

## VIDEO: The World In A Box: Geographic Information Systems

**Adapted from:** The World In A Box: Geographic Information Systems. A Public Television Documentary, Opticus Corporation: 2001.

**Grade Level:** Intermediate to Advanced

**Duration:** 60 minutes

**Setting:** classroom

**Summary:** Students watch a video about GIS, complete a worksheet, and discuss important concepts concerning GIS and its application.

**Objectives:** Students will become familiar with the role GIS plays in environmental issues and other aspects of their everyday lives.

**Vocabulary:**  
GIS (Geographic Information System)

**Materials (Included in Module):**

- The World In A Box Video
- The World In A Box Worksheet & Answer Key

**Additional Materials (NOT Included in Module):**

- TV, VCR

### **ACADEMIC STANDARDS (SCIENCE AND TECHNOLOGY):**

#### 7<sup>th</sup> Grade

- 3.1.7.B. Describe the use of models as an application of scientific or technological concepts.
- 3.7.7.A. Describe the safe and appropriate use of tools, materials, and techniques to answer questions and solve problems.

#### 10<sup>th</sup> Grade

- 3.1.10.B. Describe concepts of models as a way to predict and understand science and technology.

#### 12<sup>th</sup> Grade

- 3.2.12.B. Evaluate experimental information for appropriateness and adherence to relevant science processes.
- 3.7.12.B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.
- 3.7.12.C. Evaluate computer operations and concepts as to their effectiveness to solve specific problems.
- 3.7.12.D. Evaluate the effectiveness of computer software to solve problems.

### **ACADEMIC STANDARDS (GEOGRAPHY):**

#### 6<sup>th</sup> Grade

- 7.1.6.A. Describe geographic tools and their uses.

#### 9<sup>th</sup> Grade

- 7.1.9.A. Explain geographic tools and their uses.

#### 12<sup>th</sup> Grade

- 7.1.12.A. Analyze data and issues from a spatial perspective using the appropriate geographic tools.

### **BACKGROUND:**

**Geographic Information Systems (GIS)** provide a great advantage to many different professions throughout the world. GIS is computer software that allows multiple levels of information to be displayed at once. This information is displayed in the form of a map. By allowing multiple levels of information to be accessed, the viewer may compare different aspects of the information and thus more accurately hypothesize a solution to a problem, or come to the conclusion of what is causing a problem. GIS allows users to perform queries, which has the system compare aspects of two different types of information.

Imagine the possibilities if the US census data were to be entered into GIS (which it is, being utilized everyday for many different occupations). The census has data on how many people live in a household, their race, their ages, their occupation, what their annual income is, and so on and so forth. GIS organizes this information into a map format. The user needs only to click on a house to access all the information that the census has gathered. A new window (attribute table) will open in the program, after the location is selected, displaying all the data the census collected at that location. Now, if the user wanted to find all of citizens who are single, white males, over the age of 35, and who make less than \$20,000 a year; the user can enter this search into the query and the GIS software will highlight only the houses that meet these conditions.

This becomes valuable for many different occupations for a variety of reasons. If someone were interested in starting a business, he or she would need to know who would be interested in the services or products offered, and then use GIS to find a high density population of these types of people.

However, GIS is also very useful to Environmental Science. Forests, streams, cities, and other types of land assessment data can be entered into the computer and viewed with GIS. Different plant types, animals that live in the area, depths of water, velocity, type of sediment, location of roads and buildings; all this data can be viewed using GIS. This allows those who are in an Environmental Science profession to determine many different things, such as better land management practices, where to build certain establishments, or where not to build. GIS can also predict what changes will occur in the future if the correct data is entered and a proper model is used. This is helpful for forestry officials, for example, in determining how different populations of trees will spread throughout the years, or what areas are susceptible to forest fires.

The video, [The World In A Box: Geographic Information Systems](#), discusses the above information in a variety of settings. It gives examples of foresters managing timberlands, police officers working on crime prevention, as well as many other applications. This is a good lesson on the many varied uses of GIS.

**OVERVIEW:**

Students will watch the 1-hour video, [The World In A Box: Geographic Information Systems](#). They will complete a worksheet and discuss the fundamental aspects of GIS and its many different uses.

**Teacher Preparation:**

1. Obtain a TV and VCR for the presentation of the video.
2. Photocopy an appropriate number of VIDEO: [The World In A Box: Geographic Information Systems](#) worksheets for your students.

**Student Activity:**

1. Watch the video attentively, paying particularly close attention to information about the major uses of GIS.
2. Complete the worksheet and go over the answers with the rest of the class.

**DISCUSSION:**

- See The World In A Box: Geographic Information System worksheet.

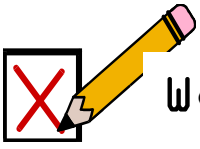
**EVALUATION:**

- Students accurately complete the worksheet.

**EXTENSIONS AND MODIFICATIONS:**

- Introduce students to GIS software by using ArcExplorer™ Java™ Edition for Education to work through tutorials found at [www.esri.com/k-12](http://www.esri.com/k-12).
- Have students discuss what might have happened in the situations described in the video if GIS were not available for use.

