POWELL CENTER FOR
ECONOMIC LITERACY

Lesson Plan

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Last Modified: November 22, 2010

Making Links:
Capital is the Key to Productivity and Growth

Time Required
Two 50-minute class periods.

Grade Level and Subject

High School, Economics (Macro or A.P.)

Keystone Economic Principles™

Principle #8 – Quantity and Quality of Available Resources Impact Living Standards.

National Standards (Economics)
Standard 6 – Specialization
Standard 13 – Income
Standard 15 – Economic Growth
Standard 18 – Economic Fluctuations

Economic Concepts
Aggregate Demand – *A schedule (or graph/curve) that shows the value of output (real GDP) that would be demanded at different price levels.*
Depreciation – *A reduction in the value of capital goods over time due to their use in production.*
Economic Growth -- *An increase in real output as measured by real GDP or per capita real GDP.*
Investment -- *The purchase of capital goods (including machinery, technology or new*

buildings) that are used to produce goods and services.
Long Run Aggregate Supply (LRAS) – *A schedule (or graph/curve) that shows the value of output (real GDP) that would be produced at different price levels. In the long run, the schedule shows a constant level of real GDP at all price levels, determined by the economy's productive capacity at full employment.*
***Per capita* Real GDP –** *The inflation-adjusted value of all final goods and services produced in a country in one year, divided by population.*
Production Possibilities Curve (PPC) -- *A schedule (or graph/curve) that shows the different combinations of two goods or services that can be produced in a full-employment, full-production economy where the available supplies of resources and technology are fixed.*
Real GDP – *The inflation-adjusted value of all final goods and services produced in a country in one year.*
Rule of 72 -- *A mathematical rule for determining the number of years it will take for an investment to double in value. The number of years is determined by dividing 72 by the annual rate of return. Thus, an investment expected to earn interest at a rate of 8 percent will double an investor's funds in 72/8, or nine years. Dividing 72 by the number of years in which an investor wishes to double his or her return will yield the necessary rate.*
Standard of Living -- *The level of subsistence of a nation, social class or individual with reference to the adequacy of necessities and comforts of daily life.*

Overview

Economic growth is a difficult concept for high school students, even those studying at the college (A.P.) level. Students frequently confuse the idea of increased equilibrium GDP with economic growth, and because of this, they often mistakenly believe that increased spending or higher Aggregate Demand (AD) will cause economic growth. Students also have a difficult time distinguishing between potential output and actual output. This activity is designed to build on the graphs and models students have used during a semester-long A.P. course and give them a real-world context. The activity will give students a deeper understanding of both the causes and effects of economic growth, using PowerPoint™ notes, a brief activity comparing the 1950's U.S. standard of living to today's U.S. standard of living, a simulation involving paper links, an examination of the www.gapminder.org website, and practice problems.

Objectives

- Students manipulate the Production Possibilities Curve and Aggregate Demand/Aggregate Supply model to demonstrate growth.
- Students understand the connection between investment, capital and economic growth.
- Students distinguish between potential GDP and equilibrium GDP.
- Students gain a concrete understanding of the changes in standard of living that come from economic growth.
- Students see that growth is critical for all nations' economies.

Materials and Handouts

Teacher materials

- PowerPoint™ Notes / LCD Projector
- Making Links simulation instructions and discussion questions
- Board or Flip Chart where simulation data from each Round is recorded
- Answers to practice problems
- 1950's v. Today Chart Answer Key

Student materials

- **Handout #1**: 1950's v. Today Chart (optional)
- 6 staplers
- 6 pairs of scissors
- Paper in three colors (pink, blue, yellow) – approximately 50-75 sheets of each for a class of 25 students
- **Handout #2**: Classroom dollars ($1) – make 8 copies for a class of 25 students
- **Handout #3**: Classroom dollars ($2) – make 15 copies for a class of 25 students
- Candy or other prizes for simulation winners/participants
- **Handout #4**: Making Links Student Evaluation

