GPSD 3rd Grade; 2nd Semester Arts-Based Professional Development

Maps, Magnets and Measuring

Social Studies (1 g, 3 b, e, f), Science (2), and Math (4)

Go to http://maps.google.com and enter "Greenville, MS" in the search box (on a SmartBoard if available). Click "Search Maps" just like doing a regular google search. Click on "satellite" view (the box in the top right corner of the map) to see a photograph of Greenville taken from space. Clicking on the "–" sign at the bottom of the vertical bar on the left side of the map will allow you to zoom out and see the entire community and the surrounding area on the map. Compare and contrast different areas on the map. Point out how you can see where communities are located by the changes in the satellite map. Discuss why Greenville might have been established in its location by looking at the map (near the river for trade and transportation and fertile soil for agriculture). Notice the agricultural fields around our area. Click the "+" sign to zoom in and find your school. (If you have trouble, you can do a new search and type the name or address of your school in the search box followed by "Greenville, MS" and it will zoom to your school. Post a Greenville street map (available from Washington County Convention and Visitors' Bureau) and find your school on the street map. Compare and contrast the views. Look at the google map for landmarks on or near your campus and have students notice the size and location of various buildings, trees, etc. in relation to one another. For example, is the distance between two trees the same as the length of one of the buildings? Hold a piece of paper or string up to compare and estimate distances. Then have them draw their own version of the map (point out boundaries to limit the size of their maps to the area you wish to cover) and take them outside to test out how to get from one area to the next. Make a large compass rose marking North, South, East, and West in the parking lot or on a sidewalk in sidewalk chalk. (Use the map and a real compass to identify true north and then you can discuss perpendicular lines to find east and west). Begin by counting off paces of distances that looked the same on the map. Are they the same number of paces? Next, have them write directions from one area to another including how many steps in which direction they need to go. Have small groups/teams choose one landmark apiece and write directions to it from a common starting point (such as the compass rose) without identifying the landmark (like a treasure map). Then have students switch maps with one another and see if they can find each other's treasure. They could even hide real treasure!

When you get back inside the classroom, look at the google map again. See if you can come up with a unit of measurement to compare to your paces. For example, if a building was 13 paces wide, what would it be 13 of that you can find in the classroom (paperclips, etc.) as the basis for a discussion of scale. You can create your own scale for the map and test it out by giving directions based on the unit you have chosen. One group can place a mark a certain distance away from a defined point on the map. The next group has to place a flag or other item in that location outside. If the mark was 15 paperclips east of the point on the map, they have to place the object 15 paces east of the actual point outside. Discuss the distance of other important landmarks and areas of the community from the school. Have students find their homes or other familiar places on the map and write directions to and from the school. You can also order a jigsaw puzzle of your location on a map that could be a fun way to introduce or conclude the lesson.

What is a compass?

The simplest compass is a magnetized metal needle mounted in such a way that it can spin freely. (You can make one yourself by magnetizing an ordinary needle, placing it carefully on a slice of cork, and letting the cork float in a tray of water.) Left to its devices, the needle turns until one end points north and the other south. You can usually figure out which end is which from the position of the Sun in the sky, remembering that the Sun rises in the east and sets in the west. So if you're looking down on the floating needle at about noon, the needle is aligned parallel to your body, going from your left to your right, and the Sun is somewhere on your right, you know that the end of the needle to your left is north.

How do compasses work?

Magnetism is one of the first bits of science we learn in school and just about the first thing we discover is that "like poles repel, unlike poles attract." That's all there is to a compass: the red pointer in a compass (or the magnetized needle on your home-made compass) is a magnet and it's being attracted by Earth's own magnetism (sometimes called the geomagnetic field—"geo" simply means Earth). As English scientist William Gilbert explained about 400 years ago, Earth behaves like a giant bar magnet with one pole up in the Arctic (near the north pole) and another pole down in Antarctica (near the south pole). The needle in your compass is pointing north because like poles attract: the needle is attracted to ("seeking out") Earth's magnetic north pole. Since like poles attract, Earth's magnetic north pole is actually the south pole of the magnet inside Earth.

