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ADVANCED

Science Courses In Iowa

JERRY L. UNDERFER

Fonda

To facilitate the study it was necessary to locate and contact schools which offered advanced science



Underfer

courses. This was done by examining "School Program B" for the academic year 1961-1962 which is on file at the State Department of Education.

Post card questionnaires and cover letters were sent to each of the schools which had courses that might be considered senior science courses and to each school which offered biology to freshmen. The questionnaire asked for the prerequisites of the course being taught and asked whether the respondent would cooperate with further requests for information. Thirty-seven out of forty-eight schools answered the questionnaire.

Eleven high schools had courses which could be considered advanced. Two of the schools indicated that they were unable or not willing to furnish more information. A second letter was sent to the nine remaining schools asking for a copy of their course outlines or a brief description of their advanced course. The outlines were studied and sent back to the appropriate

schools. The results for the schools which sent back course outlines were as follows:

Mid-Prairie Community School at Wellman, Iowa, offers a course in "Senior Science" to seniors who have completed biology, chemistry and preferably physics. The basic requirements are a research paper and a science project suitable to be shown at the Eastern Iowa State Fair. The course was designed to meet the needs of the students each year and has been taught by S. S. Statler.

During the 1961-1962 school year there were five students who were interested in biology. The following were covered during the year:

1. **The Cell** by Carl P. Swanson (from "The Foundation of Modern Biology", series).
2. **Human Physiology**, published by Holt.
3. **Microbiology**, by Pelcran and Reid.
4. One student each morning watched the television course "Modern Biology" at 6:30 a.m. and then gave a report on Friday.
5. Each student read six books during the year and gave an oral report on each book.

A sixth student took the course the second semester and completed a correspondence course in electronics. During the 1962-1963 school year two students took senior science with emphasis placed on nursing. Mr. Statler expected about 16 students to take the course in the fall of 1964. He planned on following the same basic outline with these additions; one day a week was to be set aside for current events from "Science World", "Science and

Jerry Underfer has a Bachelor's degree from Drake University and presently is working on a Master's degree in Science Education. He previously taught mathematics and science for five years in the northwest Iowa schools of Schaller and Fonda, but now is at the University High School in Iowa City. Mr. Underfer is past president of the Pocahontas County Science Association.

Math Weekly", "Scientific American", "Science Digest", "Science News Letter", and other scientific periodicals. **Atomic Structure and Bonding**, published by Lyons and Carnahan and **Atoms, Crystals and Molecules**, by Ainslie H. Dremmond will be used.

Marion Independent had a course in advanced science which was taught by James Risk. Prerequisites for the course were biology, physics, chemistry and algebra. **Basic Physiology** by Fred D'Amour is the text used along with "Scientific American" and **Today's Health**. Mr. Risk has indexed "Scientific American" back to 1948. The students select articles from these periodicals and write a short summary of the article and give a five minute oral report. Future plans include a dissection of a fetal pig.

Maquoketa's Science Seminar, taught by Henry Dickinson, was a course which delved into the study of thirty-eight (one each week) advanced topics. On Monday of each week Mr. Dickinson introduced a new topic. On Tuesday the topic was discussed with each student acting as discussion leader at least three times a year. Open-ended laboratory experiments were performed during a two hour period on Wednesdays. Problems and questions from work-sheets were worked out on Thursdays. A review and summary were conducted on Fridays.

A list of twenty books was used to obtain the information on the various topics mainly from the fields of physics and chemistry.

Pleasant Valley Township High School had an advanced science seminar which was primarily concerned with the development of individual research of scientific topics of interest to the student. Each student had the obligation to choose his own topic, gather pertinent material, and eventually present the topic at one of the bi-weekly seminars.

The course was offered to students who had completed biology, physics, and chemistry by the end of their junior year. A very formal approach was taken to the course by using applica-

tions for admission, student speaker evaluation sheets and a list of suggestions for scientific study and recommended procedures. Mr. John C. Shelton was the instructor of the course.

