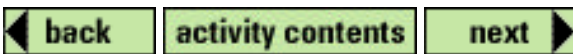


ACTIVITY CONTENTS:

Investigating Populations

- [Introduction](#)
- [Thinking About the Question](#)
- [Materials](#)
- [Safety](#)
- [Investigation I: Visualizing world data](#)
- [Investigation II: Taking a closer look at world data](#)
- [Investigation III: Predicting future world population](#)
- [Technical Hints](#)
- [Analysis](#)
- [Further Investigation](#)





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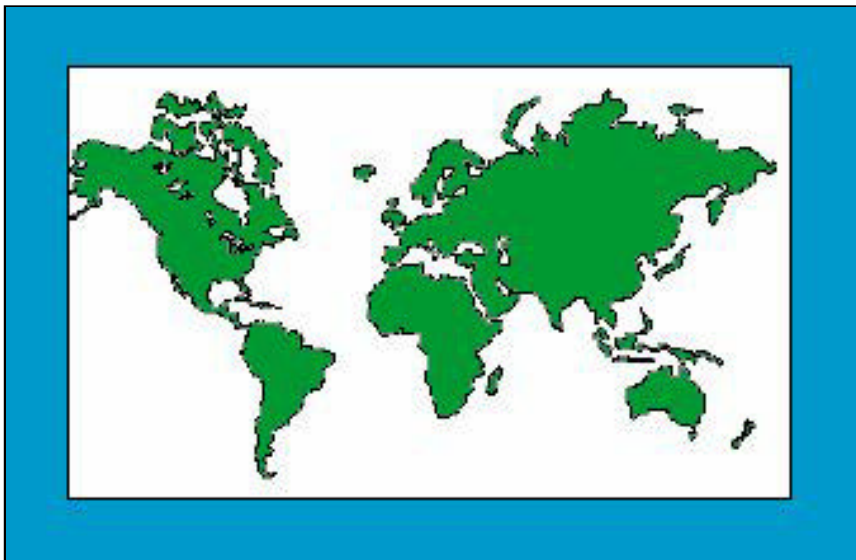
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Investigating Populations Introduction

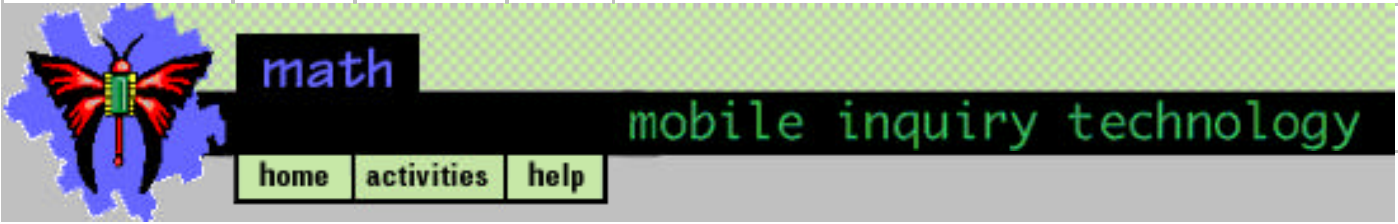
Discovery Question:

What will be the world population in the year 2100?



This activity will allow you to compare existing populations in different areas of the world and trends in the future world population growth.

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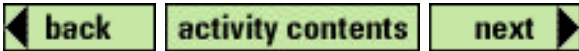


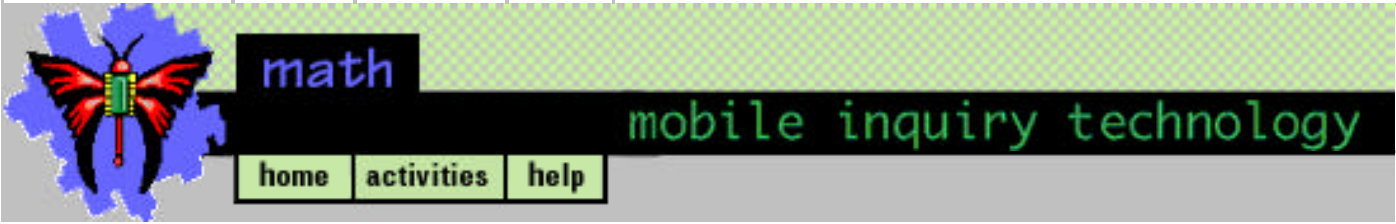
Thinking About the Question

What will be the world population in the year 2100?

