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THE SUBJECT-CENTERED CURRICULUM

AND ITS IMPROVEMENT (pag.95 a 118)

THE NATURE OF THE CURRICULUM

The activities that are provided for students by the school constitute its curriculum. It is by means of these activities that the school hopes to bring about changes in the behavior of students. What these changes in behavior are is determined by the philosophy of the school. If the school is regarded principally as a conserving agency, it will plan its program so that students behave in ways that are consistent with the cultural heritage. If it conceives its role in terms of promoting the interpretation and refinement of our democratic way of life, it will seek to provide the kinds of activities that are designed to develop in students the understandings, attitudes, abilities, and skills that it believes will bring about such interpretation and refinement. In previous chapters, the various current philosophies were examined. The development of an appropriate philosophy is held to be one of the most significant tasks of the school. But without

implementation a philosophy is dead. Really, the test of the philosophy is to be found, not in the statement itself, but rather in the way in which it becomes incorporated in the behavior of the students. It follows, then, that the activities which the school provides are actually the heart of the high-school program. In this and succeeding chapters, this problem will be dealt with critically. Our present task is to examine the most time-honored and prevalent conception of the curriculum, which holds that student activities are to be determined and organized upon a subject-centered basis.

#### WHAT IS A SUBJECT?

A subject, reduced to its simplest terms, is merely a convenient way of organizing race experience to make it effective for use in interpreting new experiences. When we speak of the organization of race experience, we refer to the system into which the various race experiences fit. This system is built by the specialist and is by its very nature characterized by logical relationships. For example, the facts, fundamental laws, and principles which form the basis of the subject of physics have been painfully and laboriously accumulated for many centuries, each scientist beginning where his predecessor stopped, discovering new problems, testing, and verifying, and finally fitting the new discovery into a logical system. Sometimes the newly discovered facts or principles will overthrow the existing system, in which case a new one must be built which forms a better structure for the classification of knowledge. For example, the experiments of Torricelli, Pascal, and others with the rise of liquids in exhausted tubes led to the important discovery of atmospheric pressure. Before this time, the rise of liquids in exhausted tubes had been explained by saying that "nature abhorred a vacuum". The newly discovered facts and principles had to be classified in relationship to the general laws of pressure and weight in liquids and finally to

the kinetic theory of gases. The important point to consider in this connection is that the essence of the subject of physics is systematic organization. One has only to examine any modern textbook in physics to see how closely this type of organization is followed. Other systems of knowledge such as chemistry, astronomy, and the like, are all characterized by the accumulation of facts and principles organized into a system.

In fields other than science, the general basis of organization is the same. In geography, the system may be developed around the "earth-round" concept, regionalism, or a number of other unifying ideas, but essentially the result is the same. The subject is organized in terms of the relatedness of the material, rather than in terms of the order of experiencing. In history, the organization is usually chronological, though the treatment of the precise order in which events occur may be subordinated to large related movements or epochs. This is but another way of building a system. Again the principle involved is the same. In mathematical subjects, the situation is not essentially different. The theorems of geometry all fit together into a related whole, which is determined, not by caprice or individual experiencing, but by logical relationships determined by the specialist and the nature of the subject itself.

These logical systems of knowledge have been taken over by the school and utilized as the subject matter of learning. This means that the material must be simplified in terms of the ability, maturity, and experience of the learner. It has to be made available for large numbers of students of varying abilities and interests. The textbook has served as the most approved instrument for simplifying, illustrating, and adapting the subject-centered curriculum to the learner. It has been regarded as the connecting link between the present ongoing experience of the student, and the highly perfected or-

organization of race experience. The important thing to remember is that the present experience of the learner is subordinated to organized race experience. The idea of the textbook maker and the teacher is to "psychologize" the subject matter in such a way that the student learns it effectively. The test of the success of teaching is whether or not the student eventually masters the system and can use it in interpreting present and future experiences. It is fair to say that many high-school students are not able to use the system effectively. To them it remains external and dead.

#### ARGUMENTS FAVORING THE SUBJECT-CENTERED CURRICULUM

Why has the subject-centered curriculum gained such wide-spread acceptance in the high school? Why has the so-called direct experience curriculum made so little headway in curriculum development? There are a number of reasons for this situation which cannot be ignored by the curriculum maker. Some of the more important of them are analyzed in succeeding sections.

SYSTEMATIC ORGANIZATION IS ESSENTIAL TO THE EFFECTIVE INTERPRETATION OF EXPERIENCE. Just as the scientist utilizes systematic organizations of facts and principles as tools for making new investigations and discovering new meanings and applications, so the individual interprets his present experience by relating it to concepts, generalizations, or principles that have been built up by the race. The meaning of a present experience is never fully understood until it is effectively related to other experiences, both individual and racial. Current events get their full meaning only in terms of an appropriate historical context. The child does not fully understand the simple experience of touching a burning candle until the meaning of "burning" is understood. When this is seen as an example

of oxidation that goes on in a wide variety of ways, the experience takes on many new meanings that are effective in controlling and interpreting new experiences. In this way, a system is built up that has the optimal predictive values. The proponents of the subject-centered curriculum hold that these ready-made systems are necessary for the interpretation of experience. The individual cannot possibly discover the connections himself. Hence, ready-made organizations conserve time and energy, and serve as guides to future experience. It isn't likely that the student will be able to work out for himself a better system of organization. Therefore he had better be taught to use the one that the race has worked out. So runs the argument of the proponents of the subject-centered curriculum.

THE ORGANIZATION OF THE SUBJECT-CENTERED CURRICULUM IS SIMPLE AND EASILY UNDERSTOOD. The scope of the curriculum is usually defined as the areas or functions of living which the school utilizes for the purpose of achieving its objectives. When subjects are rejected as the basis of curriculum organization, the problem of determining scope is a very difficult one. Under a subject organization, it is merely a matter of deciding what subjects are to be offered. In practice, this usually involves grouping those subjects that are thought to be indispensable to all students together as constants, and other subjects that are offered to meet special interests or needs of students as electives. For example, English and physical education would in most schools be regarded as constants while Latin and French are on the elective list. In order to simplify further the curriculum pattern, many schools have arranged their offerings in groups (sometimes referred to as curriculums) of subjects in terms of specialized purposes of students, e.g., college preparatory, commercial, industrial, scientific, or general.

Within these patterns the separation between constants and electives is, of course, maintained. Thus, in small compass, the total scope of the curriculum is schematically presented. (\*)

The problem of sequence, by which is meant the order in which experience (or subject matter) is presented to students, presents few difficulties for the subject-centered curriculum maker. National committees and textbook makers have, in general, solved the major problems in this field. While there is considerable variation, the sequence of subjects within areas is fairly constant. For example, in the area of science, subjects usually appear in the following order: general science, biology, physics, and chemistry. In the social sciences, world history (one or two years) usually precedes economics, sociology, or problems of democracy. In many states, American history is required by law in the eleventh year of the senior high school. These sequences are justified on the grounds that background is needed for the understanding of current problems. In mathematics, simple algebra or general mathematics, usually precedes plane geometry, which in turn always precedes solid geometry or trigonometry. These illustrations are intended to show the relatively simple manner of determining sequence in the subject-centered curriculum. It is merely a matter of arranging predetermined blocks of organized subject matter. Since these blocks are relatively self-contained, any block may be shifted

(\*) See the Report of the Committee of Ten on Secondary School Studies, New York, the American Book Company, 1893, pp. 37-47 for an interesting illustration of the way scope and sequence are determined. The reader will be struck with the similarity of programs of studies submitted by the committee and those of present-day schools. The pattern set by the committee has persisted with only slight modification for half a century.

easily without disturbing other blocks, if existing arrangements do not prove satisfactory.