Teaching Activity
Day 1

Review

1. Review definition of growth, measurement of growth, and models of growth using the PowerPoint™ document entitled *Economic Growth*. Review the textbook definition of growth (Slide 1) and the Rule of 72 (Slide 2). If needed, provide students some sample questions with the Rule of 72:

   A. **Practice Question: If the real GDP is growing at 5%, how long will it take for the economy to double?** (*Answer: About 14.4 years*)

   B. **Practice Question: If the real GDP is growing at 3%, how long will it take for the economy to double?** (*Answer: About 24 years*)

   C. **Practice Question: If the real GDP is growing at 2%, how long will it take for the economy to double?** (*Answer: About 36 years*)

2. Examine the different rates of U.S. growth (Slide 3) and calculate the time to double, using the Rule of 72.

   Discussion Question: In what decade did the U.S. experience the highest rate of economic growth? (*Answer: 1960s*) **Why might the growth rate have been so high?** (*Possible answers: the GI Bill produced a more educated workforce, increased funding of research and development, civilian applications of military technology, investment tax credits, etc.)*

3. Review the Production Possibilities Curve (PPC) and Aggregate Demand / Aggregate Supply (AD/AS) Models (Slides 4, 5, 6). This is a good time to review the axes labels (which are often an issue on the A.P. exam), the assumptions about efficiency, and the difference between short- and long-run aggregate supply (LRAS).

Application

Next, transition to a more hands-on, practical definition of economic growth. (Slide 7). If desired, distribute copies of **Handout #3:** 1950s v. Today Chart. If not, use Slides 8 and 9 to spark student discussion about the standard of living in 1950. Ask for a show of hands for each item on the chart, and record student answers, if possible as a percentage of the class. Then, ask students:

> **How did the U.S. achieve such growth?** *(Answers will vary but should include the GI bill, expansion of education, investment in highways and infrastructure.*)

Making Links: A Simulation of Growth

Materials/Supplies

- 6 staplers
- 6 pairs of scissors
- Paper in three colors (pink, blue, yellow)) – approximately 50-100 sheets of each for a class of 25 students
- **Handout #2**: Classroom dollars ($1) – make 8 copies for a class of 25 students (or a minimum of 75 $1 bills)
- **Handout #3**: Classroom dollars ($2) – make 15 copies for a class of 25 students (or a minimum of 150 $2 bills)
- Candy or other prizes for simulation (Lesson author uses Starbursts™ to reward the consumers and the 3rd-place production group. The 1st and 2nd place producers can spend their money on better prizes, like a box of Pop-Tarts™ or a bag of chips.)
- Stopwatch or wristwatch/clock with secondhand
- PowerPoint™ Slides 10, 11, 12

Time Required: 30-40 minutes

Directions are for a class of 25 students. Modify relative group sizes for smaller or larger classes. The goal is that the initial production groups are NOT able to produce enough goods for every consumer to buy food, clothing and shelter. It would be helpful to have one or two assistants to help with distributing the money and collecting materials.
Note: this simulation is simplified to focus on growth and the impact of capital on production. It does not attempt to simulate the circular flow, so producers and consumers are separate groups. This connection is addressed in the reflection questions.

Directions:

1. Select 12 students to work in production. The remaining students will be consumers. Divide the 12 production students into three (3) groups of four (4).
    a) Explain that one group will produce **food** – represented by pink paper links. One group will produce **clothing** – represented by blue paper links. One group will produce **housing** – represented by yellow paper links.
    b) Explain that each group will have one (1) stapler and one (1) pair of scissors to use to make their links. Links must be produced according to the directions – in other words, no tearing, no tape. You may want to distribute a limited amount of paper at a time, or a lot is wasted.
    c) Demonstrate how to make a link: paper should be folded in half, horizontally (so the strips are long), then in half again. Cut four strips from each sheet of paper, and staple to make a round link, about the size of a bracelet. In this activity, links should NOT be attached. Producers should create piles of as many separate links as they can in the production period. Recycle or discard any partially made links at the end of each round.
    d) Explain that you want the students to be as efficient as possible with the resources they have. They will be selling their products to consumers, and

e) Set up each group of producers in the front of the room so they can see how much the other groups (the competition) are producing.

