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Assistants IN HIGH SCHOOL SCIENCE

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The modern science programs of today have created increased emphasis upon the laboratory situation. With this increased emphasis on laboratory work, the science teacher must spend many hours preparing for laboratory experiences which will meet the needs of the students enrolled in today's and tomorrow's science courses. In order to meet these needs, what alternatives are available to the science teacher in preparation for a laboratory situation? Here are three alternatives:

1. Teacher preparation before and/or after school.
2. Sporadic solicitation of student help.
3. A planned Senior High School Science Assistant Program.

Due to the lack of teacher time and laboratory structure, many science teachers are compelled to choose one of the first two alternatives. These may not, however, be the most satisfactory solutions. Then the science teacher may turn to alternative No. 3. How can a planned Senior High School Science Assistant's Program be developed to help a science teacher in the preparation of a laboratory situation and further the knowledge of the students at the same time?

Davenport Central High School Science Department has developed a Guide for Senior High School Student Science Assistants, which is currently being used. The development of this guide came about as a result of a three-year trial period of using students as chemistry laboratory assistants. The trial program had only one

basic goal, to assist the teacher in the laboratory situation by such means as helping to answer routine student questions during the experiment periods. This would give more students time to discuss important questions with the teacher. As the program continued to develop, it became apparent that it could also fill a need for more concrete activity and safety on the part of the student; serve as a basis for furthering scientific endeavor on the part of the student; and could demonstrate in part what a laboratory's function really is.

In order to fully implement the program's intent, certain guidelines



First-level science assistants are in charge of the issuing and the cleaning of the safety glasses and goggles which students wear when working with dangerous materials or chemicals.

for selection of students as assistants had to be developed. Some of these guidelines are the following:

1. The student must have the rank of

a second-quarter sophomore or be a junior or senior to begin the program.

2. The student should have a certain degree of the following attributes acceptable to the supervising teacher (s):

- a. Courteousness
- b. Responsibility
- c. Conscientious
- d. Initiative
- e. Leadership ability

3. The student must have certain degrees of skill acceptable to the supervising teacher (s) for the following:



Central High School science assistants meet every Monday morning to receive their weekly duty roster, and learn how to perform duties in the laboratory.

- a. In the handling of chemicals
- b. In the use of equipment
- c. In the handling of glassware
- d. In the habits of cleanliness
- e. In the handling of living organisms.
- f. In the care of models

After evaluation of students according to the above cited criteria, the supervising teacher(s) will ask the student if he would like the privilege of becoming a student science assistant. If the answer is yes, permission will be requested from his parents and his counselor through the use of a permission form. The following is a copy of the Davenport Central High School Student Science Assistant Consent Form:

STUDENT SCIENCE ASSISTANT CONSENT FORM

The undersigned parent or guardian

of (Name of Pupil), (Age), hereby gives consent for him/her to participate in the Student Science Assistant Programs.

Careful supervision of student assistants will be provided by the science teachers. However, in signing this consent form it is understood that the science staff, Central High School, and the Davenport Community Schools will not be held responsible in case of accident or injury to your son/daughter in the course of his/her work as a student science assistant.

(Date) (Parent or Guardian signature)

For Counselor Use Only

I (approve, disapprove) of the above named student's participation in this program.

(Date) (Counselor's Signature)

(The counselor will return this consent form to the Science Department Chairman.)

Once permission and necessary forms from all concerned are received and placed in appropriate files, the student will then be fully accepted as a first-level student science assistant.

The first-level student science assistant will begin to proceed according to the program outline. This program outline has been designed to meet the following objectives:

1. General Objectives

- A. To assist the student in his development and use of knowledge in science.
- B. To provide an opportunity for the student to develop his potential for leadership.
- C. To aid the student in developing maturity in science activities.
- D. To allow the student to become familiar with science equipment not frequently used in the typical science course.
- E. To provide the opportunity for student experimentation and demonstration in the science areas.
- F. To attempt to provide the students with the opportunity to become familiar with methods, techniques, systems and pro-

cedures associated with the presentation of skills, materials, concepts and insights to other science students.

- G. To provide pre-vocational training and learning situations for the student which may serve as a basis for making decisions about entering a related field of study or employment.

- H. To learn safety techniques in science situations.

- I. To assist the science teacher in the routine laboratory situations so that the teacher is more effective in communicating pertinent laboratory information.

II. Specific Objectives

A. Safety

1. To use fire safety techniques in laboratory situations.
2. To learn the use of first-aid techniques in laboratory situations in case of emergency.
3. To employ safety techniques in the handling of chemicals.
4. To use safety techniques when working with poisonous materials.
5. To apply safety techniques when working with live organisms.
6. To apply safety techniques when associated with electricity and the cautions associated with voltages.
7. To employ safety techniques of shielding in use of radioactive materials, high energy and high intensity waves, and possible violent chemical reactions.
8. To utilize safety techniques in the handling of special equipment for science.

B. Science Activities

1. To educate the student in the proper procedure for preparing materials.
2. To inform the student of proper procedure for assembling equipment.
3. To train the student in the

proper procedure for preparing solutions.

4. To promote the student's skill in handling certain clerical duties.
5. To allow the student to further develop organization and cleanliness in all science activities.

Some of the topics covered in the first level student science assistant program are the following:

1. Safety and First-Aid in the Science Situation

II. Location and Organization of Science Materials and Apparatus.

III. Clerical Duties

IV. Operation and Manipulating of Standard Laboratory Apparatus

V. Restoration of Science Areas

VI. Laboratory Preparations and Equipment Assemblages

VII. Experimentation for Own Enrichment

As the student advances through the program and acquires skill and knowledge, other opportunities become available. The student's progress in the program does not depend upon his grade level in school. He is allowed to develop at his own rate. In order to proceed to the next level the student must demonstrate his proficiency.