Within a given subject, the scope and sequence is largely determined by the textbook maker. He decides what generalizations, problems, facts, and information are appropriate to the subject and the order in which they are to be presented. Frequently the textbook writer has been guided in this task by scientific studies of vocabulary, reading comprehension, student maturity, and the like. At any rate, scope and sequence are clearly determined in advance of classroom teaching. In schools that have developed courses of study, the situation is practically identical. The course-of-study maker, utilizing the same sources as the textbook writer, prescribes the general scope of the subject and the order in which the subject matter is to be presented.

This discussion has, of course, oversimplified the problem of scope and sequence as it is solved in the subject-centered school. It is not easy to select the most appropriate textbooks, and there are knotty problems involved in determining which subjects shall be required, which elective, and for what group of students.

In a well-organized subject-centered school the teacher fits neatly into the system. He is guided by the program of studies, with scope and sequence clearly outlined, and a course of study or textbook which, in his specific field, prescribes the ground to be covered (scope) and the order in which subject matter is to be presented to students (sequence). Of course, not all of his problems are solved. He must decide how best to present the material, what supplementary materials are to be utilized, whether to organize the material upon a day-to-day basis or for a longer period of time, and other important questions. The essential point to keep in mind is that the basic structure, or framework, is predetermined. Actual classroom instruction must fit into this general structure.

For the student, the scheme is also clear and intelligible. Having determined the "curriculum" he wishes to pursue, he may readily see the task before him. Sixteen units for graduation, a given number of which are required, define his program. As he "passes" courses, the appropriate units (usually defined as a subject pursued for a year with five class meetings per week) are duly recorded. If he has the misfortune to fail a unit, the difficulty can be remedied by "making it up", without disturbing the general pattern of units which he has "passed".

Since the subject matter is largely predetermined, there are few decisions that have to be made by the student in the day-to-day work of the classroom. He receives his assignments of the ground that he is to cover and if the teacher is clear about this, he knows each day what tasks are to be done and he can budget his time accordingly. Homework is facilitated by definite assignments from the text or workbook.

Thus we see that in essence the subject-centered curriculum by its very simplicity facilitates the development of a smoothly running organization which is easily understood by administrators, teachers, students, and their parents. Its very simplicity is undoubtedly one of the factors that has led to its acceptance and perpetuation.

THE SUBJECT-CENTERED CURRICULUM IS EASILY CHANGED. In most schools, the curriculum is "revised" by rearranging the blocks (units or subjects), by adding or dropping subjects, and by adopting new textbooks. Thus, the staff may decide that chemistry should precede physics, that "consumer science" should replace physics for non-college-bound students. New subjects such as pre-flight aeronautics, conservation, safety education, and consumer education may be readily added. Usually these new subjects are made elective so that it is not necessary to drop other subjects. Statistics



gathered during the past few decades show that subjects are dropped once they get established in a school, and that new subjects have been added at a rapid rate. New subjects have increased high-school offerings at least five-fold during the past two decades. The ease with which additions may be made is apparent. If it involved laborious examination of the entire offerings of subjects and content within subjects, fewer additions would be made; but since usually this is not done, subject offerings increase by leaps and bounds with a minimum of disturbance and confusion. When textbooks have been in use for the period prescribed by law or by a ruling of the board of education, it is a simple matter to select new ones upon a district, or state-wide basis. In this way the subject-centered curriculum is kept relatively up-to-date.

THE SUBJECT-CENTERED CURRICULUM IS EASILY EVALUATED. Since the principal concern is covering ground prescribed by courses of study or textbooks, the evaluation program is centered upon the determination of mastery of the subject matter. Each segment (unit, course, or subject) has its own peculiar demands and these are met through standardized testes, essay-type examinations, and the like. In some cases, uniformity on a city or county-wide basis is secured through the functioning of committees of teachers who prepare the final examinations, or by standardized tests prescribed and administered by the administrative staff. State-wide scholarship tests further promote uniformity for they are usually based upon the textbooks or courses of study most commonly used. Teachers are loath to depart from the textbook lest the students fall down in the tests.

THE COLLEGES HAVE GENERALLY APPROVED AND PERPETUATED THE SUBJECT-CENTERED CURRICULUM THROUGH ADMISSION REQUIREMENTS. Traditionally, students have been admitted to college upon the basis of units or credits in specified subjects or by entrance examinations cover-

ing the various subject fields. It is logical that this should be the case, for college curriculums are almost exclusively subject-centered. The questionable assumption has been made that certain patterns of units are essential background for successful achievement in college. Naturally high-school principals desire earnestly that their graduates succeed in college. The best way to insure this success is to meet fully the demands of the colleges as to desirable patterns of units. High-school programs of study show clearly this influence. If a high school can offer only a small number of subjects, the demands of the colleges are met first, even though only a small percentage of students may attend college.

In general, the colleges resist accepting subjects such as general science, general mathematics, general language, and the like, for the fulfillment of college-entrance requirements. The practical arts and vocational subjects have also been looked on with suspicion, especially by certain of the Eastern colleges. This attitude has tended to hamper the development of these subjects and to promote a sharp dualism between the programs of the college-bound student and his fellow who completes his formal education in the high school. The colleges have also offered resistance to the acceptance of credit in "fused" or "core" courses. It is not unusual for schools that have unified English and social science in terms of a single course, to have to "unscramble" them to conform to the requirements of the colleges for specified numbers of units in English and history. Progress is being made along this line, but the fact still remains that the colleges are a potent influence in maintaining the status quo of the high-school curriculum.

THE SUBJECT-CENTERED CURRICULUM IS GENERALLY APPROVED BY TEACHERS, PARENTS, AND STUDENTS. Since the subject-centered curriculum is in use almost universally in high schools, colleges, and universities, it follows that teachers and parents are been discussed previously, have been trained specifically to teach one

or more subjects. This means that in college they have built up "majors" in these fields by means of sequences of specialized, logically organized courses. To these have been added "special methods courses". The prospective teacher is, therefore, equipped to go into the high school and teach specific subjects. They do have some background in modern psychological and educational theory, but this is usually at variance with their academic preparation and their student teaching, which is almost inevitably carried out in a conventional subject field. As stated before, they discover that their preparation fits well into the program which they find in operation in the schools in which they secure jobs. The pressure of this practical situation makes impossible the functioning of the theory of the way learning takes place and the way learning experiences should be organized, and the teacher readily and happily accepts the subject-centered system as unavoidable and even desirable. In like manner, since all of the formal education of parents, and generally of students, has been in subject-centered programs, there is a general assumption that the system is sound and should be continued. They tend to distrust courses labeled "core", "orientation", or "general education" as passing fancies and frills. They are apt to regard trips, excursions, student planning, projects, and the like, as conducted tours or entertainments which are amusing, but through which little is learned. The covering of ground in textbook and the mastery of the subject matter contained therein is more tangible and more in keeping with the conception of real learning to which parents and students are accustomed.

