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ABSTRACT

Most children become excited about science because they can do something and because they can watch the results. These are some of the answers most elementary school students tell you when they are asked about science class. It has been substantiated by decades of research that experiential experiences are exciting and remembered, visual and kinesthetic-tactile approaches are effective student motivators, and students with reading difficulties can succeed with such activities. This paper describes an activity in which students build a chemistry set that is used in subsequent activities. Materials used for the set are available in the home, school, and community. Listed are: (1) materials needed; (2) procedures for jar labeling, storage cabinet and tray construction, filling chemical storage jars, and equipment and chemical storage; and (3) curriculum extension activities which include report and letter writing, pretending to run a business selling chemistry sets, and several activities that involve using the chemicals in the set. A sample letter asking for parent assistance is included and diagrams and examples are provided. (RT)

Chemistry for Kids
Building an Elementary School Chemistry Set
From Common Household Items

By

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INTRODUCTION

When it comes to science class, kids become excited. Why? Most children will tell you its because they can do something and watch the results, not just do another worksheet or read a few more pages. Besides this, they say they learn a lot. What are they telling us as teachers? They are answering for us research questions we as adults have spent years investigating not to mention the millions of dollars invested in the search.

Decades of research substantiates what most elementary school students will tell you about science and science teaching in two or three minutes. First, "hands-on" experiences are exciting, "hands-on" activities are remembered, "hands-on" science is remembered. Second, visual and kinesthetic-tactile approaches when combined are successful student motivators. Third, concrete learning experiences have a great effect on present and future student motivation. Fourth, though not as obvious from student statements, even students with reading difficulties can succeed with the conduct of such activities involving active ("hands-on") investigation.

INSERT FIGURE 1 ABOUT HERE

PRESENTATION

Students who participate in this activity build a chemistry set which they will put to work in later activities. The materials used to build the set and the basic chemicals used in the set are readily available in the school, home and/or the local community.

Grade Level. Grades 3 - 8

Materials.

1. 2 rolls of fiber packing tape for each class.
2. 1 roll of masking tape for each class (24 students).
3. 10 baby food jars for each student (small olive and other types of jars will work). Using identically sized jars makes a neat set. The 4 ounce size jar works well.
4. 1 tablespoon for each student.
5. 1 teaspoon for each student.
6. 10 glass or pill bottles with snap-on (not screw-on) tops. Size consistency is important; the 5 or 6 dram size works well. If pill bottles are not available, similar type bottles are available from school supply houses. They also are often found in science kits no longer used for the implemented science program.
7. 2 pill bottles with snap-on tops or other similar plastic bottles having snap-on tops. These bottles should be larger than the 10 listed above.
8. 1 small eye dropper and bottle with screw-on top (actually size will work but 50-100 milliliters size works best).

9. 1 pencil for each student.
10. 2 pieces of 8 1/2" x 11" paper for each student.
11. 1 box for each student (any box that is cardboard - see parent request letter below for suggested size).
12. 1 carrying tray for each student (See Figure 2.).

INSERT FIGURE 2 ABOUT HERE

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13. 1 medium size drinking glass for each student.
14. Several paper napkins for each student.
15. 3 cardboard box tops, the same as the box listed above or larger for each student.
16. 1 pair of scissors for every 6 students.
17. 1 pocket knife or similar cutting instrument for each class.
18. Chemicals. Unless otherwise noted the amounts for each student are a quantity large enough to fill one baby food jar. This is a suggested list of chemicals. The actual chemicals included in your chemistry sets depends upon the activities you want to conduct. The "Curriculum Extension" section of the activity lists some activities that may be conducted using some of these chemicals.

		Jars Numbers
a.	Clear Ammonia	(1)
b.	Baking soda	(2)
c.	Flour	(3)
d.	Cream of Wheat	(4)
e.	Table Salt	(5)
f.	Tap Water	(6)
g.	White Vinegar	(7)
h.	Vegetable Oil	(8)

i. 1 small bottle of tincture of iodine for each student (not an iodine solution).

19. For the "Curriculum Extension."

a. At least 1 Apple IIe or GS Computer for each class

b. 1 copy of AppleWorks for each computer (Versions 1.2, 1.3, 2.0, and 2.1 may be used - 2.0 and 2.1 are usually used with the GS Computers).

c. 1 data disk for each computer.

Procedures.

1. Jar Labeling. Have each student label his or her jars with a piece of tape. The labels should appear like the example in Figure 3.

INSERT FIGURE 3 ABOUT HERE

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2. Storage Cabinet Construction. Construct the Chemistry

Set Storage Cabinet (See Figure 4).