Earth's magnetic field is actually quite weak compared to the "macho" forces like gravity and friction that really dominate our lives. For a compass to be able to show up the relatively tiny effects of Earth's magnetism, we have to minimize the effects of these other forces. That's why compass needles are lightweight (so gravity has less effect on them) and mounted on frictionless bearings (so there's less frictional resistance for the magnetic force to overcome).

http://www.explainthatstuff.com/how-compasses-work.html

What is Universal Design for Learning

Published on *National Center On Universal Design for Learning* (http://www.udlcenter.org)

What is UDL?

Universal Design for Learning is a set of principles for curriculum development that give all individuals equal opportunities to learn. UDL provides a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone–not a single, one-size-fits-all solution but rather flexible approaches that can be customized and adjusted for individual needs. Individuals bring a huge variety of skills, needs, and interests to learning. Neuroscience reveals that these differences are as varied and unique as our DNA or fingerprints. Three primary brain networks come into play:

Recognition Networks: The "what" of learning

How we gather facts and categorize what we see, hear, and read. Identifying letters, words, or an author's style are recognition tasks. Present information and content in different ways.

Strategic Networks: The "how" of learning

Planning and performing tasks. How we organize and express our ideas. Writing an essay or solving a math problem are strategic tasks. Differentiate the ways that students can express what they know.

Affective Networks: The "why" of learning

How learners get engaged and stay motivated. How they are challenged, excited, or interested. These are affective dimensions. Stimulate interest and motivation for learning.

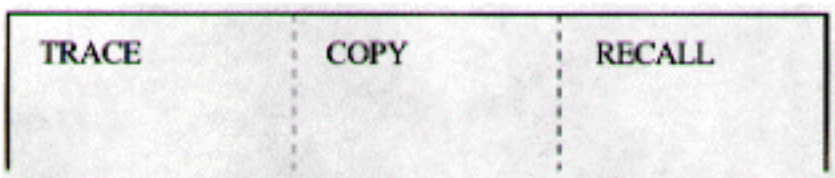
See also: http://www.udlcenter.org/implementation/examples/examples2_1

Six Ways to Practice Spelling

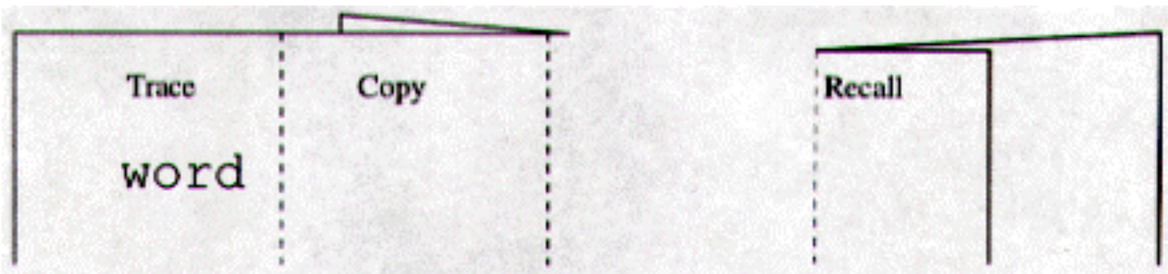
http://www.ldonline.org/article/6192

Trace, copy and recall

Make a chart like this with 3 or four spelling words you want to learn:



Then fold over the "recall" part so that only the first two columns show:



Then,

- Say the word to yourself.
- Trace it in the first column, saying the letters as you trace. Say the word again. You might put a little rhythm into it, "WORD. W – pause – O – pause – R-D. WORD!" (Remember, the goal here is to remember how to spell the words, not to successfully follow these directions.)
- Go to the second column, say the word, and write it the same way.
- While the rhythm and the sound and the feeling are fresh in your mind, flip the paper over and say the word and spell it out — the same way, saying each letter (because, after all, *practice makes permanent*).
- If it's a hard word, put it on the list more than once. If you're feeling particularly smart, trace and copy TWO words, and try to remember them both before you flip the page over. However, if your short-term memory isn't big enough to hold all that, do one at a time because you want to practice the words RIGHT, not make guesses!
- After you've done all the words this way a few times, start doing them two or three at a time, and when you feel like you know them, do the list again — but skip the tracing, or, when you're feeling VERY confident, skip the tracing and the copying both.