Where is the largest number of people in the world today? What will the population of North and Central America be in fifty years? The answers to these and many other questions are based on models. These models change over time and the amount they change depends on their current values. Models apply to many situations, from the motion of a child's swing, to the progress of a chemical reaction, to the population of the world.

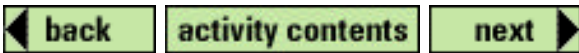
Look at a map of the world. On which area of the world do you think the majority of people lived? Do you think that the majority of people will be in the same in each area in 2100? Discuss your thoughts with your partners.

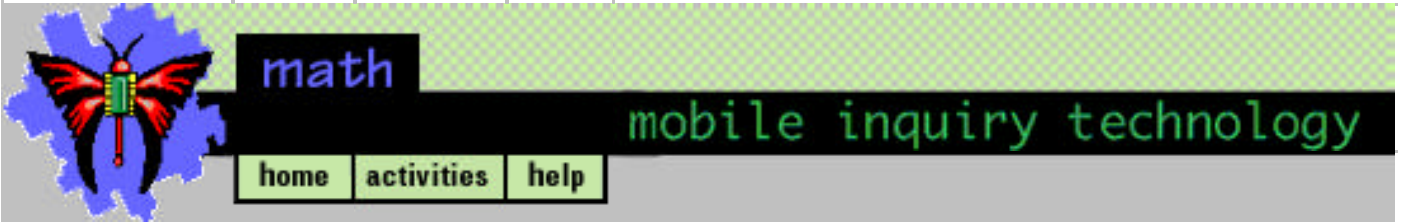




Investigating Populations Materials

- world map
- ClarisWorks paint document (worldmap2doc)
- ClarisWorks spreadsheet document (pop1ss)





Investigating Populations Safety

No specific safety instructions are needed for this activity.





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Investigating Populations Investigation I

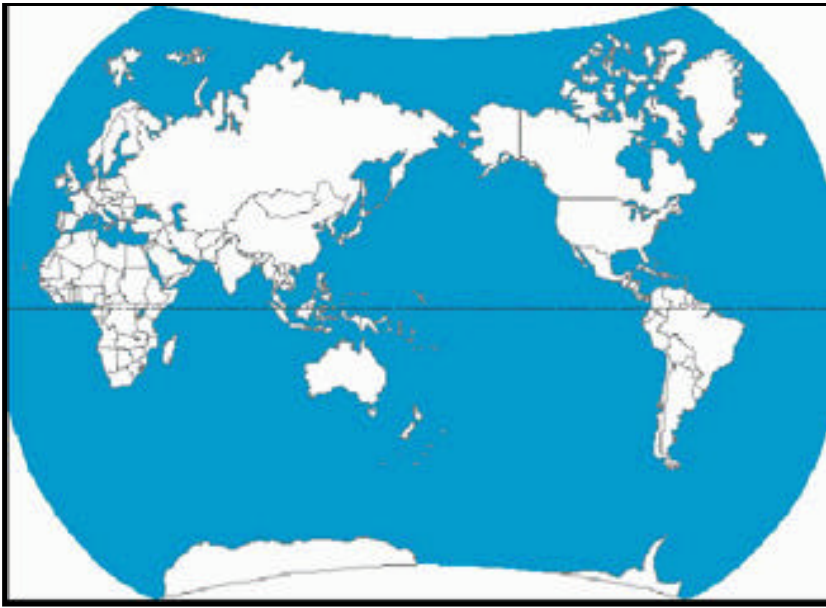
Visualizing world data :

1. Observe the data in the table. What do the numbers tell you? Which area has the greatest number of people? Do the numbers by themselves tell the whole story? Sometimes it is better to view data in another form as the world map shown below.