#### ARGUMENTS AGAINST THE SUBJECT-CENTERED CURRICULUM

In spite of its universality, its general acceptance by the colleges, parents, teachers, and students, and its respectability in terms of the cultural heritage, the subject-centered curriculum has been under fire for some time and many

successful attempts have been made to improve it. Some of these are within the patterns of "subjects" while others break more or less completely with traditional conceptions of curriculum organization. Before discussing these changes, let us examine in some detail the general criticisms that are being made of the subject-centered curriculum.

THE SUBJECT-CENTERED CURRICULUM IS PSYCHOLOGICALLY UNSOUND. It would be absurd to deny the value of systematized race experience as a vital and necessary instrument for educating the student. Such organization is the result of the struggle of the human race toward civilization. Without these formulated race experiences, man would be little better than the lower animals because he would not be able adequately to profit from the experiences of the past. Education is essentially a process of growth. Starting from a world that William James characterized as a "blooming, buzzing, confusion", the child gradually extends his experiences, both first-hand and vicarious, to the point where he is able to weave unity and consistency into his world. He gradually brings order and system into his life. In this task, race experience is invaluable. He draws upon subject matter to solve his problems, meet his needs, and extend his interests. From the time he builds block houses on the floor, to the establishment of a home of his own, he is drawing heavily upon the experiences of the race. Very early in life, simple stories and pictures of the way other people live help him to understand better his own home. Gradually as he develops more and more skill in reading, he extends the range of his environment. He builds new concepts of "houses", "homes", and "family life". As he is confronted with problems, he is helped to meet them by finding out how others have solved similar problems. As he becomes more mature, he is able to use race experience more and more effectively. Gradually he comes to the point where systematic treatments of science, mathematics, social science, art, are the most effective tools he can use in solving the problem of establishing his own home. He draws

from these systems of knowledge to plan, build, and finance his home. His intellectual and aesthetic values are recreated through the constant use of organized subject matter. He has reached the stage in which the psychological and the logical become one and the same thing. But note that direct, first-hand experience is always antecedent. Organized subject matter is the instrument for enriching and extending it. It is not the end, or the goal. The goal for the student is the resolution of tensions, the solving of problems, the satisfaction of needs which grow out of the interaction of a living, dynamic, purposive organism in an equally dynamic environment.

There is an exceedingly wide gap between the experience of the child and the logically formulated experience of the race. This means that while logical relationships are essential in the organization of experience, they cannot be imparted ready-made to the child, as John Dewey pointed out many years ago and is equally applicable today. He stated: "Facts are torn away from their original place in experience and rearranged with reference to some principle. Classification is not a matter of child experience; things do not come to the individual pigeonholed. The vital ties of affection, the connecting bonds of activity, hold together the variety of his personal experiences. The adult mind is so familiar with the notion of logically ordered facts that it does not recognize - it cannot realize - the amount of separating and reformulating which the facts of direct experience have to undergo before they can appear as a "study" or branch of learning. A principle, for the intellect, has to be distinguished and defined; facts have had to be interpreted in relation to the principle, not as they are in themselves. They have to be regathered about a new center which is wholly abstract and ideal ... The studies classified are the products in a word, of the science of the ages, not of the experience of the child".(\*)

(\*) - John Dewey, *The Child and the Curriculum*. Chicago, University of Chicago Press, 1902, pp. 10-11.

The difficulty with using this ready-made organization of race experiences has been emphasized by so many writers that we need only to mention it briefly here. There is the ever-present danger that the learning which results from such organization is apt to be what is popularly called "book learning". The students learn symbols: words, without having back of them meaningful experiences. They learn to recite definitions from the textbook glibly, without having the slightest notion of their real meaning. A striking example of this point is found in the familiar story of the failure of many students living in a certain city located on the Mississippi River, to make any connection whatever between the Mississippi River about which they studied in their textbooks and the stream of water which flowed past their doors. The textbook study evidently had failed to function in the life and experiences of the student. Even though he learned to recite the material to the complete satisfaction of the teacher, he merely acquired verbal knowledge which was soon forgotten because it failed to function in experience. In a real sense it served effectively to separate the student from his world.

Such is the indictment against the logical organization of subject matter. Society has sought to transmit the experiences of the race in the form of a definite logically organized curriculum with the result that the gulf between the growing child and society has become wider and wider as race experience, because of the increasing complexity of civilized social life, makes adult activities more and more remote from the experiences of child-hood.

Even though it is recognized in the light of the newer psychology that such systematized knowledge is often far from experience, particularly of adolescence, yet this is very different from saying that such knowledge cannot be made to function in experience through proper treatment. Race experience cannot and need not be ignored. Through the student's ability to use language, experience remote in time and place can be made vital. "Book learning" deserves all the scorn and ridicule which it has received, but the remedy lies along the line of vitalizing race experience rather than discarding it.

Thus logical organization properly utilized implies not only an educational ideal of a remote future but is very significant in determining a direction which the educative process should take. It becomes, as Dewey points out, a guiding principle for dealing with the present development of the student's experience. It affords a guiding principle in interpreting and giving direction to the activity of the student. In succeeding chapters we shall attempt to show more clearly how this may be accomplished.

THE SUBJECT-CENTERED CURRICULUM IS REMOTE FROM THE DEMOCRATIC VALUES THAT THE MODERN SCHOOL SEEKS TO ACHIEVE. Even though we grant the merits of logical systems of knowledge in helping the student to meet his problems, and eventually to refine his own conceptual system, it must be emphasized that this value is not achieved directly but rather through helping the student to use race experience effectively. The center of orientation is the student and his world rather than the refined system of knowledge of the world of adults. The democratic school is seeking to build characteristics of personality such as creativeness, cooperativeness, social sensitivity, ability to think reflectively, and tolerance. These values are best achieved when the actual vital experience of the student in living his life in the home, the school, and the community is made the center of his curriculum. To attempt to achieve them by centering exclusively upon accumulated race experience tends to promote mere verbalism and frequently to set up a dualism between the life of the student and the work of the school. Achieving democratic values is a matter of living them, and of reflecting upon the experiences that are being lived.

One reason why so many very good statements of democratic objectives have failed to influence practices is because the school has adopted these values but has failed to change the curriculum in order to use the most effective means of achieving the ends. It associates thinking with the mastery of facts on the plausible grounds that facts are needed with which to think. It approves highly of social sensitivity, cooperativeness, and tolerance as ends but assumes that ideas about them will take effect in conduct without actual living experience. The time-worn analogy of the correspondence course in swimming applies here. Each is likely to be equally ineffective.

THE IMPROVEMENT OF THE  
SUBJECT-CENTERED CURRICULUM.

Those, who by disposition, training, and experience are partial to the subject-centered approach to curriculum making will probably feel that the writer has not been fair to this time-honored, and generally accepted basis. Admittedly, for purposes of exposition, the traditional subject organization has been the center of the discussion up to this point. And certainly those who are familiar with actual school practice will be quick to admit that the picture has not been overdrawn as the subject-centered curriculum works out in vast numbers of schools. It would be a mistake to assume, however, that many improvements that tend to minimize the difficulties are not now under-way. Some of the more radical of these will be discussed later under the broad-fields and unified-studies type of organization. These are still regarded as subject-centered but give a much more significant place to the first-hand experience of students. Our present purpose is to discuss briefly some illustrations of the vitalization of subjects as such. These illustrations are typical trends, the counterpart of which are probably to be found in all fields. The reader will be able to supply additional illustrations in his own field of specialization.

