



## Unlocking the Mystery to Measuring GDP

### Lesson Description

Distinguishing between real and nominal gross domestic product (GDP) and being able to calculate the GDP deflator are key concepts of most macroeconomics classes, although they can sometimes pose a challenge for students who are less than proficient at math. In this lesson, students will be introduced to real and nominal GDP and the GDP deflator, learn how to calculate these indicators using simplified examples, and practice an activity using real combination locks that will open when students have correctly solved the answers. In the assessment, students will be given two problem sets to calculate nominal and real GDP and the GDP deflator, and they will use their answers to solve a “mystery” timeline of economically significant historical events.

### Standards and Benchmarks

#### Voluntary National Standards in Economics

**Standard 18: Economic Fluctuations:** Fluctuations in a nation’s overall levels of income, employment, and prices are determined by the interaction of spending and production decisions made by all households, firms, government agencies, and others in the economy. Recessions occur when overall levels of income and employment decline.

#### Benchmarks Grade 8

1. GDP is a basic measure of a nation’s economic output and income. It is the total market value, measured in dollars, of all final goods and services produced in the economy in one year.

#### Benchmarks Grade 12

1. An increase in nominal GDP might reflect increases in the production of goods and services and also increases in prices. GDP adjusted for price changes is “real GDP.” Real GDP per capita allows comparison of material living standards over time and among different countries.

### Grade Level

8–12

### Concepts

Base Year	Gross Domestic Product (GDP)	Nominal GDP
Constant Prices	GDP Deflator	Price Level
Economic Growth	Inflation	Real GDP

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## Objectives

Students will be able to

1. define real and nominal GDP and distinguish between the two
2. calculate nominal and real GDP using simple mathematical examples and
3. define and calculate the GDP deflator using simple mathematical examples.

## Time Required

60 minutes (40 minutes for the lesson and activity and 20 minutes for the assessment)

## Materials

- One small combination lock per group (with two or three students per group, 10-15 locks will be needed for a class of 20-30). Each combination lock should contain only **three numbers and be self-setting**. (These can be purchased cheaply at discount stores or online.) *Make sure to label or mark each lock with the number of its corresponding problem set.*
- Handout 1: Group Problem Sets (15 provided)
- Group Problem Set Answer Key
- Handout 2: Assessment
- Handout 2 Assessment Answer Key
- Visual 1: GDP Key Terms
- Visual 2: GDP Problem Set 1
- Visual 3: GDP Problem Set 2
- Lock Combinations Answer Key

*Optional:* You can place the locks on zippered pencil pouches, backpacks, or other small items to “lock” something. If you do use the combination locks to lock something, a small prize or the assessment may be placed inside.

## Preparation

1. Prior to beginning the lesson, combinations must be set up for the locks using the Lock Combinations Answer Key. (Fifteen problem sets are provided, and one lock per group should be used. If you have 30 students, they could be divided into groups of two, or use ten locks for groups of three). Locks may be identified by labeling them with numbers, stickers, or color coded to match each problem set.
2. Make enough copies of Handout 1 for each group. (Each page includes two identical problem sets, so each student, in groups of two, has a copy.) Cut the copies of Handout 1 in half so that each student will have a handout. You might require these to be turned in as proof of work. Make a copy of Handout 2: Assessment for each student. *Note: Make an extra copies of Handout 1 if you would like groups to work an extra problem set (see lesson).*

## Procedure

(Note: This lesson assumes students have prior knowledge of GDP and its components. If students have not yet covered this material, a list of resources can be found in the appendix to the lesson.)

