

Teenagers With Global Control

a dynamic population and resource study
used with *Fahrenheit 451*

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Tolerating Teenagers with Global Control

Using *The Rulers II* model to understand differing views

Variations This model hails from *The Rulers* packet already available from the Creative Learning Exchange, except that this version has a few changes in the model and presentation. The model required an adjustment as one team after another ran into damning snafus; more on this later. The presentation of the model and the students' responses were much improved this year as I learned from a few missteps.

Good Intentions We finished reading Ray Bradbury's *Fahrenheit 451*, a science fiction-utopian nightmare of Guy Montag's life as a fireman. As you recall, Guy *starts* fires; that is, he burns books. All information is controlled. This book fuels deep and troubling discussions among teenagers, none so unsettling as censorship—the control of information. This model puts students in the position of *needing* the control they inherently despise.

They inherit a nation out of control with respect to its population and resources. Each team has a cyber-century to salvage its country. When they realize what they have to do to accomplish this, full disclosure presents a problem—people won't like it!

And this step moves us into the realm of language and politics and ethics. Teenagers are impressionable, and so the study of rhetoric and the means of manipulation constitute a rich ground for intellectual growth.

Further, as a Catholic school, we can explore ethical matters more personally with respect to the Gospels and Church doctrine.

And the road to hell Seems there was a flaw in the original model. With the population, birth rate, and resources numbers in place, the model works just fine, thank you. However, I asked students to adjust these numbers based on real countries, and most teams found themselves in an abyss—graphs didn't work, machines froze up—and I found myself, literally, with 20-plus students in chaos.

"Mr. Joy? Mr. Joy? What happened? Ours won't work?"

I sat in my swivel chair in the midst of the lab and put my head down. It was Wednesday, the third day of the excursion, just two days before Christmas break.

Redemption I stayed after school that day making adjustments in the model, trying out different numbers. It seemed to work.

Additionally, someone wanted to start a recycling program for some portion of resources and asked how that might be done. We worked out a logical flow and connection. Students immediately perceived that this strand resembled the population strand. Bingo!

One group even added an "innovation" flow, figuring that humanity every other generation or so conjures a way to extract more energy or use other resources. Still another group, with few scruples, went to war and collected spoils. When asked about their responsibility to the vanquished country, they realized there might be problems but that's why they had a big army. Immoral, but effective. They *were* teenagers, after all.

Bliss Papers came in on Friday, along with amended models. Each team submitted a packet that included their original graph, the amended model, and the final graph. Also, they included policy changes and likely citizen responses. Some teams mandated strict recycling; others—as I mentioned—simply were marauders; others relied on new technology.

Two students in one team acted out their conclusions—one as a journalist, the other as the executive of company that uses a resource. Each gave a speech and then took questions from the class referring to their findings in the model.

It was the day before Christmas break.

Curriculum Guide for *The Rulers II*

Students can see the big picture after ruling a country for a century

Starting with a population study and leading to universal knowledge

Well, maybe it's not that grand, but at least you're reading this. Actually, *The Rulers* begins with a basic population model, and so it works well for inexperienced STELLA users. This includes teachers as well. The entire *Rulers* packet might be worth looking at since the model expands through three permutations and so do the curricular possibilities.

The Cairo Conference on Population Control was underway in Fall 1994, and I gathered news clippings. These are useful pieces to open the concept, but any printed resource on population—and they, like humans, are plentiful—would suit the purpose.

We went into this after reading and writing on *Fahrenheit 451* so students had people in mind who lived within a totalitarian society.

The first day

Step them through a basic population model. Build it icon by icon. The graphic aspect of STELLA readily appeals to them.

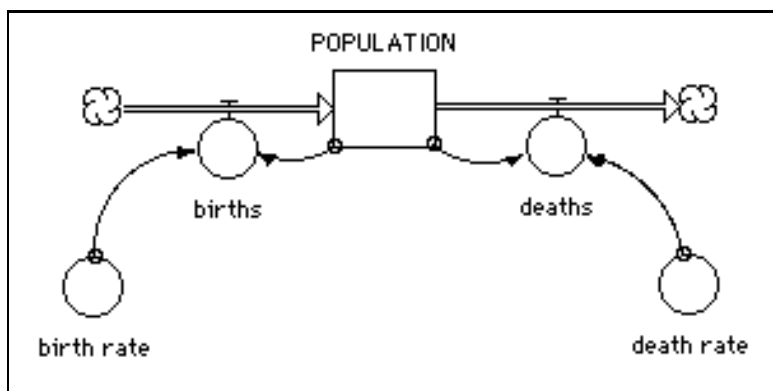


Figure 1. This model is a good starting point for discussing STELLA icons and systems tools.