**MATHEMATICS.**

During recent years, plane geometry has been vastly improved through the "nature of proof" concept that has been pioneered by Harold Fawcett, and worked out in the Ohio State University School. Instead of stressing the conventional theorems, he develops the nature of proof, particularly the place of definitions and assumptions in relation to the conclusions that are reached. Students are taught to be critical concerning radio and newspaper advertising, the sermons that they hear, the articles that they read, and in their discussions with their fellows. Subject matter is



drawn from the daily living of the student. He comes to see that the methods of the mathematician and of the scientist may be generalized to apply to all aspects of living. Evidence tends to show that when geometry is taught in this manner, significant changes in behavior take place in the student. He learns to analyze evidence, distinguish facts from assumptions, recognize both the stated and unstated assumptions that are essential to a given conclusion, evaluate assumptions, and evaluate arguments. Finally, he learns "constantly to re-examine the assumptions which are behind his beliefs and which guide his actions". Procedures similar to this were followed in a number of the schools of the Eight-Year Study. Students who were so trained in exact thinking apparently did somewhat better work in college mathematics. This indicates clearly that wide departures may be made in conventional practice without impairing the chances of college success.

#### CHEMISTRY.

The field of chemistry is another area in which significant changes have taken place. A recent textbook, the subject matter of which was worked out experimentally in certain of the Denver, Colorado, high schools by the authors, break almost completely with the conventional logical organization. It is organized in terms of units centering around (1) the Chemistry of the Individual, (2) Chemistry of the Home, (3) Chemistry of the Community. Typical units under the first classification are (1) drugs and medicines, (2) cosmetics, (3) clothing, (4) chemical hobbies, (5) vocations relating to chemistry. First-hand experience of students is drawn upon throughout the treatment. That the authors are not willing to break completely with conventional logical organization is evidenced by the fact that the first ninety-three pages of the text are given over to the "essentials of chemistry". In a sense, of course, the total arrangement of the book is just a newer kind of logical organization.

## SOCIAL SCIENCE.

Perhaps the social science field has undergone more extensive reorganization than any other. Instead of the conventional course in the principles of economics, South Pasadena offers a semester course entitled "Current Economic Problems" which deals with such problems as "How may I become an intelligent consumer?" "How can we raise our level of living through improved production methods?" "Why is it necessary for the Government to step in and regulate business?", "How does the Government foster the development of American Industry and agriculture?" and "How may we make our savings work?". In Tulsa, instead of the conventional course in American history, a course entitled, "America, Today and Yesterday" is given. The following problem areas are included, (1) Democracy Engages in Social Reform, (2) Democracy Engages in Social Conflict, (3) Economic Revolution Overtakes Democracy, (4) Democracy Establishes a World Power, (5) Reforming Democracy - the Progressive Era, (6) Mobilization to Make the World Safe for Democracy, and (7) Democracy Again Engages in Social Reform. It is evident that there is a general chronological sequence in the above list of "problem areas", but conventional logical structure would appear to be subordinated to a more functional treatment of problems of contemporary living.

In Moultrie, Georgia, the teacher and students outlined a number of basic problems for which they wanted to find solutions. These included the following:

1. What are the services of the city, county, state, and national governments?
2. What are the obligations a citizen owes to his local, state, and federal governments?
3. What are some of the most important social problems found in our community?
4. Has the course opened for you any new opportunities for understanding how better to make a living in Moultrie?
5. During our excursions into the community, has your attitude toward the school changed at all?

On the face of it, this list of problems does not seem much different from the ordinary textbook course in civics. It does, however, differ significantly from such courses in at least three respects. First, it was cooperatively planned; second, it was oriented directly in terms of the life of the student in his community; and third, its subject matter consisted largely of first-hand study of the institutions, agencies, and organizations of the community itself. In all, some twenty organizations were visited by the class and studied intensively in terms of their contributions to the life of the community.

#### HOME ECONOMICS.

In the field of home economics, the conventional courses in sewing and cooking are being subordinated to courses dealing with practical problems in home living. One such course is composed of the following units: "(1) Our homes of yesterday and today, (2) Founding a home, (3) Maintaining a successful home, (4) Making the most of oneself, (5) Providing for the advancement and higher life needs of the family, (6) Making good use of our time, (7) How the home and community are related, (8) Keeping the family in good health, (9) Our part in the community health program, (10) Caring for the patient in the sickroom, (11) How heredity and environment influence the child, (12) Caring for younger children, (13) How the child grows and develops, (14) Educating our children, (15) Our responsibility to all children, (16) Planning and furnishing the home, (17) Caring for our home, (18) Selecting and caring for the equipment of the home, (19) Good housing for all, (20) Using the family income, (21) Better buy-manship in the home, and (22) Laws that affect the home".

The author states that the above units are divided into problems, each of which becomes a lesson. Enrichment is secured by the introduction of concrete experiences of students. This is an example of a teacher-planned program, which retains most of the elements of logical structure that are characteristic of the subject-centered curriculum. The material, however, has been oriented in terms of the problems likely to be faced by the student.

**INDUSTRIAL ARTS.** In the field of industrial arts, similar reorganization in terms of the practical problems of living is taking place. The traditional system of building skills by the introduction of increasingly difficult operations arranged sequentially, is yielding to a project or problem approach that is oriented to the needs and problems of the individual student. The general shop provides for orientation into a wide variety of industrial processes, and the use of various media, such as leather, textiles, ceramics, metal, plastics, and the like. The war accelerated the trend toward the adaptation of the program to the needs of students in this field. Model-plane building, shop mechanics, power machinery operation, etc., have come rapidly to the front. This movement has also tended to stimulate cooperation with other areas such as science and mathematics in the giving of courses in preflight aeronautics, radio, and electricity.

**ENGLISH.** An illustration of how the field of English has reached out into other areas in order to break down the traditional organization of composition and literature, and to provide vital experiences is reported by Principal H.A. Ferguson of the Montclair, New Jersey, High School:

A sophomore English class was set up on somewhat of an experimental basis. With two periods available each day, these pupils have had special opportunities to go to the museum, to visit other classes in the school as an aid to the choice of next year's subjects, and to hear talks by teachers and outsiders on various topics. Each pupil has a ten-week period of using Mondays for a project of his own choice on which he later reported to the group. Model planes, boats, and catapults were made in the shop; a lamp and a dress were made. One girl got a start on typewriting; several read books they had missed. A group worked together to give a scene from Clarence, while a smaller group worked on photography within and without the school. A project was carried through on

the general subject of War. Through it, the pupils began to see what discussion is, what propaganda is, and that some issues are too big for final decisions.

This course would seem to illustrate the complete abandonment of logical organization. There is no apparent thread of continuity which is to be found in most subject-centered courses. It illustrates also how one field draws heavily upon many others. When a course reaches out into as many diversified areas as this one appears to do, "English" becomes merely a convenient label rather than a category that defines the scope and sequence of the experiences that are included.

#### OTHER FIELDS.

No attempt has been made in this rapid survey of innovating practices in subject-centered curriculum to cover all of the subjects. Similar illustrations could be given in the field of modern languages where in some quarters there is a tendency to subordinate the actual learning of a language to the understanding of a culture and its relationship to other cultures. Fine Arts courses have been broadened to include work in a wide variety of media, and many have lost their systematic character that was common a few years ago. Health and physical education programs are beginning to stress personal hygiene, from both the physical and mental standpoint, nutrition and diet, remedial instruction, and the like. Many have lost their formal character.

