

THE LIVING CENSUS

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What is a Census? What purpose does a Census serve? How should a Census be conducted? What conclusions can be drawn from a Census? What consequences does a Census have for me? These are some of the questions that we intend to address in the Project entitled, The Living Census. This project will consist of the following four distinct phases: Discovering Portugal, Getting to Know the Community in which We Live, Dealing with the Data and finally, Taking Command. Each one of the phases of the project will consist of a series of activities where concepts in the area of mathematics, geography, and graphic arts, among others, will be introduced. These activities will then be put together in the form of a Guidebook of Practical Activities for The Living Census, to be distributed to all secondary schools in the country. Presenting The Living Census in the secondary career of these students will bring more awareness of the topic to the students and will encourage them to participate in civic activities, such as a census or an election.

INTRODUCTION

The Living Census is a project directed toward all high school students and will initially consist of the following four distinct phases: *Discovering Portugal, Getting to Know the Community in which We Live, Dealing with the Data* and finally, *Taking Command*. In the following sections, we will describe the dimension and content of each phase, but first let us present the overall description and fundamental aims of *The Living Census*. Each one of the phases of the project will consist of a series of activities where concepts in the area of mathematics, geography, and graphic arts, among others, will be introduced. These activities will take place at those participating high schools which have taken up the challenge, at the invitation of the Universidade do Minho in Guimarães, Portugal, with the subsequent short term goal of extending the project onto the national and international level. Similar to other projects, such as *Census 2000* or *Census At School*, the project will feature an Internet page (in Portuguese and English) where the resulting studies can be put online to encourage direct dialogue with the participants in the various schools. These discussions will provide the main theme for various meetings to be hosted by the Department of Mathematics for Science and Technology (DMCT) of the Universidade do Minho. With this project, we hope to expand and reinforce the need and the use of Applied Mathematics not only in Portugal and in Portuguese-speaking countries, but also among other countries where similar studies are carried out. The activities planned for 2006-2007 will then be put together in the form of the "Guidebook of Practical Activities for The Living Census," to be distributed to high school mathematics instructors (and their departments) throughout the country. Presenting *The Living Census* at this point in the high school career of these students will bring more awareness of the topic to the students and will encourage them to participate in civic activities, such as a census or an election. It is worth noting that these students will be of voting age in three years and by participating at an early age in such projects, we hope to promote a higher level of participation on a national level in such civic duties.

STEP BY STEP THROUGH THE PHASES

Throughout the implementation of *The Living Census*, we will teach the students the different techniques and methodologies necessary for the conclusion of the project. We will take into consideration the objectives of our National Curriculum for Mathematics in the hope that in the future *The Living Census* will be adopted in all classes nationwide. We do not wish to limit ourselves to merely addressing theoretical concepts; we believe that the application of these theoretical concepts in *The Living Census* will give students greater awareness of the importance of knowing more about the population in which we live and what the real consequences of a *Census* are for their families, their community and their country in every day life.

Let us move on to the detailed description of the four different phases of *The Living Census: Discovering Portugal, Getting to Know the Community in which We Live, Dealing with the Data and Taking Command*.

In the first phase, *Discovering Portugal*, we wish to strengthen the students' knowledge of the different regions of Portugal and teach them how to use the map of Portugal to represent the different characteristics of the population. In this phase, the students will learn graphical procedures to represent real data where, using different colors, textures or areas, they will represent the various characteristics of the population on the map of Portugal. At the end of the phase, the students will present the different maps of Portugal that they have drawn and will discuss the ramifications and conclusions that can be drawn for the Portuguese population. Below we present a table summarizing the core features of this phase:

<i>Discovering Portugal</i>	
<i>Objectives:</i>	Students will learn how to read, use and construct a map of Portugal in such a way that they can compare the various characteristics of the population.
<i>Curricular Areas:</i>	Geography, Mathematics and Graphic Arts
<i>Primary Skills Focus:</i>	The creation, reading and use of thematic maps
<i>Additional Skills Focus:</i>	Deepening the knowledge of population features of the various regions of the country; Ability to work in groups