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## Teach

1. Write the following number on a board, Smart Board, or projector: \$10,002,857,000,000.
2. Tell students that it is a GDP—gross domestic product—statistic and ask if they can guess when U.S. GDP was around \$10 trillion dollars. Tell students that [GDP](#) is the total value of all final goods and services produced within a country's borders in a given time [period](#). *After they have volunteered their answers, let them know that this figure represents GDP from the first quarter in the year 2000.*
3. Ask students to guess the current level of GDP. *Reveal current GDP to students. Q1 2019 GDP stood at \$21,060,062,000. This figure can be updated by accessing the [FRED graph "GDP."](#) You might want to project this graph in the classroom and show students how GDP has grown over time.*
4. Ask students if this means that the United States is producing nearly twice as many goods now as in the year 2000. *(Some might say yes, and some might have some knowledge of the influence of inflation on GDP).*
5. Let students know that these figures are not adjusted for **inflation**, which is a rise in the general or average price level of the goods and services produced in an [economy](#). The **price level** is the average of the current prices of everything sold in an economy. Ask if students believe prices have changed since the year 2000. *(Most students will know that the price level has risen over time.)*
6. Tell students that the GDP figures that you have given them are what we call "nominal" GDP." Let them know that nominal GDP does not take inflation into account but instead measures **current production in current prices**. This means that if the price of American-made cars rises, the higher prices for American cars will contribute more to nominal GDP. (For example, ten cars sold at \$20,000 each will contribute \$200,000 to GDP, whereas ten cars sold at \$25,000 each will contribute \$250,000 to GDP when calculating nominal values.) Explain that without knowing whether prices have risen or not, we can't tell if we are producing more cars or whether their prices have simply increased when looking at nominal GDP.
7. Tell students that figuring out if the nation is producing more goods and services, or measuring **economic growth**, is the purpose of real GDP. Real GDP measures **current production in constant prices**, a way of measuring the real change in an economy's output. To find out if the economy is growing, we have to take out the effects of price level changes and isolate the production effect.
8. Display Visual 1, GDP Key Terms and reinforce the meaning of each term.
9. Tell students that you are going to show them a model of a simple economy that produces only two goods, cheese and crackers.

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10. Display Visual 2 or write the following on the board or an overhead projector:

Year	Cheese		Crackers	
	Price	Quantity	Price	Quantity
2016	\$2	20	\$3	30
2017	\$3	25	\$3	40
2018	\$4	30	\$4	40

11. Tell students that 2016 is going to be the **base year** in this problem. This means that when prices are held constant for comparison, you will use 2016 prices since 2016 is the first year against which price changes can be measured.

12. Show students how to calculate nominal GDP. You may want to let students know that since nominal GDP measures current production in current prices, you just multiply the price of each good times the quantity and add together.

- **2016:** Price of cheese x quantity of cheese ( $\$2 \times 20$ ) + price of crackers x quantity of crackers ( $\$3 \times 30$ ) = \$130
- **2017:** Price of cheese x quantity of cheese ( $\$3 \times 25$ ) + price of crackers x quantity of crackers ( $\$3 \times 40$ ) = \$195
- **2018:** Price of cheese x quantity of cheese ( $\$4 \times 30$ ) + price of crackers x quantity of crackers ( $\$4 \times 40$ ) = \$280

13. Remark to students that based on nominal GDP calculations, it appears that this economy is producing more than twice as much output in 2018 as in 2016. Ask them if the prices of cheese and crackers rose. (Students should reply that yes, cheese is twice as expensive and crackers have also risen significantly in price.)

14. Ask students how to determine the growth, if any, of the economy's output. (*Answers might vary but explain that to find the correct answer you have to perform a calculation to remove the effect of rising prices. Let students know that this calculation is called real GDP, or inflation-adjusted GDP, and that it measures economic growth.*) Explain that economic growth is a sustained rise over time in a nation's production of goods and services.

15. Demonstrate how to calculate real GDP. Let students know that since you are isolating the production of output, you will calculate real GDP by working the problems as if the price changes never occurred. It might be helpful to cross out the increased prices in 2017 and 2018 on your chart.