Region	1995 Population in millions	Life Expectancy	Fertility Rate
Africa	744	53.0	6.0
North and Central America	419	72.8	2.8
South America	320	67.4	2.9
Asia	3,408	64.8	3.2
Europe	516	75.2	1.7
Formerly USSR	289	70.4	2.3
Oceania	29	72.6	2.5

Life expectancy is the number of years that a person on the average lives.
Fertility rate is the number of children born to a woman during her lifetime.

2. Open "worldmap2doc" within the paint program. Refer to [Technical Hints](#) to see how to use the paint program.



3. Choose and design your own color scale for population size. For example, suppose blue represents the largest population area and yellow represents the smallest area. Record your color scale on paper. Color the areas mentioned in the table according to your scale on the world map.
4. Go to Question 1 and 2 in "Analysis".

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Investigating Populations Investigation II

Taking a closer look at world data

1. Prepare a spreadsheet that lists the data shown in the first two columns of the data table. Refer to [Technical Hints](#) to see how to make a spreadsheet.

Region	1995 Population in millions	Life Expectancy	Fertility Rate
Africa	744	53.0	6.0
North and Central America	419	72.8	2.8
South America	320	67.4	2.9
Asia	3,408	64.8	3.2
Europe	516	75.2	1.7
Formerly USSR	289	70.4	2.3
Oceania	29	72.6	2.5

2. On your spreadsheet, determine the total population in 1995. Refer to [Technical Hints](#) to see how find a sum on a spreadsheet.
3. Find the percentage of population for each area by dividing the individual population of each area by the total population and formatting for percent. Refer to [Technical Hints](#) to see how calculate a percent.
4. Go to Question 3 and 4 in "Analysis".



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Investigating Populations Investigation III

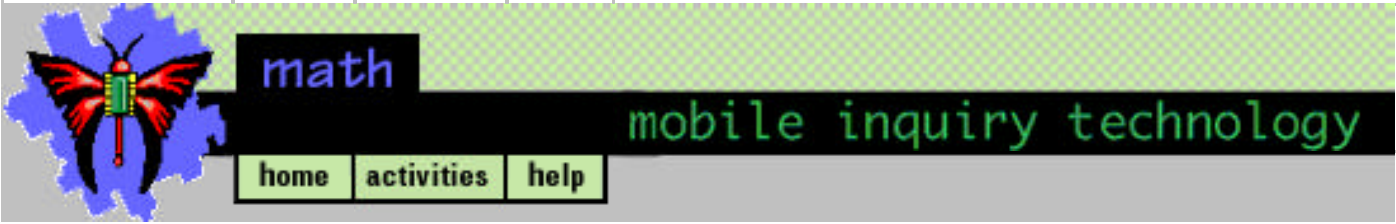
Predicting future world population

1. How many people will be on the Earth when your grandchildren are adults? Will there be enough food? How much will the world population increase by the end of the next century?
2. Here is what we know: the 1995 world population was about 5,770 million, the average life expectancy was 65.5 years, and on average, each woman gave birth to 3.3 children (the fertility rate). This information can be used to make a model to show the population of the world in the coming years.
3. Open the spreadsheet document titled "pop1 SS". View the graph of the population growth over the next 100 years. Discuss what you see with your partners.
4. Go to Question 5, 6, and 7 in "Analysis".

