AN OBJECTIVE TEST OF ELEMENTARY SCHOOL GEOGRAPHY

# THE DEVELOPMENT AND STANDARDIZATION OF AN OBJECTIVE TEST OF ELEMENTARY SCHOOL GEOGRAPHY

Abstract of M.A. Thesis in Education

### presented by

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The problem of keeping school geography in line with current modes of geographical thought is acute.

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This investigation was initiated with a view to evolving a testing instrument in elementary school geography which would be useful in measuring achievement in grades five, six and seven. Hypotheses were developed based on the child development theories of Bruner and Piaget, and the levels of educational objectives of Bloom.

The test was administered to schools in the Montreal area, and test norms were established for each grade. The test revealed significant differences in attainment between the three grade levels, and some verification concerning the level of complexity of items as related to grades was made. Significant correlations between the test and other measures of pupil aptitude and attainment were obtained.

Discovery of significant sex differences favouring boys was not unexpected, but with the data available, no conclusive reasons for them were advanced.

# THE DEVELOPMENT AND STANDARDIZATION

# OF AN OBJECTIVE TEST OF

ELEMENTARY SCHOOL GEOGRAPHY

A THESIS

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## INTRODUCTION

Many subjects on school curricula have attained a certain prestige, due to their being deemed of absolute necessity for a person to operate and participate in modern society. Language and mathematics are prime examples of such subjects. Other subjects have become important due to today's emphasis on science and technology.

There is yet another classification of subjects, generally associated with the humanities, but not exclusively so, which operate with factual materials and attempt to convert these facts into ideas. The past nature of such subject has limited their role in school to that of facts alone. Generally the area of ideas has been of minimal importance. Subjects such as history and geography are outstanding examples of subjects in this category.

The purported "factual" nature of a subject such as geography does not usually make it very palatable to the prospective pupil or teacher. It is not surprising therefore to find geography in a relatively low position on any subject hierarchy in high schools, and in a low position on any pupil preference hierarchy in elementary schools. For someone who refuses to accept the strictly "factual" nature of such a subject, problems constantly occur when one is faced with a curriculum based on facts, especially when that curriculum is predetermined. Recognition that curricula and materials can be influenced in certain ways, offers opportunities for movement away from a factual approach to a subject, toward something more current. One way which can be used to influence curricula, and the presentation of materials within them, may be through the development of standardized testing instruments. The prime purpose of this investigation is essentially a practical one, and is concerned with the development of an objective, multiple-choice, standardized test in elementary school geography. The conception of geography utilized by the investigation may not be apparent in the test, since it is probable that a "modern" conception of the subject would be too advanced, and hence not valid for use in schools at present. The attainment of this "modern" conception of the subject is thought to be a gradual process and so the test hopefully moves toward a goal, rather than makes any pretense of attaining that goal.

It is apparent that the modern ideas concerning any subject in school are closely linked to the psychological theories of learning, and the educational objectives that have to be met. In what may be called a "quantifying age" (Spate, 1960), all subjects are being revamped due to considerations of the future demands of society. Future educators apparently are going to be more concerned with the "teaching of learning" than with the "teaching of subjects". Geography is seen by geographers and enlightened educators, as having a role in the teaching of learning to pupils. Slowly the old traditions are dying. It is not important to know that "A" is the capital city of country "B". What is 2

important to know perhaps, is why "A" is located where it is and have the pupils find these facts for themselves.

This investigation has been very selective in the choosing of criteria for the basing of the test. One is not negating other theories of child development, learning, or educational objectives. The theories chosen seem to be valid as sound bases for modern education.

Outlinine of chapters

Chapter 1 concerns itself with the evolution of a modern definition of geography. School geography, is seen to follow somewhat belatedly this evolution. Chapter 2 deals with the ideas of structure, development and readiness, while Chapter 3 deals with the work and theories of Bloom. Four hypo-> theses were developed from the ideas of Chapters 2 and 3. A review of related literature shows the relative scarcity of work previously done in this field and is found in Chapter 4. Chapter 5 is concerned with geography in Quebec, and the possible use of standardized instruments is discussed in Chapter 6. The mechanics of test construction, administration and evaluation, along with the results of the test are found in Chapters 7 to 9. In these three chapters the extent to which the test correlates with other pupil attainment and aptitude measures is given. A discussion of sex differences found in the test is also made.

Chapter 10 summarizes the major aims and findings of the study, and makes some proposals for future investigation and research.

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# CHAPTER 1

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# A DEFINITION OF GEOGRAPHY

Geography is the object of study in the curriculum in both elementary and high schools, either as a separate subject, or combined with history in the form of social studies. Common procedure involves compulsory study in the elementary school with optional study in most high schools. Increasing awareness of the value of this subject has occurred in recent years, and educators have devoted more time and energy promoting its proper place and teaching in the schools.

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The search for a definition of geography involves not only an awareness of the historical development of the discipline, but also must consider the ultimate practicality of any such description to education. Examination of examples of current geographic thought reveals that some definitions, while being very succinct, are not immediately comprehensible. Such definitions, while offering the germ of geographic thought, convey little insight to educators, whose interest is in their application. Therefore, while the definition of geography proposed by Cholley, "L'objet de la Géographie est la connaissance de la Terre (Hartshorne, 1959)," expresses completely the ultimate goal of the subject, and of those who teach it, there is little suggestion within the definition as to how this "connaissance de la Terre," will occur. Equally unrewarding in application is the definition that includes elements of the whole, but still refrains from suggesting a point of departure for the practice of the definition. Thus geography is a "... science that deals with the earth and its life, esp. the description of land, sea, air and the distributions of plant and animal life including man and his industries with reference to the mutual relations of these diverse elements (Webster's International Dictionary, 1963)." Many aspects of man and the earth are mentioned, but apparently there is little rationale. Closer examination of the statement reveals that while geography is a "science", its function seems to be confined to a "description" of the various elements and their "mutual relations." The important element of explanation has been omitted, which to some degree conflicts with the idea of geography aspiring to the status of a "science". Granted that the term "science" is often subject to semantic difficulties, but any subject that describes phenomena and does not try to explain, surely does not merit such a title.

The confusion arising out of definitions stressing the descriptive element of the subject is compounded by suggestions that geography may be something other than a "science", descriptive or not.

It fuses the results; if not the methods, of a host of other subjects and in its full latter-day development seems to require a knowledge of a larger range of ancillary studies than almost any other science or art (Wooldridge and East, 1958).

Implicit in the above statement is the idea of geography related to the arts as well as to the sciences. This dichotomy is another problem which prevents simple 5

defining of the subject applicable to modern educational practice. Without

becoming totally immersed in the science-art controversy, perhaps the comments

of Preston James (1962), may help to clarify the situation.

Perhaps the most challenging problem geographers have faced over the centuries is the reconciliation of geography conceived as science and geography conceived as art. For most people it must be one or the other.

Only occasionally have great intellects appeared big enough to embrace geography as both science and art - men such as Humbolt, who made an art out of measurement.

For those whose stature is slightly less than that of Humboldt, James suggests

humility in the presence of that which we do not understand.

We must learn to be tolerant of those who claim to be able to grasp the whole personality of a region, and to set forth in words the vaguely conceived coherence of diverse elements. But we must also be tolerant of those sophisticated young people who ask a UNIVAC silly questions ...

Although the question of the art-science dichotomy will probably remain to some extent, the trend of geographic thought seems to be headed away from the purely descriptive "art" area to that of the "explanation" of phenomena. The development of the dualism of description and explanation is perhaps best expressed by Hartshorne: "Geography is concerned to provide accurate, orderly and rational description and interpretation of the variable character of the earth surface." (Hartshorne, 1959).

Hartshorne admittedly is only developing the definition stated previously by Cholley. Through Hartshorne's definition, and the analysis of its constituent elements that follows, such as clarification of the terms "areal differentiation", a description concerning the dualism of physical and human geography, and a discussion of "systematic" and "regional" geography, one sees the many possibilities that are inherent within the discipline. A two-fold breakdown of the subject becomes clear; description and interpretation. 7

The existence of the description-explanation dualism allows further progress to be made in the development of geographical definitions. Emanating from the Hartshornian concept comes the idea of geography as seeking to establish a reliable knowledge of reality through a four-point process. Geography seeks to establish this reality;

1. ... on the basis of empirical observation as independent as possible of the person of the observer, to describe phenomena with the maximum degree of accuracy and certainty.

2. ... on this basis, to classify the phenomena; as far as reality permits, in terms of generic concepts or universals; ...

3. ... through rational consideration of the facts thus secured and classified and by logical processes of analysis and synthesis, including the construction and use wherever possible of general principles or laws of generic relationships, to attain the maximum comprehension of the specific interrelationships of phenomena.

4. ... to arrange these findings in orderly systems so that what is known leads directly to the margin of the unknown. (Hartshorne, 1959).

The third and fourth sections of this process indicate that more than just observation, description and interpretation are employed or should be employed by geographers. Similarly the teacher of the subject should be aware of certain advances made in the latter portions of the statement. Certainly "laws" and "orderly systems" imply the construction of some type of model, and/or the use of geometric/ statistical procedures to add meaning to the pure description and analysis, and enable one to proceed more easily to the area of the "unknown".

If the development of laws and systems, and the use of statistics is now coming to the forefront of geographical thought, there must be some reason(s) which would qualify this as an "advance" in definition.

This current trend { toward statistics ] is both inevitable and desirable. It is inevitable because geographers are so few and the facts with which human geography is concerned are so many that the description and analysis of areas of any substantial size is only made possible by the use of statistics collected by others ... The trend is desirable not only because of the precision which quantitative data add to many of the general statements made by geographers, but also because mapping and interpreting the various features of the earth's surface - a process which must involve mensuration of some kind or other - is perhaps the geographer's most valuable contribution to the work of other disciplines. (Coppock and Johnson, 1961).

Neglect of statistical models by geographers has been blamed on the "ideographic" nature of the subject. Emphasis should now be given to the universal and general, rather than to the unique and particular (Reynolds, 1956), (Bull ----), (Spate, 1960), although there still is admittedly some place for the latter.

Remembering that the original idea of this section was to evolve a definition of geography which would be of practical value in the schools, one should now pose the question as to the applicability of any or all of these definitions to school work. If models are current in the advanced thought of geographers, could a definition model be constructed which would satisfy the needs of both the professional geographer, and the teacher of the subject? (see Fig. 1)



The model although unrefined, represents the three basic areas of current geographic thought. Obviously one has to have "Description", before any "Explanation" can be attempted, while both of the above have to be located in an area which is subject to some type of measurement. What is subject to "Description", "Explanation" and "Spatial Measurement" could be debated. For this investigation it will be considered that man and his environment are the subjects of study, their importance being relative to the areas in which they are studied and examined. The model could be applied to different sets of data from various areas, and the information manipulated in such a way as to show similarities, and/or differences, in some quantitative form. Bull ---- gives one example of what a very specific model, developed by L. R. Horridge, for relating world plant formations to certain items of climatic data, would function like.

How acceptable then would such three-dimensional constructs be for educators, especially at the elementary level? If one accepts Bruner's (1960), hypothesis that the major ideas of any subject can be made meaningful to children at any age, this model is theoretically sound. Perhaps the third stage of "Geometrical-Spatial" measurement would pose an initial problem due to its novelty.

Geography is a subject of study in many schools, either as a separate entity, or combined with history in the form of social studies, Why then is it studied? Does this field offer anything new or old that makes it unique? How does the status of geography in school relate to the changed and changing conception held by the professional geographers, or is there, or should there be something intrinsically different between what goes on in school, and what goes on at another level?

## Geography in the School

Geography as it has developed in the school has followed rather belatedly the advances made in theory and in practice by professional geographers. 10

Indeed in Great Britain, the development of geography in the secondary school in the late 19th century was not deemed possible until the subject had been firmly established in the universities. (Keltie, 1888). Observation of the development of school geography may necessitate investigating some of the dichotomies that exist in the thinking about the subject, which previously have been bypassed in the attempt to arrive at a working definition of the subject. While not wanting to negate some of these rather important issues, it is hoped that the major points of educational geography will be able to be shown and explained within the three-fold development of the subject as seen by this investigation.

#### Section A - Description

In commenting on the "descriptive" nature of the subject, some allusion was made as to what exactly was being described. The world naturally includes man and his environment. Which should be studied, purely physical features, or purely human features, or some combination of the two? Arising out of this question of course, comes the "art", - "science" diatribe, which can be seen to exist in academic geography today.

At their worst, the early "descriptive" studies would indeed find it difficult to be classified as "art" or "science". Voyages of discovery undertaken from 1600–1850, brought a wealth of new, and often fascinating material which was classified under the heading of "geography". The results of these exciting times however, are generally to be decried from an educational viewpoint. The exotic nature of distant lands was often emphasized whereas studies of the home region were few. The teacher expounded bizarredescriptions from a geography textbook which was virtually a gazetteer of unrelated facts that both he and his students readily accepted without discussion. The students were not actively involved in the pursuit of knowledge and their thinking was not stimulated. (Wise, 1966).

Perhaps it is sufficient to note that this tradition of what was sometimes termed "Cape and Bay Geography" has persisted up to quite recent times. Many courses in school geography still omit a thorough study of the home area before moving on to other regions, countries, or topics.

#### Section B - Interpretation

The second phase of geographic thought was that of "interpretation". James Fairgrieve (1930), summed up the educational implications of this stage as follows;

The function of Geography in school is to train future citizens to imagine accurately the conditions of the great world stage so that they may think sensibly about political and social problems in the world.

At this time it may be appropriate to note that this statement, originally made in 1930, is still current in the thinking of curriculum planners in the Province of Quebec, 37 years later. (Quebec, 1965).

It was suggested earlier that geography which emphasized pure description did little, if anything, to the improvement of the child. Interpretation, combined with description however, seems to make a meaningful contribution to the child. Geography, operating at this second stage of development, can be seen as having a four-fold educational value according to UNESCO, (1965), due to the mental aptitudes that are developed.

a. Powers of Observation

... in its descriptive aspect, geography must be regarded as a science of observation...

b. Memory and Imagination

... educators have discarded this concept [development of a verbal memory.] Nevertheless geography cannot be studied properly without the essential minimum of place names ...

[learning terms in their precise context through the use of maps and diagrams.]

c. Judgment and Reasoning

1. ... pupil is trained to analyse, compare and classify.

2. ... led to identify and recognize correlations and causes.

3. ... in his search for "why" he does not overlook the existence of various orders of causes.

4. ... be taught to take into account all physical and natural forces, as well as of the will and irrational behaviour of men.

d. Inculcation of a Geographical Outlook

... the pupil will be given a vision which will enable him to take an overall view by grasping the relationships by which individual phenomena are linked together within the whole, of which they are the parts.

Not mentioned in the preceding quotation, but certainly stressed elsewhere in the UNESCO publication, is the idea of "international understanding", which should be effected if the four aptitudes mentioned previously are acquired. Scarfe (1960), terms this idea "fostering good will". "There is no region on the earth where place conditions do not present proviems and difficulties to which men must either conform or succumb. Normally, adjustments are sensible, often they are clever; always they differ from place to place ..." Scarfe sees this idea of international understanding as the "special function" of geography. Similarly he attributes the explanation of modern social and political problems to the study of history. Surely a true "international understanding" requires an appreciation of both place and time conditions. This conclusion, while logical, is not overly original, as this aspect of the need for both points of view has led educators in many areas, especially the United States, to combine Geography and History in the form of social studies; a practice decried by both geographers and historians. Perhaps a true "international understanding" is a function of all disciplines. If geography is to develop it must be as a separate entity. Wise, (1962), in summarizing this assumption states;

...school geography must be taught in close relationship to other subjects, especially history, but it must be taught separately. History and Geography are closely related but they have different points of view, and require different methods.

Scarfe, (1964), also contends that geography should remain a separate subject in school.

#### Section C - Geometrical-Spatial

If geography at the hypothesized second stage of development, can be of some value to the child as he experiences education, will, or does the supposed third stage of geography give him any greater benefits? The use of geometrical-spatial models may make geography a subject of considerable excitement and probable benefit to the learner.

Scarfe, (1966), though not commonly identified with the recent model-building movement, never-the-less reveals that modern geography is

... a sequence of increasingly complex principles and theories about the relationships between the various kinds of man-place associations that exist on the earth. It does not matter, therefore, which particular area of the world is studied at any one time, so long as the concepts derived from that study are capable of being understood by children at the age at which they are. [sic] The above statement brings the subject a long way from the memorization of exotic facts from distant lands. The use of statistics and models should improve the situation even more. Many of these models will be developed using the map, which up to the present, especially at the elementary level has not been employed properly or frequently enough in many instances. "The field class which is merely a walk punctuated by halts for map-reading and descriptive comment is doomed; precise measurements made at random points scattered over a field study area will take its place. In the classroom, the lecture-discussion periods seem to be numbered; instead, the disciplined and collective analysis of a problem in the light of available models, in which the teacher and pupil work together toward a solution, will replace it." (Bull----)

## Summary of chapter

What then is geography conceived to be, and does this conception exist in the schools? It has been asserted that geography as it exists today can be formulated around three basic elements in some structural form. A pyramidal model was used to relate the three areas of description, interpretation and geometrical-spacial functions. By placing phenomena in this framework, and then analysing them using some model or form, geography will be able to work with even more authority than at present, in the study of areas.

One can be assured that this conception of the subject exists in few secondary schools and even fewer elementary schools. At best, the description of

an area is followed by some attempt at analysis, but this analysis is not of a model-based nature. Evaluation of the subject too often involves recall of the descriptive elements, rather than making any attempt to get beyond factual information. How schools at any level can progress toward this three-fold conception is a problem. A combination of curricula change and teacher awareness would be of the greatest benefit to the evolving of this new approach. The development of achievement tests, based on the principles outlined above, may make some small but positive contribution to the furthering of the subject. Indeed the use of achievement tests may be an effective means of rapidly influencing the curriculum.

Evaluation is a fundamental part of curriculum development, not an appendage. Its job is to collect facts the course developer can and will use to do a better job, and facts from which a deeper under-standing of the educational process will emerge. (Cronback, 1963).

#### CHAPTER 2

# PSYCHOLOGICAL BASIS

The previous chapter alluded briefly to both Bruner's idea of the spiral curriculum, and readiness of children to appreciate a new approach to geography at the elementary level. Then, too, mention was made of the need for teacher awareness and curriculum change if new ideas developing within the subject are to be inculcated successfully. The present chapter seeks to examine some psychological bases of education, applicable at the elementary level. In particular, ways in which children best learn, methods of aiding this learning process, and the implications development has on learning in the elementary school child, will be considered. The theories of J. S. Bruner and J. Piaget, are seen to have relevance to this particular study, as they deal with the ideas of structure in a subject, and readiness in the child.

#### A) Structure

Any subject matter can be said to exist in various levels of content. The basic level, that of specific facts, constitutes the raw material for the development of ideas. Mastery of such material does not produce new ideas. The "facts" of today easily become the "fiction" of tomorrow. This obsolescence of material is especially true of a subject like geography, where features of land, and aspects of man, change constantly. The level of basic ideas and principles represents another plateau of knowledge above that of facts.

The ideas about causal relationships between human culture and natural environment are of this sort. So are scientific laws and mathematical principles, the ideas stating relationships between nutrition and the metabolism of the human body, or ideas about how such facts as climate, soil, and natural resources produce unique constellations of a geographic environment. (Taba, 1962).

Bruner, (1960), refers to this second level of knowledge as "structure".

"Grasping the structure of a subject is understanding it in a way that permits other things to be related to it meaningfully." Learning is deemed to possess importance due to its future benefits to the individual. One of these benefits is through specific transfer of training which may be thought of as a short-range goal of learning. The transfer of principles and attitudes, the second beneficial factor, is at the centre of all educational processes. To enable this second type of transfer to occur, the structure of the subject matter has to be mastered, making this idea of structure one of prime importance in learning.

The more basic the idea learned, the greater will be its breadth of applicability to new problems. Bruner, (1960), suggests that subjects need to be rewritten, and materials revamped to the capacities of students. Only through the use of our "... best minds in devising curricula will we bring the fruits of scholarship and wisdom to the student just beginning his studies." However this idea of using top personnel in teasing out basic ideas and principles for a given field is not guaranteed to produce unanimous results. (Taba, 1962). The experience of the California State Commission on Social Studies in obtaining a listing of general ideas around which to organize a social-studies curriculum in elementary and secondary schools suggests that agreement may be reached only on a level of such generalities as to produce statements which have little meaning for curriculum guidance.

Even though the results are difficult to achieve, attempts at evolving a structure should be made, for not only does such an approach make possible the grasping of general principles, it develops a positive attitude toward learning and enquiry on the part of the learner. Solving problems on one's own becomes a possibility. The act of discovery "... a matter of re-arranging or transforming evidence in such a way that one is enabled to go beyond the evidence so reassembled to additional new insights...." (Bruner, 1961), is illustrated with an example from the Harvard Cognition Project on social studies, in which a grade six class was able to locate major cities in North-Central United States, by the use of theories concerning various arrangements of phenomena. (Bruner, 1960).