Then, using the most recent information you can find, input the world population, birth and death rates, create a graph, step time specs to *within their lifetime* and run the model.

Prepare for gasps.

Students will ask you myriad questions, make requests to change factors, try other countries. Follow your instincts.

As I wanted students to work on the model by the second day, I allowed this curiosity to lead us for a time, but eventually turned to showing them the models they would work with.

The lab days

The major portion of *The Rulers* is lab time. Allow two to three days, preferably three.

Before any handouts, before any computers were turned on, I spoke about experimentation and expectation; that is, while this approach was experimental, a trial run, that they are breaking new ground, I still expected earnest effort and authentic results. Students would receive grades based on meeting the deadline with care and authority.

Students form teams of three. Handouts are distributed. We read through page one and work through the opening ideas of non-renewable resources. Discussion ensues on quality of life with each team commenting on the extent of our dependence.

By the end of the first day, students are on computers, working through some portion of the program.

Each team works at its pace. Encourage them to use each other to handle Mac related issues; some are fluent enough in STELLA to help there also. I prefer to prod, to raise questions on their thinking and problem-solving rather than get bogged down in computer minutiae. The handout ought to lead them through to the completion.

Nation cards

These are 3 x 5 cards with names of countries and their vital statistics: population, birth and death rates. They could easily be more extravagant, but maybe that's something the students could do. Give them the research assignment. Ask them to define birth rate. Differentiate birth rate from fertility rate.

NIGERIA	birth rate	death rate
	4.6	1.4
108,500,000	fertility rate	
	6.6	
[World averages: birth — 2.6; death — 0.9]		
(1990 World Fact Book)		

Be ready

At the end and beginning of each class, I seek comments on troubles and successes as well as solicit questions to get the students' pulse. This prevented a few disasters, but not all.

Doesn't matter that it's printed in the handout, they still want to know what they have to submit. I show them a sample. [There's one attached so you get an idea.]

Now and again, I use the projection panel to demonstrate options in the program if they wish to amend their model.

Bringing it home

I collected completed nation packets on the last lab day, but allowed some to hand them in the next day. Generally, students were eager to do well and needed the time to finish; they came in at lunch and after school to finish it. If it were indolence that created the need, I would not have allowed it.

Students then work on their paper. Many want more time. The results merit such a deal. They have been hypothesizing and experimenting and analyzing for three days; turning on the creative switch is not easy. They have lots to lean on, but they need seed time. Give it.

Whole class presentations are very productive, as students are intrigued by the varying degree of problems each team battled and often challenged solutions they deemed unrealistic. When students must defend their own intellectual enterprises, the discussions are profound and fierce. One day likely won't be enough.

Last thoughts

If you have time, allow three days in the lab, a few days of writing time, and then two to three days for presentations. Of all phases of this unit that need more leeway, it's the final writing and presentations.

The model has limitations. One comes to mind—no density converter. Doubtful that Costa Rica could squeeze in the population of India, you know.

With a little bit of STELLA know-how, students can adapt their model with remarkable creativity. While a working model—*operational model*, as Steve Peterson would say—has clear merit, a non-working, but complex model that depicts, or attempts to depict, myriad solutions also has value. The value of this approach is not in its finite correctness, but in its broad exploration of an idea.

Rulers II: Global Control for the Teenager

A Resource Model - Understanding Viewpoints

Why can't we just use the stuff?

In this computer model, you experience the pitfalls of depleting resources from any one of a variety of social views: a government policy maker, a president of a company, an average family member, or a journalist. Depending on who you are, you may or may not have control over what is happening.

This model of *The Rulers* contains a particularly nasty spin on the population control model. But first, you need some information.

Non-renewable resources are things like natural gas, metals(ion ore, bauxite for aluminum, etc.) fossil fuels, and potable water (what is drinkable). Other resources like trees are considered renewable and not part of this group. In the REALLY LONG view, these resources *are* renewable, but you and your ancestors will be cosmic dust by the time that occurs. Are we digging things up too fast? Will we run out of oil in forty years? Will people in sub-Saharan Africa die of dehydration? Will disease eradicate vast populations when water sources are fouled?

