

OUTLINE OF SCIENCE FOR THE FOUR UPPER GRADES

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FOUR UPPER GRADES
BY
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UNIVERSITY OF
CALIFORNIA

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PREFACE.

The material which is given in these outlines is intended for children in the grades as numbered.

The selection of the subject matter is based upon the author's own experience with children from those grades and is not too difficult. It must be remembered that a title of a section in a science book does not indicate the method of presentation, thus the same title might be found in a book intended for the lower grades as in a book for college students, but the treatment of the subject matter would be entirely different. The best results are obtained by presenting a subject in a manner which brings it just within the capability of the pupils; working them up to their highest efficiency, but stopping short of their limitations.

The needs of the child are heat, air, water, food, and the conveniences and comforts of civilization. For that reason the subject matter has been divided into ten general sections, while the outline of the complete course has been divided into work suitable for the fifth, sixth, seventh and eighth grades. This outline is offered as an aid to those who wish to develop their own courses. Four books, one for each of the grades mentioned, and based upon these outlines, are in the process of preparation by the same author.

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The divisions of the subject matter are as follows:

- | | | | | |
|-------------------------------|----|-----|------|-------|
| 1. The Sun, Stars and Planets | V. | VI. | VII. | VIII. |
| 2. Light | V. | VI. | VII. | VIII. |
| 3. Heat | V. | VI. | VII. | VIII. |
| 4. Air | V. | VI. | VII. | VIII. |
| 5. Water | V. | VI. | VII. | VIII. |
| 6. Plants and Animals | V. | VI. | VII. | VIII. |
| 7. Food | V. | VI. | VII. | VIII. |
| 8. Mechanics | V. | VI. | VII. | VIII. |
| 9. Magnetism and Electricity | V. | VI. | VII. | VIII. |
| 10. The Arts and Industries | | | | |
| (applications of science) | V. | VI. | VII. | VIII. |

There is not only a gradual transition from the work of one grade to the work of the next higher grade, aided by a brief summary of each topic, but there is also an easy development of each topic from the preceding one. For example: (1) The sun produces (2) Light, (3) Heat, affects the (4) Air, and the (5) Water, causing (6) Plants and Animals to live, produces (7) Food, has gravitation, which is considered under (8) Mechanics, has an effect upon (9) Magnetism, while aiding many of the (10) Industries. The material has been carefully selected, while the development proceeds from topic to topic and year to year.

PERCY ELLIOTT ROWELL.

Berkeley, California.

March, 1913

INTRODUCTION.

The teaching of Science in the grades has been attempted many times and in various ways, with different degrees of success. Several of the difficulties have arisen from the fact that only a narrow field of science has been presented and that field has usually been too highly specialized. The temptation to elaborate a single course produces a result, which while complex with details, remains narrow in its field. The child requires the simpler parts of all the branches of science.

All children of the grades have many common experiences. The youngest child bathes, eats, turns on the electric lights, uses an electric car and experiences all of the changes in the weather alike with the eldest child. To confine the younger child to a study of any one thing or group of things, is to deprive him of natural opportunities of learning. The beginnings of all branches of science should be given in order that the child may, as soon as possible, obtain a bird's-eye view of the field of general knowledge. He then can see the interrelations of the different facts and begin really to think and to reason.

The science which is the most valuable to the child is that which explains the phenomena of the environment—the science of common things—the science of everyday life. Therefore science, even in the grades, should deal with its common and simpler applications. Science will lose none of its cultural value but will become a living thing.



OUTLINE OF SCIENCE FOR THE FIFTH GRADE.

THE SUN, STARS, AND PLANETS. V.

1. **Time of sunrise and sunset.**
 - a. How it varies
 - b. At the same hour twice a year.
2. **Experiments.**
 - a. The definition of experiments.
 - b. The value of experiments.
3. **Direction of the North.**
 - a. North star located by means of the Great Dipper.
 - Experiment 1. To locate the north by means of the north star.
 - Experiment 2. The movement of the Great Dipper. Chart.
 - b. North by means of a shadow at local noon.
 - Experiment 3. To locate the north by means of a shadow.
 - Experiment 4. To locate the south by means of a watch.
 - c. The north side of trees has the most moss.
4. **North, south, east, and west.**
5. **North-east, north-west; south-east, south-west.**
6. **The Direction of sunrise and sunset.**
 - a. What was it today?
 - Experiment 5. The direction of sunrise and sunset by shadows.