◀ back

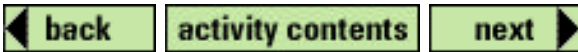
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Investigating Populations Technical Hints

- Using the paint program
- Making a spreadsheet
- Finding a sum on a spreadsheet
- Calculating a percent
- Creating a pie graph displaying percentages
- Writing text in a paint program

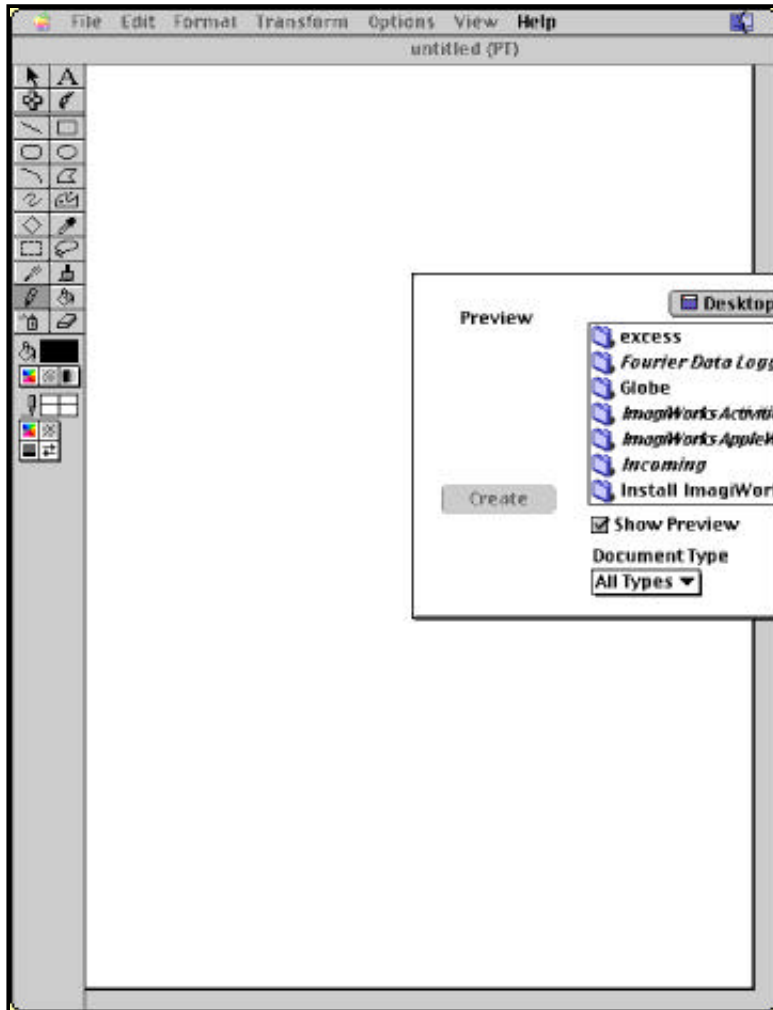




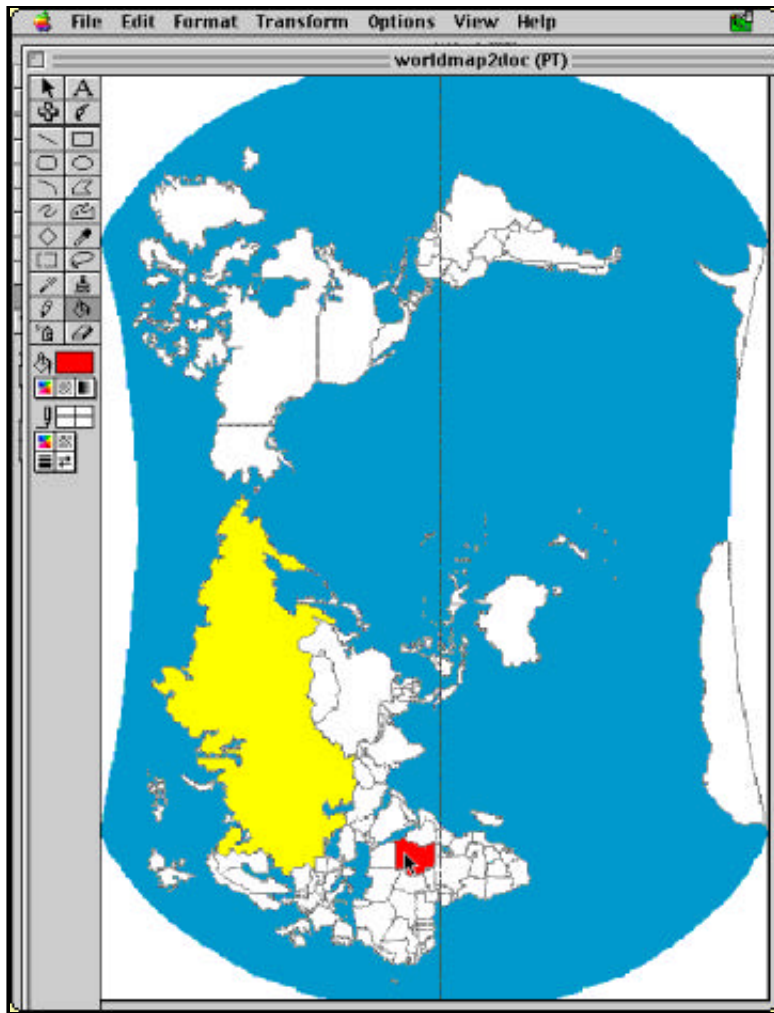
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Investigating Populations Technical Hints

To use the paint program:

1. Double click on the ClarisWorks icon on the desktop.
2. Select Painting from the opening selection. From the File menu, select and open the "worldmap2doc" document.



3. Select the Paint Bucket tool from the Tool bar.
4. Select the color of your choice from the palette. Use the Paint Bucket to fill the area of your choice. If the area includes several borders for the countries, each country will need to be filled individually.



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Investigating Populations Technical Hints

To make a spreadsheet:

Open a New document in ClarisWorks from the File menu. Select Spreadsheet from the options.

Starting in Cell A2, type the areas of the world listed on the chart. Title Column B as 1995 Pop in millions in Cell B1. Place the number of people next to the appropriate area of the world.

	A	B	C	D	E	F	G
1		1995 Pop in millions					
2	Africa						
3	North and Central America						
4	South America						
5	Asia						
6	Europe						
7	Former USSR						
8	Oceania						
9							
10							
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To find a sum on a spreadsheet:

1. Select the cell location for your sum by clicking on the cell.
2. Choose Paste Function from the Edit menu and select Sum from the Paste Function dialog box.
3. Highlight and delete the letters inside of the parentheses in the Title Bar.
4. Click and drag over the populations of the areas (B2 through B8). Click on the check mark in the Title Bar.

The screenshot shows a spreadsheet application window with the following menu bar: File, Edit, Format, Calculate, Options, View, Help. The 'Edit' menu is open, showing options: Undo Clear (⌘Z), Cut (⌘X), Copy (⌘C), Paste (⌘V), Clear, Select All (⌘A), Copy Format (⇧⌘C), Paste Format (⇧⌘V), Paste Special..., Paste Function..., Writing Tools, Find/Change, Publishing, Preferences..., and Show Clipboard. The spreadsheet has a title bar that reads 'Population spreadsheet sum (SS)'. The data is organized as follows:

		C	D	E	F	G
	B9					
1		billions				
2	Africa	744				
3	North and	419				
4	South Am	320				
5	Asia	3408				
6	Europe	516				
7	Former L	289				
8	Oceania	29				
9						
10						
11						
12						
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Investigating Populations Technical Hints

To calculate a percent:

1. Title Column C as % Population. Click on Cell C2 and type the following formula in the Title Bar: $=B2/5725$
This formula determines the part of the total population that is found in Africa. Click on the check mark.
2. Double click on Cell C2. A Format, Date, and Time dialog box will open. Select percent and click OK.
3. Click again on Cell C2 and drag to Cell C8. From the Calculate menu, select Fill Down.