A few things to consider

Please write all your responses, observations, and conclusions in your writer's notebook; each of you in your team will need to record the ideas, especially if you have differing opinions.

For starters, you'll need to imagine what your world might be like with some of those non-renewable resources reduced or eliminated.

- make a quick list of 20 or so specific ways these resources, in whatever form, show up in your daily life. A useful hint: plastics are an oil product.

- draw a conclusion about how much your *quality of life* depends on these resources ,and then create a specific statement that clarifies your team's position. [*Keep this statement available as it will form part of your concluding paper.*]

Getting started with *The Rulers II*

Open the program and look carefully at the model. Note how the natural resources have been connected to the population. Recall our brief discussions of population growth: the powerful force of exponential growth, how populations are brought into control.

- Before you RUN the model, write in your notebook *what is likely going to happen*. You might even draw a crude graph to depict your vision of the future. Be sure to tell why and use the **names** of the items on the model. A well thought-out paragraph ought to do.

•Once you complete this explanation, ask the teacher for a Country Card. Then, input the population as well as birth and death rates for this country.

>Run the model

Are your grandchildren still alive? You should see some drastic problems forming in your country, problems you'll need to correct. Remember, you have only a century.

•Print the graph

•Explain what actually occurred in the space beneath your graph.
[Keep this page as it will be part of your final packet.]

Make some decisions among yourselves

In your team, you will need to make a few decisions:

•First, choose who is who: journalist, policy-maker, family member, or a company president.

•Second, discuss how the grave circumstances of depleting resources can be slowed.

In your writer's notebook:

•Make a list of the possible solutions to this dire circumstance and note your reasoning here. Remember, keep in mind the role you are as you work through this. What do you need to do to keep yourself, your family, your interests alive as long as possible? A company president may likely have a different view of things than a journalist or a family member. Stay in your role throughout this simulation, remember frustrations and successes as you work through solutions to this trouble.

What do you have to do to balance population and resources? You are allowed to change *birth rate, per person*, and--if you can think of a way-- adjust *nonrenewable resources*.

Once you have some ideas, try them out on the model. Run the model after each change.

Continue to work through possible solutions until you reach a plan that works and *can* work, in the sense that it is not so drastic as to cause revolt among the citizenry.

Making changes we can live with

Once you believe you have a way to make it work, or have just reached a point where you can go no further, do the following:

•Print the graph

•In the space beneath the graph, write out what you changed and then explain what happened.

•Also, in what way are these results different from the original graph?

**Maybe there's
something here we
haven't thought of**

By now, you realize what's going to happen to the resources—when you use them, you *will* lose them. But our civilization has survived other shortages: whale oil is a classic example.

How might your team reclaim some resources? When you have an idea, consider how you might add this to model.

And now for some writing in your writer's notebook

Recall which role you worked with through this simulation, and then write in your writer's notebook, following one of the suggestions given.

Submit your typed response in the usual format.

As a journalist

You may wish to simply report what happened in newspaper form. Interview the people in your group. Gather information from the graphs or tables and then write a feature story that combines some measure of factual reporting as well as the human stories behind the numbers.

As a family member

You may wish to write a letter to the editor, or plan a speech to be delivered at a rally, or write a diary that depicts the changes in daily life that result from the loss of a resource.

**As a company
president**

You have some serious obligations to the public good, your employees, your stock holders, and your own family. Any one of these areas is a rich source for writing. For instance, develop an advertising campaign that defines the company's need for these resources even though the city folk want to shut you down; or, tell your ten-year old daughter, who believes completely that her adulthood is threatened, that the company you run is good for her. You get the idea.

**As a government
policy maker**

You need to convince politicians and corporate executives that a new policy is needed. Or, you may wish to show that the current policy is just fine, thank you. Whatever the case, stake out a direction, use the information gleaned from the runs, and propose your policy.

**As a sophomore at La
Salle High School**

You may have better ideas. You have just run a STELLA model that shows resources influencing population. What did this tell you? What effect might this knowledge have on you now? Can you think of a situation in this country or the world where such a circumstance is actually occurring?