The discussion up to this point has been concerned almost exclusively with the subject-centered curriculum, its essential character, and the various ways in which it is being changed. The discussion of changes has been limited to those that still retain the subject as the basis of organization. We now turn to the trend toward the breaking down of subject boundaries both within fields and among the various fields.

## THE BROAD-FIELDS CURRICULUM

Like many other terms in education, "broad fields" has been given a number of interpretations. To some, it means the grouping of the students' curriculum experiences around major areas of living, or as Hopkins puts it, "major trunk lines". As an illustration of this procedure, Harap's classification will serve. After a thoroughgoing analysis of possible major categories for curriculum organization, he proposes that curriculum experiences be grouped around the following headings. (1) Living in the Home, (2) Leisure, (3) Citizenship, (4) Organized Group Life, (5) Consumption, (6) Production, (7) Communication, (8) Transportation. In practice, such "areas of living" have been used as a technique of curriculum making, rather than as a basis for organizing the curriculum. In other words, after analyzing and classifying curriculum experiences in terms of these major categories, they are regrouped in terms of conventional subject fields. Thus, while these categories may serve to enrich subjects, they are not, in any strict sense, a basis for organizing the curriculum. Especially is this true in the senior high school, where subjects are more firmly entrenched. This trend toward utilizing areas of living in curriculum development is part of a movement to discover ways of organizing curriculum material that are more closely related to the problems, interests, and needs of the student, and of the culture. In Chapter VII an analysis and evaluation of this trend will be made.

"Broad fields", as the term is interpreted in the present context, is restricted to refer to the uniting or "fusing" of separate subjects within a given subject-matter field. A common example of this type of organization is general science, which frequently contains elements of physics, chemistry, biology, anthropology, physiology, and the like, often depending upon the interests of those who organize the course. Broader, more inclusive topics are utilized than is the case in a particular science subject. For example, the treatment of a topic such as water in a physics course

might be limited to hydraulics. In a general science course, it would deal not only with pressure, density, and the like, but also with its chemical properties, its role in plant and animal life, its effect upon man and his environment. Such general science courses have long been regarded as appropriate to the lower grades of the high school. More recently, courses have been organized in the senior high school which do not differ materially in organization from the more elementary courses. Sometimes these courses are labeled "general physical science". In most schools they are regarded as more suitable for the non-college-bound student.

From the conception of organization set forth above, it is only a step to the attempts that are being made to secure a similar unity among all of the subjects of the curriculum. The Ohio State University High School for a number of years organized its curriculum in six broad fields as follows: (1) Science, (2) Mathematics, (3) Social Science, (4) Language, (5) The Arts, and (6) Health and Physical Education. Through group planning an attempt is made to secure a unity within each of these fields. Elementary teachers are included in the planning groups. In some cases, this has resulted in an almost complete obliteration of separate subject-matter lines within fields. In others, the lines have become distinctly blurred, as for example, the boundaries between algebra and geometry. The core has also contributed further to the disintegration of subjects.

The University of Wisconsin High School a number of years ago adopted the broad fields of Health, Community Living, and Use of Leisure and Vocation, as a basis of organization. The plan was never fully worked out, however, and the categories tended to serve as centers for grouping subjects. The John Burroughs School grouped its senior high-school offering in six categories as follows: (1) Arts, (2) Science and Mathematics, (3) Social Studies, (4) Vocations, (5) Language, and (6) Physical Education. Note that all of these

fields, with the possible exception of "Vocations", are familiar subject classifications, though the content may differ materially.

Why this trend toward the broad-fields curriculum? It is clearly a trend toward a more functional, unified conception of the learning process. That many educators erroneously applied the term "integrated courses" to broad-fields programs is an indication that such courses were intended to break down the water-tight compartments between conventional school subjects. In other words, the trend toward regarding the student as a whole, and all knowledge as having significance for learning, inevitably leads to greater unity in the curriculum. The broad-fields program is just a step in the disintegration of separate subjects. The teacher who is sensitive to the social implications of the subject which he teaches and to the nature and needs of the learner finds great difficulty in staying within his subject. But the problem cannot be solved satisfactorily by one teacher alone, or by all the teachers of a school working independently and exclusively within their respective subjects. If a truly functional broad-fields program is evolved, it must be through the active cooperation of the entire teaching staff. In other words, it must be the result of a comprehensive study of the entire school curriculum. Otherwise, it becomes merely a new label to put on old subject-matter content.

It is apparent from the above discussion that there is a distinct trend toward broadening the scope of subjects and making them more functional. This tendency has not stopped with the unification of the various subjects within a given field, but has extend to the disregarding of the boundaries among the various fields. This movement has, for the most part, been identified with the core curriculum and will be discussed in a succeeding chapter.

#### SUMMARY

The subject-centere approach to learning is almost universally practiced in the American high school. It has been



assumed that logically organized race experience is a satisfactory basis for organizing learning experience. It has persisted in spite of its psychological shortcomings, and its relative ineffectiveness in contributing to democratic purposes, because of the prestige of science, the endorsement of the colleges, the simplicity of the curriculum pattern which it provides, and the general approval of administrators, teachers, laymen, and students. Many of its weaknesses tend to be corrected by the breaking down of subject lines, and the inclusion of much direct experience for the purpose of illuminating facts and principles.

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INEP

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MODELOS  
DE  
PROVAS

Visto sob êsse prisma, o ensino superior adquire dimensões maiores, em função da atual conjuntura que vive a Nação, definitiva e irreversivelmente lançada a essa autêntica "aventura do desenvolvimento", pelos caminhos do progresso. Dimensões que situam a Universidade na cúpula de uma estrutura educacional verdadeiramente sólida, capaz de estimular e orientar o País nessa trajetória e garantir-lhe, afinal, nas décadas que se aproximam, o acesso definitivo e em igualdade de condições ao mundo dos países desenvolvidos.

Ao agradecer aos promotores dêste Curso — dirigentes do FORUM DE CIÊNCIA E CULTURA da UNIVERSIDADE FEDERAL DO RIO DE JANEIRO — o honroso convite que me trouxe até aqui, congratulo-me por esta oportuna iniciativa, que corresponde, sem dúvida, ao propósito acertado de integrar a Universidade no processo de desenvolvimento nacional. Efetivamente, o conhecimento adequado da realidade brasileira, com a busca de soluções convenientes aos seus problemas, facultará aos mestres e à liderança universitária, no seu delicado campo de ação, uma forma de participação mais consciente no esforço conjunto para a promoção integral do País.

O tema sugerido para a palestra desta manhã diz respeito à problemática do desenvolvimento regional e seu planejamento no Brasil. Do ponto de vista da ação governamental é matéria

/...

$\alpha$

$\beta$

$\gamma$

Soma das cotações . . . . . pontos.

O Vogal examinador,

Classificação votada . . . . . valores.