- **2016:** 2016 price of cheese x quantity of cheese ( $\$2 \times 20$ ) + 2016 price of crackers x quantity of crackers ( $\$3 \times 30$ ) = \$130
- **2017:** 2016 Price of cheese x 2017 quantity of cheese ( $\$2 \times 25$ ) + 2016 price of crackers x 2017 quantity of crackers ( $\$3 \times 40$ ) = \$170
- **2018:** 2016 Price of cheese x 2018 quantity of cheese ( $\$2 \times 30$ ) + 2016 price of crackers x 2018 quantity of crackers ( $\$3 \times 40$ ) = \$180

16. Explain to students that since 2016 is the base year, both the real (inflation adjusted) and nominal (constant price) values for 2016 will always be the same. Compare the real and nominal figures for 2017 and 2018. Are they significantly different? (Yes—instead of increasing by more than 50 percent, when adjusted for inflation [real GDP], GDP increased slightly more than 25 percent between 2016 and 2018 in the example).

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17. Tell students that it is also possible with this same example to measure how much prices changed over time by calculating what is called the GDP deflator. While Real GDP “kicks out” the effect of rising prices, the GDP deflator brings price changes back in to measure how the price level rose over time. (*You might want to let students know that the U.S. Bureau of Labor Statistics officially measures inflation by using the consumer price index and that the Federal Reserve’s explicit inflation target is based on a measure known as the personal consumption expenditure index, or PCE.*)

18. Show students how to calculate the GDP deflator:

GDP Deflator = Nominal GDP / Real GDP x 100

- **For 2016:**  $130 / 130 \times 100 = 100$  (Let students know that the base year will always be 100 because the formula uses the same number in both the numerator and denominator.)
- **2017:**  $195 / 170 \times 100 = 114.7$  (This means that prices have risen 14.7 percent. What \$100 bought in 2016 now costs \$114.70.)
- **2018:**  $280 / 180 \times 100 = 155.55$  (This means that prices have risen 55.55 percent. What \$100 bought in 2016 now costs \$55.55 more).

*Remind students that it is important to multiply by 100 to get the correct answer. You might want to introduce the formula for percentage change before calculating GDP deflator:  $\text{New value} - \text{old value} / \text{old value} \times 100$*

19. Display Visual 3, or write the following on the board or an overhead projector to show students a second example of how to calculate nominal GDP, real GDP, and the GDP deflator, or have them calculate the problem themselves or with a partner.

Year	Bread		Jam	
	Price	Quantity	Price	Quantity
2016	\$1	100	\$2	50
2017	\$2	150	\$3	80
2018	\$3	220	\$4	100

#### Nominal GDP:

- **2016:** Price of bread x quantity of bread ( $\$1 \times 100$ ) + price of jam x quantity of jam ( $\$2 \times 50$ ) = \$200
- **2017:** Price of bread x quantity of bread ( $\$2 \times 150$ ) + price of jam x quantity of jam ( $\$3 \times 80$ ) = \$540
- **2018:** Price of bread x quantity of bread ( $\$3 \times 220$ ) + price of jam x quantity of jam ( $\$4 \times 100$ ) = \$1,060

#### Real GDP

- **2016:** 2016 Price of bread x 2016 quantity of bread ( $\$1 \times 100$ ) + 2016 price of jam x 2016 quantity of jam ( $\$2 \times 50$ ) = \$200
- **2017:** 2016 Price of bread x 2017 quantity of bread ( $\$1 \times 150$ ) + 2016 price of jam x 2017 quantity of jam ( $\$2 \times 80$ ) = \$310
- **2018:** 2016 Price of bread x 2018 quantity of bread ( $\$1 \times 220$ ) + 2016 price of jam x 2018 quantity of jam ( $\$2 \times 100$ ) = \$420

#### GDP Deflator

- **For 2016:**  $200 / 200 \times 100 = 100$  (Since 2016 is the base year, it will always be 100.)
- **2017:**  $540 / 310 \times 100 = 174.19$  (This represents a 74 percent rise in prices. What \$100 bought in 2016 now costs \$174.19.)
- **2018:**  $1060 / 420 \times 100 = 252.38$  (This represents a 152 percent rise in prices. What \$100 bought in 2016 now costs \$252.38.)