The Rulers II Revised

The Model

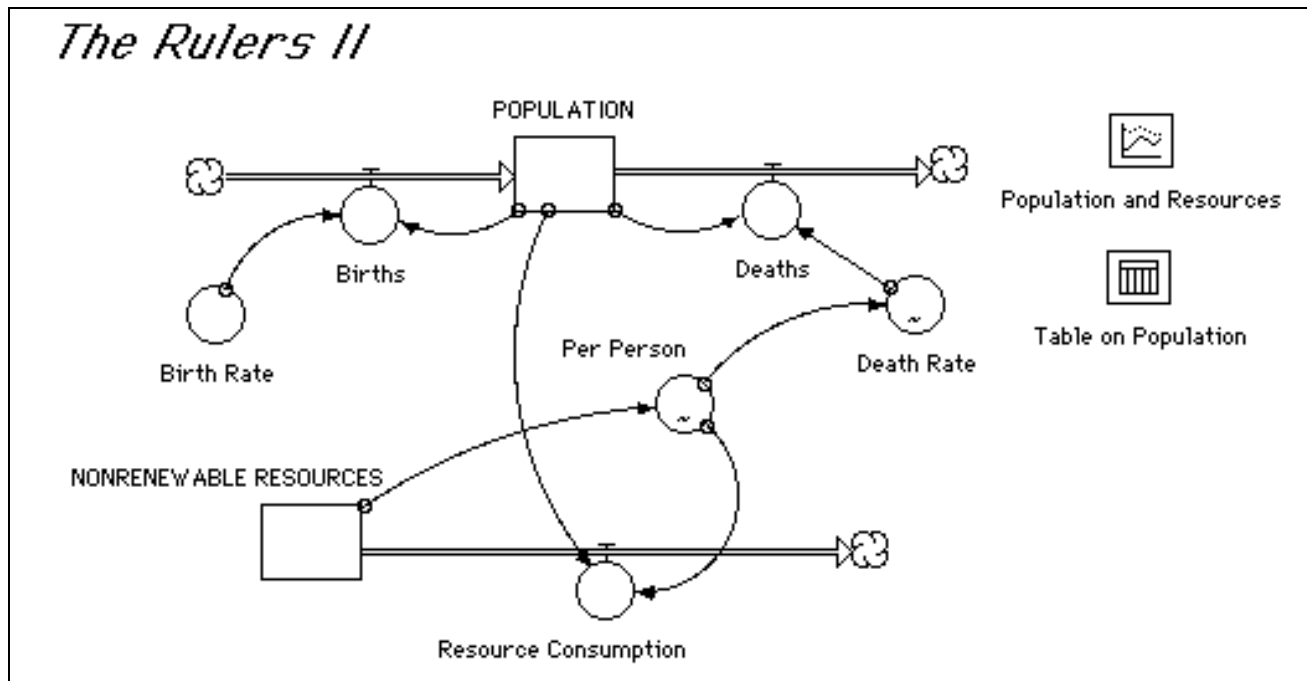


Figure 1. The Rulers II Model

The Equations

$$\square \quad \text{NONRENEWABLE_RESOURCES}(t) = \text{NONRENEWABLE_RESOURCES}(t - dt) + (- \text{Resource_Consumption}) * dt$$

$$\text{INIT NONRENEWABLE_RESOURCES} = 50000$$

OUTFLOWS:

$$\text{Resource_Consumption} = \text{Per_Person} * \text{POPULATION}$$

$$\square \quad \text{POPULATION}(t) = \text{POPULATION}(t - dt) + (\text{Births} - \text{Deaths}) * dt$$

$$\text{INIT POPULATION} = 400$$

INFLOWS:

$$\text{Births} = \text{POPULATION} * \text{Birth_Rate}$$

OUTFLOWS:

$$\text{Deaths} = \text{POPULATION} * \text{Death_Rate}$$

$$\circ \quad \text{Birth_Rate} = .026$$

$$\circ \quad \text{Death_Rate} = \text{GRAPH}(\text{Per_Person})$$

(0.00, 0.203), (0.1, 0.0998), (0.2, 0.0581), (0.3, 0.036), (0.4, 0.018), (0.5, 0.012), (0.6, 0.01), (0.7, 0.01), (0.8, 0.0095), (0.9, 0.009), (1, 0.009)

⊗ Per_Person=GRAPH(NONRENEWABLE_RESOURCES/init(NONRENEWABLE_RESOURCES))

(0.00, 0.065), (0.1, 0.075), (0.2, 0.09), (0.3, 0.095), (0.4, 0.24), (0.5, 0.535), (0.6, 0.675), (0.7, 0.77), (0.8, 0.81), (0.9, 0.845), (1, 0.985)