2. Run Round I of the simulation – a practice round -- with a small prize for the most productive group. Use a stopwatch, and give producers 30 seconds to make as many links as they can.
    a) Ask producers to report how many links they made, then throw away the links and partly used paper. (*Each group should be about to produce between 5 and 10 links*.)
    b) Ask if they can think of ways to produce more links in the real round. (*They may think of ways to increase efficiency, like having more than one person fold the paper.)* If a group does not produce at least five, you should allow other students to replace them.

3. Run Round II. Use a stopwatch, and give producers 30 seconds to make as many links as they can. Gather up unfinished links to throw away. Before you open the market to consumers, ask producers to report how many links they made. **Were they as efficient as possible?** (*They should be at least as productive as in the practice round.*)

4. Give each consumer six $1 bills. Announce that you are opening the market to consumers. They will have two (2) minutes to buy links. Only students who acquire all three colors will be judged to be living 'above the poverty line.' Students with all three can exchange the three links for candy at the end of the round.
    a) Producers should try to sell all of their links. They will be able to use the money later, and they can save the dollars between rounds. Remind consumers that they need to purchase at least ONE LINK OF EACH COLOR. (*Most students will be unable to do so*.)

5. When Round II is done, take time for a brief discussion:
    a) **How many consumers got all three colors*?*** Record the number who are above poverty level, and record the nominal GDP on the board or on a piece of paper – in other words, all income to all producers (*about 2-4 consumers will get all three.)*
    b) **Why was it so hard to get them*?*** *(not enough were produced.*)
    c) **Do the consumers feel angry with the producers? Why*?*** (*There is typically some frustration because there are not enough goods. Imagine how people in Haiti felt trying to get fresh water after the 2010 earthquake.)*
    d) **How can we get the producers to make more*?*** (*Brainstorm ideas. They'll definitely suggest more time, but tell them the production period is fixed, just as GDP production period is fixed at 1 year. They may assume that higher pay would motivate the producers to make more. Ask the producers whether they could do more work for higher pay. The producers*

will probably complain that they need more staplers and scissors.)

e) If the students ask for more staplers and scissors, tell them that these goods – CAPITAL – are fixed in the short run, but that they will be able to buy more capital in the long run. A stapler will cost $15, and scissors will cost $15.

6. Be sure that all partially made links and money not spent by consumers are collected. Tell the consumers that you are going to test whether having more consumer spending increases output. In the next round, they will each get $12.

7. Run Round III. Give producers 30 seconds to make as many links as they can. Gather up unfinished links to throw away. Before you open the market, ask producers to report how many links they made.

8. Repeat instructions above (#4) but give each consumer six **$2** bills. Again, give students two (2) minutes to try to buy all three (3) colors. When time is up, record how many students are 'above poverty level' and the nominal GDP. (*Typically, the nominal GDP is much higher, but there is almost no improvement in poverty level numbers.)* Distribute candy to consumers above the poverty line, and collect unused money and all links.

   - **How many students got all three?** (*still very few*)
   - **Why didn't having more money make you more successful at buying goods*?*** *(Because everyone had more money, the producers just raised prices.*)
   - **How do the consumers feel toward the producers now?** *(The consumers will start to feel pretty frustrated with the producers, especially if they raised prices.)*
   - **Could the producers manufacture more? What would help?** (*Typically at this point, students really want more staplers or scissors. Ask them to explain why this would be helpful. How would it allow them to produce more?)*
   - ****Allow the producers to buy additional CAPITAL (staplers and/or scissors) to use in the 3rd round. Charge $15 apiece or whatever seems affordable but not too cheap, based on the income they've reported. Typically, one or two, but not all, producers will buy staplers.**

9. Run Round IV. Give producers 30 seconds to make as many links as they can. Gather up unfinished links to throw away. **Before you open the market, ask producers to report how many links they made. (***Those who bought more capital should report a dramatic improvement in output.)*

10. Repeat instructions above (#4) and again give each consumer six $2 bills. Again, give students two (2) minutes to try to buy all three (3) colors. When time is up, record how many students are 'above poverty level' and the nominal GDP.