Reverse chaining by letter

- Say the word. Then write it, saying each letter (be enthusiastic and expressive)
  - W - O - R - D
- Skip a line and say it and write it again — minus the last letter. Say the last letter, but don't write it.
  - W - O - R - ____
- Skip a line and say it and write it again — minus the last two letters. Say them, but don't write them.
  - W - O - ___ ____
- Do that until you're only writing one letter.
- Go back to the top. Read the word, then spell it out loud.
- Fold the page over so you can't see the whole word. Say the word, spell it, and add that last letter.
- Fold the page back again. Say the word, spell it, and add the last two letters.
- Keep going until you spell the whole word.
- GO BACK AND CHECK — make sure you didn't leave out a letter.

Reverse chaining by syllable

This is harder, for longer words.

- Say the word. Then write it, saying each letter (be enthusiastic and expressive)
  - S-E-P-A-R-A-T-E
- Skip a line and say it and write it again – minus the last syllable. Say the last syllable and spell it out loud, but don't write it.
  - S-E-P-A-_________
- Continue until you aren't writing anything – but still say the spelling out loud.
- Go back to the top. Read the word, then spell it out loud.
- Fold the page over so you can't see the whole word. Say the word, spell it, and add the last syllable.
- Fold the page back again. Say the word, spell it, and add the last two syllables.
- Continue until you spell the whole word.
- GO BACK AND CHECK – make sure you didn't leave out any letters.
  - should
  - shoul__
  - shou__ __
  - sho __ __ __
  - sh__ __ __ __
  - s __ __ __ __ __
  - __ __ __ __ __ __

Highlighting the hard parts

Some words, like separate, are only hard in some parts. You might be getting these right on a test – but always spelling them WRONG when you write, frustrating you and your teachers to no end. And since practice makes permanent, every time you practice it wrong you're making it more likely you'll write it wrong the next time. Here's something to help you focus on the troublesome part.

This is also a good technique for learning rules and patterns. If you want to learn a bunch of IE words – that "I before E" rule that so many people find so hard to use – this is a good way to do it.

Get different color pens or pencils or markers, and index cards. Write the words vividly, boldly on the cards – and make the 'hard part' a different color than the rest... maybe with stripes on the letters. Make a mental picture of that card, read the word aloud and spell it aloud, and change the way you *say* the "hard part," maybe saying it louder, maybe putting on a British accent. So, you'd write:

sepArate believe

relieve grieve achieve

When you write the whole word, think about the hard part, what it looks like or sounds like. So, while you're writing "separate," you might be thinking "sep-AY-rate" and/or visualizing that bold, red A.

Again, the keys here are to NOT overwhelm your brain – don't try to learn 5 words at a time like this unless you've got an amazing visual memory. Better to do one word 5 times – and start spelling it right in your writing.

Use a tape recorder to test yourself, and to practice using words

Read the words – be sure you're pronouncing them right – into a tape recorder. Record it like it's a spelling test: word, example sentence, word. For example, you'd say "Separate. Put the papers in separate piles. Separate. Spelled s - e - p - a - r - a - t - e." Play it back – and try to say the spelling before the tape plays it.

Practice using the words in short phrases

If separate is the word, see if you can think of 5 *different* phrases with the word and write them out. Let's see... separate rooms, separate cars, separate houses, A *Separate Peace*, separate the pages. Or, try to use 20 of your words in the same story. Get silly – have fun with the words!