Bruner, (1961), feels that subject material organized in a structured fashion will be of a four-fold benefit to the individual. Briefly stated these benefits are;

- 1. An increase in intellectual potency. One is taught to acquire information in a way that makes the information more readily viable in problem solving.
- 2. A shift from extrinsic rewards to intrinsic rewards. The child is gratified through coping with problems.
- 3. Learning the heuristics of discovery. The exercise of problem solving and the effort of discovery enable one to learn the work-ing of heuristic discovery.

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4. An aid to memory processing. How can material be "placed" in the memory so that it can be got on demand?

Concern for the discovery of the structure of a subject and the forthcoming benefits derived from such an approach clearly place modern curricula in a new and different light. Materials will become, or are becoming, the means to an end, not an end in themselves.

Perhaps in the coming generation we can concern ourselves more directly with the utility of learning: whether, one thing having been learned, other things can be solved with no further learning required. When we have achieved this leap, we will have passed from the psychology of learning to the psychology of problem solving. (Bruner, 1957).

Problem solving, upon being proposed as a possible end for education, poses the practical question of how one is going to proceed to insert this type of activity into the curriculum. Progression from factual knowledge, to basic ideas (structure) through means of discovery has to be a guided process. One approach to the developing a sequence of educational goals is found in the work of Bloom, et al. (1956), who undertakes a classification of educational objectives, with practical suggestions for their implementation. "... in short teachers and curriculum makers should find this [Taxonomy of Educational Objectives; Handbook 1, Cognitive Domain] a relatively concise model for the analysis of educational outcomes in the cognitive area of remembering, thinking and problem-solving." A more complete consideration of this instrument will be made later. At present, it is considered as a concrete proposal which can, if properly used, make some of the ideas of Bruner practicable in the elementary and secondary schools.

#### B) Development

To appreciate the role readiness plays in the learning process, some awareness of the development of thinking is necessary. Of interest to this particular investigation are features of development that characterize the senior elementary school pupil (age 10 - 14). Since Bruner and Piaget have made studies in the development of thinking, it is proposed that the contributions of each in thought development be studied separately, and then common elements, if any, be examined.

#### J. S. Bruner

Bruner's work, in the field of concept attainment, is based on the assumption that virtually all cognitive activity involves, and is dependent on, the process of categorizing. Concept attainment differs from concept formation in that instead of acquiring new concepts the individual modifies and adapts his existing concepts to new uses. It is significant to note that Bruner's work on concept attainment is based on adults, not children. A categorizing system is useful in that it permits one to decrease the complexity of the environment and thereby to identify new events easily and efficiently. An elaborate consideration of the precise details of Bruner's process of concept attainment is not essential here, but it should be noted that a sequence of purposive behaviour, or "strategy" is used to validate the correctness of a prediction about some class of objects under examination. Through a "focusing" technique, an individual "selects a particular attribute of the objects and explores it fully and systematically until it is conclusively demonstrated to be wrong, only then does he move to another feature. (Adler, 1965)."

The relatedness of various conceptual categories is termed a "coding system" by Bruner. "Once such a system [coding system] is constructed, an individual can handle each environmental situation by placing it in the appropriate category of the "generic coding system," i.e. a system of classes or categories. (Adler, 1965)." Motivation is necessary for the development of such a system and the individual must have numerous experiences with dissimilar instances of the same concept, and with other concepts, if he is to draw the appropriate conclusions about the concept. Formulation of such a coding system has drawn Bruner into a description of the characteristics of the various modes of mental representation of the world.

At the enactive level of representation, objects exist for the individual only in terms of their physical presence and the actions associated with them.

At the iconic level thinking proceeds with the aid of perceptual imagery. However, perception is highly subject to fluctuation due to motives or attitudes, and can even inhibit more advanced forms of thought.

The symbolic level ... permits the abstract formal reasoning described by Piaget. (Adler, 1965).

Although a three-fold sequence is shown, Bruner does not condone rigid acceptance of the concept of stages. All levels may persist to some degree. "The symbolic level possibly is more powerful and economical, but the iconic, and even the enactive methods may be applied to a particularly thorny problem. (Adler, 1965)." The construction of diagrams and models in problem-solving are good examples of non-symbolic thought processes. The aim of understanding how thought develops is to apply this to the teaching of the child.

What is most important for teaching basic concepts is that the child be helped to pass progressively from concrete thinking to the utilization of more conceptually adequate modes of thought. (Bruner, 1960).

How Bruner's thought sequence corresponds to that of Piaget, and how these ideas can be applied to children, will be discussed later under "readiness".

Jean Piaget

The major area of Piaget's work has been in the field of intellectual growth, from infancy to adulthood. Although all his theory is of interest to educators, this investigation is particularly concerned with developmental processes encompassing the senior-elementary pupil (age 9 – 14 years). Of course, it is of importance to understand what has gone before in the growth of intelligence (or logical thinking, ) but prime concern rests with the age groups mentioned previously.

Intellectual activity begins with physical actions upon the environment by the individual. These physical actions become internalized with the result that a mental structure is formed. The development of such a mental structure proceeds in four major stages. The first two of these stages; the "sensorimotor" period and the "pre-operational level", trace the growth of intelligence from birth to age seven. The third and fourth stages, those of "concrete operations" (7 - 11 years), and "formal operations" (12+ years), are of interest to this investigation, as they shed light on how the child sees and manipulates his environment. The child operating or thinking at levels one and two learns how to

represent the external world through symbols established by simple generalization.

What is principally lacking at this stage of development is what the Geneva school [Piaget et al.] has called the concept of reversibility. When the shape of an object is changed, as when one changes the shape of a ball of plasticene, the pre-operational child cannot grasp the idea that it can be brought back readily to its original state. It goes without saying that teachers are severely limited in transmitting concepts to a child at this stage, even in a highly intuitive manner. (Bruner, 1960).

The period of "concrete" operations occurs when certain basic concepts are acquired and organized into qualitatively new stable structures. A child operating at this level is quite dissimilar to one operating at the second "pre-operational" level.

It is simply that the older child [operational] seems to have at his command a coherent and integrated cognitive system with which he organizes and manipulates the world around him. Much more than his younger counterpart [pre-operational] he gives the decided impression of possessing a solid cognitive bedrock, something flexible and plastic and yet consistent and enduring, with which he can structure the present in terms of the past without undue strain and dislocation, that is, without the everpresent tendency to tumble into the perplexity and contradiction which mark the pre-schooler. (Flavell, 1963).

As mentioned previously action with the environment eventually results in the formation of mental structure. The "actions" between the child and the environment in the first two stages are only active. There is little relatedness or systematization associated with them. When these actions become organized into close-knit systems, and when these systems combine to form structures, then the "action" can be termed a "cognitive operation". An "operation" is "... a means of getting data about the real world into the mind and there transforming them so that they can be organized and used selectively in the solution of problems. (Bruner, 1960)" In this stage, the child develops an integrated structure with which to operate. Although the child is guided by the logic of classes, and the logic of relations, he still is confined to the structuring of immediate present reality. The child is not yet able to deal with the possibilities of a situation not directly before him, or one not already experienced. The child cannot anticipate the full range of possibilities or alternatives that may exist in any situation at any given time. "Concrete operations still have their limitations, since the concepts are still not generalized to all situations. (Adler, 1964)."

The fourth stage, that of "formal operations" is Piaget's final step in the development of thinking. This stage usually commences around twelve years, although like all ages mentioned, there is no hard and fast rule on age as related to levels of thought.

Unlike the concrete operational child, the adolescent begins his consideration of the problem at hand by trying to envisage all the possible relations which could hold true in the data and then attempts, through a combination of experimentation and logical analysis to find out which of these possible relations in fact do hold true. (Flavell, 1963).

The child now deals, not with operations or events or objects, but rather with operations on operations. The child may not be able to verbalize laws of logic and mathematics, but he can arrive at these rules inductively and learn how to work with them. 25

#### Summary of Development

What is most immediately apparent when comparing the work on development conducted by Piaget and Bruner is their tendency to conceptualize the thought process into a series of steps or stages. For all practical purposes Bruner's enactive, iconic, and symbolic levels can be said to correspond with Piaget's sensori-motor-pre-operational, operational, and formal operations. While both name and differentiate levels, they do not adhere to a rigid chronological age limit. It has been suggested earlier that all types of thinking à la Bruner may be used by an individual at any time, for the solution of problems. Piaget's studies offer the opinion that the child may progress to an advanced stage of thought in one type or particular problem, but may remain at a lower Even if one assumes that a child is level when dealing with other problems. capable of thinking at a high (formal) level, there is no guarantee that the child will engage in this high type of activity to solve any one problem. Knowlege of how a child "could" function does not really give any insight into how he actually goes about organizing information and getting results. What is of importance to the teacher in both teaching and evaluation is that within reasonable age limits, children can be expected to have reached points of development where presentation of materials and ideas in increasingly abstract contexts will be acceptable and useful means of instruction. How the functions of development relate to the problem of readiness in any particular curricula should now be investigated.

#### C) Readiness

Bruner's well-known hypothesis is seemingly appropriate in light of his and Piaget's findings in thought development.

We begin with the hypothesis that any subject can be taught effectively in some intellectually honest form to any child at any stage of development. (Bruner, 1960).

From investigation of the development of thought it is apparent that at each stage of development a child has a characteristic way of viewing and explaining the world to himself. According to Bruner, the task of teaching any subject to a child involves presentation of the structure or basic concepts in a manner appropriate to the stage of development of the child. As the child develops his thinking, these first representations can later be made more powerful and precise more easily by virtue of this early learning and experience with them.

The logical outcome of this consideration for the development of the child, and the thesis of presenting the structure of the subject, is what Bruner terms the "spiral curriculum". For subject matter in a curriculum, the questions Bruner poses regarding its validity are: a) Is it worth an adult's knowing? b) Whether having known it as a child makes a person a better adult? A negative or ambiguous response to either question is an indication that the material is cluttering the curriculum. Applied to geography this would indicate that any material that does not contain some of the basic concepts and/or structure of the subject would be of questionable value. Similarly courses in a geography curriculum that did nothing to familiarize the student with basic geographic tools, such as maps, globes, and diagrams and models of various types, are not doing a proper job according to the ideas previously presented in this section.

## Summary of chapter

The psychological basis of this investigation has been very selective, and in many ways may be seen to compliment the chapter dealing with the development of geography. The concept of stages of intellectual development as conceived by Piaget and Bruner gives an investigator of curriculum some insight into how the child may function in a learning situation. With this insight in mind, he can present materials in such a way as to permit the easiest possible understanding of them. If one follows Bruner's ideas of "structure" and "spiral curriculum" the major concepts of any subject can be presented at any age in recurring, meaningful sequences. It follows that major ideas held by geographers can or could, be meaningfully transmitted at various ages in elementary and secondary schools. It also should follow, that the aims of geography, or any subject should be the same throughout the school. There seems to be little or no need of changing definitions of a subject just because the child becomes older, or proceeds to a higher grade. What is required therefore, for an adequate treatment of any subject for any age, is an explanation of the perception and conceptualizations a child of any given age is capable of, and then a development of material and procedures complimentary to the various levels should be undertaken. This latter step would best be done by those who grasped both the

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necessary subject material, but who also possessed the required knowledge of the intellectual growth of the students to whom they would be presenting this material.

#### CHAPTER 3

#### DEVELOPMENT OF HYPOTHESIS

Combining the ideas of geography and those of psychology, and bearing in mind that evaluation is a vital part of curriculum planning, it should be possible to produce a meaningful measuring instrument that would get beyond the simple recall of factual material, and which would give some stimulus to teachers of geography in their search for new approaches to the subject. This section will attempt to deal with one way such a test could be originated, through examination of <u>Bloom's Taxonomy of Educational Objectives</u>, (Bloom, 1956), although other types of categorization exist. (UNESCO, 1966).

# Bloom's Taxonomy

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A three-fold classification of the objectives of teachers has been developed by Bloom and his associates.

<u>Cognitive</u>: Objectives which emphasize remembering or reproducing something which has presumably been learned, as well as objectives which involve the solving of some intellectual task for which the individual has to determine the essential problem and then re-order given material or combine it with ideas, methods, or procedures previously learned. Cognitive objectives vary from simple recall of material learned to highly original and creative ways of combining and synthesizing new ideas and materials.

<u>Affective</u>: Objectives which emphasize a feeling tone, an emotion, or a degree of acceptance or rejection. Affective objectives vary from simple attention to selected phenomena to complex but internally consistent qualities of character and conscience.
<u>Psychomotor</u>: Objectives which emphasize some muscular or motor skill, some manipulation of material and objects or some act which requires a neuromuscular co-ordination. (Krathwohl, 1964).

The "psychomotor "classification or "domain" has not been developed to the knowledge of this investigator. Krathwohl et al. (1964) has developed the "effective" domain, while the "cognitive" classification has been studied by Bloom (1956).

Studies quoted by Krathwohl (1964), suggest that there are but small correlations between aptitudes and interests, and relations between cognitive achievement and attitudes show: them to be statistically independent. Since this investigation is primarily interested in the curriculum as it applies to geography, the domain best suited to the task at hand seems to be that of "cognition". If the study had been designed to determine personality or character changes that could be inculcated through a programme of geography, rather than the evaluation of thinking and problem-solving within the subject, the "affective" domain would have been a better tool to apply. Since "... no objective in one class was entirely devoid of some components of the other two classes... (Krathwohl, 1964)," one is not entirely isolating any one piece of behaviour into a strict and set classification.

The rationale behind the Taxonomy is basically simple,

... although the objectives and test materials and techniques may be specified by educators in an almost unlimited number of ways, the student behaviours involved in these objectives can be represented by a relatively small number of classes. Therefore, this taxonomy is designed to be a classification of the student behaviours which represent the intended outcomes of the educational process. (Bloom, 1956). 31

The classification aims at student behaviours rather than instructional methods used by teachers. A formulation of educational objectives may deal with student personnel information, the demands of subject matter, the demands made by contemporary life on young people, or the psychology of learning. These four goals not only shape curriculum and guide instruction, but they also provide specifications for the construction and use of evaluative techniques. As the cognitive domain of the Taxonomy attempts to categorize educational objectives of a subjectoriented nature, its examination should be in order.

## Cognitive Domain:

The cognitive domain is essentially a six-stage classification. These six process level from least to most complex are: Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation. The processes are purportedly hierarchical and cumulative, and each process is sub-divided. Concern need not be given these sub-divisions, but characteristics of the six levels are of prime importance. An attempt to provide a concrete example of each level applicable to geography will be made.

### Knowledge

Knowledge as defined here includes those behaviours and test situations which emphasize the remembering either by recognition or recall of ideas, material or phenomena. The behaviour expected of a student in the recall situation is very similar to the behaviour he was expected to have during the original learning situation. (Bloom, 1956).

Within the Knowledge category the arrangement is from very specific-concrete types of behaviour to the more complex and abstract types. Evaluation techniques for Knowledge should provide an indication of the student's ability to remember and relate given material. The simple recall of the definition of a river, would

be an example of Knowledge.

#### Comprehension

... when students are confronted with a communication they are expected to know what is being communicated and be able to make some use of the material or ideas contained in it. (Bloom, 1956).

The material may be in a verbal or symbolic form and test materials would indicate

the facility with which the sub-processes of translation, interpretation and extra-

polation can be manipulated. The correct recognition and identification gully-

ing on a field trip would serve as an example of Comprehension.

#### Application

Given a problem new to the student, he will apply the appropriate abstraction without having to be prompted as to which abstraction is correct or without having to be shown how to use it in that situation. (Bloom, 1956).

With Application, one would be testing the ability to approach a solution by systematically perceiving, relating, categorizing and abstracting the elements involved. Application in geography would be the recognition of certain types of landforms from previously unseen airphotographs.

#### Analysis

Analysis emphasizes the breakdown of the material into its constituent parts and detection of the relationships of the parts and of the way they are organized. (Bloom, 1956).

The measurement of Analysis should require the student not only to comprehend, but also to identify and classify the material presented to him. In geography a "region" would be capable of being broken down into its constituent parts. Each part could then be examined in relation to the remainder and to the original whole.

#### **Synthesis**

Synthesis is here defined as the putting together of elements and parts so as to form a whole. This is a process of working with elements, parts, etc., and combining them in such a way as to constitute a pattern or structure not clearly there before. (Bloom, 1956).

In evaluating Synthesis, test items should indicate the facility with which material can be organized and integrated to form a unified whole. Geographically, an example of Synthesis would be the mapping of individual forms of transportation in an area, and then superimposing these maps to see the transportation patterns that develop in the particular area.

#### Evaluation

Evaluation is defined as the making of judgments about the value, for some purpose, of ideas, works, solutions, methods, material, etc. It involves the use of criteria as well as standards for appraising the extent to which particulars are accurate, effective, economical, or satisfying. (Bloom, 1956).

A student's ability to select, apply, and utilize appropriate criteria should be indicated by items measuring Evaluation. Comparison of two different agricultural procedures and practices, using appropriate criteria, to decide which would operate more efficiently in an area, would be an example of Evaluation.

The Taxonomy, it appears, provides a hierarchy of levels by which student behaviours can be judged on matters pertaining to cognition. Although the examples given in geography were not overly sophisticated, they should serve to show that such a system is practicable to this particular subject. While the Taxonomy appears useful and practical in evaluating cognitive objectives, (McFall, 1964), there exists little outside validation of the hierarchical framework. (Stoker and Kropp, 1964), (Kropp, Stoker and Bashaw, 1966). This investigation takes a position of acceptance of the <u>Taxonomy of Educational Objectives</u>, <u>Hand-book 1</u>, <u>The Cognitive Domain</u>, similar to the acceptance given to the cognitive theories of Bruner and Piaget. It is not the purpose of this investigation to prove or disprove any of these three theories, or even to determine how accurate the description of the nature of geography in elementary school was. It should be apparent that a synthesis of these three major theories with the subject of geography should enable one to formulate hypotheses pertaining to the evaluation of geo-graphy in the elementary school.

#### Hypotheses

#### Hypothesis One

An attainment test in elementary school geography can be constructed which will measure the growth of learning in accordance with the views of Bruner and Piaget. Proof of the validity of this hypothesis will be based on the extent to which significant differences in total test scores between grade levels are found.

#### Hypothesis Two

Using the Bruner hierarchy in the construction, the progression of difficulty indicies will be in harmony with the level of understanding outlined by Bloom, of the varying level of items.

#### Hypothesis Three

Total test score will correlate significantly with I.Q.

#### Hypothesis Four

Total test score will correlate significantly with school attainment as

measured by standardized tests.

Upon statement of such hypotheses, two major questions are posed: 1) What has already been attempted in this field by others? 2) What purpose would such an investigation serve, assuming that it was successful? Question one can be answered through a review of related literature, of which little exists. The answer to question two can be found through a review of the state of geography in the elementary schools of the Province of Quebec, and the awareness, or lack thereof, of the need for standardized evaluation instruments as part of the instructional programme.

#### CHAPTER 4

#### **REVIEW OF RELATED LITERATURE**

As mentioned previously, little, if any, work has been attempted, or is being attempted on such a test in Canada, or in the United States. Examination Canadian Education Association (1962, 1963), literature reveals nothing of such a nature in progress, or completed. Other compilations of Canadian works completed (Canadian Education and Research Digest, 1961, 1962, 1963, 1964, 1965, 1966), similarly reveal nothing related to this study. (Ontario Journal of Educational Research, 1958). Review of other standard references, Phi Delta Kappa (1964), and Dissertation Abstracts (1961, 1962, 1963, 1964, 1965), yield nothing related to this question. A recent review of British research by Long (1965), shows no related work exists in England.

One Canadian study by McGill (1927), investigated objective tests in geography, but the study aimed more at ascertaining the value of objective tests as compared with essay material, rather than developing a standardized instrument. Another investigation by Southam (1933), studied objective methods, again showing the validity of the method of objective geography tests, rather than making any practical use of them.

The preceding does not mean that there are no standardized geography tests available for use in the elementary schools. Some tests under review by

Buros (1949, 1953) appear to be valid as evaluators of geographic concepts. Similarly there exist other tests which do not apparently test concepts, but continue to stress facts and place-name information. They also seem to neglect to test skill in the use of maps and other geographic materials (Buros, 1949, 1953, 1965). Another factor of importance in Quebec is the degree of cultural bias in these tests. Those instruments which combine geography and history under the heading of social studies, may not be applicable outside the United States (Buros, 1959). So even although the test may involve conceptual thinking on the part of the pupil, the material in the test may be entirely foreign to the curriculum in which it is used. 38

From the preceding it should be apparent that there does not exist a test of elementary school geography, entirely applicable to the curriculum of the Province of Quebec. Tests which rely mainly on factual items and memorization, are not deemed desirable for purposes of this study, as few of them test beyond what Bloom would consider the level of Knowledge. Considering the fact that the majority of existing tests originate in the United States, and may present some geographic items under the guise of social studies; whereas in Quebec geography is taught as a separate subject, the field of possible useful material is diminished. For all practical purposes then, it can be assumed that at present there does not exist a standardized measuring instrument for elementary-school geography in the Province of Quebec. To what extent such an instrument is needed, would be received, and utilized by educators, now becomes a matter for investigation.

