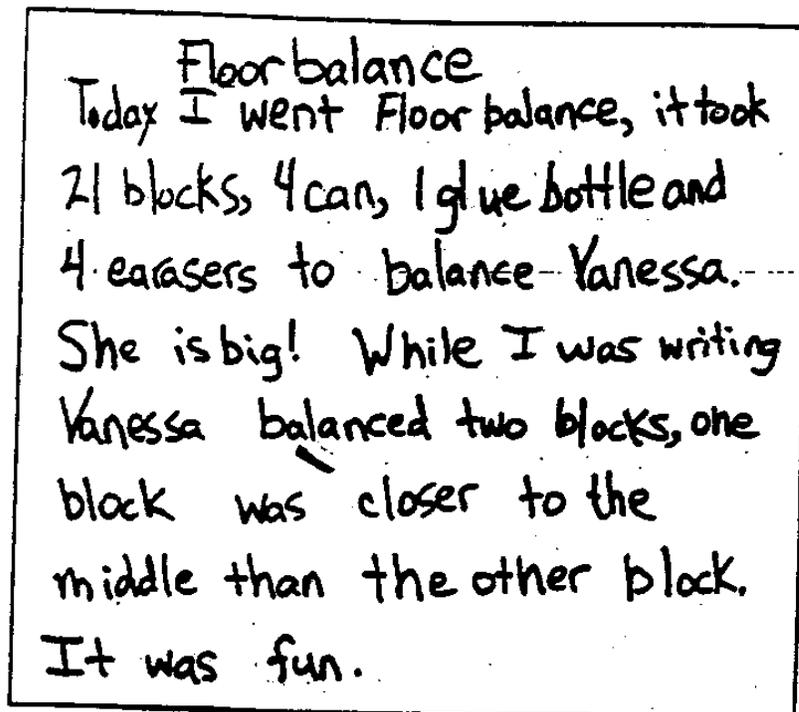
Students can be encouraged to assess their own learning, understanding, and progress. Through self-reflections in their journals and/or individual check sheets, students can be asked to judge how they are doing

Student Journal Examples

Maxie



Rebecca



Sample Letters to Parents

Request for Supplies:

We are collecting materials and supplies for our science activity centers in our class. If you have some of listed items that you no longer use, would you be so kind as to share them with us? We will use them in our investigations.

You may want to keep this list and send things to us throughout the year as you collect them.* If you have questions about what to send, feel free to contact our teacher (777) 777-7777 or <greatteacher@greatschool.org> We appreciate your help!

Sincerely,

Ms. Greatteacher's Class

(Attach list; see next page for suggestions)

Sound Unit:

We have been studying the science of sound in our class. Today the students in our class are bringing home musical instruments they made in class. Ask your child about how sound is produced, what causes a change in pitch, and how sound travels.

Here are some ideas for making instruments at home that your family might want to try:

- A comb covered with a piece of waxed paper makes a great kazoo.
- A cake pan with rubber bands across it makes a wonderful guitar.
- You can make shakers out of empty yogurt containers or empty bottles with rice, beans, or popcorn kernels.
- A can covered with a plastic lid makes a mighty drum.

Please send your ideas to school with your child or e-mail them to me <greatteacher@greatschool.org>

*Remember to send home thank you notes from the children after receiving items. It is even better if you can attach a picture of the children actually using the donated item(s).

Materials to Keep For Your Elementary Science Class

aluminum foil	microscope
aluminum foil pie plates	mirrors
aquarium	modeling clay
baking soda	peas (assorted, dried)
balance	pipe cleaners
basic rock/mineral collection	pizza boxes (for storage)
beans (assorted, dried)	plastic buckets
boxes	plastic containers
buttons	plastic jugs
camera	plastic spoons
cans	plastic wrap
cardboard tubes (wrapping, paper towel, etc.)	potholders
clipboard	potting soil
cooking oil	prisms
corks	rain gauge
dishes (paper, plastic, other)	rubber balls (assorted)
egg cartons	rubber bands
eye droppers	safety goggles
fabric swatches	salt
feathers	sandwich bags
film canisters	scales
first aid kit	seeds (assorted)
flashlights	shell collection
food coloring	shoe boxes (regular & plastic)
freezer bags (assorted)	sieves
funnels	small plastic animals
globe	small plastic trays
hot plate	sponges
iron filings	squeeze bottles
latex gloves	stir sticks
lemon juice	stop watches
lunch bags (paper)	string
magazines and catalogs (used)	sugar
magnets (all sorts and sizes)	tape measure
magnifying lenses (hand lenses)	tempera paint (assorted colors)
masking tape	thermometers
measuring cups	tongue depressors (popsicle sticks)
measuring spoons	toothpicks
meterstick (rulers)	vinegar
Others? _____	