Jones, S. (1998). Five Guidelines for Learning to Spell and Six Ways to Practice Spelling. From The Resource Room: Free Spirited Structured Multisensory Learning.
Retrieved online Nov. 14, 2008, from http://www.resourceroom.net/readspell/guidespell.asp.

Word Study: A New Approach to Teaching Spelling

By: Diane Henry Leipzig (2000)
http://www.readingrockets.org/article/80

How is word study taught?

There are distinct stages in students' spelling development (Henderson, 1981). Students at different stages attend to and represent different features in their spelling (Templeton, 1991).

Word study is based on the notion that where a student is in his or her spelling development can serve as a guide for instruction. At the start of a word study program, teachers use a spelling inventory to determine which stage of spelling development each student is at and then groups students for instruction (Bear, et al., 2000). Once groups are created, teachers develop "differential instruction" based on the stage of development each group of students has achieved (Bear & Barone, 1989).

Instruction has to be deliberately sequenced by the teacher so students will get instruction that will propel their development. Teachers select a group of words that demonstrate a particular spelling pattern and sequence these patterns to match children's development (Templeton, 1991). Because the pace of children's progression through the stages varies, rarely would all the students in a class be studying the same list of words (Barnes, 1986).

To implement word study effectively, teachers and students alike must become word detectives, engaged in an ongoing attempt to make sense of word patterns and their relationships to one another. Spelling "rules" are not dictated by the teacher for students to memorize. Rather, spelling patterns and generalizations are discovered by students.

Teaching strategies

In word study, teachers encourage students to compare and contrast features in words. One common method for doing so is by having students sort words. When sorting, students use their word knowledge to separate examples that go together from those that don't.

In addition to sorting, students may hunt for words in their reading and writing that fit the pattern being studied, may construct a word wall illustrating examples of the different patterns studied, may keep a word study notebook to record the known patterns and their new understandings about words, or may play games and activities to apply their word knowledge (Bear et al., 2000).

A cycle of instruction for word study might include the following:

- introduce the spelling pattern by choosing words for students to sort
- encourage students to discover the pattern in their reading and writing
- use reinforcement activities to help students relate this pattern to previously acquired word knowledge

Teachers then test students' pattern knowledge rather than their ability to memorize single words. For example, a teacher might have students work with twenty words during a word study cycle and then randomly test students on ten of those words. For students studying the *-at* family, a teacher might include the word "*vat*" on the spelling test even though it wasn't on the initial spelling list – this allows the teacher to see if students are able to transfer their knowledge of the "at" chunk to a new word they haven't seen before.

Clay

http://www.depauw.edu/acad/art/faculty/dherroldweb/pages/clay.html

Chemical Properties

Clay is a natural substance occurring in great abundance in nature. It is constantly being formed on the earth's surface as a result of the weathering of a very common form of rock called Feldspar.

The great bulk of material found on the earth's surface is of a small number of substances that are relatively light in weight and "Float" to the earth's surface. The heavier materials such as metals occupy the earth's core. Of the materials found of the surface of the earth Silica is the most abundant (60% of all material on the earth's surface). The second most abundant is Alumina (15%). These materials are chemically referred to as compounds - Meaning that they are a made of two or more elements that are chemically bonded together. In Nature very few materials exist as pure elements; most have formed chemical bonds with other elements - usually oxygen. Silica, for instance is the mineral (or compound) name for the element Silicon that has combined with the element oxygen. Alumina is the mineral name for the material that results from the bonding of Aluminum and oxygen.

Feldspar, from which clay is formed, is the mineral name for a family of compounds that results from a chemical bond between Silica, Alumina, and one of three different metals (Potassium, Sodium or Lithium). This rocky substance occurs in great abundance and it's exposure to air and water causes it to change very slowly over vast periods of time into clay. This weathering process results in water, (a compound of Hydrogen and oxygen) replacing the metal in the Feldspar and changing the Feldspar into a new substance we call clay. The chemical formula for pure clay (mineral name Kaolinite) is Al_2O_3 $2SiO_2$ $2H_2O$.