#### CHAPTER 5

#### GEOGRAPHY IN QUEBEC SCHOOLS

In the Province of Quebec (Quebec, 1965), the formal study of geography begins in grade five, the approach in the previous year being "informal", and that studied in grades one to three termed "social studies". In grades five to seven, "... an attempt is made to provide a 'one-cycle' treatment of the major countries of the world." The subject is compulsory in the elementary school, but in high school it becomes optional, extending to grade eleven. (All schools referred to are those of the Protestant Schools of the Province of Quebec.) The curriculum can be envisaged as a series of hops, leaps, progressions and regressions, in many instances governed by the text for the particular grade. In grades one to three, an approach is made to the home area, while grade four visits "representative" communities in various parts of the world, disregarding the home area, at least in the text. (Atwood and Thomas). The courses and texts of grades five (Taylor, Seiveright and Lloyd), six (Taylor, Seiveright and Lloyd, 1961), and seven (Taylor, Seiveright and Lloyd, 1964), take the previously mentioned "once over" treatment of the world. The high school course consists of strict "physical geography" in grades eight (Namowitz, Stone and Bird, 1956), and nine (Namowitz, Stone and Bird, 1957). Another "once-over" treatment of the world is made in grade ten (Thralls) and finally, in grade eleven, the pupil undertakes a study in depth of North America (Tomkins and Hills, 1962).

The Teachers Handbook (Quebec, 1965), gives several versions of

how geography or social studies is supposed to be benefiting the child at any par-

ticular grade level. In the primary grades (one to three) ...

- 1. It should extend and clarify the child's knowledge of the immediate world in which he lives, the world of things and the world of people.
- 2. It should help to build sound attitudes...
- 3. It should lay a foundation for the skills which the child must develop and use as he moves on to more mature studies...

but for grades four to eleven, the aims of the geography programme change...

- 1. To acquaint pupils with the basic physical and cultural distributions over the earth's surface.
- 2. To afford a sympathetic understanding of the life and work (including trade, industry and social habits).
- 3. To lead to a recognition of the interdependence of the people of the world and the necessity for good relations among them.

The aims stated seem to be partially acceptable in light of what geography is considered to be by this investigation, although they are somewhat abstract for evaluation purposes.

At least two things, however, can be seen to be amiss regarding the statement of the aims for the geography programmes, and the material presented in these programmes. From observation of the various texts and/or courses of study, it is apparent that there is no rationale for the coverage of material. The home area is a prime example of this. From extensive study in a very informal way in the primary grades, one is never really presented with this material again at a more formal level. The Brunerian thesis of "spiral curriculum" is denied. More complex relationships, which are, or should be, gradually developed throughout the geography courses, could best be made with reference to concrete and familiar situations. The courses of study leave little room for this type of development. Linked to this coverage of materials and the denial of concept formation, is the general approach of the texts utilized in the various grades. This is especially true of those used in grades four to seven. Little attempt appears to have been made to set forth a sequence of increasingly complex ideas to present to the child, rather a coverage of areas is made. In many cases material found at the end of such texts is no more "difficult" than that at the beginning. An attempt to rectify this situation appears in the offing as far as texts are concerned, by the possible introduction of a new book for grade four (Massey, 1965), which deals with the developing of skills and ideas. Of particular importance in this text is the area of developing map skills.

If the "spiral curriculum" can be applied, there seems to be no need for a restatement of aims at the grade four level. One is not arguing the merits of either set of aims discussed earlier, rather for an incorporation of these ideas to be made applicable to all grade and age levels. If there are important truths that derive from the study of geography, these should be universal and be the aims of the geography courses. If the geography being taught does not, or cannot, arrive at these goals, it is the way of teaching and the materials used that should be changed, not the aims. Geography has too long remained a "factual" subject, and facts alone do not lend themselves to many forms of spiral development, if any. While it is obvious that the student in high school will be much more capable of drawing inferences and making deductions than the primary or senior elementary pupil, due to the factor of maturation and development alone, it should be possible to develop a curriculum in geography that builds onto some core rather than adds to a sinking foundation.

What could have given Quebec geography teaching a turn in the right direction was the Parent Report (Quebec, 1965 A). While recognition of the necessity for a progression of difficulty in teaching the subject, and the need for the use of the home region is evident, the base established for the elementary school does little to approach the concreteness suggested by the developmental psychologists. Little indication is given of what materials, (areas or countries), should be covered. Even less indication is given as to how these materials should be developed. If the content of the Report is not outstanding as a guide to a renovation of the geography curriculum, perhaps the recommendations made at the conclusion, are a step in the right direction. As long-term goals they are admirable. Recommendations pertinent to the problem are given.

267. We recommend that all elementary teachers receive a sufficient preparation for the teaching of geography and be able to benefit from the advice of a specialist.

268. We recommend that at the secondary level, the teaching of geography be placed in the hands of university graduates with a Bachelor's degree.

271. We recommend that a provincial co-ordinator within the Department of Education assisted by an advisory committee, be in charge of the programmes and the methods of teaching geography, the preparation of texts and the teaching material required, as well as the publicity necessary to ensure the recruiting of future teachers. (Quebec, 1965A). In essence these recommendations bear out what has been evident for some time, namely that the teachers of geography have been to a large degree un-or-not properly qualified. "Geography, however, is further weakened in that great differences exist in the amount of knowledge of geography acquired by teachers (Oulton, 1955)". A more recent study by Wisenthal (1964), indicates that "a large number of Quebec high school pupils are being taught by teachers who are unprepared or underprepared to do an adequate job." While all subjects are covered in the investigation, the comparison of geography with other subjects is indeed startling. (see Table 1)

#### Table 1

Subject	no courses	l or 2 courses	3, 4 or 5 courses	6 or more courses
English	21.6 %	14.7 %	33.1 %	30.6 %
Mathematics	23.9	29.5	32.2	14.4
History	23.9	23.0	34.0	19.1
French	41.5	19.1	19.1	20.3
Geography	52.7	29.3	12.3	5.7
Physics	18.6	39.7	36.6	5.1
Latin	27.6	36.1	30.4	5.9
Chemistry	9.6	36.5	40.8	13.1
Biology	25.0	25.0	25.0	25.0

Number of University Courses Taken by High School Teachers of Quebec in the Subjects They are Teaching

That over half of the teachers of geography have no academic background in the subject is truly distressing. Equally alarming is the small percentage having taken six or more courses. In effect, few would be qualified to act in the capacity of "specialists".

One result of this lack of qualification can be shown by the decreasing numbers of students who option for geography in the upper grades of high school. (McNeilley, 1963). (Table 2)

# Table 2

	Summary	Summary of 18 High Schools of Greater Montreal Board			
Grade		Grand Total Students	Geography Students		
8		6,050	3,131		
9		5,438	2,630		
10		4,873	937		
11		3,987	618		
	Totals	20,348	7,316		

Summary a	f 18	3 High	Schools	of	Greater	Montreal	Board
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While 51% study geography in grade eight, only 15% study it in grade eleven. It would be wrong to lay this decrease in students entirely on the teaching and nature of the subject, since other elements such as university requirements, lack of proper facilities, and even student disinterest all contribute. High school studies show a low standard of teacher-training and student participation in geography. In the elementary school, with its even less stringent demands on properly qualified personnel, the subject cannot be held in a much higher light, or taught in a better manner. McNeilley (1963), in his study of geography teaching in Montreal concludes "... probably only a small minority of elementary school teachers do possess the basic training needed." If this be the case, what purpose does a standardized geography test serve in the elementary school? If a test is devised which merely continues to evaluate obsolete material and/or methods, one tends to solidify thinking at that stage, while if the test is entirely novel and bears little resemblance 44

to what is being taught, the results of such evaluation are meaningless to the teacher and students. An examination which uses either new material, or presents questions on these materials in a new manner, could maintain the contact with reality necessary to make the results of value, and yet could show a path away from what may be obsolete, to something more contemporary or even avant-garde. To properly assess the position such evaluation could or should have, it is necessary to turn to several general works in the field of measurement, and then see what position, if any, can be ascertained for Quebec. 45

#### CHAPTER 6

#### EVALUATION IN THE CURRICULUM

It is assumed that measurement or evaluation is an essential part of any curriculum, therefore the goals of any specific achievement test should coincide with the major aims of the course of study under consideration. The chief down-fall of standardized tests lies in this area.

A common situation, which reflects the lack of co-ordination of many phases of education, is that which occurs when one group of individuals defines the purposes of a programme while another group develops evaluative criteria without having these purposes in mind. To a considerable extent, the use of standardized tests of achievement represents this practice. (Travers, 1955).

Since the test should try to measure the objectives of a course of study, it is essential that co-ordination of aim and test be made. Educational objectives, which in this case have been predetermined by the Department of Education in Quebec, can thus be re-affirmed in the means used to evaluate them. Whether the technique be oral, objective, or subjective, the demands made of the student during evaluation should be such as will show how he is observably different after the educational experience from what he was before the experience. The problem for those whose task is the setting of objectives lies in determining where, on a continuum to place the aims for a particular course.

... one of two extreme situations usually exists. In one case, our objectives are limited to the learning of material covered in a textbook and our teaching and evaluating procedures are primarily concerned with the retention of textbook content. At the other extreme, overly ambitious goals are set for a course – goals so general and so idealistic that their attainment is impossible either to achieve or to evaluate. (Gronlund, 1965).

The mean of these two extremes would perhaps be the ideal objective to aim for, especially in geography, which deals with much factual material and then seeks to develop very nebulous qualities such as attitudes and understandings.

Observation of pupil growth is the second important function of evaluation. With the objectives of a programme constantly before him, the teacher can use a testing instrument diagnostically to assess areas in which the pupil or the teacher may be deficient. "...teaching is improved when learning difficulties – gaps in the sequence of learning – are discovered, also a process in which tests are used." (Chauncey and Dobbin, 1963).

The test envisaged by this investigator is aimed primarily at the evaluation of the objectives of a particular course of study. It should be remembered that the objectives in this case are pre-set. It is logical to conclude that if a test is directed at the objectives of the curriculum, the test can be used to stimulate in some way the teaching of that curriculum. It would be rather naive to suppose that teachers never teach material for the passing of a test. In many ways it is impossible and sometimes undesirable to prevent this, if test and curricula are interrelated. Therefore, a good test may stimulate enlightened, or even better teaching. "Vague objectives in the course of study may be pointed out and methods of instruction may be evaluated through the use of educational tests and critical interpretation of their results." (Greene, Jorgensen and Gerberich, 1953).

The objectives of curricula and tests spring from pupil needs, and not

from teacher activities. "The modern way of stating educational objectives reflects the fact that these objectives stem from pupil needs." (Ahmann and Glock, 1963). Implicit too, is the fact that if a pupil's needs are going to be met properly, teacher activities will have to make a corresponding change. If a standardized test correctly evaluates pupil achievement in terms of their needs, and has caused a change in teacher behaviour to produce it, the test, combined with the curriculum, has been instrumental in this. A logical conclusion regarding the value and possible use of standardized tests in the elementary schools of Quebec would be that if they were designed to reflect the objectives of the curriculum they would make a valuable contribution to the educational enterprise. Some indication of the value seen for standardized tests may be shown...

The Ministry of Education of Quebec is planning to administer examinations in language and arithmetic to all pupils at the end of elementary school. (Tremblay, 1966).

As these examinations were of the objective, multiple-choice, standardized variety, it is evident that the Quebec Department of Education at least, recognizes the importance of this type of instrument. The development of an instrument in another subject area, namely geography, would not be contrary to current trends of thought at the ministerial level.

### CHAPTER 7

#### TEST CONSTRUCTION

A discussion of the difficulties standardized tests have in achieving unanimity with the objectives of the course of study, has already been made. This test recognizes these difficulties, and has made some attempt to combat them. If one considers the rather lofty aims set forth for the grades under consideration (five, six and seven), and the material, which covers the entire world, one is bound to select some areas for questioning while omitting other areas which may be equally suitable for the basing of items.

#### Content Justification

A test which tries to show geography attainment, and seeks to measure this attainment using items at varying levels of complexity, can create for itself even greater problems than that of reconcilling aim with test. When employing a framework such as the Bloom Taxonomy, the test items themselves present a difficulty. The correct process envisaged by the test maker may produce the wrong response from the student, or the right response may result from using a procedure other than that thought of by the examiner. In some instances, a particular item could evoke many different types of response by individuals, all of which may produce a correct answer. The difficulty most hard to rectify is that of student's having beforehand the solutions of a problem, thus making the item one of "Knowledge", no matter what process the examiner may have envisaged.

Since the geography programme in grades five to seven is what could be termed "content oriented", to its detriment, the items were constructed to try to eliminate much of what would be "Knowledge" due to previous familiarity with the materials. Since pupils in grade five could not be expected to have had acquaintance with grade seven material, the problem was compounded.

Two techniques can be used to handle this problem. One is to assume that students do have content available to them by virtue of common antecedent experiences. The second is to provide deliberately for student access to the content at the time the response measures are collected. (Kropp, 1966).

The second approach was thought the more practical, and by means of maps, graphs and diagrams, pupils were given information in the test items. To even further familiarize the students with content, selection of items for any particular grade was made from material from the course of study of the previous year, therefore questions were derived from the curricula of grades four to six.

The variability of course content from school to school in a particular content and the variability of student ability to profit from common exposures cast considerable doubt on the validity of assuming that students will know the content on which the processes are to operate. (Kropp, 1966).

Thus by giving the student content within the item, and by downgrading the material he is expected to manipulate, the student has the maximum possible chance of success, no matter what the programme of his school. In effect, the test tries to present material to the student which will show his ability to demonstrate various geographic skills, such as map reading and interpretation, and observation of distributions of phenomena. All of the above can be considered vital to the proper understanding and teaching of the subject, therefore these skills can be justifiably evaluated in light of the aims of the curriculum. Factual knowledge items are included, but these are not intended to take precedence over other "classifications" of items.

#### A) Item Construction

The textbooks for grades four, five and six, along with the suggested new text for grade four, were used as the basis for item development. The rationale for item construction was centred around what might be called a "unit question". The use of diagrams and maps precluded the one-map, one-question approach, so three or more questions were constructed around a piece of material in an attempt to make the student see relationships, patterns, or whatever might be present in the material. With an expected administrative period of one hour, it soon became apparent that items based on this "unit question" concept would not cover all of one year's course of study, let alone that of three years'; however, items in the "unit questions" became the bases for the test. Areas which were not included in units were covered by single items. Choice of which areas received "unit question" coverage and which areas received single questions was made by the test constructor, and was arbitrary. Although the test was intended tc act as a measure of geography achievement, the items are not entirely content oriented.

For pretest item analysis, single tests were constructed for each of the

three grades, utilizing materials from the "course" (the previous year's work), for that grade. For grade five, a sixty-four item test was developed. The grade six test consisted of fifty-seven items, and that administered to grade seven, fiftyfive. In addition to the materials selected from the texts, a "unit question" on the mythical Island of Ajax, was included so as to be certain of having some items in the "Classification" category of Bloom. (See Appendicies A, B, and C for sample tests).

The test items were of the objective, multiple-choice type. This technique was chosen over others due to the ease with which it could be scored, the facility of pupil response, and also because it appeared to be more suited to the development of items using the Bloom Taxonomy than did other types. Each test item was constructed using four distractors plus the correct response. The pupils were told to seek the "best" answer available. Item construction followed the principles alluded to by Thorndike and Hagen (1961), and Ahmann and Glock (1963).

A breakdown of the pretests should help reveal the nature of the items. (See Table 3).

Grade	Number of Items	Number of Unit Questions	Question Numbers in Bloom Category
5	64	7	<ul> <li>(1) 8-15, 23, 24, 26, 32-35, 37, 61-64</li> <li>(2) 1-7, 20-22, 25, 27, 29-31, 38-45</li> <li>(3) 46-60</li> <li>(4) 36</li> <li>(5) -</li> <li>(6) -</li> </ul>
<b>6</b>	57	7	<ul> <li>(1) 1, 4-8, 14, 17, 22-24, 29, 34, 37, 38, 42-44, 46, 49, 50</li> <li>(2) 2, 3, 12-13, 18-21 33, 47, 48</li> <li>(3) 30, 45, 51-57</li> <li>(4) 9, 31, 32, 35, 36</li> <li>(5) 39-41</li> <li>(6) -</li> </ul>
7	55	5	<ol> <li>(1) 2-6, 8-13</li> <li>(2) 1, 7, 15-28, 30-32</li> <li>(3) 29, 38-51, 53, 55</li> <li>(4) 35-37</li> <li>(5) 33, 34</li> <li>(6) 14, 52</li> </ol>

Ta	ble	)	3

Items of Pretest Classified According to the Bloom Categories

The classification of items into the Bloom categories is open to question, but where an item seemingly could go into more than one category, it was placed in the lowest point of the classification.

#### B) Administration Procedure

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The procedure adopted for test administration was made as simple as possible, and was similar for both the pretest and the second form. All administration was done by the author, and on occasion with the assistance of another researcher who was thoroughly familiar with the procedures used. Classroom teachers did not participate in the administration, but once a class was informed about the nature of the test, and was working on it, the teachers stayed with the class while the examiner left to start another class. It is assumed that the class received no further assistance.

In point form, the administrative procedure went as follows:

- Introduction of the test to the class. This involved simply informing the class that they were about to do a test in geography.
- (2) Arranging that everyone had proper materials. All that was required was a pencil.
- (3) Distribution of the test booklets. These were not to be touched until instructions were given by the examiner.
- (4) Filling in of the front cover. The examiner explained each blank to be filled, stressing legibility.
- (5) Reading the instructions on the back cover. The examiner read these orally after having told the class to follow closely on their copies. The sample question was done orally by one member of the class, and everyone filled in the correct response.

- (6) Any questions prior to starting were answered by the examiner. These usually involved the reasons for the test, and if the pupils would receive a mark.
- (7) The class was told that they had one hour to complete the test. (In practice a strict cut-off was not used).
- (8) Arrangements were made with the classroom teacher to pick up the completed test booklets.

#### **Results of Pretests**

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The three pretests were administered in early February, 1967, to grades five, six and seven in Herbert Purcell and Stonecroft Schools of the Protestant School Board of Greater Montreal. All the pupil responses were transferred to 1.B.M. cards, and all scoring and analysis was done by computer. Item analysis of the pretest items gave the difficulty level, distractor values, and a point-biserial correlation for each item. Table 4 shows the number of pupils tested in each grade. Tables 5 and 6 show frequency distributions of difficulty levels and point-biserial correlations.

Grade	Number of Pupils
5	89
6	91
7	91
Total	27 1

Number	of	Pupils	Tested	in	Pretest
TOUNDER	0	TOPIIS	103ICU		TICICSI

Table 4

# <u>Table 5</u>

# Distributions of Difficulty Levels on Pretest Items

	Number of Items at Each Level			
Percentage Difficulty	Grade 5	Grade 6	Grade 7	
90 - 99	6	0	0	
80 - 89	6	0	1	
70 - 79	3	2	1	
60 - 69	12	5	5	
50 - 59	9	6	n	
40 - 49	12	8	9	
30 - 39	7	14	15	
20 - 29	7	13	7	
10 - 19	2	7	6	
0 - 9	0	2	0	

Tabl	е	6
------	---	---

	Number o	Number of Items at Each Level			
<u> </u>	Grade 5	Grade 6	Grade 7		
.6064	1	0	0		
.5559	2	2	1		
.5054	3	3	0		
.4549	1	4	4		
.4044	6	6	7		
.3539	6	9	1		
.3034	11	6	10		
.2529	8	5	8		
.2024	9	5	5		
.1519	4	8	9		
.1014	4	2	6		
.0509	4	1	1		
.0104	2	1	1		
negative r	3	5	2		

Distributions of Validity Correlations on Pretest Items

#### C) Item Selection:

From items of the pretest it was hoped to obtain sufficient items from each "grade" level to construct a single test for use in all three grades. Due to the adoption of the "unit question" concept it was not a simple matter of selecting items of appropriate difficulty level and high validity in terms of pointbiserial correlation. In many instances some items within a unit would be found to be unsatisfactory on either difficulty or correlation criteria, thus diminishing the usefulness of the remaining items. When this occurred, new items had to be constructed within a unit. In effect this meant using untried items which might be less valid than those they replaced. Usually the entire "unit question" was discarded. It was hoped that the time required to complete the second form of the test would be approximately one hour, so it was expected that eighty to ninety questions would be necessary. Criteria for selection of items for this second form were based on (in no particular order of importance) the following:

- (a) A reasonably even distribution of questions among the three grade levels.
- (b) The "unit question" concept.
- (c) Difficulty levels of the items. The percentage difficulty was limited from 25% to 85%. (Pidgeon, 1961). Items outside this range were discarded as being too difficult or too easy.
- (d) Point biserial correlation of >.300. Exceptions were made with this criteria, as it was deemed more important to obtain items having the required difficulty level.

Items selected for the second form were revised in one way. The original pretest items contained four distractors plus the correct answer. There was no provision for indicating that the pupil "did not know" the answer, or simply did not have time to attempt the question. To help rectify this situation, the least valid distractor for each item was discarded, and the fifth choice was made "Don't know", thus giving three distractors plus the correct response.

#### D) Construction of the Second Form

Utilizing the items selected from the pretests, a second form of the test was constructed. The "unit" concept was maintained, resulting in thirteen

(13) "unit questions", plus twelve (12) individual items selected to make the best possible use of the format of the test. This test had 92 items, and units were arranged in ascending-grade order with the common question on the mythical Island of Ajax placed at the end of the grade five material. (see Appendix D for a sample test booklet). Units were structured as to place the easier items at the beginning, and the more difficult ones at the end. The arrangements of units was done in this way also, given the handicaps of grade placement and test format.