Helpful Internet Sites

Assessment Ideas for the Elementary Science Classroom

<http://www.sasked.gov.sk.ca/docs/elemsci/ideass.html>

This site deals specifically with the needs of elementary/middle level science teachers. This is a wonderful resource! (Includes templates).

Children's Literature for Teaching Science

<http://www.indiana.edu/~reading/ieo/bibs/childsci.html>

ERIC resources for teaching science through children's literature.

Integrating Science in the elementary classroom

<http://www.mcps.k12.md.us/curriculum/science/elem/elem.htm>

Montgomery County, MD has a website that offers some of the most helpful teacher resources on the web. This page will help science teachers with integrating science and other subject areas.

New Teacher Resources

<http://www.teachersfirst.com/unitlist.htm>

Articles by and for new teachers. Suggested lesson plans with attention to the planning and management issues concerning new teachers

Primary Science Club Activities

http://www.science.ie/content/content.asp?section_id=522

Wonderful templates for science activities. Instructions on forming a primary science club. Excellent sheets that can be sent home to parents.

Primary Science Learning Games

<http://www.primarygames.com/science.htm>

A series of games that can be used as supplemental activities in the primary classroom.

Problem Solving in Elementary Schools

<http://www.indiana.edu/~reading/ieo/bibs/probele.html>

ERIC resources that address problem solving. Useful links to other Internet resources.

Science Ideas for Primary Students

<http://www.teachingideas.co.uk/science/contents.htm>

An array of ideas for teaching primary students. Available templates for journal writing. Excellent resource!!

Science Lesson Plans

<http://www.col-ed.org/cur/science.html#sci1>

This site, sponsored by the Columbia Education Center in Oregon provides a tremendous collection of elementary/middle level science lessons.

Supplements to Science Lessons

<http://www.monroe2boces.org/programs.cfm?sublevel=350&subsubpage=82&subpage=54&master=3>

BOCES2 website provides an array of elementary science lesson supplements. Excellent resources for teachers trying to differentiate instruction on particular topics.

Teachernet Primary Science Resources

<http://www.teachernet.gov.uk/teachingandlearning/subjects/science/primaryscience/>

One of the best sites on the internet for all kinds of activities, ideas, and integrated lesson plans for primary school science.

LIST OF RELATED CITATIONS
Essential Elements for Elementary Science
PRESENTED BY DR. DEBBIE SILVER

Abruscato, J. (2001). *Teaching Children Science: Discovery Methods for the Elementary and Middle Grades*. Boston, MA: Allyn and Bacon.

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Carin, A. A. & Bass, J.E. (1997). *Methods for Teaching Science as Inquiry*. Upper Saddle River, NJ: Prentice-Hall, Inc.

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Feldkamp-Price, B.; Rillero, P.; & Brownstein, E. (1994). "A Teacher's Guide to Choosing the Best Hands-on Activities." *Science and Children (31)* 6, pp 16-19.

Periodicals for Science Teachers

Science and Children (elementary—a journal of the National Science Teachers Association) 3140 N. Washington Blvd., Arlington, VA 22201 <http://www.nsta.org>

Science Scope (elementary/middle grades-- a journal of the National Science Teachers Association) 3140 N. Washington Blvd., Arlington, VA 22201 <http://www.nsta.org>

Periodicals for Science Students

Chickadee (ages 3 – 9). Box 304, 255 Great Arrow Avenue., Buffalo, NY 14207

Dragonfly. National Science Teachers Association) 3140 N. Washington Blvd., Arlington, VA 22201 <http://www.nsta.org>

WonderScience (grades 4-6). American Chemical Society, P.O. Box 57136, Washington, DC 20037.