INSERT FIGURE 4 ABOUT HERE

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a. Box Front. Cut off the top cover of the box.

b. Support Pieces. Make two support pieces from the box cover. Then, tape the support pieces in place using fiber tape.

c. Cabinet Shelves. Cut cabinet shelves from the two additional box covers. Then tape the shelves in place using fiber tape.

d. List of Chemicals and Equipment. Have each student make the list of Chemicals and Equipment and tape it (using masking tape) to the side of the Chemical Storage Cabinet.

3. Tray Construction. Construct the tray (see Figure 2).

4. Filling Chemical Storage Jars. Fill the jars with the 8 chemicals provided.

5. Equipment and Chemical Storage. Place the chemicals and equipment in the cabinet (see Figure 4).

Curriculum Extension.

1. Report Writing. Write a report describing how you made the chemistry set, etc?) using the AppleWorks word processing subprogram (see Figure 5).

INSERT FIGURE 5 ABOUT HERE

2. Letter Writing. Write a letter to a friend using the AppleWorks word processing subprogram. Tell your friend how to build his or her own chemistry set.
3. Running a Business. Pretend you are in business and you want to sell chemistry sets to other boys and girls your age. Make an advertisement for a newspaper or a sign to put up in the community telling all about your chemistry sets. Be creative.
4. Activities List. Several activities, which may be conducted using the chemicals in the set are listed below. In some cases additional chemicals may be needed:
   a. Making soda pop - also requires a fruit juice, sugar, and water.
   b. Making baking soda explosions.
   c. Making dancing mothballs.
   d. Testing for starch.
   e. Testing for copper.
   f. Others - check your school library for science activities books. If your library uses the Dewey Decimal System, you'll find activities books using, among others, 507. You should also check the 540 s.

Letter Asking For Parent Assistance. The following letter can be easily xeroxed and sent home with students.

Date

Dear Parent:

The students in you child's class are going to build and use a chemistry set as part of the school science program. I would like to enlist your help collecting materials for this project. We need the following items:

1. Baby food jars.
2. Plastic and glass pill bottles with snap-on caps.
3. Plastic teaspoons & tablespoons.
4. White vinegar.
5. Baking soda.
6. Cardboard boxes - beer or wine bottle case sizes.
7. Eye droppers.
8. White flower.
9. Eye dropper bottles.
10. Table salt.
11. Cream of Wheat.
12. Vegetable oil.
12. Tincture of Iodine.

We shall be collecting these items for the next three weeks. Any items you can send to school with your son or daughter will be gratefully appreciated.

Yours sincerely,

SUMMARY

Students participating in this activity build their own chemistry set. By using the set in future experiments, students have the opportunity to see chemistry from a "hands-on" perspective. In addition, they are introduced to some of the things chemists do (career education perspective).