Getting to Know the Community in Which We Live presents a discussion phase in which various municipal and/or national figures are invited to meet the students so that they can recognize the importance of a Census and see its relevance in the formation of laws and in the making of decisions that affect Portuguese citizens on both the local and national level. For example, it is easy to see how a community of elderly residents would have needs quite different from those of a community with a high population of school-age children. Thus, the students will gain a greater appreciation of the concerns and needs of the various regions of Portugal and will obtain a better holistic view of their own country. At the end of the phase, the students will write public service messages in support of the Census. Below we present a table that summarizes the core features of this phase:

<i>Getting to Know the Community in Which We Live</i>	
<i>Objectives:</i>	The students will discuss the importance of a Census with prominent local figures and will pose questions about the governance of a community or a country.
<i>Curricular Areas:</i>	Civics and Government (Social Studies), Geography and Marketing.
<i>Primary Skills Focus:</i>	Critical thinking and creativity.
<i>Additional Skills Focus:</i>	Understanding the powers and responsibilities associated with Government and the management of jobs and posts in politics; Understanding the scope of one's various civic duties.

In the third phase of the Project, *Dealing with the Data*, students will learn various probability sampling methods, namely simple random sampling, stratified and group sampling

and systematic sampling, among others. A series of activities will be done to explore the advantages and disadvantages of these methods and how to adequately apply them to the situations being studied. We will also introduce the concepts of population estimation and projection. Knowledge of the principal characteristics of the current and future population is of the utmost importance both for the public sector and industry. As examples, we cite the process that determines where new schools or hospitals are to be built as well as how certain poorer regions are earmarked to receive government subsidies. Determining the right location for the construction of warehouses to stock merchandise or deciding when to launch a new product's publicity campaign to achieve the most effective results – these are issues that require knowledge of what a given population consists of. In the table below, we present the core features of this phase:

<i>Dealing with the Data</i>	
<i>Objectives:</i>	The students will learn statistical methodologies for analysing the data.
<i>Curricular Area:</i>	Mathematics
<i>Primary Skills Focus:</i>	Understanding Probability and Statistics, Estimation and Projections
<i>Additional Skills Focus:</i>	The ability to communicate with mathematics; Knowledge of the world, the community and society as an entity in constant movement

Assuming Command is the phase where the students are now prepared to execute their own sampling studies on the population to which they belong. We will direct students to those issues of greatest concern or interest to them so that they will actively collect and analyze the data using the knowledge and skills developed in the previous three phases. Themes such as fashion, sport, music, marketing, new technologies and literature, among others, will be proposed. The results will be published online for direct discussion between the participants from various schools, thus enabling the students from the diverse regions of Portugal to better understand the differences and similarities that can be seen in the regions that make up Portugal. The *Departamento de Matemática para a Ciência e Tecnologia* (DMCT) will arrange for various meetings to be held so that students and teachers will have dialogue on the results obtained in the studies performed in the participating schools. Below is a table with a summary of the core features of this phase:

<i>Taking Command</i>	
<i>Objectives:</i>	The students will perform various sample studies, choosing themes of their own interest.
<i>Curricular Areas:</i>	Mathematics, Geography and all other areas of interest to the students
<i>Primary Skills Focus:</i>	Developing student autonomy in terms of critical thinking and creativity for a large-scale academic project
<i>Additional Skills Focus:</i>	Ability to communicate in public; Teamwork and leadership skills.

CONCLUSION

The Living Census is a project that exposes students of many different ages to the wide range of timely issues that touch on local and national themes, such as politics, social problems and contemporary culture. By involving well known figures in their community, students will be able to link the notions of local decision-making to the richness and diversity of applied mathematics. With this presentation, we hope to engage other Portuguese-speaking countries and also to be able to learn from similar, already expanded projects, such as *Census 2000* and *Census at School*. In the future, international meetings can be called so that students of various backgrounds can participate in a wider sharing of the knowledge and information within the world of mathematics.

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