#### E) Administration of the Second Form of the Geography Test

The second form of the test was administered to pupils of grades five, six, seven, in Hillcrest, Thomas Bowes, and Martinvale Schools of the Protestant School Board of Greater St. Martin (Chomedy), and to grade six and seven of Tetraultville School, of the Protestant School Board of Greater Montreal, in mid-March, 1967. The test booklet responses were transferred to I.B.M. cards, and were scored. Total test scores were obtained for each grade and item analysis was carried out for each grade. No attempt at overall item analysis was made.

#### F) Pupil Aptitude and Attainment

In the second form, other data on pupil aptitude and attainment were obtained. These consisted of standardized scores from the Word Meaning and Arithmetic Application subtests of the Stanford Achievement Tests. These two subtests were chosen as it was supposed that the skills measured there (word understanding, and application of mathematical skills), might have some relation to 59

the skills being tested in the geography test. The schools of the Chomedy area use the Stanford Achievement Tests in helping to assess pupil growth. The sole Montreal school utilized the Gates Reading Test and the Stanford Arithmetic Application Test, therefore the Gates scores are not included in the mean grade scores for reading attainment.

Measurement of I.Q. was given by Otis and Henmon Nelson Tests. As it was not possible to use each of these measures independently in making correlations, they were considered as synonomous values for the purposes of this study. Although the tests differ in content, their marking scales marking are similar. An "F" test showed no significant differences between the scores of pupils on the two tests.

> F ratio  $\frac{5.975}{5.375} = 1.110$ significance levels 5% = 1.261% = 1.39

> > ("F" ratio is not significant)

The information on pupil attainment and aptitude is given in two forms. Table 7 shows the overall mean values by grade, and the values for the total pupil population. Table 8 shows mean values by schools. Table 9 summarizes the number of pupils taking the test by grade and by school. Generally the pupils tested in both forms of the test come from low-middle to middle-class homes as determined by a subjective visual examination of the areas in which the schools were situated. No objective measure of socio-economic status was made, as it was not deemed necessary. How pupils from "lower" or "upper" class families would do on the test is therefore open to speculation and further investigation.

Table	7
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Mean Values of Pupil Attainment and Achievement by Grade for Boys and Girls

	Grade 5			
Criteria	Boys	Girls		
Age	133.34	132.97		
I.Q.	109.85	110.04		
Stan. Word-Mean.	53.88	52.44		
Stan. Arith. App.	53.04	51.34		
Geog. Test Score	40.31	35.81		
	Gro	ıde 6		
Age	145.49	144.84		
I.Q.	117.70	112.69		
Stan. Word. Mean.	58.49	58.44		
Stan. Arith. App.	56.94	50.64		
Geog. Test Score	51.02	44.27		
	Grade 7			
Age	158.88	156.61		
I.Q.	111.77	112.55		
Stan. Word. Mean.	74.40	71.30		
Stan. Arith. App.	87.41	76.86		
Geog. Test Score	54.76	52.12		
	Total Pupil Populatic			
Age	145.75	145.05		
1.Q.	111.25	110.00		
Stan. Word. Mean.	60.55	61.71		
Stan. Arith. App.	63.12	59.71		
Geog. Test Score	48.56	45.07		

( n is not constant in all cases due to some students not having scores on a particular criteria.)

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# <u>Table 8</u>

	Бу	Grade an	a School	for Boys d	ind Giris						
	Grad	le 5	Gra	de 6	Grade 7						
School	Boys	Girls	Boys	Girls	Boys	Girls					
Tetraultville											
No. of Pupils			14	16	18	22					
Age			144.79	144.69	156.94	156.24					
1.Q.			109.93	110.06	110.89	113.20					
Word Meaning	(Gates)		73.07	68.63	75.78	75.55					
Arith. App.			47.00	45.73	67.00	66.90					
Geog. Score			53.93	46.50	57.17	55.00					
Hillcrest											
No. of Pupils	48	40	29	34	32	30					
Age	134.08	133.59	146.36	145.56	160.10	155.71					
1.Q.	110.60	109.15	112.47	113.04	114.31	113.39					
Word Meaning	56.38	52.56	57.00	58.40	77.40	71.11					
Arith. App.	55.52	52.76	58.14	52.25	103.36	80.70					
Geog. Score	41.88	37.34	50.07	41.21	53.17	50.94					
Thomas Bowes											
No. of Pupils	21	43	38	29	32	30					
Age	133.05	132.52	145.42	145.69	158.47	158.87					
I.Q.	112.67	111.15	112.11	113.96	112.00	111.21					
Word Meaning	53.76	50.15	55.74	56.85	72.75	70.56					
Arith. App.	53.77	49.70	61.38	53.35	84.14	82.26					
Geog. Score	39.33	34.91	52.84	50.55	56.66	53.23					
Martinvale											
No. of Pupils	11	11	12	15	14	10					
Age	137.64	132.46	144.47	141.08	158.93	153.30					
I.Q.	101.20	109.00	110.64	112.25	106.00	112.20					
Word Meaning	45.20	51.89	53.57	50.75	68.93	65.20					
Arith. App.	43.20	52.44	51.64	47.00	80.86	70.10					
Geog Score	35 36	33 64	14 07	36 67	55 57	49 30					

Mean Values of Pupil Attainment and Achievement by Grade and School for Boys and Girls

# Table 9

	by Sch	ıde		
School	Grade 5	Grade 6	Grade 7	Total
Martinvale	22	27	24	73
Thomas Bowes	64	67	62	193
Hillcrest	88	63	67	218
Tetraultville	0	30	40	70
Totals	174	187	193	554

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Numbers of Pupils Taking the Geography Test by School and by Grade

## CHAPTER 8

#### Results of the Second Form of the Test

The results of the second test are shown in Graphs A and B, and in

Tables 10 and 11.

Reliability Coefficients as Corrected by the Spearman-Brown Formula												
Grade	Spearman-Brown Formula											
5	.905											
6	.966											
7	.903											

#### Table 10

# Table 11

Grade	Mean Score, Geography Test	<u>s</u>
5	38.4	13.69
6	47.7	14.68
7	54.2	12.65
6 7	47.7 54.2	14.68 12.65

#### Mean Geography Test Score by Grades

# Results of the Second Test

# A) Establishment of Test Norms

From the results of the second form, norms for each of the three grade levels were established. Raw geography test scores were converted to z scores with  $\frac{1}{x}$  of 100, and s of 15, which conforms to measures commonly used in other standardized tests. This conversion was done by using a graph technique, (see Graphs C, D, E), and was verified by a technique which transforms percentile levels into equivalent normalized standard scores (France, 1965). Separate norms were established for both sexes. (see Tables 12, 13 and 14).

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KENELER & ESSER CT. N.Y.



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			G	rade 5			
Percentile		Raw S	ocore	Percentile		Raw	Score
Score	Z Score	Boys	Girls	Score	Z Score	Boys	Girls
	145	85	71		111	51	<b>11</b>
	144	84	70	75	110	50	
	143	83	69		109	49	43
	142	82	68		108	48	42
	141	81			107	47	-
	140	80	67	70	106	46	41
	139	79	66		105	45	40
	138	78	65	65	104	44	39
	137	77	64	60	103	43	38
99	136	76	-		102	42	37
	135	75	63		101	41	
	134	74	62		100	40	36
	133	73	61	55	99	39	-
	132	72	-		98	38	35
	131	71	60	50	97	37	34
	130	70	59		96	36	-
	129	69	58	45	95	35	33
	128	68	-		94	34	32
95	127	67	57	40	93	33	31
	126	66	56		92	32	30
	125	65	55		91	31	29
	124	64	54	30	90	30	-
	123	63	-		89	29	28
90	122	62	53		88	28	27
	121	61	52	20	87	27	26
	120	60	-		86	26	_
	119	59	51	•	85	25	25
	118	58	50	15	84	24	24
85	117	57	49	10	83	23	23
	116	56	-		82	22	-
	115	55	48		81	21	22
80	114	54	47		80	20	21
	113	53	46		79	19	20
	112	52	45	5	78	18	19

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Elementary School Geography Test Z Score Conversion Table

Ta	bl	е	13

Percentile Score	Z Score	Raw S Boys	Score Girls	Percentile Score	Z Score	<u>Raw</u> S Boys	icore Girls
<u> </u>							
	138	88	83		106	57	51
	137	87	82		105	56	50
•	136	86	81	65	104	55	49
	135	85	80		103	54	48
	134	84	79	60	102	53	47
	133	83	78		101	52	46
	132	82	77		100	51	45
99	131	81	76	55	99	50	44
	130	80	75	50	98	49	43
	129	79	74		97	48	42
	128	78	73		96	47	41
	127	77	72		95	46	40
95	126	76	71	45	94	45	39
	125	75	70	40	93	44	38
	124	74	69	35	92	43	37
	123	73	68		91	42	36
90	122	72	67	30	90	41	35
	121	71	66		89	40	34
	120	70	65	25	88	39	33
	119	69	64	20	87	38	32
85	118	68	63		86	37	31
	117	67	62		85	36	30
	116	66	61		84	35	29
	115	65	60	15	83	34	28
80	114	64	59		82	-	27
	113	63	58	10	81	33	26
	112	62	57		80	32	25
75	111	-	56	5	: 79	31	24
	110	61	55		78	30	23
	109	60	54		77	29	22
70	108	59	53		76	28	21
	107	58	52				
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Elementary School Geography Test Z Score Conversion Table Grade 6

Table 14

Elementary School Geography Test Z Score Conversion Table Grade 7

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G	rade	

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Percentile		Raw	Score	Percentile		Raw	Score
Score	Z Score	Boys	Girls	Score	Z Score	Boys	Girls
	135	86	82	55	102	-	54
	134	85	81	50	101	57	53
99	133	84	80		100	56	52
	132	83	79		99	55	-
	131	82	78		98	54	51
	130	81		45	97	53	50
	129	80	77	40	96	52	49
	128	79	76		95	-	48
	127	-	75	35	94	51	47
	126	78	74		93	50	-
	125	77	73	30	92	49	46
95	124	76	73		91	48	45
	123	75	72		90	-	44
	122	74	71		89	47	43
	121	73	70	25	88	46	42
	120	-	69	20	87	45	41
90	119	72	68		86	44	-
	118	71	-		85	43	40
	117	70	67		84	42	39
85	116	69	66		83	-	38
	115	68	65	15	82	41	37
80	114	-	64		81	40	36
	113	67	63		80	39	-
	112	66	-	10	79	38	35
	111	65	62		78	37	34
75	110	64	61		77	-	33
70	109	-	60		76	36	32
	108	63	59		75	35	31
	107	62	58	5	74	34	30
65	106	61	57				
60	105	60	-				
	104	59	56				
	103	58	55				

## B) Confirmation of Hypotheses

# Hypothesis One

An attainment test in elementary school geography can be constructed which will measure the growth of learning in accordance with the views of Bruner and Piaget. Proof of the validity of this hypothesis will be based on the extent to which significant differences in total test scores between grade levels are found.

Confirmation of Hypothesis 1 will be found in Table 15.

Diffe	rences Between Me	ean Score	s on the Geo	graphy Test
Grade	Mean Score		<u>s</u>	df
5	38.4		13.69	173
6	47.7		14.68	186
7	54.2		12.65	192
t Test Betw	een Grades	t	Signifi	icance Level
5 ai	nd 6	6.24		>.001
6 ai	nd 7	4.61		5.001
5 ai	nd 7	8.74		5.001

### Table 15

The t tests show that each of the differences between mean scores is significant. This indicates that the test does show differences between grade levels, and thus would be a measure of learning growth.

### Hypothesis Two

Using the Bruner hierarchy in the construction the progression of difficulty indicies will be in harmony with the level of understanding outlined by Bloom, of the varying level of items.

In order to test this hypothesis, difficulty levels were established at three points: 0 to 39%, 40 to 69%, and 70% and over. A test of chi square  $(x^2)$  between these difficulty levels and the three grades produced a value for  $x^2$ , as shown in Table 16. Cell entries are the number of items found at each of the three levels of difficulty.

## Table 16

ltem Difficulty Index	5	Grade Level 6	<u>s</u> 7	Total
High ( 70 + )	11	18	31	60
(70 + ) Medium (70 - 68)	34	46	42	122
(40 - 39) Low (0 - 39)	47	28	19	94
	92	92	92	276
$x^2 = 25.189$	(si	gnificant at	<b>≻.</b> 001 level)	

Test of  $X^2$  on Difficulty Levels and Grade Levels

Difficulty indices increase as one moves from grade to grade; this

provides support for hypothesis two, in that younger pupils are unable to cope with higher level items in the same fashion as older pupils.

## Hypothesis Three

Total test score will correlate significantly with I.Q.

Table 17 shows the correlation between I.Q. and the raw Geography Test Score.

Table 17

Correlation Between I.Q. and the Geography Test Score											
Total population	(n = 429) r = .520										
	(significant at the .001 level)										
Boys	(n = 222) r = .655										
	(significant at the .001 level)										
Girls	(n = 207) r = .507										
	(significant at the .001 level )										

The levels of significance ( .001 ), indicate a high degree of correlation between the geography test score and I.Q., as measured by the Otis and Henmon Nelson tests.

Total test score will correlate significantly with school attainment as measured by standardized tests.

Table 18 shows the various correlations made to test this hypothesis.

Table 18

Correlations Between Stanford Word Meaning Score, Stanford Arithmetic Achievement Score and Geography Test Score

Total Population	Boys	Girls
r	r	r
.514	.692	.434
.562	.519	.685
	Total Population r .514 .562	Total Population         Boys           r         r           .514         .692           .562         .519

( all correlations significant >.001 level )

In all cases the correlations between the Geography Test score and the Stanford Word Meaning and Stanford Arithmetic Application tests are highly significant (>.001 level). These high correlations with the Stanford test scores indicate that something of the abilities measured in both Word Meaning and Arithmetic Application, are present in the Geography Test.

C) Item Selection for the Final Test Form

From the item analysis of the second test, eighty items were selected for a final form. Criteria for item selection remained the same as for the second test, with the stipulation that the difficulty index had to increase as the grade level increased. This final form (see Appendix E) was not administered to pupils.

# CHAPTER 9

## Discussion of Results

Differences between the various schools tested were found, and are

shown in Table 19.

## Table 19

# Differences between Schools on Geography Test Score, Age and Reading Score

Grade	Sex	Schools incl . School No. ()	Difference Between Means	t	Significance level
A. Ge	ography	Test Score			
6	girls	Martinvale (1) T.Bowes (2)	13.89	3.664	<b>&gt; .001</b>
6	girls	Martinvale (1) Tetraultville (4)	9.84	1.763	.10
6	boys	Martinvale (1) Tetraultville (4)	9.86	1.939	>.10
6	boys	Martinvalle (1) T. Bowes (2)	8.78	2.268	>.05
B. Age	<u>e</u>				
6	girls	Martinvale (1) T.Bowes (2)	4.66	1.563	< .10
6	girls	Martinvale (1) Hillcrest (3)	4.52	1.608	<.10
C. Re	ading Sco	Dre	<u></u>		
6	girls	Martinvale (1) T. Bowes (2)	5.94	1.428	< .10
6	girls	Martinvale (1) Hillcrest (3)	7.65	1.843	>.10
6	boys	Martinvale (1) T. Bowes (2)	9.74	1.984	>.10

The most obvious differences are found between School 1 and the other three schools. Reasons for these differences, especially those in the geography test scores, are not readily explainable using I.Q. or even age as possible factors influencing pupil performance. The size of the populations tested to the schools should not influence the results of significance tests. The pupils from the schools seemingly came from similar socio-economic backgrounds. Perhaps some of the differences came from the relatively small population of pupils tested in School 1, but it is probable that pupil attainment is being influenced adversely by some unexplained factors.

The establishment of norms for both sexes was the direct result of the not unexpected discovery of significant differences in geography test scores between boys and girls. The degree to which test score differences for the total population of each grade are significant, are found in Table 20.

#### Table 20

### T Tests Between Boys and Girls on Five Criteria by Grades

(significance level indicated 'n.s.' indicates not significant)

Grade	Geo.	Score	Arith.	Score	Word	Mean	<u> </u>		Age	
5 6	2.015	>.05 >.01	.933 1.398	n.s. ≻.20	.905 259	n.s.	.363 692	n.s. n.s.	.881 .524	n.s.
7	1.613	<.10	2.009	>.05	1.556	>.20	289	n.s.	2.034	>.05
Total	2.761	≻.01	1.535	>.20	.810	n.s.	398	<u>n.s.</u>	.092	<u>n.s.</u>

Clearly boys show a superiority in Geography Test performance over that exhibited by girls. (significant >.01 level). Reasons for this superiority are not readily perceptible from the rest of the data.

Other investigations of sex differences in pupil achievement at the elementary level, reveal some facts that may be pertinent to the present study. Terman and Tyler (Tyler, 1956), found that boys do significantly better than girls on tests of geography achievement. Aside from the often used explanation of the earlier onset of puberty in girls, no reasons for sex differences are offered that would be applicable to the present investigation. Anastasi (1958), reports that boys are better than girls on the Stanford Social Studies Test. Boys also tend to do better in "Information" subjects such as history, geography and science.

Wozencraft (1963), employing the Stanford Achievement Tests, found that girls were significantly better ( .05 level) than boys on the Word Meaning Tests, and where significant differences existed, they were in favour of the girls. This discovery would tend to contradict the findings of Anastasi. Olson (1959), contends that in elementary school, girls are better than boys in reading comprehension, vocabulary and basic language skills, while boys show a superiority in arithmetic. Wisenthal (1964), reviews a number of studies showing significant differences in reading and writing ability in favour of girls. Again, boys are found to be better than girls in mathematics.

Where researchers have concerned themselves with the investigation of sex differences in primary mental abilities, factors that may prove of importance to the present investigation are revealed. Thurstone's (1938) S or spatial orientation factor was found to be significantly higher in boys than in girls at all ages in several studies noted by Wisenthal (1964). The S factor is considered to involve perception and vision. Since the Geography Test items are concerned in many instances with the viewing of maps, charts, and diagrams, this spatial superiority of the boys may be a factor in their higher test scores. Thurstone's N or number ability factor seemingly does not show clear-cut sex differences according to studies reviewed by Wisenthal (1964). The Geography Test measures something which correlates significantly with the Stanford Arithmetic Application Test. The Geography Test therefore contains some of the N factor. To what extent N and other factors are present, and whether they are sex-difference prone, is not within the scope of this investigation.

To completely confuse the issue, a study made by Powell et al. (1963), revealed no sex differences using the California Reading Achievement Test, the California Arithmetic Test, and the California Test of Mental Ability. While such a study does not supply an answer to the problem of sex differences, it does serve to question the whole area of sex differences yet further.

Aside from significant differences between boys and girls on certain of the five criteria shown in Table 20, there exist significant sex differences between other factors. The correlation coefficients used in verification of Hypotheses three and four also show significant sex differences. These differences were tested using Fisher's  $z_r$  transformations (Ferguson, 1959), and the results are shown in Table 21.

## Table 21

Correlation Significance Between Boys and Girls

	Geography Test		Fisher z <sub>r</sub>	Significance	
	r Boys	r Girls	•		
I.Q.	.655	.507	2.27	>.05	
Arithmetic App.	.519	.685	2.60	>.01	
Word Meaning	.692	.434	2.56	<.01	

The reasons for such sex differences are difficult to explain. For boys, Word Meaning correlates significantly higher with the geography test score, and for Arithmetic Application, the reverse is true. Factors which would contribute to such significant differences are beyond the scope of this study. Any comments which might be made would be pure speculation, and might well form the basis of some further research.

#### CHAPTER 10

#### Summary of the Investigation

Proceeding from modern conceptions and theories of geography and developmental psychology, a test in elementary school geography was constructed around a framework of differing levels of educational objectives. Criteria for selection of the theories, conceptions and framework were arbitrary, thus the study overlooks other useful examples in the fields of geography, psychology, and educational objectives. For purposes of such a study it was felt that the modern geography propounding models, as examined by Chorley and Hagget (1965), the developmental theories of Piaget and Bruner, and Bloom's thesis on evaluation of different objective levels, could be validly combined or related to develop a test which would be of use in elementary school geography.

The development of four hypotheses in effect attempted to relate the test back to its geographic, psychological and educational objective base.

Hypothesis One, concerning the growth of learning as observed through the three grades tested, was verified conclusively from the results of the test. It is not however, overwhelming and unexpected to find that pupils in grade seven do better than those in grade six, and those in grade six do better than those in grade five. Since the test attempted to eliminate problems of content, the results do tend to imply that abilities in geography do increase with grade/age when strictly factual items are kept at a minimum.

Hypothesis Two dealt with items as they related to Bloom's Taxonomy. Here verification is somewhat more tenuous. If however the Taxonomy is cumulative and hierarchical, items that are lowest in difficulty level (have few people getting them correct) are likely to be on a higher level of classification than those with a high difficulty level. This, of course, assumes that the examiner has made a conscious effort to construct items in terms of a hierarchy of categories.

Hypotheses Three and Four, were verified when significant correlations between the Geography Test and measures of attainment (reading and arithmetic), and aptitudes (I.Q.), were found. Indications are that the test contains qualities which are found in all three evaluative criteria employed. To what extent each quality was present was not determined.