The weathering process of clay formation results in a number of variations in clay types that are important to the potter. These clay types are the result in variations in the particle size of a particular deposit and/or the quantity of impurities (usually iron oxide) that has been mixed with the clay during weathering.

Common name	Impurities	Particle size
Kaolin	none	large
Stoneware	1% Iron oxide	mixed (large & small)
Fire clay	1% iron oxide	large
Ball clay	1% Iron oxide	small
Earthenware	7% Iron oxide	mixed

Clays are generally classified as either primary or secondary according to their geologic history. A primary clay (kaolin) is almost always found in the same place as the feldspar from which they were formed. They are relatively uncontaminated by other minerals and remain unsorted by particle size. Kaolin is relatively rare in nature and difficult to work with because of it's low plasticity. The vast majority of clays are called secondary because they have been transported by weathering action of wind and water from their original site of formation. The weathering process tends to mix in other minerals (notably iron) and to sort the particles by size - clay carried by a fast moving stream will tend to settle to the bottom by particle size according to how turbulent the water is.

If clay is heated to a sufficiently high temperature as in a pottery kiln, it is chemically transformed into a new substance. The principle difference between this new substance and the original clay is that the water portion of the clay molecules have been driven off leaving a compound of Silica and Alumina. This new substance is monolithic; the individual particles are fused and will longer dissociate into a plastic mud when wet.

Physical properties of clay

Plasticity

Clay has one unusual physical property called plasticity, that makes it very useful for making objects. Clay is one of a very few materials that have this quality. A plastic material is simultaneously very malleable and yet strongly adhesive to itself. In the case of clay, plasticity results from **a.** the extremely small size of the particles, **b.** the flat plate shape of the particles, **c.** and the film of water that forms between these plates when the material is wetted. Because the particles are flat, many adjacent particles will lie parallel to each other with a thin film of moisture between them. The moisture film lubricates the plates allowing them to slide back and forth over each other making the material very malleable. At the same time, the moisture film creates suction between the plates that causes them to cling strongly together which gives the material strength to hold what ever shape it has been given.

Plasticity varies greatly from one clay type to another. Clay that is short (low plasticity) either has relatively large particles or has been contaminated with a non plastic material such as sand. Highly plastic clays such as Ball Clay, are made of a high percentage of pure clay with small particles. Plasticity is also effected by the presence of organic matter that develops over time. Freshly mixed clay from a dry bagged form will be difficult to work with until it has had a chance to age for at least a couple of days.

Shrinkage

All clays shrink when they dry and again in the glaze fire. Shrinkage, (about 7% in drying and another 7% in the glaze fire), can be the cause of considerable hassle. If Clay dries unevenly different parts of a piece will shrink at different rates. This frequently causes stresses that result in cracks. This is particularly a problem with large irregular shapes. It is also a problem in low humidity conditions that cause very fast drying. Drying shrinkage is also a function of particle size with large particle short clays shrinking less than small particle plastic clays.

Drying and Firing clay:

Plastic or wet clay, contains two kinds of water water of plasticity and chemically combined water. The water of plasticity or "free water" is added to the dry bagged clay to make it plastic and readily evaporates when the clay is left exposed to the air. Chemically combined water is part of the molecule of kaolinite and is driven off during firing to permanently change the chemical nature of the clay.

Free water constitutes about a third of the weight of plastic clay and must be allowed to evaporate before work can be fired. As the clay dries the film of water between the plates of clay leaves allowing the plates to move closer together causing the object to shrink. Typically a clay object will loose about 7% of its size in all dimensions when fully dried. A course textured handbuilding body might have it's drying shrinkage reduced to 5% or less but all clays undergo a substantial change in dimension during drying. This movement of the clay during drying can cause stress that results in cracks that appear either during drying or later in one of the firings. Clay objects that are dried slowly are less likely to develop stress cracks so it is common practice to cover a drying object with plastic particularly during cold weather when the indoor humidity is low. Some studios are equipped with "damp boxes" or "damp rooms" where a high humidity environment is maintained to slow drying and extend the period of workability.