O Presidente do Júri,

Nome do examinando

Número da pauta

Dobre por A B e cole

**ANO DE 1940**

**Exame  $\delta$**

(a)

**Disciplina D**

**Ponto n.º 3**

Epoca de

Em de de 1940

Rubrica do Reitor ou seu delegad

ª chamada

ª prova escrita

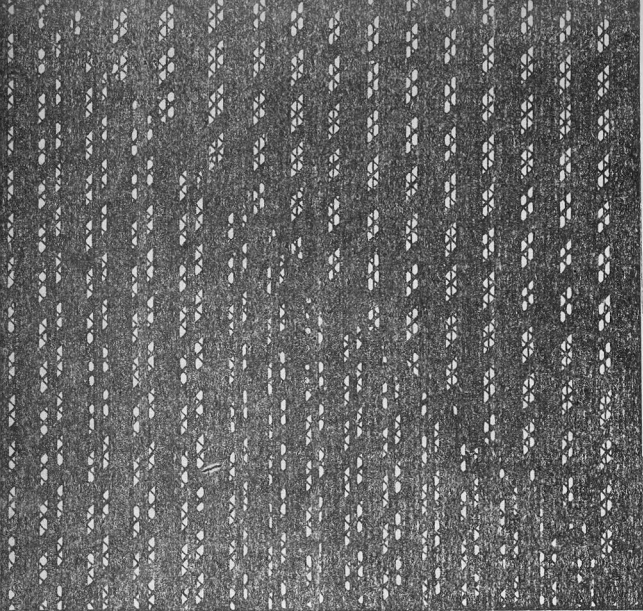
**Prova escrita de**

Texte:

- a) Ce dernier repas était servi sur une table immense, dans le vestibule de la prison.
- b) Cyrille invita ses frères à distribuer au peuple ce repas fastueux,
- c) afin de le remplacer par une simple agape, composée d'un peu de pain et de vin pur.
- d) La multitude étonnée faisait silence; elle écoutait avidement les paroles des confesseurs.
- e) «Ce repas, disait Cyrille, est justement appelé le repas libre,
- f) puisqu'il nous délivre des chaînes du monde et des maux de l'humanité.
- g) Dieu n'a pas fait la mort, c'est l'homme qui l'a faite.
- h) L'homme nous donnera demain son ouvrage, et Dieu, qui est l'auteur de la vie, nous donnera la vie.
- i) Prions, mes frères, pour ce peuple: il est bien à plaindre!
- j) Prions pour lui et pour Galérius, notre empereur.»
- k) Et les martyrs priaient pour le peuple et pour Galérius, leur empereur.
- l) La foule disait: «Les chrétiens prient pour nous et pour l'empereur, ils nous plaignent, ils nous donnent leur repas;
- m) ils sont couverts de plaies, ils ne disent rien contre nous ni contre les juges.
- n) Leur Dieu sera-t-il le véritable Dieu?»
- o) Parmi tant de malheureux idolâtres, quelques-uns se retirèrent saisis de frayeur,
- p) quelques autres se mirent à pleurer et criaient:
- q) «Il est grand, le Dieu des chrétiens! Il est grand, le Dieu des martyrs!»
- r) Ils restèrent pour se faire instruire, et ils crurent en Jésus Christ.

Traduisez le texte.

I



4 b)

5 c)

6 d)

5 e)

6 f)

6 g)

7 h)

5 i)

4 j)

4 k)

6 l)

6 m)

5 n)

7 o)

4 p)

5 q)

5 r)

**II**

Répondez aux questions suivantes:

a) Où se déroule la scène?

4

b) A qui le repas fastueux fut-il distribué? Pourquoi?

5

c) Qui sont les confesseurs?

6

d) Pourquoi disait Cyrille que ce repas était justement appelé le repas libre?

5

e) Les chrétiens avaient-ils des sentiments de haine ou de vengeance? Justifiez la réponse.

7

f) Quelle sorte de commentaires faisait la multitude?

6

g) Qu'est-ce qui résulte de cette étonnante conduite des chrétiens?

5

### III

Faites dans les expressions qui suivent les modifications signalées au-dessous:

*Ce dernier repas était servi dans la prison — alinéa a).*

a) Remplacez *repas* par *réfection* et faites l'accord.

2

*La multitude étonnée faisait silence — alinéa d).*

b) Remplacez *multitude* par *assistants* et faites l'accord.

2

*Il nous délivre des chaînes du monde — alinéa f).*

c) Mettez la phrase à la forme passive.

3

*Dieu n'a pas fait la mort, c'est l'homme qui l'a faite — alinéa g).*

d) Remplacez *mort* par *péchés* et faites l'accord.

3

*L'homme nous donnera demain son ouvrage — alinéa h).*

e) Ecrivez *empereurs* au lieu d'*homme* et faites l'accord.

2

*Les chrétiens prient pour nous et pour l'empereur — alinéa l).*

f) Ecrivez les noms au féminin.

2

*Ils nous plaignent — alinéa l).*

g) Mettez le verbe au futur simple.

2

*Ils nous donnent leur repas — alinéa l).*

h) Ecrivez la phrase à la forme interrogative, en mettant le verbe au passé indéfini.

2

*Parmi tant de malheureux idolâtres, quelques-uns se retirèrent saisis de frayeur — alinéa o).*

i) Remplacez *idolâtres* par *femmes* et faites l'accord.

2

*Quelques autres se mirent à pleurer — alinéa p).*

j) Mettez le verbe au plus-que-parfait de l'indicatif.

3

*Ils restèrent pour se faire instruire — alinéa r).*

k) Remplacez *ils* par *nous* et faites l'accord.

2

#### IV

Mettez en français:

a) Se quisermos fortificar a nossa fé,

4

b) devemos recordar muitas vezes os mártires do cristianismo,

4

c) cuja morte é o testemunho mais irrefragável da sua sinceridade e da sua santidade.

7

d) Eles nunca pediam a Deus

7

e) que castigasse os seus perseguidores:

6

f) perdoavam-lhes e rezavam por eles.

7

g) Por isso muitos pagãos se converteram e adoraram a Cristo.

7

## Vocabulário

### I

- Agape* — ágape, pequena refeição dos primitivos cristãos.
- Avidement* — avidamente, vorazmente, sôfregamente.
- Chaîne* — cadeia, corrente.
- Chrétien* — cristão.
- Confesseur* — confessor, mártir da sua fé.
- Crier* — gritar, bradar, exclamar; chiar; publicar, apregoar, proclamar.
- Cyrille* — Cirilo.
- Délivrer* — desembaraçar, dispensar; livrar, libertar; entregar.
- Empereur* — imperador.
- Etonner* — surpreender, espantar, admirar; atordoar, abalar; assustar; fender.
- Fastueux* — faustoso, pomposo, magnífico.
- Foule* — turba, multidão, chusma, povo.
- Frayeur* — terror, horror, susto, medo, pavor.
- Galérius* — Galério.
- Haine* — ódio; raiva, aversão, rancor.
- Idolâtre* — idólatra; gentio, infiel, pagão.
- Inviter* — convidar; induzir, incitar, arrastar.
- Juge* — juiz, árbitro; julgador.
- Mal* — mal; perda, prejuízo; desgraça; pena, dor.
- Malheureux* — infeliz, desditoso, desgraçado; triste; fatal; miserável, mesquinho; patife, maroto.
- Martyr* — mártir, vítima da sua fé.
- Plaie* — ferida, chaga, cicatriz; praga, flagelo; pena.
- Plaindre* — lamentar, lastimar, condoer-se; queixar-se; lamentar-se.
- Pleurer* — lamentar, prantear, chorar.
- Prier* — pedir, suplicar; rezar, orar; convidar.
- Remplacer* — suprir, substituir.
- Repas* — refeição; banquete.
- Rester* — sobrar, sobejar; demorar-se; durar, ficar, permanecer; estacionar; restar, subsistir.
- Saisir* — prender, agarrar, tomar; levar; arrebatrar; apoderar-se; apreender; aproveitar; abranger; perceber; acometer; penhorar.
- Véritable* — verdadeiro; verídico.
- Vestibule* — vestíbulo; porta, entrada.