In establishing norms, sex differences favouring boys were accounted for by providing separate norms for each sex. The high internal reliability of the second form of the test would be a positive factor in any future use of the instrument. The final form of the test, which was not administered to pupils would give an even greater degree of refinement in measurement. It is hoped that further investigations will be made using this final form.

Since the study was primarily one of a practical nature, the discovery of sex differences, although not unexpected, was not fully investigated due to the limitations of the data. The reasons given by others for sex differences in geography seem to relate to antiquated "factual" conceptions of it. To what extent these reasons would be valid using truly modern conceptions, is an area which would need further investigation, and could be the topic for future research.

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## General Directions to the Pupil

Read this page carefully before you begin working!

1. There are 92 questions in this booklet.

- Work as <u>quickly</u> but as <u>carefully</u> as you can. If you find that you cannot do a question, go on to the next one. If you have time, go back to the ones you have left out.
- 3. Make the best choice that you can, and check all your answers.
- 4. Read the instructions to each question carefully. Each question has five (5) choices: the letters A, B, C, D and E are listed to the left of each choice.
- 5. <u>Circle the letter</u> which you think corresponds to the <u>best</u> answer available.

6. Here is a sample question:

The largest river in Quebec is . . .

A. the Richelieu

B. the St. Maurice

C. the St. Lawrence

D. the Montmorency

E. don't know

Of course you would circle letter C because it corresponds to the <u>best</u> answer available.

- 7. Circle the letters in pencil. If you put a circle in the wrong place, do not use an eraser. Instead, cross out the letter and circle the letter you prefer. If you change your mind back to your first choice, print the letter again and circle it.
- 8. If you do not know the answer to a question, circle letter E which is "don't know".

9. If you have any questions about the test ask them now.



# MAKE-BELIEVE TOWN



## LOOK AT THE MAP OF A "MAKE-BELIEVE TOWN"

2 (1 ) <b>1</b> , ( 1 ) (1 ) 2 ) (1 ) (1 ) 2 ) (1 ) (1 ) 2 ) (1 ) (1 ) (1 ) (1 ) (1 ) (1 ) (1 ) (	If you were to walk from the School to the Post Office, about • how far would you walk?	5. If you were to go from the Playground to the Fountain in the Park, about how far would you go?
1 1 <b>1</b> - 14	A.: l mile	A. $\frac{1}{2}$ mile
: 	B. · 3 miles	B. 3 miles
•	C. $\frac{1}{2}$ mile	C. l mile
	D. 2 miles	D. 1 mile
 	E. 1 <sup>1</sup> / <sub>2</sub> miles	E. 2 miles
2.	If your class took a trip from the School to the Fire Station you would go	6. If you were to start at the Fountain and walk north which of the following would you pass by?
•	A. north then east	A. Lake
	B. west then south	B. School
	C. east then south	C. Statue
	D. east	D. Post Office
	E. north	E. Playground
З.	if you walk along the Footpath	
••••••••••••••••••••••••••••••••••••••	in the Park from the Fountain to the Statue the direction of your trip will be	7. The streets are numbered. Which one do you think is the main street of this town?
· · · · · ·	in the Park from the Fountain to the Statue the direction of your trip will be A. north	7. The streets are numbered. Which one do you think is the main street of this town? A. 1
	in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest	7. The streets are numbered. Which one do you think is the main street of this town? A. 1 B. 2
	in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest	7. The streets are numbered. Which one do you think is the main street of this town? A. 1 B. 2 C. 3
••••••••••••••••••••••••••••••••••••••	in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest D. south	7. The streets are numbered. 'Which one do you think is the main street of this town? A. 1 B. 2 C. 3 D. 4
	<pre>in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest D. south E. northeast</pre>	7. The streets are numbered. 'Which one do you think is the main street of this town? A. 1 B. 2 C. 3 D. 4 E. 5
	<pre>in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest D. south E. northeast On your walk along the Footpath you will see a on your right-hand side.</pre>	7. The streets are numbered. 'Which one do you think is the main street of this town? A. 1 B. 2 C. 3 D. 4 E. 5
	<pre>in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest D. south E. northeast On your walk along the Footpath you will see a on your right-hand side. A. Post Office</pre>	7. The streets are numbered. 'Which one do you think is the main street of this town? A. 1 B. 2 C. 3 D. 4 E. 5
	<pre>in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest D. south E. northeast On your walk along the Footpath you will see a on your right-hand side. A. Post Office B. Playground</pre>	7. The streets are numbered. 'Which one do you think is the main street of this town? A. 1 B. 2 C. 3 D. 4 E. 5
ц., ., ., ., ., ., ., ., ., ., ., ., ., .	<pre>in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest D. south E. northeast On your walk along the Footpath you will see a on your right-hand side. A. Post Office B. Playground C. Picnic Area</pre>	<pre>7. The streets are numbered. 'Which one do you think is the main street of this town? A. 1 B. 2 C. 3 D. 4 E. 5</pre>
4.	<pre>in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest D. south E. northeast On your walk along the Footpath you will see a on your right-hand side. A. Post Office B. Playground C. Picnic Area D. Lake</pre>	<pre>7. The streets are numbered. 'Which one do you think is the main street of this town? A. 1 B. 2 C. 3 D. 4 E. 5</pre>
4.	<pre>in the Park from the Fountain to the Statue the direction of your trip will be A. north B. southwest C. northwest D. south E. northeast On your walk along the Footpath you will see a on your right-hand side. A. Post Office B. Playground C. Picnic Area D. Lake E. School</pre>	<pre>7. The streets are numbered. 'Which one do you think is the main street of this town? A. 1 B. 2 C. 3 D. 4 E. 5</pre>

	•				
•					
•		8.	A "three-story forest" in a coun-	ll. A steppe is a	
			is hot all year long is called	A. rocky wasteland	
•	• •		A. a taiga	B. dry grassland plain	
	•		B. a tundra	C. mountain range	
•			C. a jungle	E. sandy desert	
			D. a savanna	12. Nomads require (need)	•
			E. an oasis	A. large supplies of household goods	
•	•••	9.	In a "three-story forest" there are rainy and dry seasons. In a dry season	B. expensive clothes	
	·	•	A. no rain falls	C. belongings that can be moved easily	•
	•	<b>4</b> 5 5	B. the forest changes color: and leaves fall	D cars and trucks	
			C there is no difference from	E. telephones and electricity	
•			the wet season	13. Which of the following would you <u>not</u> expect to find in the Arctic?	
•	·	ч.	D. the rainfall is slightly less than in the wet season	A. seals	
			E. the temperature changes from "hot" to "cold"	B. polar bears	
		10.	Kazak nomads living on the	C. white whales	
• •			to place because	E. cattle	
<i>r</i> .			A. pasture grass takes a long time to grow in dry areas	14. Huge tongues of thick ice moving	
			B. they like to see new lands	toward the ocean are called	
,			C. the weather is too cold for them to stay in one place	A. ice cubes	
		·	D. the pasture gets flooded and can not be used	B. icebergs	
۰			E. their herds are too large for	D. igloos	
N			the pasture land	E. drumlins	

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#### HOUSING

1. The house uses matting for walls; the roof is steep and thatched with straw.

2. The house is made of mud bricks; the roof is flat and covered by leaves and mud.

> The walls are made of thin strips of wood fastened to posts placed in the ground. The walls are partly plastered on the outside with mud. The roof is thatched with palm leaves.

З.

- The house is built of wood; there is a 4. stone fireplace and wood is stacked outside the kitchen. Lighting is by electricity and there is a telephone.
- Walls are made of crisscrossed rods of 5. willow wood covered with felt; the roof is also covered with felt.

15. The Altiplano of Peru is close to the Equator yet it has a cool climate. This is because the area

A. is very high

B. receives little sunshine

C. has few rivers

÷.

D. receives little rainfall .

E. has air that is "thin"

## HOUSING - FOR QUESTIONS 16, 17, 18 and 19 SEE OPPOSITE PAGE

16.	Which of these houses would be most suitable for the area in which you live? A. 1 B. 2 C. 3 D. 4 E. 5 Which of these houses is de- signed to be moved from place	18.	Which of the houses is <u>not</u> well suited for a rainy climate? A. 1 B. 2 C. 3 D. 4 E. 5 Which of these houses would you find in the Arctic?
	to place? A. l		A. 1
	B. 2	,	B. 2 C. 3
	C. 3 D. 4		D. 4
	E. 5		E. none of these houses
		í .	



in a a general a second	(LOOK AT THE MAP ON THE NEXT PAGE T	O ANSWER QUESTIONS 30-35)
30.	The square represents 1 acre. About how many acres is the large farm on the map?	34. Norway is sometimes called "a land of 5 F's". This is a good way to describe the country be-
		cause
	A. ll acres	A. the land is <u>flat</u> .
	B. 20 acres	B. there is much water and <u>ferries</u> are used
•	C. 5 acres	C. the 5 F's are important
	D. 30 acres	features of the country
	E. 7 acres	D. the country borders on Finland
31.	About how many acres are there in the neighbour's farm?	E. an important industry is
e is en	A. 10 acres	
	B. lacre	35. This farm probably exists in
•*•	C. 15 acres	A. India
	D. 2 acres	B. Peru
	E. 20 acres	C. the Congo
32.	Fodder crops are used to	D. the Canadian Arctic
	A. plough back into the ground	E. none of the above areas
	B. feed livestock	36. To travel from Oslo, Norway, to
1. 19. 2	C. sell to markets	person
. •	D. feed people	l year by foot 10 days by ship
	E. burn for heating homes	18 hours by air
33.	On this farm which would be <u>fodder</u> crops?	By looking at this list we can say that
·.·.	A. grass and turnips	A. the distance between Norway and Egypt has become less
	B. barley and oats	
	C. rye and barley	B. man has shortened the time it takes to get from place to place
•	D. potatoes and turnips	C. air transportation will become more important in the future
· · · · ·	• E. • oats and grass	D. ship transportation will im-
		prove to compete with air transportation
		E. airplanes will tend to become larger

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landa (tar. 1947) - 24 18 - Amerikan Sanger 19 - Shine Sanger 19 - Amerikan Sanger 19 - Amerikan Sanger 19 - Sanger Sanger

M. Berlands, M. Mall
M. Market, M. Lands, M. Mall
M. Market, M. Lands, M. Market, M

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37. The "Land of the Midnight Sun" refers to areas which

mur

FENCE

A. on the Equator

are

h 141

B. north of the Arctic Circle

FOREST

C. cold all year

D. always lighted by the sun

E. cold in the summer
(	LOOK AT THE DIAGRAM ON THE NEX	(T PAGE)
38. One of shows The ot	the arrows on the diagram the direct rays of the sun. her arrows show	41. At position 5 what would the days be like in the Arctic?
A. th ea	e clockwise turning of the rth on its axis	B. there would be 12 hours of day-
B. th of	e counterclockwise turning the earth on its axis and	Light and 12 hours of night C., there would be 6 hours of day-
th of	e counterclockwise movement the earth around the sun	D. the sun would not set
C. t th	he clockwise movement of e earth around the sun	E. there would be 18 hours of day-
D. th ea co th	e clockwise turning of the rth on its axis and the unterclockwise movement of e earth around the sun	42. If the sun never sets at all in the Arctic what would it be like in the Antarctic at the same time of the
E. th ea	e clockwise turning of the orth on its axis and the	A, the sun would never set
ea 	arth around the sun	B. there would be 12 hours of sunshine and 12 hours of
the ea certai would the ti	rth that receive sunlight in n seasons. In which position the Arctic have darkness all me (24 hours)	C. there would be 6 hours of sunshine and 18 hours of darkness
A. 1 B. 4		D. there would be 18 hours of sunshine and 6 hours of darkness
. C. 5		E. the sun would never rise
D. 6	• * •	43. How long would it take the earth
E. 7		to go from position 1 to posi- tion 5?
40. At whi thern	ich numbers would the nor- hemisphere have summer?	A. l year
A. 1	and 2	B. 1 month
B. 3	and 4	D O months
C. 5	and 6	D. 9 months
D. 7	and 8	
E. 8	and 1	



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46.	Near what city on the Population map would you find a <u>peninsula?</u>	50. What type of vegetation is shown on the Resource map?
	A. 2	A. swamps
	B. 3	B. grain
	C. 4 1	C. forests
•	D. 6	D. brush
	E. 7	E. grass
47.	Which river forms a <u>delta</u> at its mouth?	51. What does 🛣 stand for on Ajax?
n porta (* 1944) Start de la start Start de la start de la start	A. Kof River	A. hydro station
	B. Doh River	B. terephone pore
	C. San River	C. church
	D. Sum River	
	E. Blu River	
48.	What would the lowland area around the Sum and Blu Rivers be called?	follow adirection.
and a second second Second second second Second second	A. valley	A. east-west
	B. plateau	C south asst
· · · · · · · · · · · · · · · · · · ·	C. mesa .	D north south
	D. mountain range	D. north-south
· · · · ·	E. gorge	E. east-north
49.	In what part of Ajax would you find mostly highland areas?	onto Ajax? From the
· ·	A. West	A. south
• "	B. East	B. north
	C. South East	C. northwest
	D. North East	D. west
	E. South	E. southwest
	2. Journ	
	. *	

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54.	The line drawn across Ajax marked 0° is called the	58. About how many miles long is Blu Lake?
	A. Equator	A. 50 mi.
:	B. Arctic Circle	B. 100 mi.
	C. North Pole	C. 25 mi.
	D. Tropic of Cancer	D. 2 mi
	E. Tropic of Capricorn	E. 10 mi
55.	What would the temperatures be like on Ajax?	of rainfall received on Ajax for one year?
• • • •	A. cold (always below $32^{\circ}$ F.)	A. 35 inches
	B. cool (average of 45° F.)	B. 20 inches
•	C. warm (average of $65^{\circ}$ F.)	C. 45 inches
	D. hot (average of 75° F.)	D. 40 inches
	E. very hot (average of over $80^{\circ}$ F.)	E. 75 inches
56.	If you were to travel along the line marked O from the west of Ajax to the east, about how far would you go?	60. How many people per square mile would you find in areas marked
. •	A. 100 miles	A. over 250
:	B. 275 miles	B. 100 to 250
4	C. 10 miles	C. 25 to 100
· · ·	D. 200 miles	D. 0 to 25
	E. 500 miles	E. the map does not tell us
57.	Which river is a <u>tributary</u> of another river on Ajax?	
	A. Kof River	
	B. Doh River	
	C. San River	
	D G D:	{
	D. Sum River	

CLIMATE: Read these facts on five climates and answer questions 61-64.

- 1. Temperatures are low because the sun is never high in the sky. The warmest month of the year is less than 50°F.
- 2. It rains in all seasons. Temperatures usually rise to 90°F. There is much moisture in the air. At night there are heavy fogs and dews.
- 3. The temperatures are not as cold as one would expect. Rainfall is over 70" yearly. An ocean current affects the climate.
- 4. The monsoon is the main feature. These winds bring much rain for 3 months. The rest of the year does not have as much rain. The temperature is near 80°F. all year.
- 5. Winters are cold with below freezing temperatures. In the winter months up to 100" of snow may fall. The rainfall averages 40" per year.

61.	Whi des	ch of cribe	these Norway	climates <u>/</u> ?	would	best	<b>63.</b> /	· Whi bes	.ch of st des	f these climates would scribe parts of <u>India</u> ?
	A.	1	. •	•				Α.	l	
	в.	2				• • •		в.	2	
	с.	3						c.	з	$(r,r) = \frac{1}{r} \sum_{i=1}^{r} \frac{1}{r} \sum_{i=1}^$
	D.	4	. <b>.</b>				N	D.	4	•
	<sup>-</sup> Е.	5	•			•	×	E.	5	

62. Which of these climates would best describe the <u>Province of Quebec</u> ? 64. Which of these best describe						ch of these climates would t describe a <u>rainforest</u> ?
4994 - A	Α.	1		· · · • · · ·	Α.	1
<b>.</b> .	в.	2		ta station	в.	2
<sup>11</sup>	с.	3		·	c.	3
	D.	4			. D.	4 .
	Ε.	5		• • • •	E.	5

## GENERAL DIRECTIONS TO THE PUPIL

READ THIS PAGE CAREFULLY BEFORE YOU BEGIN WORKING.

Δ.

1. There are 64 questions in this booklet.

2. Work as quickly but as carefully as you can. If you find that you cannot do a question, go on to the next. If you have time, go back to the ones you left out. Make the best choice that you can and check all your answers carefully.

3. Read each question carefully. Each question has <u>five</u> choices: the letters A,B,C,D, and E are listed to the left of each choice. <u>Circle the letter</u> which you think corresponds to the <u>best</u> answer available.

Here is a sample question:

The largest river in Quebec is the ......

A. Richelieu

- B. St. Maurice
- C. Montmorency
- D. St. Lawrence
  - E. Chaudiere

Of course, you would circle "D" because it is the <u>best</u> answer available from the five choices.

4. Write in pencil. If you put a circle in the wrong place, <u>do not use an eraser</u>. Instead, cross out the wrong letter neatly and circle the one you prefer. If you change your mind back to your first choice, print the letter again and circle it neatly.

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5. If you have any questions about the test, ask them now.

BEGIN AS SOON AS YOUR TEACHER TELLS YOU TO.

	•
	· · · · · · · · · · · · · · · · · · ·
APPENDIX B	
n an	
GEOGRAPHY	
NAME	•••••
Family name First na (PRINT)	
PLACE AN $\sqrt{X}$ /IN THE BOX WHICH APPLIES TO YOU	
· · · · · · · · · · · · · · · · · · ·	
BOY	
I WAS BORN IN THE MONTH OF:	
JANUARY FEBRUARY MARCH APRII	<ul> <li>A state of the sta</li></ul>
	ST
	IBER
YEAR OF BIRTH 195	· · · · · · · · · · · · · · · · · · ·
I AM NOW IN GRADE	•••
THE NAME OF MY SCHOOL IS	





	(LOOK AT THE 2 MAPS TO ANS	WER QUESTIONS 1 - 8)
1.	Map 1 shows what Canadian region? A. St. Lawrence Lowlands	5. If you were to visit the areas numbered on Map 2 what would be the: chief industry you would find?
	B. Laurentian Uplands	Area 1 M
<ul> <li>These borns in the Contract of the second sec</li></ul>	C. Appalachian Region	A. wheat growing
	D. Great Lakes Region	B. fishing
	E. Peace River Region	C. apple growing
2.	Use Map 1. If you were to fly from Halifax to St. John's about how far would you travel?	D. lumbering E. ship building
	A. 575 miles	6. <u>Area 2</u> (8 places marked) • 2.
	B. 150 miles	A. pulp and paper
	C. 400 miles	B. farming
	D. 850 miles	C. oyster gathering
	E. 200 miles	D. mining
3.	Use Map 1. If you were to fly directly from Quebec City to Halifax, and then from Halifax	E. dairy farming 7. <u>Area 8</u> (3 places marked) • 3.
	approximately	A. mixed farming
	A. east	B. manufacturing
	B. southeast then east	C. pulp and paper
· · · ·	C. southeast then north	D. coal mining
	D. east then north	E. potato growing
· · · · · · · · · · · · · · · · · · ·	E. south	8. <u>Area 4</u> <b>4</b> .
4.	Which of the following statements would <u>not</u> be true of the dotted	A. fishing
	outlined areas on Map 2?	B. pulp and paper
	A. The land dips gently beneath the sea, so that for some	C. dairying
	water is shallow.	D. mining
	B. In shallow water fish find a good supply of food.	E. extensive agriculture
	C. The Labrador Current brings cold water into these areas.	
	D. Cod, haddock, halibut and herring are found here in large numbers.	
· .	E. Fishing is safe here because there rarely is any fogener	



## NIAGARA ESCARPMENT

	Below	Above
Average Winter Temperature	27° F	24.2° F
Minimum Winter Temperature	-16 <sup>0</sup> F	-34 o F
Growing Season (in days)	163	148
Rainfall (in inches)	30	32
Summer Sunshine	more below the	scarp than above

Which of the following would <u>not</u> be a reason for growing fruit below the Niagara Escarpment rather than above it?

- A. Winters are slightly warmer below the scarp.
- B. The growing season is longer below the scarp.
- C. Winter temperature seldom go below the killing temperature of fruit trees (-16° F.) below the scarp.
- D. There is less rainfall below the scarp which is good for the proper ripening of fruit.

E. There is less summer sunshine below the scarp.

10.	Two boundaries of the Niagara
	Fruit Belt shown on these
	maps would be

- A. the Niagara Escarpment and Lake Ontario.
- B. the Niagara Escarpment andLake Erie.
- C. the Welland Canal and Hamilton.
- D. the Welland Canal and the Niagara River
- E. Lake Ontario and Lake Erie
- 11. What would be the main fruit crop grown? A. pears B. peaches C. grapes D. plums E. cherries

12.	Wha <sup>.</sup>	t type of soil seems to be
	use	for pear production?
a madan.	Α.	Lockport clay
	B.	Vineland clay
	c.	Silt and loam
	D.	Sandy loam
	Έ.	none of the above soils
13.	The	growth of Hamilton to the
	wes	t of the Fruit Belt presents
	ant	hreat to the Belt. What
	wou	ld this threat be?
	Α.	Valuable fruit growing lands
•	• .	will be turned into industrial
		and residential areas.
· · · · ·	в.	The soils will change.
•	C'.	More people will mean that
	•	the area will not be able to
· ···,		produce enough fruit to feed
,t		them.
	D.	The value of land will decrease
	E	Mone land will be used by the

fruit growers.