20. Ask students if they have any questions before moving on to the group activity. If they worked the problem themselves or with a partner, review the answers together as a class.

### Activity

21. Now tell students that they are going to work together to “unlock” the mystery of calculating GDP. Working in groups, they will solve a problem set just like the two previous examples that have been worked in class.
22. Explain that they will calculate nominal GDP, real GDP, and the GDP deflator and use their answers to help them unlock a combination lock. Show students the combination locks and, using a sample problem set sheet, demonstrate how answers will be recorded. Also show them how to find the highlighted answers that will unlock their locks.

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23. Tell students that they should each work individually to solve the problem, record their answers on the handout, compare answers among the other member(s) of their group, get their lock from the teacher, and try to unlock the combination lock. (To avoid congestion at the teacher's desk or front of the room, you may want to ask students to raise their hands when they are finished with their problem set and you can check their work at their desks, then give the group their lock. This would also allow for assistance if groups have made a mistake in their calculations.)
24. Divide students into pairs or groups of two or three and give each group their copy of Handout 1.
25. Allow time for students to work their problems, record them on the sheets (these can be collected), confer with group members, and receive their locks. (*You may wish to check that the individual calculation sheets have been completed for each group member before allowing groups to receive their lock. Locks may also be distributed along with Handout 1, but having students get the locks after they have worked the problem makes it more likely that they will compare answers first.*)
26. *Optional:* If you would like students to have more practice, make extra copies of the group sheets and have students turn in their locks when they are finished with the first problem set and have opened their lock. After all locks have been collected, teams can then be given another, different problem set to work and attempt to open another lock. Do not let groups trade locks, as this may make it easier for answers to be shared. *If any students have problems unlocking their locks, you may refer to the Group Answer Key to check their answers.*
27. Collect all the locks at the end of the activity.

## Review and Closure

28. Review the key concepts by asking students the following questions.
  - a. Current production in current prices is measured by which of the following: nominal GDP, real GDP, or the GDP deflator? (*Nominal GDP*)
  - b. Which measure is a calculation of current production in constant prices, adjusted for inflation? (*Real GDP*)
  - c. Real GDP measures what economic indicator? (*Economic growth*)
  - d. How can GDP be used to measure inflation? (*GDP deflator*)
  - e. Which year will always have the same value for nominal and real GDP? (*The base year*)
  - f. When measuring the GDP deflator, the base year always has what value? (*100*)
  - g. If the GDP deflator is 100 in the base year and 115 the following year, what is the inflation rate? (*15 percent*)

# Visual 1: GDP Key Terms

## Base Year

An initial year against which price level changes can be measured.

## Constant Prices

A way of measuring the real change in an economy's output.

## Economic Growth

A sustained rise over time in a nation's production of goods and services.

## Gross Domestic Product (GDP)

The total value of all final goods and services produced within a country's borders in a given year.

## GDP Deflator

A measure of the changes in the prices of goods and services produced in an economy.

## Inflation

A rise in the general or average price level of the goods and services produced in an economy.

## Nominal Gross Domestic Product

The total market value of all final goods and services produced in an economy in a given year, expressed using the current year's price for goods and services.

## Price Level

A rise in the general or average price level of the goods and services produced in an economy.

## Real Gross Domestic Product

The total market value of all final goods and services produced in an economy in a given year calculated by using a base year's price for goods and services, or nominal gross domestic product (GDP) adjusted for inflation.

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## Visual 2 GDP Problem Set 1

Year	Cheese		Crackers	
	Price	Quantity	Price	Quantity
2016	\$2	20	\$3	30
2017	\$3	25	\$3	40
2018	\$4	30	\$4	40

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## Visual 3 GDP Problem Set 2




Year	Bread		Jam	
	Price	Quantity	Price	Quantity
2016	\$1	100	\$2	50
2017	\$2	150	\$3	80
2018	\$3	220	\$4	100

**Handout 1: Group 1 (Cut apart for each group member)**

Group 1

Year	Rice		Peas	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	50	\$3	110
2	\$2	60	\$4	125
3	\$3	70	\$5	140