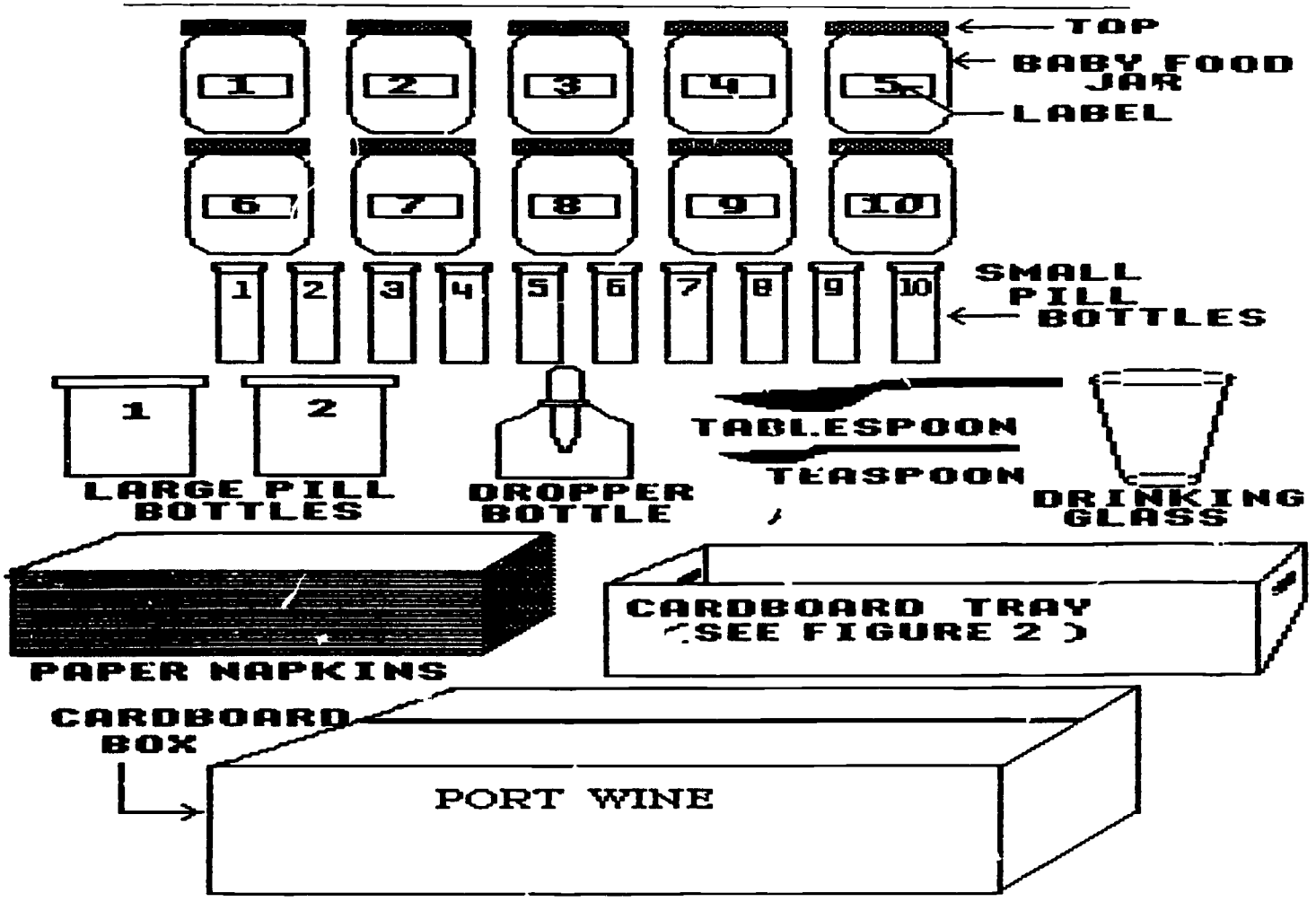

Figure 1. Basic Elementary School Chemistry Set Equipment.

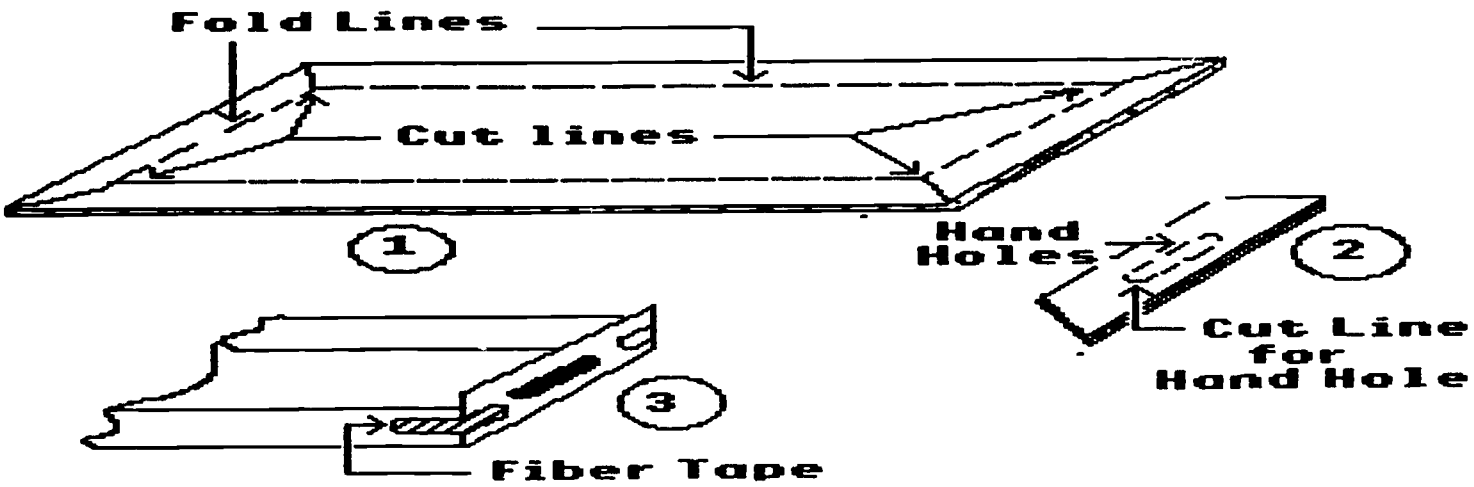

Figure 2. Cardboard Tray Details.