### IV

- Adorar* — adorer.
- Castigar* — châtier, punir; condamner, prender, blâmer.
- Convertir-se* — se convertir.
- Cristianismo* — christianisme.
- Fé* — foi; croyance.
- Fortificar* — fortifier, rendre vigoureux; firmer; enforcer.
- Irrefragável* — irréfragable, incontestable, irréfutable, évident, assuré, certain.
- Muitas vezes* — souvent, maintes fois, plusieurs fois.
- Nunca* — jamais, en aucun temps.
- Pagão* — païen, idolâtre, gentil.
- Perdoar* — pardonner; excuser; exempter; tolérer.
- Perseguidor* — persécuteur.
- Recordar* — rappeler, remémorer; repasser.
- Santidade* — sainteté.
- Sinceridade* — sincérité; franchise; candeur.
- Testemunho* — témoignage, marque, preuve, confirmation.



P.

1948

The Subject-Centered Curriculum and its  
improvement (pg 95 a 128)

- the Nature of Curriculum

Author - Harold Allenby

Editor - Reorganizing the High School  
Curriculum - The Macmillan Company

Tex - de la Logia facts - 25 pgs

A.1-P.1-V.1-nº 23

ÉTICA - Professorado

Oliveira, Valdemar de

Um Dever dos Professores

Jornal do Comercio. Recife (Pernambuco). 14-  
março-42. pq.

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TESTE CBPE - A

	Escores
P	<input type="text"/>
M	<input type="text"/>
G	<input type="text"/>
H	<input type="text"/>
C	<input type="text"/>
I - F	<input type="text"/>
Total	<input type="text"/>

Este teste contém perguntas sobre Português, Matemática, Geografia, História, Ciências, Inglês ou Francês. Leia com atenção as instruções que explicam o que você deve fazer para resolver as questões. Trabalhe depressa mas sem precipitação. Não perca muito tempo com as questões difíceis. Procure resolver primeiro as questões fáceis e volte depois para rever o trabalho e completar as questões que deixou sem resposta.

Não faça perguntas durante a prova e não converse com ninguém. Se errar, não use borracha: risque a resposta errada e assinale depois a resposta certa.

Você tem exatamente 50 minutos para fazer este teste.

Preencha os claros abaixo com letra bem legível.

NOME \_\_\_\_\_

\_\_\_\_\_  
(nome da escola)

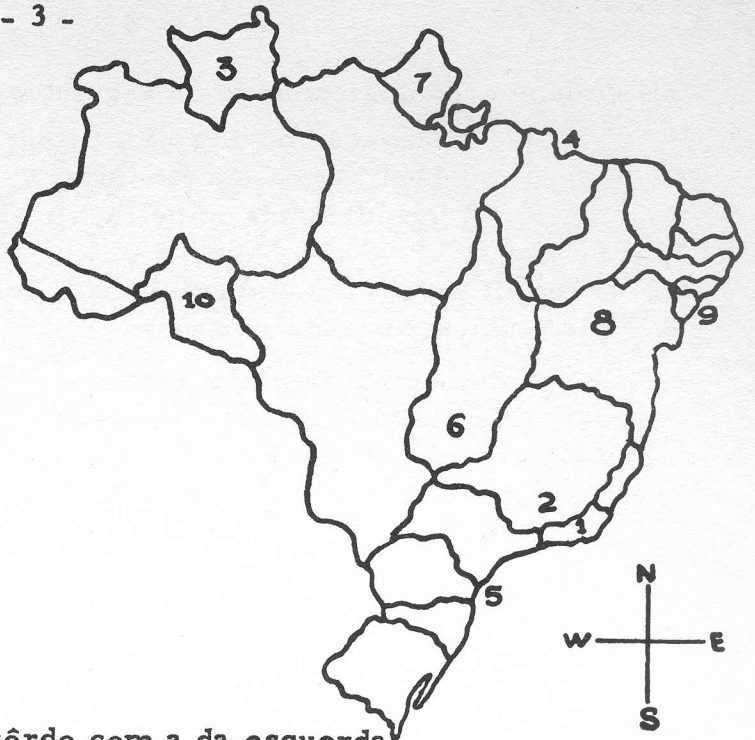
DATA \_\_\_\_/\_\_\_\_/19\_\_\_\_





16) Você tem abaixo 4 acidentes geográficos. Identifique-os segundo sua numeração no mapa ao lado

- ( ) - nascente do rio São Francisco
- ( ) - capital do país
- ( ) - pôrto de Paranaguá
- ( ) - Território do Rio Branco



17) Numere a coluna da direita de acôrdo com a da esquerda

- |                      |                                       |
|----------------------|---------------------------------------|
| 1. Minas             | ( ) Companhia Siderúrgica Nacional    |
| 2. Estado do Rio     | ( ) Refinaria de Cubatão              |
| 3. Rio Grande do Sul | ( ) Usina hidro-elétrica Paulo Afonso |
| 4. Alagoas-Sergipe   | ( ) Mina de Morro Velho               |
| 5. São Paulo         |                                       |

18) Nos tempos atuais, observa-se uma tendência das populações a se deslocarem principalmente (sublinhe a única resposta certa)

- da cidade para o campo
- de umas para outras cidades
- do campo para a cidade
- de uma zona rural para outra
- das grandes para as pequenas cidades

19) O Irak tem sido últimamente centro de conflito entre nações devido a (sublinhe a única resposta certa)

- seus recursos agrícolas
- suas fontes de alimento
- suas jazidas petrolíferas
- suas facilidades de transporte
- suas tendências imperialistas

20) Um navio que partisse do Rio exatamente em direção leste iria encontrar a costa (sublinhe a única resposta certa)

- da Austrália
- de Madagascar
- de Portugal
- de Marrocos
- da União Sul Africana

21) Ordene cronologicamente os seguintes acontecimentos

- ( ) Elevação do Brasil à categoria de Reino
- ( ) Abolição da escravatura
- ( ) Inconfidência Mineira

22) O Brasil possui tão ampla extensão territorial em razão sobretudo (sublinhe a única resposta certa)

- das entradas e bandeiras
- da política hábil de D. Pedro II
- da divisão do Brasil em capitanias hereditárias
- da ação diplomática de Rio Branco
- do Tratado de Petrópolis

23) No Brasil o Congresso Nacional é constituído por duas Casas que são:

\_\_\_\_\_ e \_\_\_\_\_.

