

Patricia Vance
Chem Ed 2013
Teacher Emeritus
The Roeper School

THE OLD AND THE NEW

If I were to present myself before you with an offer to teach you some new game ... if I were to tell you of an improved plan of throwing a ball, of flying a kite, or playing leapfrog... oh, with what attention you would listen to me!

Well, I am going to teach you many new games. I intend to instruct you in a science full of interest, wonder and beauty, a science that will afford you amusement in your youth, and riches in your more mature years.

In short, I am going to teach you the science of chemistry!

Dr. Scoffman
Chemistry No Mystery
1848

ELEMENTS, COMPOUNDS AND MIXTURES

LAB SET-UP:

For each set of substances you will need:

- 9 Petri dishes with lids
- about 25 bolts
- about 22 washers
- about 34 nuts to fit the bolts
- tape
- glue, preferably a hot glue gun

ASSEMBLE THE DISHES AS FOLLOWS:

- #1 – 4 sets of nuts with bolts attached, 3 loose nuts
- #2 – 6 nuts
- #3 – 7 bolts and 9 washers
- #4 – 8 nuts, glued in pairs
- #5 – 6 washers (or 6 bolts or 6 nuts)
- #6 – 4 bolts with one nut attached to each
- #7 – 2 bolts with one nut attached to each and
2 bolts with one washer and one nut attached to each
- #8 – 3 bolts with one washer and one nut attached to each
- #9 – 3 bolts, 2 washers, 2 nuts; none attached to one another

Tape dishes shut and number clearly.

Source: Lee Marek
Woodrow Wilson Workshop

Directions:

Have students fill out the worksheet definition side as homework the night before to prepare for the activity. Do not let them proceed without this done, but do not check for accuracy.

Either distribute the dishes around the room in stations, or have enough sets for groups of three or four to use one set.

Tell students they must fill in each box for each numbered dish, and that they must agree within their group of three before writing an answer. Have them turn in the papers clipped together in groups, so that you can check that answers agree.

AND NOW THE NEW: FORMATIVE ASSESSMENT
AND DISCOVERING MISCONCEPTIONS

All numbers refer to the book *Science Formative Assessment* by Page Keeley;
Corwin/NSTA Press. ISBN 978-1-4128-4180-8 (paperback).

For the laboratory:

- #17 Fist to Five
- #48 Question Generating
- # 52 Rerun
- #74 What Are You Doing and Why?

For Questioning and Class Discussion:

- #7 Commit and Toss
- #13 Fact First Questioning
- #37 No Hands Questioning
- #45 Popsicle Sticks (a new twist)
- #59 Ten Two (combine with Fist to Five)
- # 65,66,67 Traffic Light Cards, Cups and Dots
- #69 Two or Three Before Me
- #73 Wait Time Variations

For Written or Visual Responses:

- Drawing and #39 Paint the Picture
- Acting
- Paired Problem Solving
- #8 Concept Card Mapping
- #14 Familiar Phenomenon Probes
- #20 Frayer Model
- #29 Juicy Questions
- #31 Justified True or False
- #36 Muddiest Point v.s. #44 Point of Most Significance
- #38 Odd One Out
- #58 Synectics
- #68 Two Minute Paper

WAIT TIME

When the teacher asks a question:

- Listen carefully.
- Silently think about your own ideas.
- Don't raise your hand.
- Wait to be called on.
- Answer in a clear voice so everyone can hear.
- Remember that all ideas are important.
- If you are not called on, listen to others' responses.
- Think about how your ideas are similar to or different from the answers you hear.

When a student answers a question and other students can add their ideas:

- Use the silent time to think about your own ideas.
- Be prepared to build off of others' responses.
- Think about what others have said before it is your turn to talk.
- Respect others' ideas when you challenge them.
- Make eye contact with the class, not just the teacher.

p. 216, *Science Formative Assessment*