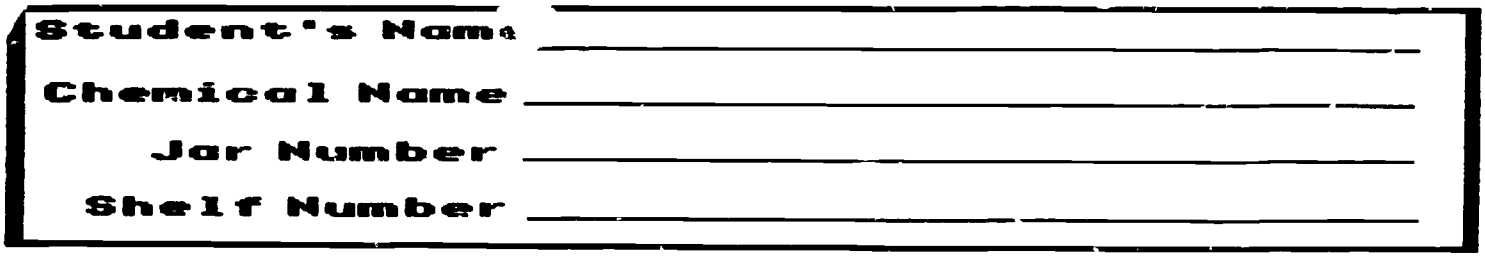

Figure 3. Example of Jar Label.

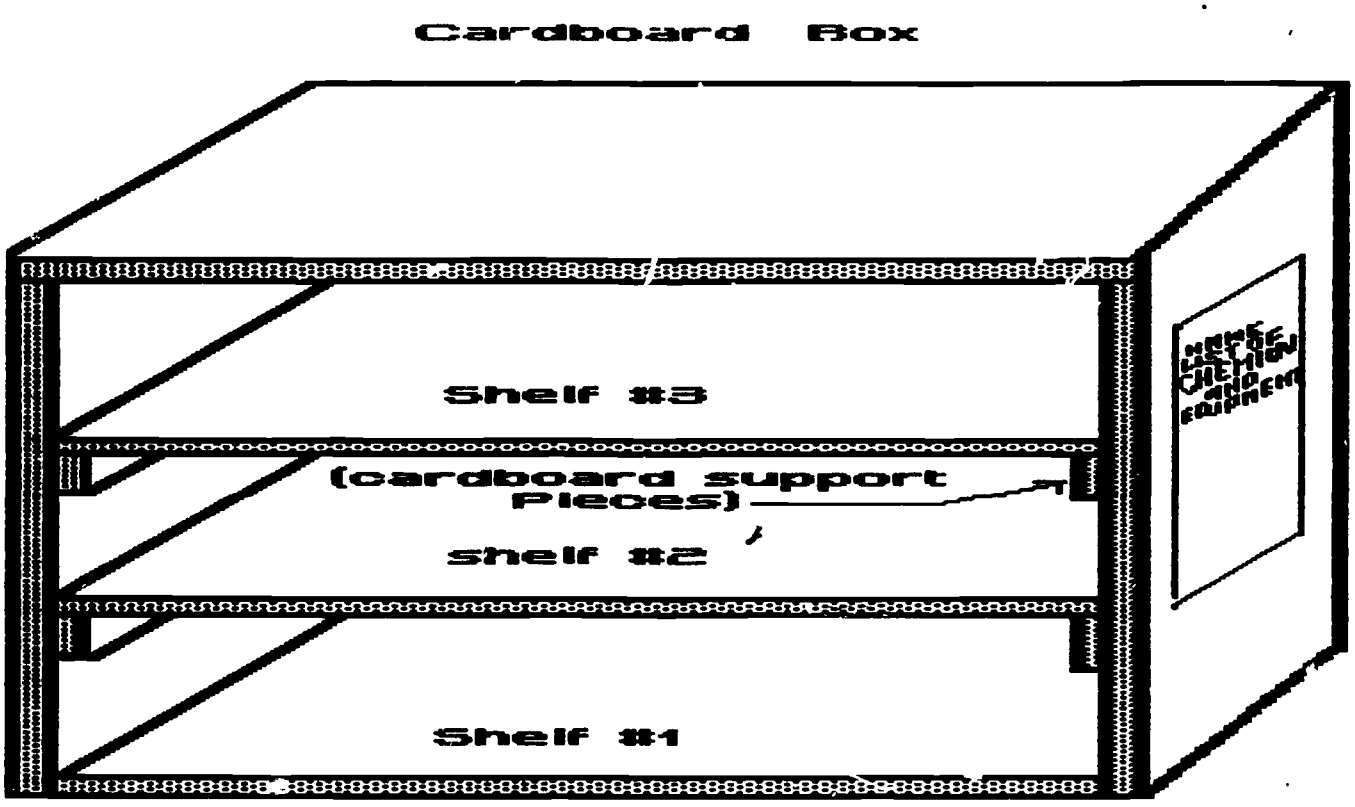

Figure 4. Chemistry Set Storage Cabinet.