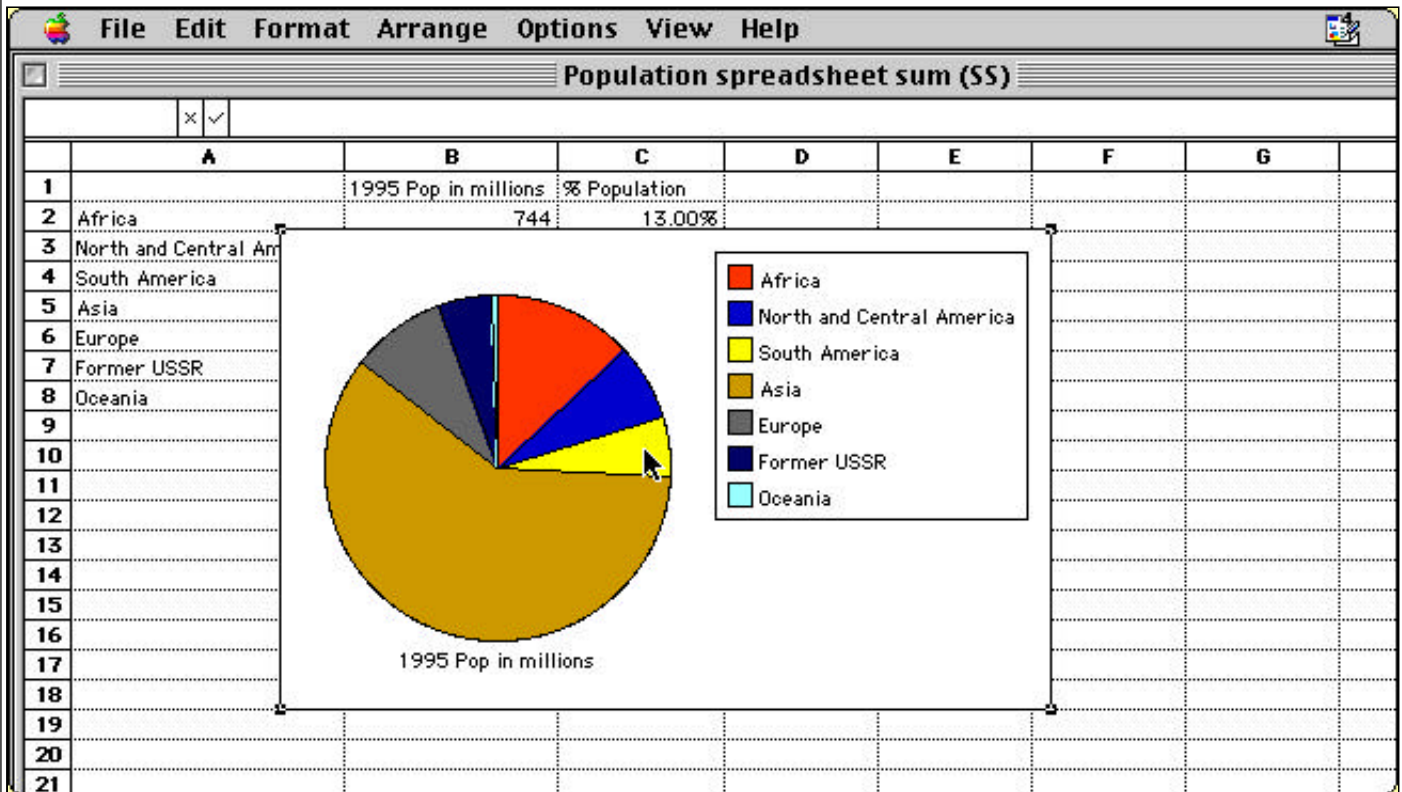
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Investigating Populations Technical Hints

To creating a pie graph displaying percentages:

1. Click on the original data in the first two columns. Do not include the total population.
2. Select Make Chart from the Options menu. Choose Pie and click OK.
3. Double click on the graph and select the Series option. Click on the box next to Label data. You can change where the percentage appears by selecting any option (e.g. % in slice, % in legend, etc.).