24) Numere a coluna da direita de acordo com a da esquerda

- |                             |     |   |
|-----------------------------|-----|---|
| 1. Inconfidência Mineira    | ( ) | Expulsão dos holandeses                       |
| 2. Guerra dos Mascates      | ( ) | Presença de forasteiros nas regiões das minas |
| 3. Guerra dos Palmares      | ( ) | Decadência da exploração do ouro              |
| 4. Insurreição Pernambucana | ( ) | Elevação de Recife à categoria de vila        |
| 5. Guerra dos Emboabas      |     |   |

25) A Regência no Brasil passou à história como um período de (sublinhe a única resposta certa)

- vitórias diplomáticas
- relativa tranquilidade política
- acentuado progresso nas letras e artes
- grande desenvolvimento da lavoura
- lutas e convulsões internas

26) A principal característica de um estado independente é (sublinhe a única resposta certa)

- a soberania
- a existência de um congresso
- um sistema de leis escritas
- forças armadas para a defesa nacional
- a unidade de língua

27) O mais grave conflito religioso no século XVI foi um movimento chamado (sublinhe a única resposta certa)

- jansenismo
- inquisição
- enciclopedismo
- reforma
- arianismo





33) As partes de uma célula germinativa que contêm as características hereditárias do novo organismo são chamadas (sublinhe a única resposta certa)

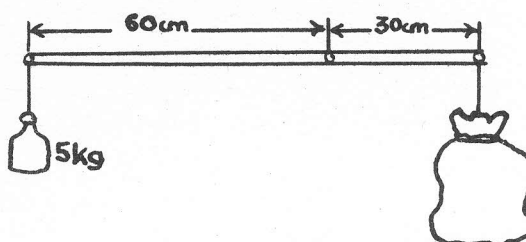
- cloroplastos
- cromosomas
- óvulos
- embriões
- espermatozoides

34) A mudança de direção de um raio de luz quando passa de um meio para outro, de densidades diferentes, é chamada (sublinhe a única resposta certa)

- dispersão
- aberração
- distorção
- reflexão
- refração

35) Na balança improvisada representada no desenho, um saco de batatas foi equilibrado por um peso de 5 kg. Não levando em conta o peso da barra horizontal, pode-se calcular o peso do saco em (sublinhe a única resposta certa)

- 5 kg
- 10 kg
- 12 kg
- 15 kg
- 20 kg



36) O crescimento do indivíduo é controlado principalmente (sublinhe a única resposta certa)

- pela tiroide
- pelo timo
- pela hipófise
- pelas suprarrenais
- pelas paratiroides

37) Um aluno encheu d'água uma garrafa, tapou-a bem e colocou-a no congelador de uma geladeira. Algumas horas mais tarde a garrafa se partiu quando a água se congelou. O aluno escreveu a seguinte conclusão:

"Qualquer substância aumenta de volume quando passa do estado líquido ao estado sólido". Pode-se dizer que esta conclusão (sublinhe a única resposta certa)

- é válida, porque de fato a água se dilata ao solidificar-se
- é válida, porque a conclusão foi baseada numa prova experimental
- é válida, porque a experiência obedeceu às regras científicas
- não é válida, porque, repetindo-se a experiência nas mesmas circunstâncias, o resultado poderia ser diferente
- não é válida, porque outras substâncias podem ter propriedades diferentes das da água.



Nome .....

Data desta prova ..... N.º de inscrição: .....

Data do nascimento: dia ..... mês ..... ano .....

**DEPARTAMENTO ADMINISTRATIVO DO SERVIÇO PÚBLICO**

**Divisão de Seleção e Aperfeiçoamento**

---

**INSTRUÇÕES**

**NÃO ABRA O CADERNO ANTES DE O EXAMINADOR MANDAR!**

**NÃO PERGUNTE NADA A NINGUEM!**

**NÃO SE DISTRAIA! NÃO OLHE PARA O VIZINHO!**

**NÃO EMENDE! NÃO RASPE!**

---

Tudo quanto o candidato tem que fazer, nesta prova, está claramente explicado e indicado nas páginas a seguir.

Leia, pois, **ATENTAMENTE**, as instruções que vêm antes dos diversos exercícios. Regule-se por elas, **POIS NENHUM ESCLARECIMENTO A MAIS PODERÁ SER DADO**. Escreva a resposta de cada questão no lugar indicado.

Procure trabalhar **TÃO DEPRESSA QUANTO POSSIVEL**, mas sem atropelo. O tempo será suficiente para que o candidato possa examinar todas as questões. Se encontrar dificuldade em qualquer questão, passe adiante e procure resolver as demais; vá assim até o final da prova. Havendo tempo, volte então a examinar as questões em que encontrou dificuldade.

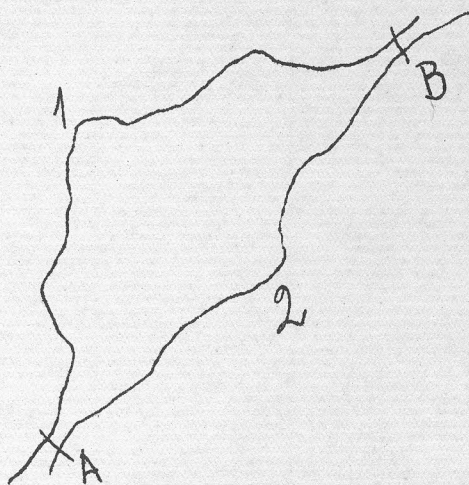
O fiscal da prova não poderá responder a pergunta alguma.

**NÃO SE DISTRAIA!**

NÃO EMENDE! NÃO RASPE!

(Use o almasso para as soluções. Faça os cálculos no papel branco).

- Qual o aumento de despesa por tonelada de mercadoria, na distância média, se o transporte é feito no sentido de menor intensidade, com aproveitamento exclusivo de vagões que deveriam retornar vazios, mas que sofreram, com o carregamento e a descarga, um retardamento  $t'$  além do tempo normal?
- Representada uma corrente de transporte segundo o critério da fórmula de Lamalle, qual o meio de transformar a curva obtida na representativa do custo parcial, de acordo com o mesmo critério?
- Pede-se a indicação justificada da linha de menor resistência econômica entre os pontos A e B, servidos pelas estradas de ferro 1 e 2, definidas pelos seguintes característicos:



	1	2
Distância real AB	300 km	250 km
Distância virtual AB	400 km	420 km
Relação entre o comprimento real e o virtual da estrada	0,6	0,8
Custo médio unitário	\$130	\$140
Custo parcial unitário	\$060	\$060

- Completar o quadro da página seguinte, referente à evolução de cinco vias férreas onde a estatística acusa variações convencionalmente expressas da seguinte forma:

C = crescente

E = estável

D = decrescente

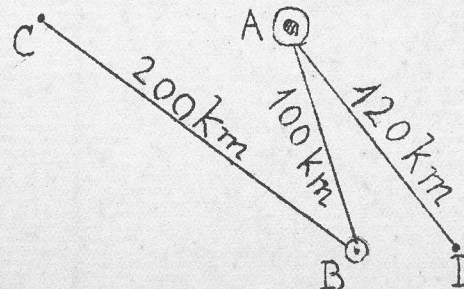
NÃO PARE! VIRE A FOLHA E CONTINUE!

NÃO EMENDE! NÃO RASPE!

Custo parcial	C		D	D	E
Despesas gerais	E	E	C	C	
Custo médio		D	D	E	C
Distância média	E	C	E	E	E
Intensidade de tráfego	D	C		E	C
Índice de aproveit?	E	E	C		E

5. Uma cidade, uma vila e dois povoados são servidos por uma linha ferroviária e dão as seguintes rendas diárias de transportes:

- A..... 12:000\$
- B..... 4:000\$
- C..... 1:000\$
- D..... 2:000\$



Pedem-se, em ordem decrescente de extensão, as zonas de influência dos centros dados, através da determinação gráfica aproximada dos pontos de passagem das linhas de influência.