(*Typically, almost every student is 'above poverty level' now.)* Distribute candy to consumers above the poverty line, and collect unused money and all links.

- **How many students got all three?** (*most*)
- **Why were you more successful at buying goods?** (*because producers made more*)
- **How do the consumers feel toward the producers now?** (*usually less frustrated, although prices remain high)*
- Ask the producers to sort their money in piles of six bills apiece. (This will help you be ready for the next class period.) You can auction the prizes to the producers, or have each team turn in their money and count it while they answer questions, and then distribute the prizes.

11. **Debriefing:** Ask students to write down their answers to the PowerPoint™ questions (Slide 12) before discussing. This will not only help them reflect on the simulation before discussing, but it will also help quiet everyone down. Ideally, you can discuss the answers at the end of Day 1. You may need to finish the discussion on Day 2.

    Reflection questions: (Slide 12)

    1. **Were producers able to increase output just because consumers had more money? What does this say about the impact of increased Aggregate Demand (AD) on economic growth?** (*No. Increased consumption/AD will increase prices and might cause a temporary increase in output, but it won't cause growth. This is a key point*.)
    2. **Why did consumers get angry with producers? Does that happen in the real world? Why? What can be the result?** (*Yes, people often wonder why those with businesses and money don't provide enough. In some nations, this can lead to violence and revolt. Also, producers may focus on exporting to people in foreign nations with more money*.)
    3. **What was necessary to increase output and raise more people above the poverty line? What does that mean for nations with many people in poverty?** (*More capital. Developing nations need greater investment in capital so that they can become more productive and lift people out of poverty. An example would be China, which lifted about 300 million people out of poverty in 30 years, due to rapid industrialization.)*
    4. **What would happen if the consumers who got all three links in the first round also got more money for the next round? Does that happen in the real world?** (*Yes, privilege and accomplishment are accumulative. People who thrive become better educated and pass these skills onto their children. This is a cause of income disparity. You might discuss what would have happened if consumers had started with different amounts of money.*)
    5. **In reality, consumers get their income by being producers. What happens to people's incomes as their productivity levels go up? Why?** (*There is a positive cycle. More productive workers earn more income,*

Day 2

Review

1. Begin by reviewing the reflection questions from the previous day.
    A. Why is capital essential to growth? What happens in nations that do not invest in capital, compared to those with highly developed and industrialized economies?
    B. Thoughtful students may question why there is such an emphasis on accumulation of "stuff." This is a good opportunity to transition to developing economies. In many parts of the world, the question isn't whether to buy a 1500 square foot house or a McMansion, the question is whether people can access clean water and health care – also results of growth.

2. Use PowerPoint™ Slides 13 and 14 to discuss the impact of growth in developing nations.

3. Gapminder.org (see hyperlink on Slide 14) is an excellent way to illustrate how increases in *per capita* real GDP correlate to standard of living indicators. Allow 25-30 minutes to explore and discuss this website. The website's interactive graphs plot correlations between many different indicators, depending on what you select.
    A. Start by explaining what each dot represents. Nations are color-coded by world region, and each dot's size is relative to its population.
    B. Rewind the clock to 1850 to demonstrate that every nation had a relatively low life expectancy and low level of per capita income.
    C. Ask students to hypothesize: **What will happen to nations that rapidly industrialize – like the U.S., Great Britain and Germany?** *(They will move up and to the right, while other nations remain in the lower left.*)
    D. Click the play button and watch the progress of all nations. Then use the panel on the right to select specific nations to compare.
    E. Keep *per capita* real national income on the X-axis and show the various correlations – longevity, education level, health indicators – on the Y-axis. This helps students see why increasing income is so important for people in developing nations.