Bisque Fire:

Clay objects are usually (but not always) fired twice with the first firing called a bisque fire. The main purpose of a bisque fire is to alter the chemical nature of the clay by driving off the chemically combined water. This chemical change, called dehydration, begins to occur at about 1200 F and is complete by the time the temperature has risen to about 1800 F. A bisqueware will be physically much stronger than greenware (unfired dry clay), have a light tan color and will no longer dissolve back to plastic clay when wetted. A bisque fire must begin with an extended period of low heat called water soaking, to drive off the last of the free water. The water soaking period is commonly twelve hours in length or more depending on the weight of the pieces, their dryness and the current humidity. If the temperature of the bisque fire is raised above the boiling point of water (2120 F) before the work is thoroughly dry the residual water trapped in the pores of the clay will turn to steam creating pressure that will break the clay into many small pieces. After water soaking the kilns temperature can be raised fairly rapidly with a typical firing cycle to cone 06 (1,800 0 F) lasting about six or seven hours. Between the temperatures of 500 and 1000 degrees F the Silica in the clay goes through a change in its crystalline structure called quartz inversion. If firing or cooling is taken through this temperature range too rapidly the dimensional changes of this phenomenon can cause cracking. After this initial firing the bisque ware is ready for glazing. The ware is strong enough to survive the sometimes rough handling necessary in glazing. The bisqueware is very porous and absorbent which facilitates glazing but will not expand and risk cracking as unfired greenware would.

Glaze fire:

In a high temperature firing the glazed bisque ware is commonly loaded in a fuel burning reduction kiln. The water soaking cycle is not necessary as the bisqueware is now so porous that free water can escape quite readily. A typical cone 10 (24000) reduction firing will begin with a relatively rapid temperature rise in an oxidation atmosphere (plenty of oxygen no unburned fuel) to about cone 06 (18000 F) in four hours or so. At around this temperature the firing is slowed down and the atmosphere is changed to reduction by adjusting the fuel to air ratio of the burners so that they are operating "rich" too much fuel, not enough oxygen. The carbon rich atmosphere inside the kiln under these conditions effects the molecular makeup of minerals in the clay and glazes by reducing their oxygen content. Red iron is reduced to black iron, Copper oxide is reduced to copper etc. This occurs because the carbon in the unburned fuel has a stronger attraction to oxygen then than minerals being reduced. The result is a characteristically "mellow" look of stoneware due primarily to the reduced iron and other effects such as reduction reds from copper that can be achieved in no other way. The other significant change in this high fire environment is called vitrification. The clay has shrunk once again (another 7%) and is very hard, dense and without pores. The clay has partially melted causing the pores to close up and shrinking the pot. The material is much stronger than bisqueware and impervious to water but is more brittle.

Low temperature glaze firing is commonly done in an electric kiln in an oxidation atmosphere although there are exceptions such as Raku and luster firing. Since the vagaries of reduction firing are not an issue a low temperature oxidation firing is relatively simple with rate if fire and final temperature the only issues. A low fired clay will have the same characteristics as bisque open, porous and somewhat fragile.

PHYSICAL SCIENCE

<u>2. Explain concepts related to objects and materials, position and motion of objects, and properties of magnetism.</u>

g. Cite evidence to explain why heating or cooling may change the properties of materials (e.g., boiling an egg, evaporating water, chilling gelatin, making ice cream, etc.) (DOK 2)

EARTH AND SPACE SCIENCE

<u>4. Develop an understanding of the properties of Earth materials, objects in the sky, and changes in Earth and sky.</u>

a. Recall that soil is made up of various materials (weathered rock, minerals, plant and animal remains, living organisms.) (DOK 1)

b. Compare and contrast changes in the Earth's surface that are due to slow processes (erosion, weathering, mountain building) and rapid processes (landslides, volcanic eruptions, earthquakes, floods, asteroid collisions). (DOK 2)