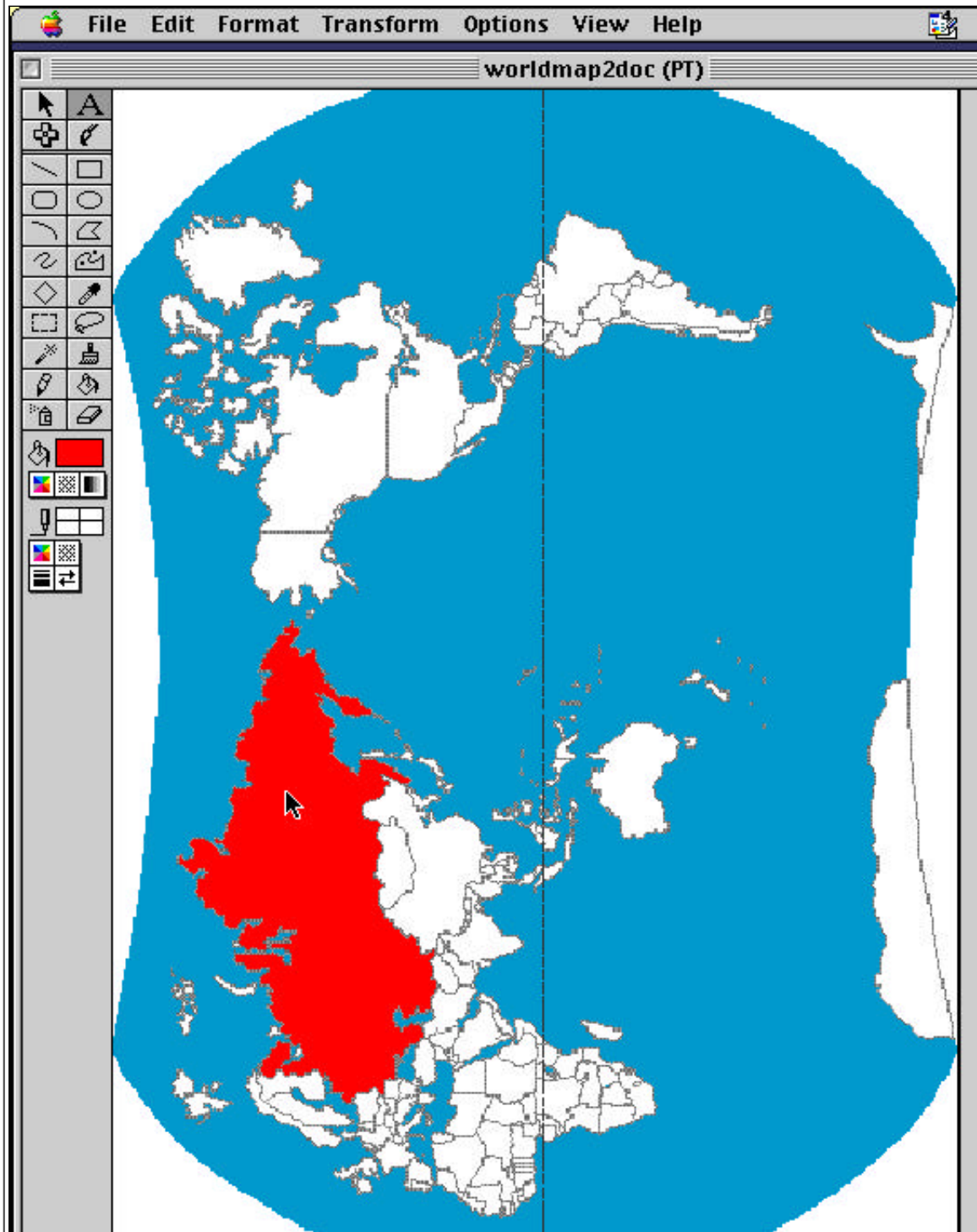
4. Click on the graph and move it to any location. You can increase the size of the graph by clicking on a corner and dragging to the new size.