4. **Discussion questions:**
    - **What is the best indicator of an improved standard of living**? *(Answers will vary – emphasize that it's not just income, but what that income helps people achieve.*)
    - **Why do some nations achieve rapid growth, while others lag behind**?

(*investment, education, productivity, political stability, economic policy)*

- **Are natural resources a good predictor of which nations will grow?** *(No, some nations with few resources achieve rapid growth, while others that are rich with resources are slow to grow.*)
- **Why do some nations experience growth, and then decline? What events cause this?** (*wars, political instability, government policies)*
- **What impact do wars seem to have on growth?** (*very negative, look at Japan and Germany at the end of WWII)*
- **What do you predict will happen in the next 10 years**? *(Answers will vary, possibility that China and India will surpass some western nations)*
- **Is economic growth ONLY about materialism and accumulating stuff?** (*No, it's about being able to achieve a reasonable standard of living for many people.*)

5. Return to the PowerPoint™ to connect the simulation and Gapminder.org back to the graphs and economic concept of growth. Review the causes of growth (Slide 15) and look at Aggregate Demand / Aggregate Supply (AD/AS) diagrams (Slides 16 and 17) to review why AD will *not* cause economic growth.

6. Then, to reinforce the simulation's emphasis on capital, use Slide 18 to look at some real-world examples of how capital has improved productivity, causing growth.

7. Finally, as a last step, review what stifles growth (Slide 19).

Application

Using Slide 20, have students graph the impact of each of these changes on Long Run Aggregate Supply (LRAS) and the Production Possibilities Curve (PPC).

Finally, have students complete Handout #4: Making Links Student Evaluation.

Handout #1

1950s v. Today Chart

Indicate on the chart below whether you or your family owns each of the following items. Guess what percentage of American households owned this item in 1950.

Goods/Services that American households have	Do you or your family have this good or service?	Percentage of households that owned one in 1950???
Car		
Dishwasher		
Phone		
Cell Phone		
Computer		
Microwave		
iPod or mp3 player		
TV		
Cable TV		