Group 1 Answers




Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ 
2	_____	_____	___ 
3	_____	_____	 ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 1

Year	Rice		Peas	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	50	\$3	110
2	\$2	60	\$4	125
3	\$3	70	\$5	140

Group 1 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ 
2	_____	_____	___ 
3	_____	_____	 ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 2

Year	Baseballs		Bats	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$5	120	\$10	100
2	\$6	150	\$12	80
3	\$6	200	\$15	100

Group 2 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	<b>1</b> _____
2	_____	_____	_____ <b>120</b>
3	_____	_____	<b>150</b> _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 2

Year	Baseballs		Bats	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$5	120	\$10	100
2	\$6	150	\$12	80
3	\$6	200	\$15	100

Group 2 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	<b>1</b> _____
2	_____	_____	_____ <b>120</b>
3	_____	_____	<b>150</b> _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 3

Year	Sugar		Spice	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$1	200	\$2	225
2	\$2	200	\$3	250
3	\$3	250	\$5	260

Group 3 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	■ _____
2	_____	_____	— ■ _____
3	_____	_____	— ■ _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 3

Year	Sugar		Spice	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$1	200	\$2	225
2	\$2	200	\$3	250
3	\$3	250	\$5	260

Group 3 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	■ _____
2	_____	_____	— ■ _____
3	_____	_____	— ■ _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 4

Year	Hats		Scarves	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$6	60	\$4	80
2	\$8	80	\$5	100
3	\$10	100	\$8	100

Group 4

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	— <b>1</b> —
2	_____	_____	<b>2</b> _____
3	_____	_____	— <b>3</b> —

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 4

Year	Hats		Scarves	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$6	60	\$4	80
2	\$8	80	\$5	100
3	\$10	100	\$8	100

Group 4

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	— <b>1</b> —
2	_____	_____	<b>2</b> _____
3	_____	_____	— <b>3</b> —

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.




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Group 5

Year	Cell Phone Cases		Cell Phone Chargers	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$10	50	\$20	50
2	\$11	60	\$20	70
3	\$12	80	\$25	100

Group 5




Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ 
2	_____	_____	___ 
3	_____	_____	 _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 5

Year	Cell Phones		Chargers	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$10	50	\$20	50
2	\$11	60	\$20	70
3	\$12	80	\$25	100

Group 5

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ 
2	_____	_____	___ 
3	_____	_____	 _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 6

Year	Wheat		Barley	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	40	\$3	100
2	\$2	50	\$4	120
3	\$3	75	\$6	140

Group 6 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	<b>1</b> _____
2	_____	_____	_____ <b>1</b> _____
3	_____	_____	_____ <b>1</b> _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 6

Year	Wheat		Barley	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	40	\$3	100
2	\$2	50	\$4	120
3	\$3	75	\$6	140

Group 6 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	<b>1</b> _____
2	_____	_____	_____ <b>1</b> _____
3	_____	_____	_____ <b>1</b> _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 7

Year	Flour		Sugar	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$3	25	\$3	110
2	\$4	45	\$4	120
3	\$5	50	\$6	130

Group 7 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b> ___
2	_____	_____	___ <b>1</b> ___
3	_____	_____	___ <b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 7

Year	Flour		Sugar	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$3	25	\$3	110
2	\$4	45	\$4	120
3	\$5	50	\$6	130

Group 7 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b> ___
2	_____	_____	___ <b>1</b> ___
3	_____	_____	___ <b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 8

Year	Tea		Coffee	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	50	\$3	110
2	\$3	60	\$4	125
3	\$5	70	\$5	140

Group 8 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	__ <b>1</b> __
2	_____	_____	__ <b>1</b> __
3	_____	_____	__ <b>1</b> __

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 8

Year	Tea		Coffee	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	50	\$2	50
2	\$3	60	\$3	60
3	\$5	70	\$5	70

Group 8 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	__ <b>1</b> __
2	_____	_____	__ <b>1</b> __
3	_____	_____	__ <b>1</b> __