\* 7 鶲 CANAL \*\*\* GEND Æ ..... 8 A 090 DOCKS m

MAP 2

USE THESE 2 MAPS: TO ANSWER OF	ESTIONS 14-23
14. On Map 1 there are three num- bered and circled areas.	18. In 1959: an important phase of Montreal's growth began. On the Map (2) this phase is shown by.
In this valley lumbering, farming and small industries are the main occupations. The name of the area is the same as the river	<ul> <li>A. the Lachine Canal</li> <li>B. the Beauharnois Powerhouse</li> <li>C. Mount Royal</li> <li>D. the Seaway Canal</li> <li>E. Dorval Airport</li> </ul>
flowing through it. This river is the A. Saguenay B. Montmorency C. St. Maurice D. Richelieu E. Chaudière 15.: <u>Area 2</u> If you were to visit this area.	19. These symbols are important in the growth of Montreal. They would represent
one interesting feature you would likely see would be A. an open pit coal mine B. an aluminum smelter C. piles of asbestos waste D. iron-ore mining E. tobacco farms 16. Area 3 is one of the finest farm-	<ul> <li>20. If you were to approach Montreal by boat from the northwest you would probably be sailing on the river.</li> <li>A. St. Lawrence</li> <li>B. Richelieu</li> <li>C. Yamaska</li> <li>D. Ottawa</li> <li>E. St: Francis</li> </ul>
A. there is good rich soil B. the growing season is 3-4 weeks longer than in the rest of Quebec C. the rainfall is heavier than in the rest of the province D. level land makes it easy to use farm machinery	21. Montreal is important for a number of reasons. Which of the following reasons cannot be found by looking at the 2 maps? A. Montreal is a port B:: Montreal is at the meeting • place of rivers • C: Montreal lies at the center of a fertile plain
<ul> <li>17. In Area 3 which city would you not find?</li> <li>A. Quebec City</li> <li>B. Montreal</li> <li>C. Trois Rivières</li> <li>D. Huntingdon</li> <li>E. Sherbrooke</li> </ul>	E. Montreal has plenty of water E. Montreal has a large popu- lation which supplies the many factories with workers.
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22.	The Richelieu River is important to Montreal because	25. Which statement would best dependent scribe the Laurentian Uplands?
	<ul> <li>A. it flows south to Lake Champlain</li> <li>B. it is Montreal's source of drinking water</li> <li>C. it connects Montreal with New York City</li> </ul>	<ul> <li>A. a region of extensive farming</li> <li>B. a region of deciduous forests</li> <li>C. a region of coniferous forests</li> <li>D. a region of deep,rich soil</li> <li>E. a region of heavy rainfall and a long growing season</li> </ul>
	D. it flows through fertile farm land	26. The Laurentian Uplands consist mainly of
23.	<ul> <li>L. It is good for recreation</li> <li>On Map 2, the area around the A's would be used for</li> <li>A. tobacco farming</li> <li>B. dairying</li> <li>C. mining operations</li> </ul>	<ul> <li>A. stumps of worn-down mount- ains and glacier-carved valleys</li> <li>B. flat lowlands and plains</li> <li>C. high, steep-sloped moun- tains</li> <li>D. plateaus, cut by large rivers</li> <li>E. low, smooth, rounded mount- ains covered by forests</li> </ul>
	<ul><li>D. heavy industry</li><li>E. mixed farming</li></ul>	<ul><li>27. The Rouyn-Noranda region is par- ticularly noted for</li><li>A. gold, copper and zinc mines</li></ul>
24.	The pulp and paper industry is located in parts of the Laurentian Uplands many mills are situated on south-flowing tributaries of the St. Laurence River, Which of the	<ul> <li>B. pulp and paper mills</li> <li>C. iron-ore production</li> <li>D. coal mining</li> <li>E. mica, magnesium and graphite mines</li> </ul>
	following would <u>not</u> be a reason for this location?	28. The aluminum industry is located on the Saguenay River. One im- portant reason for this is
· • ;	<ul> <li>A. water is needed for operation of the mills</li> <li>B. hydro-electric power is generated by these rivers</li> </ul>	<ul> <li>A. aluminum ore is mined in the area</li> <li>B. there is a flat area around Lac St. Jean</li> </ul>
	<ul> <li>C. logs can be floated to the mills</li> <li>D. the finished paper is usually shipped down these rivers by boat</li> </ul>	<ul> <li>C. there is a cheap source of electrical power here</li> <li>D. there are railways to southern Quebec</li> <li>E. there are large forests close-by</li> </ul>
	E. the pulpwood forests are close at hand	29. Northern Ontario is similar to Northern Quebec since both
29.	D. depend on roads for transportatio	<ul> <li>A. have large populations</li> <li>B. have mineral and forest resources</li> <li>C. have mild winters and summers</li> <li>E. have farming as their prime occupation</li> </ul>





## LOOK AT ABOVE MAP TO ANSWER QUESTIONS 33-36

33.	Edmonton is located about how many feet above sea level? A. 100 feet B. 1,000 feet C. 2,000 feet D. 2,000 - 3,000 feet E. over 3,000 feet	35.	Something of importance to Ed- monton has been left off this map. This would be A. roads and railway lines B. pulp and paper locations C. Lake Athabaska D. Rocky Mountains E. grain elevators
34.	A river (marked A) flows through Edmonton and supplies water for the city's needs. This river is the	36.	What is the most important fact shown on the Map which has aided Edmonton's growth?
	A. St. Lawrence B. Peace C. Athabaska D. North Saskatchewan E. Mississippi		<ul> <li>A. fishing on Lake Athabaska</li> <li>B. skiing in the Rocky Moun-</li> <li>C. oil, oil refining, and in- dustries which depend on oil</li> <li>D. ranching to the southwest</li> <li>E. wheat growing to the south east</li> </ul>



37.	<ul> <li>The tourist industry exists in the provinces of Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland. Which of the following statements would not be true?</li> <li>A. The tourist industry provides many people with jobs.</li> <li>B. The governments of these provinces encourage tourists to come for visits.</li> <li>C. The summers are cooler in these provinces than in areas to the west.</li> <li>D. These provinces are good for</li> </ul>	<ul> <li>40. Fort William and Port Arthur are located at the "head" of the Great Lakes. Two railways have large freight yards here. Iron ore is mined near by, and ship building is carried on. The Twin Cities are important as a center of</li> <li>A. transportation</li> <li>B. industry</li> <li>C. farming</li> <li>D. government</li> <li>E. ranching</li> <li>41. An early spring; enough rain in</li> </ul>
	<ul> <li>recreation such as hunting, fishing, sailing and sight- seeing.</li> <li>E. The population of these pro- vinces is large, and is crowded into small areas.</li> </ul>	the spring and early summer; long, warm, sunny summer days, and a dry sunny fall. These weather conditions all make possible on the
38.	What common feature do the follow- ing cities have? Halifax,Saint John, Sydney, Charlottetown, St. John's A. they are the capitals of	<pre> prairies. w- A. ranching B. oil drilling C. lumbering D. wheat growing E. fruit growing</pre>
	<ul> <li>their provinces</li> <li>B. they have good port and harbour facilities</li> <li>C. they are industrial centers</li> <li>D. they have populations over 50,000</li> <li>E. fishing is the most important occupation</li> </ul>	<ul> <li>42. <u>Drought</u> is an important word to all Prairie farmers. A <u>drought</u> is a</li> <li>A. heavy snowfall</li> <li>B. lack of rain</li> <li>C. lack of wind</li> </ul>
39.	Coal from the south shore of Lake Erie.	D. very strong storm E. lack of good soil
	Oil from Sarnia. Transportation by rail, road and ship. Minerals from Northern Ontario and other areas. A large population. All the above combine to make Toronto	<ul> <li>43. Which of the following cities would not be important in the shipping of Prairie wheat?</li> <li>A. Vancouver</li> <li>B. Port Arthur</li> <li>C. Fort William</li> <li>D. Churchill</li> <li>E. Sept Iles</li> </ul>
· · ·	<ul> <li>A. a great manufacturing city</li> <li>B. a fishing port</li> <li>C. a farming center</li> <li>D. railway center</li> <li>E. a center of government</li> </ul>	

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USE THE MAP TO ANSWER QUESTIONS 44-50

<ul> <li>44. The west coast of Vancouver Is- land has great forests. The reason for forests in this area is</li> <li>A. the western slopes of moun- tains receive heavy rain- fall</li> <li>B. the Pacific Ocean gives a temperate climate</li> <li>C. the winds blow from west to east</li> </ul>	<ul> <li>48. Where do the forest industries seem to be mainly located?</li> <li>A. on the Peace River</li> <li>B. on the Columbia River</li> <li>C. on Vancouver Island (southern part)</li> <li>D. near area 1</li> <li>E. on the Fraser River (where the river changes direction in its flow from north to south)</li> </ul>
<ul> <li>D. Victoria is located on Vancouver Island</li> <li>E. the Coast Ranges are very high</li> <li>45. What would the symbol x repre- sent on the map?</li> </ul>	<ul> <li>49. The map showing parts of British Columbia has the boundaries with Alberta and Washington marked in. What boundary is not marked in on this map?</li> <li>A. the one with Saskatchewan</li> </ul>
<ul> <li>A. forestry tower</li> <li>B. salmon processing plant</li> <li>C. grain elevators</li> <li>D. location of treasure</li> <li>E. mining</li> </ul>	<ul> <li>B. the one with Alaska</li> <li>C. the one with the California</li> <li>D. the one with Manitoba</li> <li>E. the one with the North West Territories</li> </ul>
46. The area marked (1) is similar to the Niagara Fruit Belt in some ways. This area is called the	50. The hydro station at Kitimat (on the map) is important be- cause
A. Okanagan Valley B. Peace River District C. Clay Belt D. Eastern Townships E. Rocky Mountain Trench	<ul> <li>A. aluminum is smelted there</li> <li>B. fishing is carried on in the area</li> <li>C. electricity is cheap there</li> <li>D. farming is carried on close by</li> <li>E. ships can dock at the port</li> </ul>
47. What would be the chief occu- pation in the Peace River District?	
A. fishing B. ranching C. fruit growing D. dairy cattle raising E. grain growing	



USE THE 4 MAPS TO ANSWER QUESTIONS 51-57

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	51.	In which direction does the main ocean current flow?	56. Which city probably has the <u>least</u> population?
· · · · · · · · · · · · · · · · · · ·	• • • •	A. south B: north C. southwest D. northeast E. west	A. 1 B. 2 C. 3
	52.	The landforms of Ajax generally follow a direction.	D. 4 E. 7
	•	A: east-west B. north-west C. south-east D. north-south E. east-north	<ul><li>57. Which city would probably be a manufacturing center?</li><li>A. 7</li></ul>
 	53.	Which river would you expect to have the slowest speed of cur- rent?	B. 5 C. 1
•		A. Kof B. Doh C. San D. Blu E. Sum	E. 2
-	54.	Which city is located on a river delta?	
	•	A. 1 B. 2 C. 3 D. 4 E. 7	
	55.	In which city would flooding re- present a problem?	
		A. 1 B. 2 C. 3 D. 4 E. 5	

GENERAL DIRECTIONS TO THE PUPIL

READ THIS PAGE CAREFULLY BEFORE YOU BEGIN WORKING.

1. There are 57 questions in this booklet.

2. Work as quickly but as carefully as you can. If you find that you cannot do a question, go on to the next. If you have time, go back to the ones you left out. Make the best choice that you can and check all the answers carefully.

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3. Read each question carefully. Each question has <u>five</u> choices; the letters A, B, C, D, and E are listed to the left of each choice. <u>Circle the</u> <u>letter</u> which you think corresponds to the <u>best</u> answer available.

Here is a sample question:

The largest river in Quebec is the .....

A. Richelieu

B. St.Maurice

C. Montmorency

D. St.Lawrence

E. Chaudière

Of course, you would circle "D" because it is the <u>best</u> answer available from the five choices.

4. Write in pencil. If you put a circle in the wrong place, <u>do not use an</u> <u>eraser</u>. Instead, cross out the wrong letter neatly and circle the one you prefer. If you change your mind back to your first choice, print the letter egain and circle it neatly.

5. If you have any questions about the test, ask them now.

BEGIN AS SOON AS YOUR TEACHER TELLS YOU TO

	PPENDIX C
NAME	GEOGRAPHY
Family name (PRINT)	First name
I WAS BORN IN THE MONTH JANUARY MAY SEPTEMBER	H OF: FEBRUARY MARCH APRIL JUNE JULY AUGUST OCTOBER NOVEMBER DECEMBER
· · · · · · · · · · · · · · · · · · ·	YEAR OF BIRTH 195 I AM"NOW IN GRADE
· · · · · · · · · · · · · · · · · · ·	THE NAME OF MY SCHOOL IS



	LOOK AT THE 4 MAPS OF ANSWER OUESTIONS 1-14	SOUTH AMERICA TO
	<pre>Which of the following areas is the most densely populated? (see Maps 1 and 2) A. central part of the west coast B. Plateau of Patagonia C. Guiana Highlands D. Atlantic coastal plain E: Orinoco Lowlands</pre>	5. <u>Area B</u> A. bauxite mining B. sulphur mining C. oil well drilling D. aluminum smelting E. coal mining
	mh an the she	6. <u>Area C</u>
	<ul> <li>There are few people in the Amazon Basin because</li> <li>A. the climate is bad and people tire easily</li> <li>B. there is not enough water for enough water</li></ul>	A. tin and copper mining B. coal mining C. nickel mining D. silver mining E. diamond mining
•	crops C. the land is too rocky to grow anything D. there are many wild animals E. there is no way to trans- port goods in and out	<ul> <li>7. On Map <u>3</u> what is the function of the line A B?</li> <li>A. it divides South America into two parts</li> <li>B. it is the Equator and it di-</li> </ul>
• 3.	Much of South America's population is located along the coasts. Which of the following would not be a reason for this?	vides the world into the northern and southern hemi- spheres C. people living north of the line speak Spanish, those below speak Portuguese
	<ul> <li>A. early settlers stayed on the coasts because of a lack of roads</li> <li>B. the coasts are generally flat while inland the ground is</li> </ul>	D. It is close to the position of the Amazon River E. south of this line few people live
	C. ships have access to coastal areas D. there is not a large enough population to cause over-	
	E. inland natives do not want settlers	
ц.	What types of occupations would be observed in the lettered areas of Map 4?	
	Area A A. tin mining B. gold mining C. oil well drilling D. iron mining	•
	E. Clamond mining	

e		
8.	The Atacama desert in Clile is a very dry area because	13.
•	A it is very bot	Area 4
•	B. the winds do not carry any moisture	A. hot, wet forests
• •	D. the coasts are foggy	B. savanna
	area from the sea	C. mountainous vegetation
		D. grasslands
9.	The Parana Lowland is sometimes called	E. hot desert
	A. Gran Chaco	
•	B. Llanos	14. On Map 3, if you were to build
•	C. selvas	a road from the Panama Canal to
	D. altiplano	Buenos Aires, which route would
	L. talga	you choose?
1		A. 1
10.	On Map 4 what type of vegetation would you expect to find in the numbered areas?	B. 2
•	<u>Area 1</u>	С. З
	A. hot wet forests	D. 4
	B. coniferous forests	
	D. flat prairies	<b>E.</b> 5
	E. dry grasslands	
<b>ب ب</b>	Anea 2	
-	<u>med z</u>	•
·	A. rocky wasteland	
· .	B. savanna	
	C. jungle D. dogiduous formate	
	E. swamps	•
		•
12.		1 Alexandress of the second
• ••	<u>Area 3</u>	
. •	A. scrub forest	
	B. hot desert	
	C. cool forests	
	u. not swamps E. lush grasslande	
	- rasu grasstands	
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JAMAICA BAUXITE C в BAUXITE DEPOSITS WHITE LIMESTONE MILES CITY (NUMBERED) RAILWAY OVERHEAD \*\*\*\*\*\*\* TRAMWAY 15. How is bauxite trans-17. Where might new deposits of bauxite ported to port "1" be found? A. Α. A. by ship В Β. Β. by railroad С. С., C. by truck D D. D. by overhead tramway E. Е Ε. none of these methods 16. Of what importance is the 18. Where might bauxite be processed railway system shown on into alumina? the map? Α. 4 Α. transportation of в. 5 large numbers of tourists 6 с. B. connection of all 7 D. island ports Ε. 8 c. transportation of bauxite to coastal ports D. connection of all the mining areas Ε. connection of Kinston (city 7) with all other parts of the island



23.	Which city has the most variation in monthly rainfall throughout the year?	27. Which cities are located in the southern hemisphere?
	A. 1 B. 2 C. 3 D. 4 E. 6	A. 1 & 3 B. 4 & 5 C. 5 & 6 D. 2 & 3 E. 1 & 3
24.	In which city would you require the greatest amount of variation in clothing for a year? A. 1 B. 3 C. 4 D. 5	<pre>28. Which cities are located in the northern hemisphere? A. 1 &amp; 4 B. 2 &amp; 3 C. 1 &amp; 6 D. 4 &amp; 5 E. 1 &amp; 2</pre>
, 25.	E. 6 Which cities are located in the "equatorial" region?	29. None of these graphs represent an African city. Which one of these graphs would most closely represent the climate of a city
•	<ul> <li>A. 2 &amp; 3</li> <li>B. 1 &amp; 4</li> <li>C. 5 &amp; 6</li> <li>D. 2 &amp; 5</li> <li>E. 3 &amp; 6</li> </ul>	A. 2 B. 3 C. 4 D. 5 E. 6
26.	Which two cities would have trouble with frost on their crops?	
· · · · · · · · · · · · · · · · · · ·	<ul> <li>A. 1 &amp; 4</li> <li>B. 1 &amp; 6</li> <li>C. 3 &amp; 5</li> <li>D. 5 &amp; 6</li> <li>E. 4 &amp; 5</li> </ul>	



LOOK AT THE 6 MAPS OF AU QUESTIONS 3	USTRALIA TO ANSWER 0-37
<ul> <li>30. Large areas of south central Australia come very close to being called</li> <li>A. savanna</li> <li>B. desert</li> <li>C. tundra</li> <li>D. taiga</li> </ul>	<ul> <li>34. Sugar production requires plenty of rainfall and warm temperatures. On what coast of Australia would sugar be grown?</li> <li>A. west</li> <li>B. north west</li> <li>C. north east</li> <li>D. south</li> <li>E. north</li> </ul>
E: jungle	35. Tasmania differs from Australia
<ul> <li>31. What amount of rainfall seems best suited for sheep raising?</li> <li>A. over 80 inches</li> <li>B. 0 - 10 inches</li> <li>C. 10 - 20 inches</li> <li>D. 20 - 40 inches</li> </ul>	<ul> <li>A. the whole area has plenty of rainfall and hydro-electric power has been developed</li> <li>B. the land is arid and flat</li> <li>C. the land is warmer size</li> <li>D. most of the rain falls on the east</li> <li>E. it has more wheat production .</li> </ul>
E. 40 - 80 inches 32. What factor enables cattle rais-	36. Notice where most of Australia's population is located. Which of the following helps to explain this?
ing to be extended in "dry" areas? A. Artesian basins B. flat plains C. mineral resources D. few people	<ul> <li>A. there is insufficient rainfall in the central area for people to live comfortably</li> <li>B. not much wheat can be grown in inland areas</li> <li>C. sheep and cattle need water and pasture which are determined by rainfall</li> </ul>
E. wheat growing 33. Look at the maps of Australia closely. A crescent-shaped area can be seen in south- eastern Australia. How could this error be described?	<ul> <li>D. the country does not have enough people to necessitate living in dry areas</li> <li>E. all of the above help to ex- plain why people live in the areas they do</li> </ul>
A. a wheat and sheep belt	37. Australia's difficulties in trade stem from
<ul> <li>B. an area of heavy rainfall (over 60" year)</li> <li>C. an area of artesian basins</li> <li>D. a mineral belt</li> <li>E. an area of flat deserts</li> </ul>	<ul> <li>A. its location; far away from other countries</li> <li>B. its small population of 10 million</li> <li>C. difficulties with climate; especially rainfall</li> <li>D. a lack of oil resources</li> <li>E. all of the above cause difficulties</li> </ul>
	•



<ul> <li>38. The land forms of Ajax generally follow a direction.</li> <li>A. east-west</li> <li>B. north-west</li> <li>C. south-west</li> <li>D: north-south</li> <li>E. east-north</li> <li>39. Which of the cities would probably be the best location of a major port?</li> </ul>	42.	Note the clusters of population in the central and north-central portion of Ajax. What might these people do for a living? A. farming B. forestry C. mining D. manufacturing E. fishing Why are the power stations located where they are?
A. 1. B. 6		A. they are near the west coast
C. 3		B. there are cities close by
D. 4		C. rainfall is approximately 40"
E. 7 40. In which <u>ocean</u> is Ajax situated?		D. rivers flow from the mountains to the sea in a relatively short distance
A. Atlantic B. Pacific		E. there are iron deposits near-by
C. Indian D. Arctic F. it is not in an ocean	44.	Which city would probably be a lumbering center?
	4	
41. Why would there be so few people in the horse-shoe-shaped area on Afax (on the Population Map)		C. 6 D. 1
A. there are no streams and		E. 5
B. the area is heavily for- ested and parts are ele- vated	45.	Which city would probably be an agricultural center?
C. there are few mineral de- posits		A. 1 B. 2
D. there is not enough rain- fall for crops	- 14 - 14	D. 4
-	1	