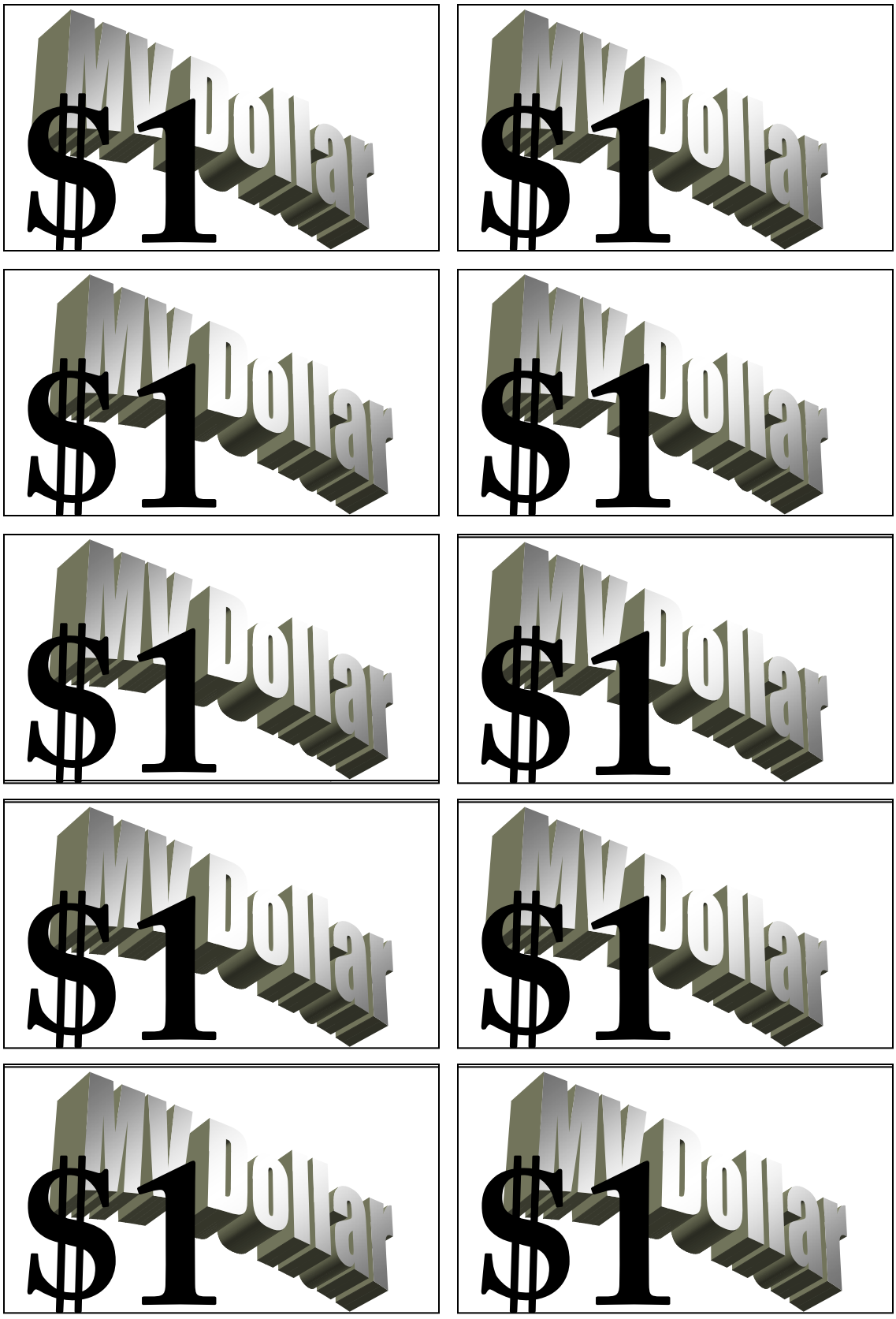
1950s v. Today Chart (Answer Key)

Indicate on the chart below whether you or your family owns each of the following items. Guess what percentage of American households owned this item in 1950.

Goods/Services that American households have	Do you or your family have this good or service?	Percentage of households that owned one in 1950???
Car		60% - 1 7% - 2 or more
Dishwasher		2%
Phone		60%
Cell Phone		0
Computer		0
Microwave		0
iPod or mp3 player		0
TV		10% 40% had never seen one
Cable TV		0

Source: Moore, Stephen, and Julian Lincoln Simon. It's Getting Better All the Time: 100 Greatest Trends of the 20th Century. Washington, D.C.: Cato Institute, 2000. Print.

Pritchett, Price. Mind Shift. Dallas: Pritchett & Associates, 1996. Print.