**NOTES (PLEASE WRITE ANY SUGGESTIONS YOU HAVE FOR TEACHERS USING THIS ACTIVITY IN THE FUTURE):**



# WORKSHEET : VIDEO: The World In A Box: Geographic Information Systems

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Name \_\_\_\_\_ Date \_\_\_\_\_

1. What does the acronym GIS stand for?  
\_\_\_\_\_
2. What are some things GIS has potential to do in our world today?  
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\_\_\_\_\_  
\_\_\_\_\_
3. What is GIS? What are special features that are unique to GIS and make it so great?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. How does GIS help to foster trust between opposing parties?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. What two relationships are incorporated in GIS?  
\_\_\_\_\_ AND \_\_\_\_\_
6. Should people trust the accuracy of what they see on a GIS?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. How can GIS help institute social programs like the crime watch prevention one in LA?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
8. How has GIS served as a tool to bring the wisdom of the past into balance with the knowledge of the present?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
9. How can GIS help to foster economic development?

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10. Does such easy access to information as allowed by GIS pose a threat to privacy?

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11. What are three occupations the video mentions that can use GIS?

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

12. Pick one occupation from question 3 and describe why GIS would be a good tool to use in this occupation?

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13. Can you think of any other occupations not listed in the video that could use GIS?

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14. Describe how one of the occupations listed above could use GIS.

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15. Think of how GIS could be used in your own community, and write it down.

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16. How might we be able to use GIS in Creek Connections?

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## ANSWER KEY : VIDEO: The World In A Box: Geographic Information Systems

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1. What does the acronym GIS stand for?  
*Geographic Information System*
2. What are some things GIS has potential to do in our world today?  
*Prevent famines*  
*Mediate conflict between development and protecting the environment*  
*Stop youth violence in cities*  
*Define election districts*  
*Speed rescue in times of disaster*  
*Plan our cities*  
*Prevent disease*  
*Protect endangered species*
3. What is GIS? What are special features that are unique to GIS and make it so great?  
*GIS is computer software that creates maps and allows for multiple layers to be shown. By allowing multiple layers of a map to be shown, more information can be provided. Also, GIS allows for queries, which cross references the entered information to find correlations between areas.*
4. How does GIS help to foster trust between opposing parties?  
*GIS presents information clearly, and everyone has equal access to the valuable information. GIS can help bring people together, working toward a common goal. GIS can be used to create a compromise, so that both parties can experience a win-win situation. GIS allows groups of individuals to interact rationally, communicate effectively, and engage in an open exchange of ideas.*
5. What two relationships are incorporated in GIS?  
*Space and Time*
6. Should people trust the accuracy of what they see on a GIS?  
*You always have to be careful, constantly questioning the information presented on a GIS. GIS can be used to misrepresent actual situations, so you must be wise about how to use the information attained from a GIS.*
7. How can GIS help institute social programs like the crime watch prevention one in LA?  
*GIS can show the effects of a particular program over a period of time. GIS makes connections that convince policy makers and community members that they should support these programs because GIS serves as proof that they are functioning as intended.*
8. How has GIS served as a tool to bring the wisdom of the past into balance with the knowledge of the present?  
*Knowledge of passed experience and culture can be mapped on a GIS, like in the case of the Alaskan Eskimos. Such cultural information can be used to locate hubs of cultural traditions and activities, which can be maintaining to secure a sense of place in present times.*

9. How can GIS help to foster economic development?  
*GIS can help new businesses by identifying the best locations for their new enterprise, and indicating which areas should be avoided by their practice.*
10. Does such easy access to information as allowed by GIS pose a threat to privacy?  
*Yes, but the information proves critical for an adequate democracy. In order to be ultimately free and fair, we must make the tradeoff between accessibility and privacy. However, GIS certainly has potential to become a Constitutional issue.*
11. What are three occupations the video mentions that can use GIS?  
a. *Forest Management / Park Service*  
b. *Law Enforcement*  
c. *Red Cross / Relief Workers*
12. Pick one occupation from question 3 and describe why GIS would be a good tool to use in this occupation?  
a. *Can assess land usage, see where different types of plants are growing, compare vegetation populations with animal populations, and project what areas will look like in the future if current land use practices remain.*  
b. *Can cross reference different factors such as single parent households, low income housing, number of teens who live in an area, and crime reported in an area. With this information they can determine the places that are most likely to have a higher crime rate, and thus send more patrols there, to help protect the neighborhood.*  
c. *The Red Cross and other Relief Workers can use GIS to compile different amounts of data such as population, income, disease, and weather patterns, to predict where there might be an outbreak of a disease or where a drought might occur so they can deliver aid before the problem advances to critical proportions.*
13. Can you think of any other occupations not listed in the video that could use GIS?
14. Describe how one of the occupations listed above could use GIS.
15. Think of how GIS could be used in your own community, and write it down.  
*Building Management, Sewer Management, First Response Crews, Park Planning, Entertainment Planning, etc.*
16. How might we be able to use GIS in Creek Connections?  
*Monitoring pollution levels in water. Determine where the pollutants are coming from. Track the health of people, animals and plants to determine the effect of the water pollutants on life in the area, etc. Also could identify stream stretches that are unique or have excellent water quality and should be protected.*