## LOOK AT THE MAPS OF AJAX TO ANSWER QUESTIONS 38-55

.1

•1 C.2

1 2 3 1

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46.	Which city would probably be a mining center?	50.	Which city is located on a river delta?
• • • •	A. 2	÷	A. 1
:.	B. 6		B. 2
	C. 4		C. 3
	D. 3		D. 4
	E. 1		E. 7
47.	Which city would probably be a manufacturing city?	51.	What would be the main diffi-
	A. 7	•	from city 3 to city 2 to the iron ore deposits?
• .	B. 5 C. 1		A. finding a flat enough road- bed in the upland areas
	D. 3		B. there are too many rivers
<b>.</b>	E. 2		to cross
48.	Which city probably has the <u>least</u> population?		C. there are not enough people in the area to build the railroad
. • •	A. 1		D. there are lowland swamps
	B. 2	· · · · · · · · ·	E. the area is too cold to
	C. 3		NOTA III CODILY
	D. 4 E. 7	52.	If you were to build a road from city 4 to city 1 what route would
49.	Which river would you expect to		you use? One that follows
• •	have the <u>slowest</u> speed of cur- rent?		A. the eastern seacost
	A. Kof		B. the western edge of the up- lands passing to the west of Blu Lake
	B. Doh		C. the Sum River
	C. San	1	D. the western seacoast
	D. Blu	ļ	E. the top of the eastern
	E. Sum		plateau
,		<u> </u>	
		·	
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#### GENERAL DIRECTIONS TO THE PUPIL

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B. St. Maurice

C. Montmorency

D. St. Lawrence

E. Chaudiere

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BEGIN AS SOON AS YOUR TEACHER TELLS YOU TO

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	A	PPENDIX D	- <b>440</b> - 247		
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and the second	G.	LUGRAPHI			
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	NAME	·····			•
	Family Name (PRINT)		First Name		
				and a second	
	Place an X in the bo	x which applies	to you		· · · ·
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	ВОҮ		GIRL		
n un a statute enternet, etc. under gaarde en					
	I WAS BORN IN THE MONT	'H OF			a seria
•	January	February	March	April	
			<b></b>		
43 	Мау	June	July	August	
		· · · · · · · · · · · · · · · · · · ·			•
	September	October	November	December	
	Year of birth 195	•			
•	I am now in grade			n tanàn ang taona 1990. Ngina kaominina dia kaomini	
	The name of my SCHOOL	 :			
	The name of my SchOOL		·		
		•	<u> </u>	BC	<b></b>

FORM 2



## Use the diagram to answer questions 1 - 7

1. How long would it take the earth to turn once on its axis?

- A. 1 day
- B. 3 weeks
- C. 1 year
- D. 6 hours
- E. don't know

- 2. The shaded areas show the parts of the earth that receive little direct sunshine in certain seasons. In what position would the Arctic have darkness all the time (24 hours)?
  - A. 1
  - B. 4
  - C. 5
  - D. 7
  - E. don't know

		•		×.						- 		
	•		ana ya ya kasa a		۰. ۰. ۰. ۰. ۰. ۰. ۰. ۰. ۰. ۲.	anta an Anta an	••••••	•••••••		بالاعدادية ومعردان الالا		
						n ar a Na <mark>1</mark> 10 a an a	·	•	•	•		
	3.	If .	the sun never	sets at al	1 in "	6.	Ati	positio	on 5 wha	t would the	ne day	5
		lik	e in the Anta	arctic at th	e same	i e i				00101		
		tin	e of year?	<b>2</b>		•••	· A:	the su	un would	l not rise	atal	1
• :		<b>A.</b>	the sun woul	ld never set		: 	В.	there light	would 1 and 18	hours of	of day darkne	y- ss
		в.	there would shine and 12	be 12 hours 2 hours of d	of sun- larkness	····	с.	the su	un would	l not set		
•		с.	there would shine and la	be 6 hours 8 hours of d	of sun- larkness	·	D.	there light	would 1 and 6 1	oe 18 hour hours of d	s of d arknes	ay- s
•	•	D.	the sun woul	ld never ris	se i		Ε.	đon't	know			
		E.	don't know	· · · · ·		7.	One	of the	e arrow	s on the d	iagram	
· ,	4.	How	long would :	it take the	earth to		sho The	ws the other	direct arrows	rays of t show	he sun	
		EO.		T TO POST	.1011 51		A.	the c	lockwis	turning	of the	
		А.	1 year		:	44 A.		eartn	on its	axis		
		в.	4 months		1	- 4.1 - 74 ( - 15 {	- В.	the contract	ounterc e earth	lockwise t on its ax	urning	
	. •	c.	9 months	•	•			the c	ounterc	lockwise m	ovemen	t
		D.	6 months					or th	e earth	around th	e sun	te de la composition de la composition Composition de la composition de la comp
		E.	don't know		-		C.	the c earth	lockwis around	e movement the sun	of th	e
	5.	At her	which number hisphere have	would the r summer?	northern	:	D.	the c earth	lockwis on its	e turning axis and	of the the cl	.ock-
	•	Α.	1. – 1997 1.K., 1				• .•	wise aroun	movemen d the s	t of the e un	arth	. •
	. <b>·</b>	в.	3				Ε.	don't	know			
		c.	5	· · ·						:	. :	ж. Полого (1996)
		п		•						19 A. 19		
		Δ.										
•		Ε.	don't know								·.	
••••••••••••••••••••••••••••••••••••••	· · ·		· · · · · · · · · · · · · · · · · · ·		<u></u>							
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						I				•		



at v



- C. 5 acres
- D. 7 acres
- E. don't know

14. This farm probably exists in	16. Norway is sometimes called a "land of 5 F's". This is
A. India	a good way to describe the country because
B. Peru	A. the land is <u>flat</u>
C. the Congo	B. the 5 F's are important
D. none of the above areas	features of the country
	C. the country borders on
15. Fodder crops are used to	<u>Finland</u>
A. plough back into the ground	D. am important industry is
B. feed livestock	fishing
C. sell in markets	E. don't know
D. burn for heating homes	17. The "Land of the Midnight Sun" ·
E. don't know	refers to areas which are
	A. on the Equator
	B. north of the Arctic Ocean
an a	C. cold all year
	D. always lighted by the sun
	E. don't know

Ì

## 18. Read the following facts and then answer the question.

To travel from Oslo, Norway, to Alexandria, Egypt, it takes . . . .

l year by foot 10 days by ship 6 days by train and ship 18 hours by air

By looking at this list we can say that . . . .

- A. the distance between Norway and Egypt has become less
- B. man has shortened the time it takes to get from place to place
- C. air transportation will become more important in the future

D. airplanes will tend to become larger

Read these facts on five climates and then answer the four questions

- 1. Temperatures are low because the sun is never high in the sky. The warmest month of the year is less than 50°F.
- 2. It rains in all seasons. Temperatures usually rise to 90°F. There is much moisture in the air. At night there are heavy fogs and dews.
- 3. The temperatures are not as cold as one would expect. Rainfall is over 70". yearly. An ocean current affects the climate.
- 4. The monsoon is the main feature. These winds bring much rain for 3 months. The rest of the year does not have as much rain. The temperature is near 80°F. all year.
- 5. Winters are cold with below freezing temperatures. In the winter months, up to 100" of snow may fall. The rainfall averages 40" per year.

19	. Wh de	ich of these climates would best scribe a <u>rainforest</u> ?	21.	Which of these climates would best describe <u>India</u> ?
•	Å.			A. 1
	в.	2		B. 2
. •	с.	3	-	C. 3
-	D.	4		D. 4
	E.	don't know		E. don't know
20	). Wh de	ich of these climates would best scribe the <u>Province of Quebec</u> ?	22.	Which of these climates would best describe <u>Norway</u> ?
	Α.	1		A. 1
	В.	2		B. 3
	c.	3		C. 4
	D.	5	<b> </b> .	D. 5
	E.	don't know		E. don't know



23.	The line drawn across Ajax marked is called the	0 <sup>0</sup>	27. Which river is a tributary of another river on Ajax?
	A. Equator		A. Doh River
	B. International Date Line		B. San River
• • •	C. Tropic of Cancer		C. Sum River
	D. Tropic of Capricorn	:	D. Blu River
ی ا بی از محمد محمد از	E. don't know		E. don't know where a standard and
24.	Which city is located on a river	<u>delta</u> ?	28. What would the lowland area around
•	A. 1		A. valley
			B. plateau
•		i i i i i i i i i i i i i i i i i i i	C. mountain range
	E dop!t know	n an	D. gorge
	Which niver forms a delta at its	mouth?	E. don't know
	A. Kof River	moutin	29. In what part of Ajax would you find mostly <u>highland</u> areas?
	B. San River	1	A. western
	C. Sum River		B. B. eastern
	D. Blu River		C. north-eastern
••••••••••••••••••••••••••••••••••••••	E. don't know	· .	D. central
26.	Near what city on the Fopulation would you find a peninsula?	Мар	E. don't know
<b>.</b>	A. 2	· •	30. The landforms of Ajax generally follow a
•	B. 3	· ·	A. east-west
	C. 4		B. north-west
	D. 6	•	C. south-east
	E. don't know		D. north-south
		•	E. don't know
9		•	
		1 1 1 1	
		,	

31.	In which city would flooding repre- sent a problem?	35.	What does 📥 stand for on Ajax?
•	A. 1 twee day	• •	A. hydro-station
•	B. 2		<b>B.</b> church
	C. 3		D. city
	D. 4		E. don't know
32.	A cross-section cut through Ajax along the Equator would show the shape (or profile) of the island to be like	36.	From which direction do the winds blow onto Ajax? From the
	A		B. northeast
			C. west D. southwest
e se ener.	E. don't know		E. don't know
33.	In which direction does the main ocean current flow?	37.	What would be the highest amount of rainfall received on Ajax for one year?
	A. south		A. 20 inches
	6 southwest		B. 45 inches
•	D. west		C. 40 inches
	E. don't know	ļ	E. don't know
34.	What type of <u>vegetation</u> is shown on the Resource Map?	38.	How many people per square mile would -you find in areas marked
	A. swamps		
	B. grain		A. over 250
	C. forests		$B_{1}$ 100 to 250
			C' SO LO TOO
	D. brush		D. 0 to 25

39. Which city probably has the least population?	41. What would be the main difficulty of building a railroad from City 3 to City 2?
B. 3	A. finding a flat enough roadbed in the upland areas
C. 4. Charles and the second description of the second secon	B. there are too many rivers to cross
E. don't know	C. there are not enough people in the area to build the railroad
40. Which city would probably be a mining center?	g D. there are lowland swamps E. don't know
B. 6	42. Why are the power stations located where they are?
C. 3	A. they are near the west coast
D. 1 E. don't know	<ul> <li>B. there are cities nearby</li> <li>C. rainfall is approximately 40" per year</li> </ul>
	D. rivers flow from the mountains to the sea in a relatively short distance
	E. don't know
43. An oasis is a A. dry area	
B. pasture land	
C. place in a desert	where water exists
E. don't know	and
44. A "three-story forest and is hot all year 1	" in a country that has much rainfall ong is called
A. a taiga	an an tao amin'n an tao an Tao amin'
B. a tundra	
C. a jungle	
D. an oasis	
E. don't know	

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		с		
		<ul> <li>Martin Constraints</li> </ul>		
	45.	Drought is an important word to all Prairie farmers. Androught is a	49. Which of the following cities would <u>not</u> be important in the shipping of Prairie wheat?	
•		A. lack of money	A. Vancouver	
		B. lack of rain	B. Fort William	
		C. very strong storm	C. Churchill	
		D. lack of good soil	D. Sept Isles	•
	* • • • •	E. don't know	E don!t know	•
	46.	Coal from the south shore of Lake Erie.	E. don't know	·
••••••		Oil from Sarnia. Transportation by rail, road and ship. Minerals from Northern Ontario and other areas. A large population.	50. The tourist industry exists in the provinces of Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland. Which of the following statements would not be true?	·
	17 A.	All the above combine to make Toronto		
	•		vides many people with jobs	
		A. great manufacturing city	B. the summers are cooler in	
			areas to the west	
		C. railway center	C: these provinces are good	
		D. Center of government	hunting, fishing, sailing	•
-			and Signt-Seeing	
	47.	An early spring; enough rain in the spring and early summer; long, warm, sunny summer days; and a dry sunny fall.	D. the populations of these provinces are large, and are crowded into small areas	
		These weather conditions all make possible on the prairies.	E. don't know	
•		A. ranching	51. What common feature do the follow- ing cities have? Halifax, Saint John Sydney, Charlottetown, St.	-
		B. lumbering	John's?	
		C. wheat growing	A. they are the capitals of	,
	•	D. fruit growing	By the here good part and	
		E. don't know	harbour facilities	
	48.	Northern Ontario is similar to North- ern Quebec since both	C. they are industrial centers	
		A. have large populations	D. fishing is the most impor- tant occupation	
		<ul> <li>b. have mineral and forest resources</li> <li>c. have mild winters and warm summers</li> <li>D. depend on roads for transportation</li> <li>E. don't know</li> </ul>	E: don't know	
		n na shekara na shekar	• • • • • • • • • • • • • • •	



Use the Map of Montreal to answer questions 52-54

52.	Montreal is important for a number of reasons. Which of the following reasons cannot be found by looking		The ant	Richelieu River is import- to Montreal because
	at the map.	n transformer Stationers	Α.	it flows south to Lake Champlain
	A. Montreal is a port	( )	•	
	B. Montreal is at the meeting place of rivers		B.	it is Montreal's source of drinking water
	C. Montreal has many forms of transportation.		с.	it provides a water-link with New York City
	D. Montreal has a large popu- lation which supplies the		D.	it flows through fertile farm land
	many factories with workers	· · ·	. <b>L</b>	don't know
	E. don't know			
53.	If you were to approach Montreal by boat from the northwest you would probably be sailing on the	• • •		
	River.	n de service Northeres		A Carton Construction of the second sec
·	A. St. Lawrence			
	B. Richelieu			
	C. Yamaska			
	D. Ottawa			
	E. don't know			······································
		1		



## Use the Map to answer questions 55 to 57

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55. What would be the main fruit crop grown?

- A. pears
- B. peaches
- C. grapes
- D. cherries
- E. don't know
- 56. Two boundaries of the Niagara Fruit Belt shown on the map would be . . . . . . . . . . . . . . .
  - A. the Niagara Escarpment and Lake Ontario
  - B. the Niagara Escarpment and Lake Erie
  - C. the Welland Canal and the Niagara River
  - D. Lake Ontario and Lake Erie

- The growth of Hamilton to the west of the Fruit Belt presents a threat to the Belt. What would this threat be?
  - A: valuable fruit growing lands will be turned into residential and industrial areas
- B. the soils will change
- C. more people will mean that the area will not be able to produce enough fruit to feed them
- D. more land will be used by the fruit growers
- E. don't know
- 58. Look at the table of information on the Niagara Escarpment and then answer the question.

		·
Below	Above	
27 <sup>0</sup> F	24.2 <sup>°</sup> F	• <u>•</u>
-16 <sup>0</sup> F	-34 <sup>0</sup> F	
163	148	
30	32	
more below	the scarp than	above
	<u>Below</u> 27 <sup>°</sup> F -16 <sup>°</sup> F 163 30 more below	BelowAbove $27^{\circ}F$ $24.2^{\circ}F$ $-16^{\circ}F$ $-34^{\circ}F$ 1631483032more below the scarp than

Which of the following would <u>not</u> be a reason for growing fruit below the Niagara Escarpment rather than above it?

A. winters are slightly warmer below the scarp

- B. the growing season is longer below the scarp
- C. winter temperatures seldom go below the killing temperature of fruit trees (-16°F) below the scarp
- D. there is less summer sunshine below the scarp
- E. don't know

57.

- Min da la companya da la companya

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n an	e e e e e e e e e e e e e e e e e e e
lice the Manuef British Columbia to answer out	at 300 50 to 65
59. Where do the forest industries seem 63. The area to be mainly located?	marked <u>1</u> is similar to ara Fruit Belt in some
A. on the Peace River	his area is called the
B. on Vancouver Island (south- ern part)	agan Valley e River District
C. near area l C. Clay	Belt
D. on the Fraser River (where the river changes direction in its flow from north to south)	y Mountain Trench
E. don't know	t know
60. The west coast of Vancouver Island the map) has great forests. What is the	o station at Kitimat (on ) is important because
reason for this?	ninum is smelted there
A. the western slopes of the mount- ains receive heavy rainfall area	ring is carried on in the N
B. the Pacific Ocean gives a temperate climate	stricity is cheap there
C. the winds blow from west to east E. don'	t know
D. the Coast Ranges are very high 65. What wor	ald-be the chief occupation
E. don't know	reace Aiver District?
61. What would the symbol (X) repre- sent on the map?	it growing
A. forestry tower	ry cattle raising
B. salmon processing plant	in growing
C. grain elevators E. don	't know
D. mining	
E. don't know	
62. The map showing part of British Columbia has boundaries with Alberta and Washington marked in. What boundary is not marked in on this map? The one with	
A. Saskatchewan B. Alaska	
C. California D. the North West Territories E. don't know	

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Use the Map to answ	$\frac{1}{100}$	
66. If you were to fly directly from Quebec City to Halifax, and then from Halifax to Charlottetown, you would fly approximately	68. If you were to visit any of the 8 areas marked ≠ 2, what would be the chief industry you would find?	
A. east	A. pulp and paper	
B. southeast then east	B. farming	
C. southeast then north	C. oyster gathering	
D. east then north	D. mining	
E. don't know	E. don't know	
67. If you were to visit Area 1 on the map, what would be the chief industry you would find?	69. Which of the following statements would <u>not</u> be true of the dotted outlined areas on the map?	
A. fishing	A. the land dips gently beneath	
B. apple growing	miles out from shore the water is shallow	
C. lumbering	B. the Labrador Current brings cold water into these areas	
D. ship building	C. cod, haddock, halibut and herring are found here in	•
E. don't know	large numbers D. fishing is safe here because	
	there rarely is any fog E. don't know	

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3.B -JAMAICA WHITE LIMESTONE BAUXITE DEPOSITS CITY RAILWAY OVERHEAD TRAMWAY Use the above map to answer questions 70 to 72 70. How is bauxite transported to 72. Where might bauxite be processed port 1? into alumina? A. by ship Α. 2 B. by railroad B. 3

C. by truck

D. by overhead tramway

E. don't know

71. Where is the bauxite mainly located?

A. on the east coast

B. near city 4

C. where there is White Limestone rock

D. on the western tip of the island

E. don't know

C. 4



73.	Large areas of south-central	77. Tasmania differs from Australia
	Australia come very close to being called	<ul> <li>A. the area has plenty of rain- fall and hydro-electric</li> <li>power has been developed</li> <li>B. the land is arid and flat</li> </ul>
	C. tundra	C. the land is warmer than Aust- ralia
•	E. don't know	D. most of the rain falls on the east coast
74.	Sugar production requires plenty of	E. don't know
	rainfall and warm temperatures. On what coast of Australia would sugar be grown? A. west	78. Look at the maps of Australia closely. Af crescent-shaped area can be seen in south-eastern Australia. How could this area be described?
· · · · ·	B. south-east	A. a wheat and sheep belt
•	C. north-east	. B: an area of heavy rainfall (over 60" a year)
- 	D. south	C. an area of Artesian basins
	L. don't know	D. an area of flat deserts
75.	What factor enables cattle raising to be extended in "dry" areas?	E. don't know
•	A. Artesian basins	79. Notice where most of Australia's
	B. flat plains	the following helps to explain this?
• •	C. few people	And A. Sthere is insufficient rainfall
• •	D. wheat growing	and to live comfortably
	E. don't know	B. sheep and cattle need water and
76.	What amount of rainfall seems best suited for sheep raising?	by rainfall
· · · · · · · · · · · · · · · · · · ·	A. 10-20 inches	enough people to necessitate living in dry areas
· . · · ·	<ul><li>B. 20-40 inches</li><li>C. 40-80 inches</li></ul>	D. all of the above help to explain why people live where
	D. over 80 inches	they do
	E. don't know	E. don!t know

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Use the graphs to answer questions 80 to 87

80.	Which city has the <u>most</u> variation in monthly <u>rainfall</u> throughout <b>the year</b> ?	82. None of these graphs represent an African city. Which one of these graphs would most closely
	A. 2	represent the climate of a . city on the Congo River?
	B. 3	A. 2
	C. 4	B. 3
	D. 6	C. 4
	E. don't know	D. 6
81.	Which two cities would have trouble with frost on their crops?	E. don't know
	A. 1&4	83. The average monthly <u>temperature</u> at City 3 is approximately
•	B. 1 & 6	•••••F•
	C. 3&5	B. 32 <sup>0</sup>
	D. 5&6	$C_{1}$ $70^{\circ}$
	E. don't know	D. 80 <sup>°</sup>
		E. don't know