The dispensing of materials is a necessary portion of any laboratory situation. Second-level assistants are in charge of the dispensing area.

ciency to the supervising teacher(s). When a certain level of proficiency has been demonstrated, the student then proceeds to follow the program to the next level. Although the topic headings are the same for each level, the areas are developed in greater detail and demand a greater proficiency in the performance of all areas. If the science assistant progresses faster than the average assistant, the student can move from the first level to the second level within the course of one year. Therefore, at the beginning of the second year, this "advanced" student would begin the third level program. This advancement, while possible, does not on the whole pertain to the average science student assistant.

The Davenport Central High School Student Science Assistants Program began with three student assistants in 1962. The trial period continued from 1962 to 1965 without a planned program to follow. During the summer of 1965 Henry Becker and Mary Sievert of the Davenport Central High School Science Department developed the guidelines for this program. Implementation of the program began in September, 1965, with the participation of ten students. The program was expanded in February, 1966 from ten students to include twenty-eight students. Some of the students selected in September, 1965, had progressed to the second level by February, 1966. It is expected that some of these second level science assistants will be on the third level by September, 1966. Upon attainment of the third level the science assistant(s) may receive the designation Senior Science Student Assistant. This designation would permit the assistant(s) to aid in the preparation of first and second level assistants during the class period to which they are assigned and at the weekly student science assistants' meeting.

In the course of proceeding through the various levels of assisting, it is assumed that the relationships be-

tween the student and the supervising teacher(s), the student and the peer group, and the student and other science assistants do develop in depth. In addition to the growth of deepening personal relationships with others the student does find himself developing increasing skill and knowledge in the whole field of science. As the student develops his potential, the



The science assistants make molar, molar and normal solutions on the first-level, buffers, indicators and standard solutions on the second-level, and unknowns on the third-level.

supervising teacher(s) finds that the student's assistance to him increases.

In the final analysis, the richness of the experience for the student and the teachers involved should be and is the criterion for the evaluation of this program.

SUGGESTED BIBLIOGRAPHY

A. Books

1. Ansley, A. J., **An Introduction to Laboratory Techniques**. Macmillan and Company, Ltd., 1938.
2. Brooks, Vincent J. and Morris B. Jacobs, **Poisons—Properties, Chemical Identification, Symptoms and Emergency Treatment**, 2nd Ed., D. Van Nostrand Co., Inc., 1958.
3. Farris, Edmond J. and others, **The Care and Breeding of Laboratory Animals**. John Wiley and Sons, Inc., 1950.
4. **Handbook of Chemistry and Physics**. Charles P. Hodgman Ed. Chemical Rubber

MINUTES OF EXECUTIVE BOARD

Ames, Iowa, March 4, 1966, 9:00 P.M.

The meeting of the Iowa Science Teacher's Association Executive Board was called to order by Mr. David Fagle, President.

Guests were introduced: Betty Goettsch, Paul Tweeten, and Roger Volker.

Members present at the executive meeting were as follows:

David Fagle

Kenneth Frasier

Freman Gruber

Thomas Scott

Richard Sweeney

Dick Engelson

A quorum was established and minutes of the December 4, 1965 Executive Board meeting were approved.

Mr. Kenneth Frazier gave the enclosed treasurer's report. Five March 4, 1966 bills were approved and the treasurer's report was accepted.

President Fagle reported as of 3/4/66 there were 264 paid members in the ISTA.

A motion was made to approach ISEA officers on the standing of ISTA with ISEA. Mr. Sweeney and Mr. Scott were appointed to talk with Ray Stevens and Ken Wells to find out if we are affiliated with ISEA. Their report will be made at the April meeting. Motion passed.

A motion was made to have an after dinner speaker during the Fall ISEA meeting and to drop for this year the sectional meetings. This motion was approved on the basis that an outstanding speaker is selected. If a speaker cannot be contacted it was suggested we not have a dinner speaker and concentrate on sectional meetings. An outline of the Fall Science program must be in the ISEA office by May 1, 1966.

The following is a possible list of speakers:

Bill Houser (teacher in Turkey for two years)

Richard Boubjerg (teacher of life science, oceanography)

Dr. Hubert N. Alyea

Sam Hinton

Dr. Ralph T. Overman (Oak Ridge)

Paul Brandwine (Harcourt and Brace)

Paul Blackwood (U.S. Office of Education, Head of Sci. Ed.)

The meeting was adjourned at 10:00 P.M.

Publishing Co.

5. **Handbook for Chemistry Assistants.** Division of Chemical Education of the American Chemical Society. Fischer Scientific Company, 1952.

6. **Manufacturing Chemists' Association, Inc. Guide for Safety in the Chemical Laboratory.**

7. Pieters, H. A. J. and J. W. Greygh-ton, **Safety in the Chemical Laboratory.** Butterworth's Scientific Publications, 1951

8. Rosen, Joseph, **Reagent Chemicals and Standards**, 4th Ed., D. Van Nostrand Co., Inc., 1961.

9. **Safe Use of Electrical Equipment,**

Joint Committee of the National Commission on Safety Education and the National Science Teachers Association, 1951.

10. Sprague, Norman G. **Basic Laboratory Practice**, Chemical Publishing Company, Inc., 1941.

B. Periodicals

1. Drummond, Ainslie H., Jr. "Safety in the School Laboratory" **Science and Math Weekly**, Teacher's Edition. 5:28, April 21, 1965.

2. Youngpeter, John M. "The Use of Student Assistants in High School Science", **The American Biology Teacher** 24:194-195. March, 1962.