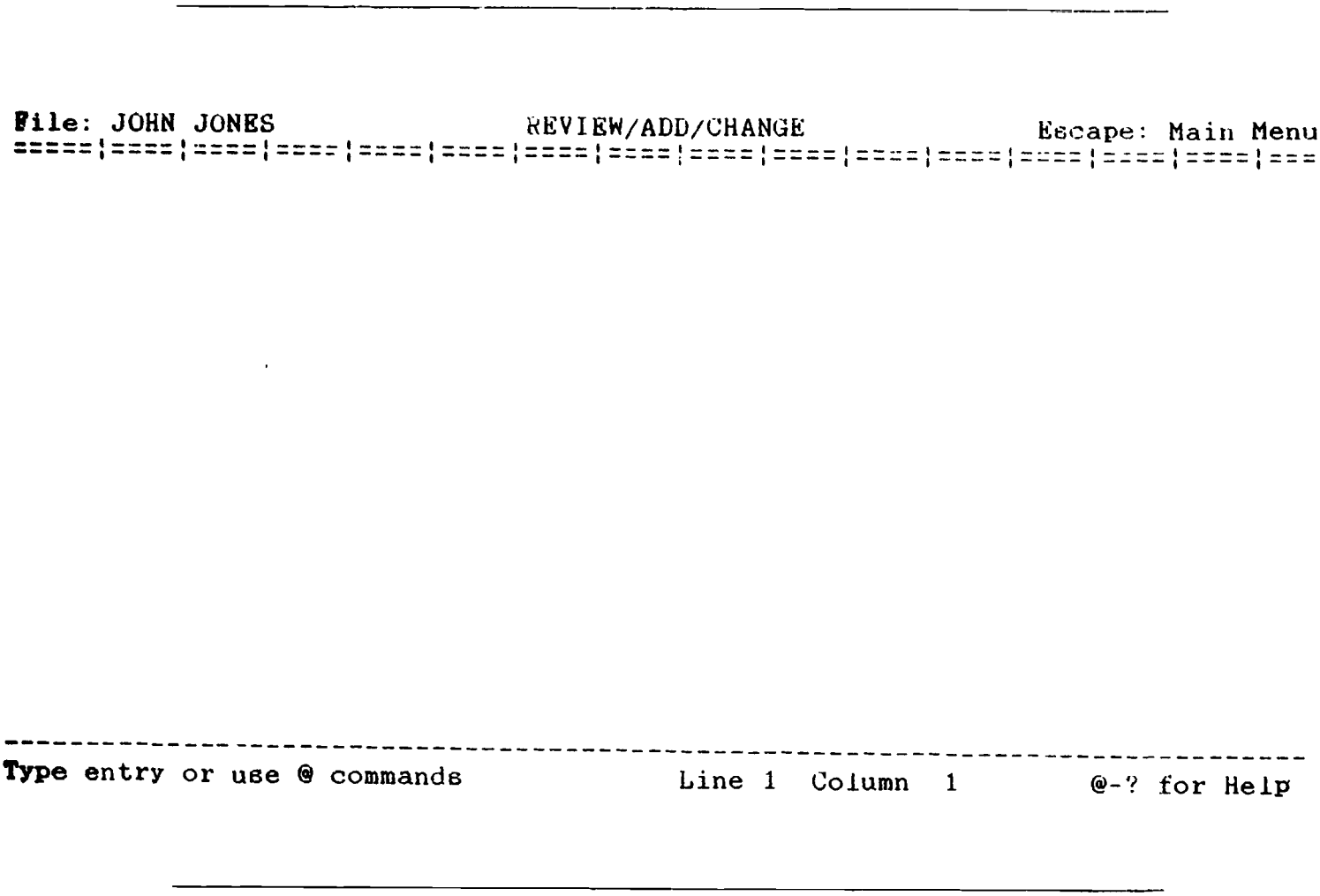

Figure 5. A Blank Word Processing File.