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 9

Year	Soup		Sandwiches	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	50	\$5	60
2	\$3	60	\$5	70
3	\$4	75	\$6	80

Group 9 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 9

Year	Soup		Sandwiches	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	50	\$5	60
2	\$3	60	\$5	70
3	\$4	75	\$6	80

Group 9 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 10

Year	Rice		Peas	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	50	\$3	110
2	\$2	60	\$4	125
3	\$3	70	\$6	140

Group 10 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 10

Year	Rice		Peas	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	50	\$3	110
2	\$2	60	\$4	125
3	\$3	70	\$6	140

Group 10 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 11

Year	Pencils		Pens	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$1	50	\$2	40
2	\$2	65	\$3	55
3	\$3	70	\$4	80

Group 11 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 11

Year	Pencils		Pens	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$1	50	\$2	40
2	\$2	65	\$3	55
3	\$3	70	\$4	80

Group 11 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 12

Year	Chips		Salsa	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	100	\$3	45
2	\$4	120	\$4	55
3	\$5	135	\$5	70

Group 12 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 12

Year	Chips		Salsa	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	100	\$3	45
2	\$4	120	\$4	55
3	\$5	135	\$5	70

Group 12 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 13

Year	Potatoes		Corn	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$4	25	\$4	60
2	\$5	30	\$5	80
3	\$6	40	\$7	100

Group 13 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	<b>1</b> _____
2	_____	_____	_____ <b>100</b>
3	_____	_____	<b>100</b> _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 13

Year	Potatoes		Corn	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$4	25	\$4	60
2	\$5	30	\$5	80
3	\$6	40	\$7	100

Group 13 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	<b>1</b> _____
2	_____	_____	_____ <b>100</b>
3	_____	_____	<b>100</b> _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 14

Year	Waffles		Syrup	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	150	\$2	50
2	\$3	160	\$2	50
3	\$4	170	\$4	60

Group 14 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 14

Year	Waffles		Syrup	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$2	150	\$2	50
2	\$3	160	\$2	50
3	\$4	170	\$4	60

Group 14 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	___ <b>1</b>
2	_____	_____	___ <b>1</b>
3	_____	_____	<b>1</b> ___

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

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Group 15

Year	Ice Cream		Ice Cream Cones	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$4	60	\$2	80
2	\$6	80	\$3	100
3	\$6	100	\$4	120

Group 15 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	<b>1</b> _____
2	_____	_____	_____ <b>1</b> _____
3	_____	_____	_____ <b>1</b> _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

Group 15

Year	Ice Cream		Ice Cream Cones	
	Price	Quantity	Price	Quantity
1 (Base Year)	\$4	60	\$2	80
2	\$6	80	\$3	100
3	\$6	100	\$4	120

Group 15 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	_____	_____	<b>1</b> _____
2	_____	_____	_____ <b>1</b> _____
3	_____	_____	_____ <b>1</b> _____

Use the numbers that are highlighted in your answers to open the combination lock, starting with Year 1. *Do not round.* Return the lock to your teacher after you have completed each set of questions.

**Measuring GDP Lesson**

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**Group Answer Sheet KEY:**

## Group 1

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	430	430	100
2	620	495	125
3	910	560	162

## Group 2

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	1600	1600	100
2	1860	1550	120
3	2700	2000	135

## Group 3

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	650	650	100
2	1150	700	164
3	2050	770	266

## Group 4

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	680	680	100
2	1140	880	129
3	1800	1000	180

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Group 5

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	1500	1500	100
2	2060	2000	103
3	3460	2800	123

Group 6 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	380	380	100
2	580	460	126
3	1065	570	186

Group 7 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	405	405	100
2	660	495	133
3	1030	540	190

Group 8 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	430	430	100
2	680	495	137
3	1050	560	187

**Measuring GDP Lesson**

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Group 9 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	400	400	100
2	530	470	112
3	780	550	141

Group 10 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	430	430	100
2	620	495	125
3	1050	560	187