My Dollar
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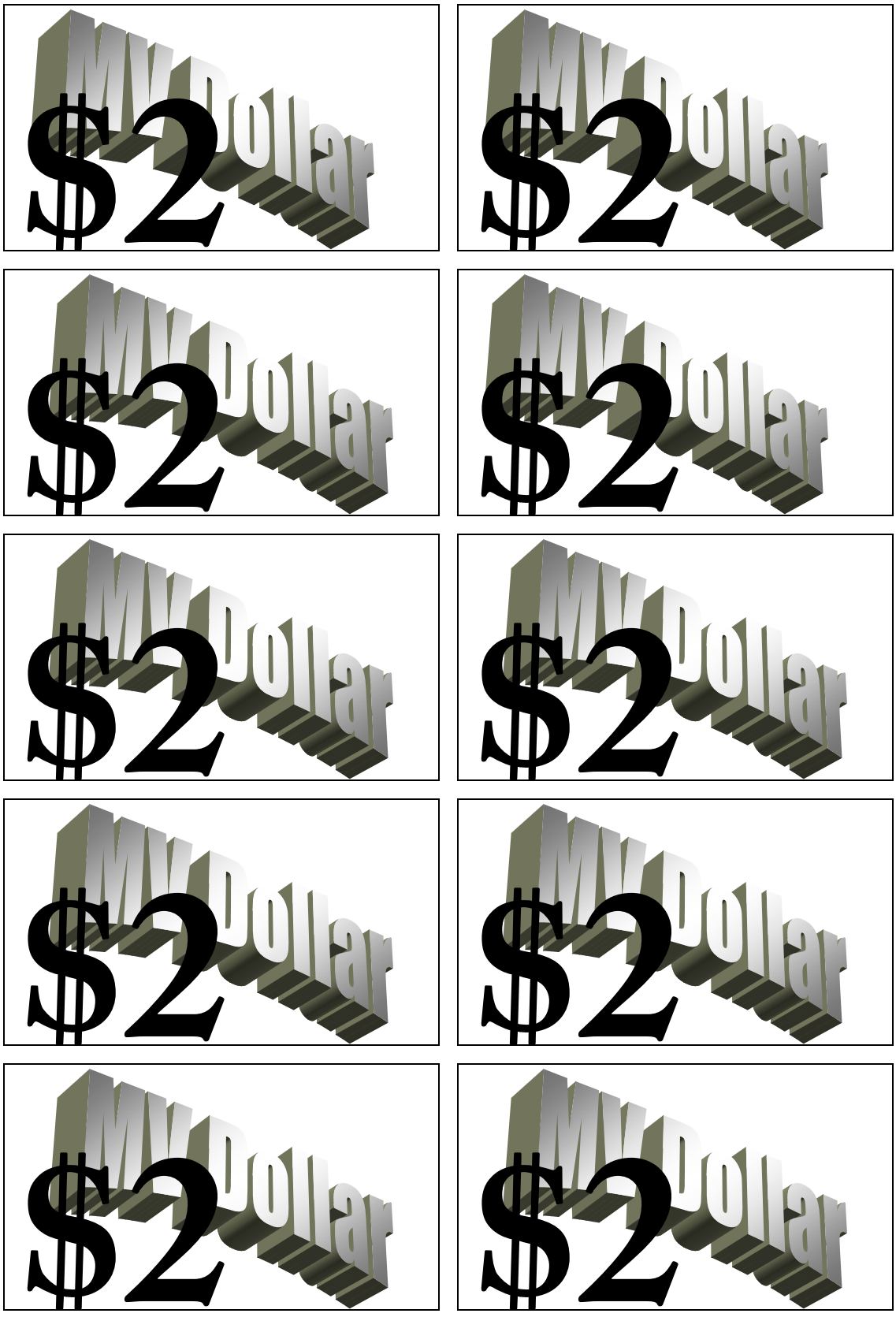
My Dollar
$2

Handout #4

Making Links: Student evaluation

Please rate your response on each of the following questions on a scale of 1 to 10, with 1 meaning strongly disagree and 10 meaning strongly agree.

	Disagree									Agree
1. Before this activity, I understood the concept of *economic growth*.	1	2	3	4	5	6	7	8	9	10
2. After this activity, I understand the concept of *economic growth*.	1	2	3	4	5	6	7	8	9	10
3. This activity helped me understand why increases in AD do not cause *economic growth*.	1	2	3	4	5	6	7	8	9	10
4. This activity helped me understand the connection between *capital* and *economic growth*.	1	2	3	4	5	6	7	8	9	10
4. The directions to this activity were clear and easy to follow.	1	2	3	4	5	6	7	8	9	10
5. The teacher asked relevant questions that helped me understand the point of the Making Links simulation.	1	2	3	4	5	6	7	8	9	10
6. The class time used on this activity was time well spent.	1	2	3	4	5	6	7	8	9	10

Additional feedback:

7. How would you recommend that this activity be improved?

8. Do you think this activity should be used in future A.P. Macro classes (before the A.P. test)?

9. Do you think this activity is appropriate for regular-level economics courses?