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To write text in a paint program:

1. On your final colored map (this one only has one area colored), select the Text (A) tool from the Tool Bar.
2. Click on the area that you would like to label. Type the percentage found from your spreadsheet.

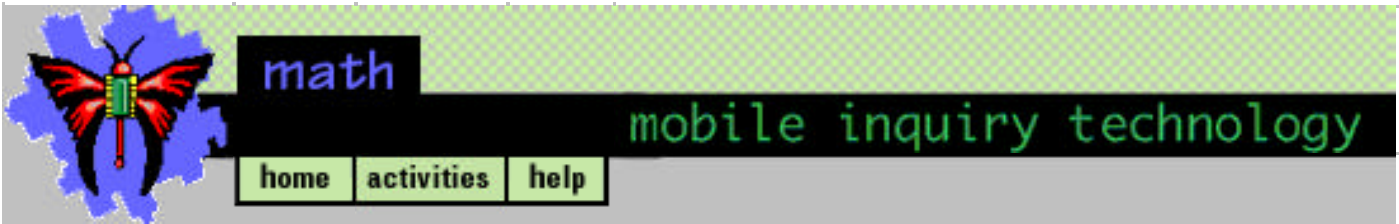




3. Click on the areas and label with the appropriate percentage.

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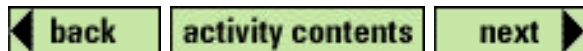
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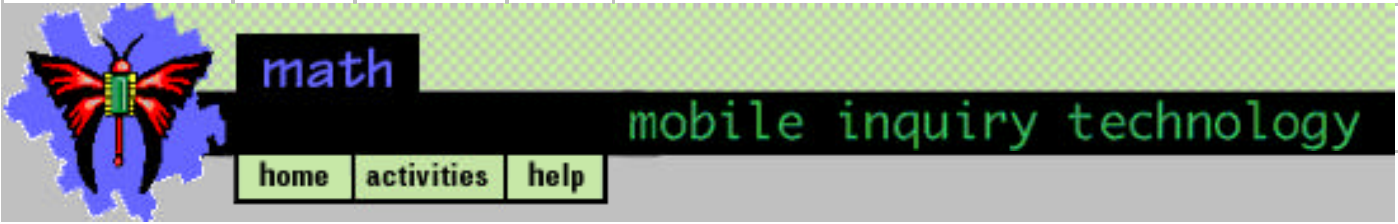


Investigating Populations Analysis

Use your map (and pie chart) to complete the following questions on paper:

1. What does this visualization of coloring the world map add to your overall picture of world population?
2. Write a description of area size versus population level of the world on paper.
3. Create a pie graph of the world populations. Refer to [Technical Hints](#) to see how create a pie graph with percentages.
4. Write the percentage of population directly on your map for each area on your colored map in "Investigation I". Refer to [Technical Hints](#) to see how write text in a paint program. Review your description of area size versus population from "Investigation I". How has the pie graph altered your interpretation of the data?
5. Is the world population increasing at the same rate each year? Explain your reasoning.
6. This model is based on population growth in 1995 and the average life expectancy and fertility rate at that time. What factors could change to alter the world population picture?
7. Is there a limit to population that an area can support? Explain your reasoning.





Investigating Populations Further Investigation

The population projections you have made so far may be unrealistic because the Earth cannot possibly support the populations you predicted for the year 2100. What will happen? Either there will be mass starvation (a pessimistic scenario) or we have to make fewer children (an optimistic scenario). Explore these two alternatives by making a spreadsheet model that has fertility rates and life expectancy values that can be influenced by the population.