Group 11 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	130	130	100
2	295	175	168
3	530	230	230

Group 12 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	335	335	100
2	700	405	172
3	1025	480	213

Measuring GDP Lesson

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Group 13 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	340	340	100
2	550	440	125
3	940	560	167

Group 14 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	400	400	100
2	580	420	138
3	920	460	200

Group 15 Answers

Year	Nominal GDP (LOCK 1)	Real GDP (LOCK 2)	GDP Deflator (LOCK 3)
1	400	400	100
2	780	520	150
3	1080	640	168

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## LOCK COMBINATIONS ANSWER KEY

Group 1: 051

Group 2: 101

Group 3: 166

Group 4: 018

Group 5: 031

Group 6: 126

Group 7: 039

Group 8: 037

Group 9: 021

Group 10: 051

Group 11: 082

Group 12: 022

Group 13: 151

Group 14: 082

Group 15: 158

## Handout 2: Assessment

Calculate nominal and real GDP, as well as the GDP deflator, for Coffee Country and Dessert Country. After you have calculated your numbers, use them to solve the History Mystery below. *Do not round your answers.*

Country 1: Coffee Country	Price Coffee	Quantity Coffee	Price Coffee Makers	Quantity Coffee Makers
YR 1 CC	\$3	500	\$39	11
YR2 CC	\$3	550	\$59	5
YR3 CC	\$3	580	\$89	3

Country 2: Dessert Country	Price Pie	Quantity Pie	Price Cake	Quantity Cake
YR1 DC	\$6	250	\$7	67
YR2 DC	\$7	225	\$7	62
YR3 DC	\$8	180	\$9	61

Fill in the grid below, then use your answers to solve the History Mystery.

Answers	Nominal GDP	Real GDP	GDP Deflator
YR 1 CC			
YR2 CC			
YR3 CC			

Answers	Nominal GDP	Real GDP	GDP Deflator
YR1 DC			
YR2 DC			
YR3 DC			

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### Measuring GDP Lesson

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## History Mystery

Your teacher has asked for you to help create a bulletin board timeline of some major events that occurred in the 20th and 21st centuries. Each of the events below took place in a year *that is the same as the correct answers for nominal and real GDP in the tables in Handout 2*. (Repeated answers will only be used once.) The events are listed in chronological order, from the earliest year to the most recent. Using the answers from your calculations, identify the years in which each event occurred and write them in the blank provided. The answer for E will come from your GDP deflator calculations for Dessert Country for Year 3. If you have calculated accurately, you will have the correct year for each event and be able to put together the timeline.

Historical Events:

- A. The newly discovered continent of America is first named on a map \_\_\_\_\_
- B. U.S. Congress ratifies the Treaty of Paris with Great Britain to end the Revolutionary War \_\_\_\_\_
- C. Texas and Florida become states \_\_\_\_\_
- D. Banks fail and stock prices fall as railroad speculation causes a banking panic in the United States \_\_\_\_\_
- E. The Federal Reserve Act is signed in 19\_\_\_. (Use the first two numbers from your GDP deflator calculation for Year 3 Dessert Country).
- F. Beginning of the Great Depression \_\_\_\_\_
- G. End of World War II \_\_\_\_\_
- H. U.S. moon landing \_\_\_\_\_
- I. Fall of the Berlin Wall \_\_\_\_\_
- J. Introduction of the iPhone \_\_\_\_\_
- K. End of the Great Recession \_\_\_\_\_

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### Measuring GDP Lesson

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### Handout 2 Assessment: Answer Key

Calculate nominal and real GDP, as well as the GDP deflator, for Tables 1 and 2. After you have calculated your numbers, use them to solve the History Mystery below. *Do not round your answers.*

Country 1: Coffee Country	Price Coffee	Quantity Coffee	Price Coffee Makers	Quantity Coffee Makers
YR 1 CC	\$3	500	\$39	11
YR2 CC	\$3	550	\$59	5
YR3 CC	\$3	580	\$89	3

Country 2: Dessert Country	Price Pie	Quantity Pie	Price Cake	Quantity Cake
YR1 DC	\$6	250	\$7	67
YR2 DC	\$7	225	\$7	62
YR3 DC	\$8	180	\$9	61

Fill in the grid below, then use your answers to solve the History Mystery.