84. 85. f A A E C C I I E 86. K Y	Thich cities are located A. 2 & 3 B. 5 & 6 C. 2 & 5 D. 3 & 6 E. don't know In which city would your or a year? 3. 4 4 . 5 . 6 . don't know hich city has the <u>least</u> ear? . 2	require the grat	monthily	of variation	in clothing
85. I f A E C I E 86. N Y	A. 2 & 3 B. 5 & 6 C. 2 & 5 D. 3 & 6 E. don't know n which city would your or a year? . 3 . 4 . 5 . 6 . don't know hich city has the <u>least</u> ear? . 2	require the gro	eatest amount	of variation	in clothing
85. I f A P C U I E 86. W Y	E. don't know h which city would you or a year? . 3 . 4 . 5 . 6 . don't know hich city has the <u>least</u> ear? . 2	require the gre	monthily temper	of variation	in clothing
85. I f A B C U E 86. W Y	h which city would you or a year? . 3 . 4 . 5 . 6 . don't know hich city has the <u>least</u> ear? . 2	require the gre	monthly temper	of variation	in clothing
E C I E 86. W	• 4 • 5 • 6 • don't know hich city has the <u>least</u> ear? • 2	<u>t</u> variation in i	montîhîry: <u>temper</u>	<u>reture</u> throug	hout the
E 86. W y	. 6 . don't know hich city has the <u>least</u> ear? . 2	<u>t</u> variation (in )	monthily. <u>temper</u>	reture throug	hout the
E 86.' M y	. don't know hich city has the <u>least</u> ear? . 2	<u>t</u> variation (in )	monthly. <u>temper</u>	uture throug	hout the
86.' h	hich city has the <u>least</u> ear? . 2	t variation in .	monthily <u>temper</u>	rature throug	hout the
I	• 3	· · · · · · · · · · · · · · · · · · ·			
C 1	• 4			. · ·	
• 1	. don't know				
87. 1	hich cities are located	d in the southe	rn hemisphere'	?	
	. 1 & 3	• • • • • • • • • • • • • • • • • • • •			
• · :	3. 5 & 6				
•	2 & 3		• • • • • • •	en groene Le la companya	анан аларын а Аларын аларын
	). 1&3		•		
÷	. don't know	- ji		1 (1) 1 (1) 1 (1)	с
					. :



#### Use the Maps of South America to answer questions 88 to 92

- 88. On the Population Map what is the function of the line A B?
  - A. it is the Equator, and it divides the world into the northern and southern hemispheres
  - B. people living north of the line speak Spanish, those living below speak Portuguese
  - C. it is close to the position of the Amazon River
  - D. south of this line few people live

E. don't know

89. Which of the following areas is the most densely populated?

A. central part of the west coast

B. Guiana Highlands

C. Atlantic coastal plain

D. Orinoco Lowlands

90. What type of vegetation would you expect to find in the area marked 1? all sealer be could B. sandy deserts claiden clear d'unalizant se energie с. flat prairies in an tha <u>Rifelin</u> na zach 1999 (A. 1995) - 12 - 2 D. dry grasslands 999 (127) (12 ) (122) ECCG E. don't know Much of South America's population is located along the coasts. Which of 91. the following would not be a reason for this? early settlers stayed on the coasts because of a lack of roads Α. the coasts are generally flat, while inland the ground is more hilly в. there is not a large enough population to cause overcrowding с. inland natives do not want settlers D. Ε. don't know 92. There are few people in the Amazon Basin because . the climate is bad and people tire easily Α. there is not enough water for crops в. C. the land is too rocky to grow anything

D. there is no way to transport goods in and out

## General Directions to the Pupil

and the Barr

#### Read this page carefully before you begin working!

- 1. There are 92 questions in this booklet.
- 2. Work as <u>quickly</u> but as <u>carefully</u> as you can. If you find that you cannot do a question, go on to the next one. If you have time, go back to the ones you have left out.
- 3. Make the best choice that you can, and check all your answers.
- 4. Read the instructions to each question carefully. Each question has five (5) choices: the letters A, B, C, D and E are listed to the left of each choice.
- 5. <u>Circle the letter</u> which you think corresponds to the <u>best</u> answer available.
- 6. Here is a sample question:

The largest river in Quebec is . . . . . . . . .

A. the Richelieu

Sec.

B. the St. Maurice

C. the St. Lawrence

D. the Montmorency

E. don't know

Of course you would circle letter C because it corresponds to the <u>best</u> answer available.

- 7. Circle the letters in pencil. If you put a circle in the wrong place, <u>do not use an eraser</u>. Instead, cross out the letter and circle the letter you prefer. If you change your mind back to your first choice, print the letter again and circle it.
- 8. If you do not know the answer to a question, circle letter E which is "don't know".
- 9. If you have any questions about the test ask them now.

# APPENDIX E

# <u>GEOGRAPHY</u>

	· .	
NAME Family Name (PRINT)	First Name	
Place an X in the box which appl	Lies to you	
ВОҮ	GIRL	
I WAS BORN IN THE MONTH OF		
January February	March April	
May June	July August	
September October	November December	
Year of birth 195		
I am now in grade	· · · ·	
	· · ·	
The name of my SCHOOL is		

A B C

FORI # 3



## Use the diagram to answer questions 1 - 7

2.

- 1. How long would it take the earth to go from position 1 to position 5?
  - A. l year
  - B. 4 months
  - C. 9 months
  - D. 6 months
  - E. don't know

If the sun never sets at all in the Arctic, what would it be like in the Antarctic at the same time of year?

- A. the sun would never set
- B. there would be 12 hours of sunshine and 12 hours of darkness
- C. there would be 6 hours of sunshine and 18 hours of darkness
- D. the sun would never rise
- E. don't know

			•		
		-			
<b>7</b>		3.	The shaded areas show the parts of the earth that re- ceive little direct sunshine		
	• *		in certain seasons. In what position would the Arctic have darkness all the time	6	
	•		(24 hours)?	At position 5 what would the days be like in the Arctic?	
			B. 4	A. the sun would not rise at all	
	•		C. 5	B. there would be 6 hours of day- light and 18 hours of darkness	
		•	D. 7	C. the sun would not set	
			E. don't know	D. there would be 18 hours of day- light and 6 hours of darkness	
		•		E. don't know	
		4.	How long would it take the earth to turn once on its axis?		
	`		A. l day	· · · · · · · · · · · · · · · · · · ·	
			B. 3 weeks	7.	
			C. lyear	At which number would the northern hemisphere have summer?	
			D. 6 hours	A. 1	
			E. don't know	B. 3	
-				C. 5	
		5.	One of the arrows on the diagram shows the direct rays of the sun.	D. 7	
•	•		The other arrows show :	E. don't know	
			earth on its axis		
			B. the counterclockwise turning of the earth on its axis and the counterclockwise movement of the earth around the sun		
			C. the clockwise movement of the earth around the sun		
			D. the clockwise turning of the earth on its axis and the clock- wise movement of the earth around the sun		
			E. don't know		

-





8.

This farm probably exists in . . . . .

- A. India
- B. Peru
- C. the Congo
- D. none of the above areas

.....

The square represents 1 acre. About how many acres is the large

farm on the map?

Α. ll acres

B. 20 acres

- с. 5 acres
- D. 7 acres
- E. don't know

10.

9.

About how many acres are there in the neighbour's farm?

- 10 acres Α.
- в. l acre
- с. 15 acres
- D. 2 acres
- Ε. don't know

Read the following facts and then answer the question.

11.

To travel from Oslo, Norway, to Alexandria, Egypt, it takes . .

l year by foot 10 days by ship 6 days by train and ship 18 hours by air

By looking at this list we can say that . .

- the distance between Norway and Egypt has become less Α.
- man has shortened the time it takes to get from place в. to place
- C. air transportation will become more important in the future

D. airplanes will tend to become larger





Use the four maps of Ajax to answer questions 12 - 31.

. .

• •		
12	• What does 🛧 stand for on Ajax?	Which city probably has the <u>least</u> population?
	A. hydro-station .	A. 2
	B. church	B. 3
	C. star	C. 4
• •	D. city	D. 7
	E. don't know	E. don't know
13	What type of <u>vegetation</u> is shown on . the Resource Map?	n 17. Which river is a <u>tributary</u> of another river on Ajax?
	A. swamps	A. Doh River
	B. grain	B. San River
	C. forests	C. Sum River
	D. brush	D. Blu River
· ·	E. don't know	E. don't know
	How many people per square mile • would you find in areas marked A. over 250 B. 100 to 250 C. 25 to 100 D. 0 to 25 E. don't know	Near what city on the Population Map would you find a <u>peninsula</u> ? A. 2 B. 3 C. 4 D. 6 E. don't know 19.
15	In what part of Ajax would you fir mostly highland areas?	and The line drawn across Ajax marked 0° is called the
	A. western	A. Equator
	p. eastern	B. International Date Line
	C. nortn-eastern	C. Tropic of Cancer
	F. denit kerne	D. Tropic of Capricorn
	L. don't Know	E. don't know

20. What would be the main difficulty of building a railroad from City 3 to City 2?	From which direction do the winds blow onto Ajax? From 24. the	••••
A. finding a flat enough roadbed in the upland areas	A. north B. northeast	-
<ul> <li>B. there are too many rivers to</li> <li>cross</li> <li>C. there are not enough people in the area to build the railroad</li> </ul>	C. west D. southwest	
D. there are lowland swamps	25.	
E. don't know	What would the <u>lowland</u> area around the Sum and Blu Rivers be called?	•
Which river forms a <u>delta</u> at its mouth?	A. valley	
A. Kof River	B. plateau	
B. San River	C. mountain range	· · ·
C. Sum River	D. gorge	
D. Blu River	E. don't know	· · · ·
E. don't know		
Why are the power stations located where they are?	Which city is located on a river	
A. they are near the west coast `	A. 1	•
B. there are cities nearby	B. 2	
C. rainfall is approximately 40" per year	C. 3	
D. rivers flow from the mountains to the sea in a relatively short distance	, E. don't know	
E. don't know	27.	_
23.	A cross-section cut through Ajax along the Equator would show the shape (or profile) of the island to be like	•
<pre>which city would probably be a mining center? A. 2 B. 6 ~ C. 3 D. 1 E. depit know</pre>	A	

		-
•	28.	
• •	What would be the highest amount of rainfall received on Ajax for one year?	30
· •	A. 20 inches	In which city would flooding repre- sent a problem?
	B. 45 inches C. 40 inches	A. 1
	D. 75 inches	B. 2
	E. don't know	C. 3
	20	D. 4
		E. don't know
	In which direction does the main ocean current flow?	~~
	A. south	The log former of Atom and the
	B. southeast	follow a
	C. southwest	A. east-west
	D. west	B. north-west
	E. don't know	C. south-east
		D. north-south
	·	E. don't know
	•	

32.

---- -
<u>Read these facts on five climates and then answer questions 33 - 35.</u>

- 1. Temperatures are low because the sun is never high in the sky. The warmest month of the year is less than 50°F.
- It rains in all seasons. Temperatures usually rise to 90°F. There is much moisture in the air. At night there are heavy fogs and dews.
- 3. The temperatures are not as cold as one would expect. Rainfall is over 70" yearly. An ocean current affects the climate.
- 4. The monsoon is the main feature. These winds bring much rain for 3 months. The rest of the year does not have as much rain. The temperature is near 80°F. all year.
- 5. Winters are cold with below freezing temperatures. In the winter months, up to 100" of snow may fall. The rainfall averages 40" per year.

33. Which of these climates would best describe a <u>rainforest</u>?

- A. 1
- \_ \_

B. 2

С. З

D. 4

E. don't know

34.	Which of these climates would best describe <u>India</u> ?	
•	A. l	
· · · · · · · · · · · · · · · · · · ·	B. 2	
	C. 3	
	D. 4	
	E. don't know	
	35. Which of these climates would best describe <u>Norway</u> ?	
	A. 1	
	B. 3	
	C. 4	
9 	D. 5	
	E. don't know	

	6. Coal from the south shore of Lake Erie. Oil from Sarnia.	
•	Transportation by rail, road and ship. Minerals from Northern Ontario and	10.
_	other areas. A large population.	Which of the following cities would
	All the above combine to make Toronto	of Prairie wheat?
	a	A. Vancouver
	A. great manufacturing city	B. Fort William
• •	B. cultural center	C. Churchill
	C. railway center	D. Sept Isles
	D. center of government	E. don't know
	E. don't know	The tourist industry exists in
3	7. An early spring; enough rain in the $41$	the provinces of Nova Scotia,
	spring and early summer; long, warm,	Island and Newfoundland. Which
	fall.	of the following statements would not be true?
	These weather conditions all make	nould <u>not</u> be trug.
• •	possible on the prairies.	A. the tourist industry pro- vides many people with jobs
	A. ranching	B. the summers are cooler in
	B. lumbering	these provinces than in areas to the west
	C. wheat growing	C. these provinces are good
	D. fruit growing	hunting, fishing, sailing
	E. don't know	and signt-seeing
· · ·	38.	D. the populations of these provinces are large, and
	Drought is an important word to all Prairie farmers. A drought is a	are crowded into small areas
	A. lack of money	E. don't know
	B. lack of rain	What common feature do the follow-
	C. very strong storm 42	• John, Sydney, Charlottetown, St.
	D. lack of good soil	A. they are the capitals of
	E. don't know	their provinces
	39.	B. they have good port and harbour facilities
	Northern Ontario is similar to North- ern Quebec since both	C. they are industrial centers
	A. have large populations B have mineral and forest resources	D. fishing is the most impor-
	C. have mild winters and warm summers	
	D. depend on roads for transportation E. don't know	E. don't know





Use the map to answer questions 46 - 48.

What would be the main fruit crop grown? -46. Α. pears Β. peaches с. grapes D. cherries E. don't know 47. Two boundaries of the Niagara Fruit Belt shown on the map would be . . . . . . Α. the Niagara Escarpment and Lake Ontario в. the Niagara Escarpment and Lake Erie

C. the Welland Canal and the Niagara River

D. Lake Ontario and Lake Erie

E. don't know

48. The growth of Hamilton to the west of the Fruit Belt presents a threat to the Belt. What would this threat be?

- A. valuable fruit growing lands will be turned into residential and industrial areas
- B. the soils will change
- C. more people will mean that the area will not be able to produce enough fruit to feed them
- D. more land will be used by the fruit growers
- E. don't know

49. Look at the table of information on the Niagara Escarpment and then answer the question.

Conditions	Below	Abo	ve .
Average Winter Temperature	27 <sup>0</sup> F	- 24.	2°F
Minimum Winter Temperature	-16 <sup>0</sup> F	-34 <sup>0</sup> 1	F
Growing Season (in days)	163	148	
Rainfall (in inches)	30	32	
Summer Sunshine	more below	the scarp	than above

Which of the following would <u>not</u> be a reason for growing fruit below the Niagara Escarpment rather than above it?

- A. winters are slightly warmer below the scarp
- B. the growing season is longer below the scarp
- C. winter temperatures seldom go below the killing temperature of fruit trees (-16°F) below the scarp
- D.' there is less summer sunshine below the scarp
- E. don't know



50. Where do the forest industries seem [53. to be mainly located? The west coast of Vancouver Island A. on the Peace River has great forests. What is the reason for this? B. on Vancouver Island (southern part) A. the western slopes of the mountains receive heavy rainfall near area l с. B. the Pacific Ocean gives a D. on the Fraser River (where the temperate climate river changes direction in its flow from north to south) C. the winds blow from west to east E. don't know D. the Coast Ranges are very high E. don't know 51. What would be the chief occupation in the Peace River District? 54. A. fishing The map showing part of British Columbia has boundaries with B. fruit growing Alberta and Washington marked in. What boundary is not marked in on C. dairy cattle raising this map? The one with ..... D. grain growing Saskatchewan ·A· B. Alaska E. don't know C. California D. the North West Territories E. don't know 52. 55. What would the symbol (X) represent on the map? The area marked <u>1</u> is similar to the Niagara Fruit Belt in some A. forestry tower ways. This area is called the B. salmon processing plant • • • • • • • • • • • • A. Okanagan Valley C. grain elevators D. mining B. Peace River District E. don't know C. Clay Belt . -D. Rocky Mountain Trench E. don't know

e i i i i i i i i i i i i i i i i i i i	ALLES CEAN CEAN C CEAN C CITY	
<pre>Use the map 56. If you were to fly directly from Quebec City to Halifax, and then from Halifax to Charlottetown, you would fly approximately A. east B. southeast then east C. southeast then north D. east then north E. don't know</pre>	<ul> <li>to answer questions 56 - 59.</li> <li>58. Which of the following statements would not be true of the dotted outlined areas on the map?</li> <li>A. the land dips gently beneath the sea, so that for some miles out from shore the water is shallow</li> <li>B. the Labrador Current brings cold water into these areas</li> <li>C. cod, haddock, halibut and herring are found here in large numbers</li> <li>D. fishing is safe here because there rarely is any fog</li> <li>E. don't know</li> </ul>	· · · · · · · · · · · · · · · · · · ·
<ul> <li>57. If you were to visit any of the 8 areas marked 4 2, what would be the chief industry you would find?</li> <li>A. pulp and paper</li> <li>B. farming</li> <li>C. oyster gathering</li> <li>D. mining</li> <li>E. don't know</li> </ul>	If you were to visit Area 1 on 59. the map, what would be the chief industry you would find? A. fishing B. apple growing C. lumbering D. ship building E. don't know	

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JAMA	ICA CONTRACT	$\sim$ $\bigcirc$
•	Card Ava	
	WHITE LIMESTONE	и
Ö	BAUXITE DEPOSITE	
Ð	CITY	+
	RAILWAY	
•••••••••	overhead tramway	•

## Use the above map to answer questions 60 - 62

		Use the above map to a	inswer questions 60 - 62	
	60.	How is bauxite transported to port 1?	Where might bauxite be processed 62. into alumina?	
		A. by ship	A. 2	
		B. by railroad	B. 3	÷.,
		C. by truck	C. 4	
		D. by overhead tramway	D. 1	
		E. don't know	E. don't know	
	61.	Where is the bauxite mainly located?		· · ·
		A. on the east coast		
		B. near city 4		
۲		C. where there is White Lime- stone rock		
		D. on the western tip of the island		
		E. don't know	· · · · · · · · · · · · · · · · · · ·	



63. Su ra wh be	gar production requires plenty of infall and warm temperatures. On at coast of Australia would sugar grown?	67.
A. ' B.	west south-east	Look at the maps of Australia closely. A'crescent-shaped area can be seen in south-eastern Australia. How could this area be described?
с. D. Е.	north-east south don't know	A. a wheat and sheep belt B. an area of heavy rainfall (over 60" a year)
54 • في الم ب Au ده	arge areas of south-central Istralia come very close to being Alled	C. an area of Artesian basins D. an area of flat deserts E. don't know
B. C. D.	desert tundra steppe	68. What factor enables cattle raising to be extended in "dry" areas?
E. 65 ، <sub>Wha</sub> sui	t amount of rainfall seems best ted for sheep raising?	B. flat plains C. few people
A. B.	10-20 inches 20-40 inches	D. wheat growing E. don't know
С. D. Е.	40-80 inches over 80 inches don't know	69. Tasmania differs from Australia
56. Not pop the A.	tice where most of Australia's oulation is located. Which of a following helps to explain this? there is insufficient rainfall in the central area for people	<ul> <li>A. the area has plenty of rainfall and hydro-electric power has been developed</li> <li>B. the land is arid and flat</li> <li>C. the land is warmer than Austmalia</li> </ul>
В.	to live comfortably sheep and cattle need water and pasture, which are determined by rainfall	D. most of the rain falls on the east coast E. don't know
C. D. E.	the country does not have enough people to necessitate living in dry areas all of the above help to ex- plain why people live where they do don't know	



Use the graphs to answer questions 70 - 76.

-70. None of these graphs represent 72. Which city has the most variation an African city. Which one of in monthly <u>rainfall</u> throughout these graphs would most closely the year? represent the climate of a city on the Congo River? Α. 2 Α. 2 Β. 3 в. 3 с. ш с. ш D: 6 D. 6 Ε. don't know Ε. don't know 71. The average monthly temperature In which city would you require the at City 3 is approximately . . greatest amount of variation in clothing Ϋ́F. 73. for a year? 550 Α. З Α. 32<sup>0</sup> в. Β. 4 70<sup>0</sup> с. Ċ. 5 80<sup>0</sup> D. Ð. 6 don't know Ε. don't know E. 

74. Which cities are located in the "equatorial" region?

A. 2 & 3
B. 5 & 6
C. 2 & 5
D. 3 & 6
E. don't know

75.

----

Which city has the <u>least</u> variation in monthly <u>temperature</u> throughout the year? A. 2

B. 3

C. 4

D. 6

E. don't know

76.

Which two cities would have trouble with frost on their crops?

A. 1 & 4 B. 1 & 6 C. 3 & 5 D. 5 & 6

E. don't know



What type of vegetation would you expect to find in the area marked 1?

- A. hot, wet forests
- B. sandy deserts
- C. flat prairies
- D. dry grasslands
- E. don't know

80.

:. There are few people in the Amazon Basin because . . .

- A. the climate is bad and people tire easily
  - B. there is not enough water for crops
  - C. the land is too rocky to grow anything
  - D. there is no way to transport goods in and out
  - E. don't know

79.