Decorah's advanced senior science course was confined to the field of biology. The text book used was **Principles of Modern Biology** by Marsland. The course of study included the following:

1. **ECOLOGY**—Lecture and text book on ecology. Compare rocky slopes and grassland - by observation and field trips.
2. **BOTANY**—Counts tomatoes and learn how to estimate size and number using math equations. Streaming of protoplasm. Biochemistry - Chromotography - colors in leaves.
3. **MICROSCOPIC ANIMALS**—by hay infusion and soil. Compare kinds. Compare numbers. Used a number of food controls, etc.
4. **BACTERIOLOGY**—Grow specific bacteria in various culture media. Grow many kinds of common bacteria. Learn lab techniques.
5. **DISSECT FETAL PIG**—Comparative anatomy: Frog and human.
6. **HISTORY OF SCIENCE**—Early, modern and late - by reports and lecture.
7. **PROJECT**—Each student does a Biological project.

Much more laboratory experimentation was utilized than in introductory biology. Guide sheets for each of the topics investigated were provided. Maybelle Brown was the instructor.

Jack Schaefer of Bettendorf has written a detailed course of study for the advanced science course which he has been teaching. This study is on file at the State Department of Public Instruction. The course entails a systematic study of several advanced topics in biology, physics, and chemistry, supplemented by required individual projects and research papers. The research paper must be footnoted, have a bibliography, have correct margins and is bound for reference by future students.

Many local organizations and institutions have provided laboratory equipment and helped the students in their research projects. Among the organizations assisting were Saint

Lukes Hospital, Aluminum Corporation of America, Rock Island Arsenal, Bendix Aviation and local medical doctors.

Mr. Schaefer has found that students with high intelligence quotients and B averages are the only students capable of taking the course. In a re-

cent survey Mr. Schaefer found that none of the former senior science students surveyed felt the time spent on projects was wasted. Over a five year period, seventeen of these students won scholarships or won recognition in state and local science fairs with their projects.

The Case of the Missing Joules - A Chem Gem Necklace

Inspector Sherlock Ohms, of Standard International Yard, was driving across the Wheatstone Bridge in his '09 Maxwell. He was trying to remember Ava Gadro's number so he could call and data for the Policeman's Ball—when suddenly he blew a tire. "OH—Nernst," said Sherlock, "I don't have a tire ion with me, but luckily ammonia short distance from the Ideal Gas Station." (This business was handled by Saul Vent, who, at the moment, was freon bail.)

Just as the inspector emerged from the station, a rubber policeman whizzed by on his Carnot cycle. Ohms knew he was deuteride by, but he wondered watt made him rush so. He shouted atom, but he was gone. Ohms' reaction was instantaneous. By radio activity he learned that Micro Farad, Recipro City's top-ranking rookie, was chasing a joule thief.

Ohms chased Micro down Elect Road, around the Elastic Modulus, back over Salt Bridge and up into Farren Heights. He turned left at the Old Ball Mill, went past the Mono Clinic, the Palladium and all the way to the liquid junction at Endothermic Street. They were almost across the city line when Sherlock's car swerved and crashed into a Van der Waal. The impact splintered the Plancks and punched a big hole in the hydrolysis system. "I note that was going to happen," said Sherlock, "but I'd beta catch up to him." Quickly he volted out of his rectilinear and took up the chase on foot.

He soon came across Micro, standing in a magnetic field, holding Ann Hydrate and Al Doll at bay. "Watts the meaning of this?" queried the In-

spector, and the copper was quick to explain.

"Well, Sir, I stopped in at the Invar Bar, a local dyne and dance spot, for a couple of quartz of Lambert Beer when I noticed Ann Hydrate sitting alone at a two-place log table. I knew some joule thieves had made a radon Ethyl Benzene's country estate, and I spotted one of the Benzene rings on her, along with a para Ethyl's earrings.

"Anode an explanation of this, but before I could torque to her, she was in her coat of rust and out the door. Being true to the Kopp's Rule, I was quick to follow; but when she got into her Monochromatic-8, I knew I was infra tough chase. Fortunately her engine started Fehling just beyond the city limits and I caught her.

"She had led me to the missing joules, and also to her accomplice Al Doll who was about to barium in a hollow common log, under the square roots of this deserted magnetic field. While we were waiting for you, their other partner Cal Orié tried to run mc down with his Mercury. Did that make my blood Boyle! I dodged and hit him with a bag of Boltz . . . man! Did that change his molar concentration!"

"But really, Inspector, there wasn't any trig in catching these joule thieves. I just Van't Hoff on a normal lead—don't you zinc that explains it?"

Inspector Ohms beamed. "Son, you'll go on nights for this!" (In effect this was a promotion—for in Recipro City, nitrates are much mohr than those faraday man.)

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