Answers	Nominal GDP	Real GDP	GDP Deflator
YR 1 CC	1929	1929	100
YR2 CC	1945	1845	105
YR3 CC	2007	1857	108

Answers	Nominal GDP	Real GDP	GDP Deflator
YR1 DC	1969	1969	100
YR2 DC	2009	1784	112
YR3 DC	1989	1507	131

#### Measuring GDP Lesson

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## History Mystery Answer Key

Your teacher has asked for you to help with create a bulletin board timeline of some major events that occurred in the 20th and 21st centuries. Each of the events below took place in a year *that is the same as the correct answers for nominal and real GDP in the tables in Handout 2*. (Repeated answers will only be used once.) The events are listed in chronological order, from the earliest year to the most recent. Using the answers from your calculations, identify the years in which each event occurred and write them in the blank provided. The answer for E will come from your GDP deflator calculations. If you have calculated accurately, you will have the correct year for each event and be able to put together the timeline.

### Historical Events:

- A. The newly discovered continent of America is first named on a map **1507**
- B. U.S. Congress ratifies the Treaty of Paris with Great Britain to end the Revolutionary War **1784**
- C. Texas and Florida become states **1845**
- D. Banks fail and stock prices fall as railroad speculation causes a banking panic in the United States **1857**
- E. The Federal Reserve Act is signed in **1913**. (Use the first two numbers from your GDP deflator calculation for Year 3 Desert Country.)
- F. Beginning of the Great Depression **1929**
- G. End of World War II **1945**
- H. U.S. moon landing **1969**
- I. Fall of the Berlin Wall **1989**
- J. Introduction of the iPhone **2007**
- K. End of the Great Recession **2009**

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## Appendix: GDP Teaching Resources

These resources can be used as a supplement to the lesson to introduce GDP to students or further expand the lesson's content.

### [GDP Infographic and Classroom Activity](#)

This colorful infographic highlights the basics about GDP, the calculations of the GDP deflator and nominal and real GDP. It also includes an accompanying classroom activity exploring what is—and what is not—included in GDP.

### [Classroom Economist GDP Module](#)

The GDP edition of the Classroom Economist discusses gross domestic product: what it is, how to measure it, and what it means to a country's economy. Included are a lesson, PowerPoint teaching presentation, narrated content PowerPoint, a quiz, resources guide, primary source video, and lesson demonstration video.

### [The Fed Explains Real versus Potential GDP](#)

The second in a series of animated videos on economic issues and the Federal Reserve focuses on GDP. Engaging graphics and straightforward examples define total output and explain the difference between real and potential GDP.

### [Factors Influencing GDP](#)

In this activity, students will explore how a country's factors of production influence a country's GDP. In the lesson, students encounter economic terminology, complete a graphic organizer, and participate in a group card-sorting activity. Students will use their understanding of the factors influencing GDP to make and support a hypothesis about which GDP and GDP per capita goes with each country. They will then write a short piece using evidence from the card sort to justify which factors they think are most important in determining a country's GDP.

### [GDP: The Economic Lowdown Video Series, Episode 7](#)

GDP data are among the most important economic data available for measuring economic growth, but measuring the output of a large, dynamic economy is a complex task. The seventh episode of the Economic Lowdown Video Series explains what GDP measures, its calculation, its usefulness in determining whether and how quickly the economy is growing, and how it can be used as an indicator of a nation's standard of living. The content may also be accessed through the [Economic Lowdown Episode 13 podcast](#).

### [GDP and Pizza: Economics for Life Online Course for Teachers and Students](#)

GDP and Pizza: Economics for Life is designed to help students in civics, economics, and other social studies classes grasp challenging economic content. It also explains why these topics are important.

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