

Currency & Printing

Grade Levels: 9-12



Subject Areas: Government, Economics, Technology, and College Readiness

Learning Objectives

- The history of journalism and newspaper publishing in early Texas and American History
- The history of newspaper, journalism, people and treaties through Mexican and Texas history

Students will learn to:

- Use primary and secondary sources, including original artifacts, to discuss the importance of word choice and purpose.
- Identify the history and development of currency through people and events on specific times through printing and illustration through time
- Demonstrate an understanding of the different forms of media and printing styles

Lesson Details

1. Pre-arrival lesson options: vocabulary activity and crossword
2. Main lesson ideas:
 - Distribute the infographic on how money is made, courtesy of information from the U.S. Department of the Treasury.
 - Handwriting analysis exercise, with signature and partner activity
 - Identifying counterfeit money activity, spot the difference.
 - After museum visit and taking note on currency, both American coins/notes and Texas Independence currency notes.
3. Post-visit lesson options: discussion/reflection questions and post-visit activity.

Vocabulary words associated with lesson:

analysis, copy, currency, engraving, etching, forensic, forgery, intaglio, letterpress, mint, offset printing, photogravure, plate, printer, printing press, siderography, signature, stereotype

Applicable TEKS*

Economics: 12.1.A; 12.3.A-C; 12.4.A-B; 12.11.A-C; 12.13.A-B; 12.21.A-E; 12.22.A-B; 12.23

Government: 12.1.B-E; 12.2.A-B; 12.6.A-B; 12.10.A; 12.12.A-D; 12.14.A-C; 12.17.A-B; 12.18.A-B; 12.19.A-E; 12.21

Humanities: 1.A-B; 2.A-D; 3.B-C; 4.C-D; 5.A-B

College Readiness: 1.A-B; 2.A-D; 3.B-C; 4.C-D; 5.A-B

Vocabulary

Name: _____

For each section write a vocabulary word in the top, and circle the part of speech it is. Then, define it, write a few synonyms, and a sentence using the word.

Word	
Definition	Synonyms
Noun Verb Adj. Adv.	
Sentence	

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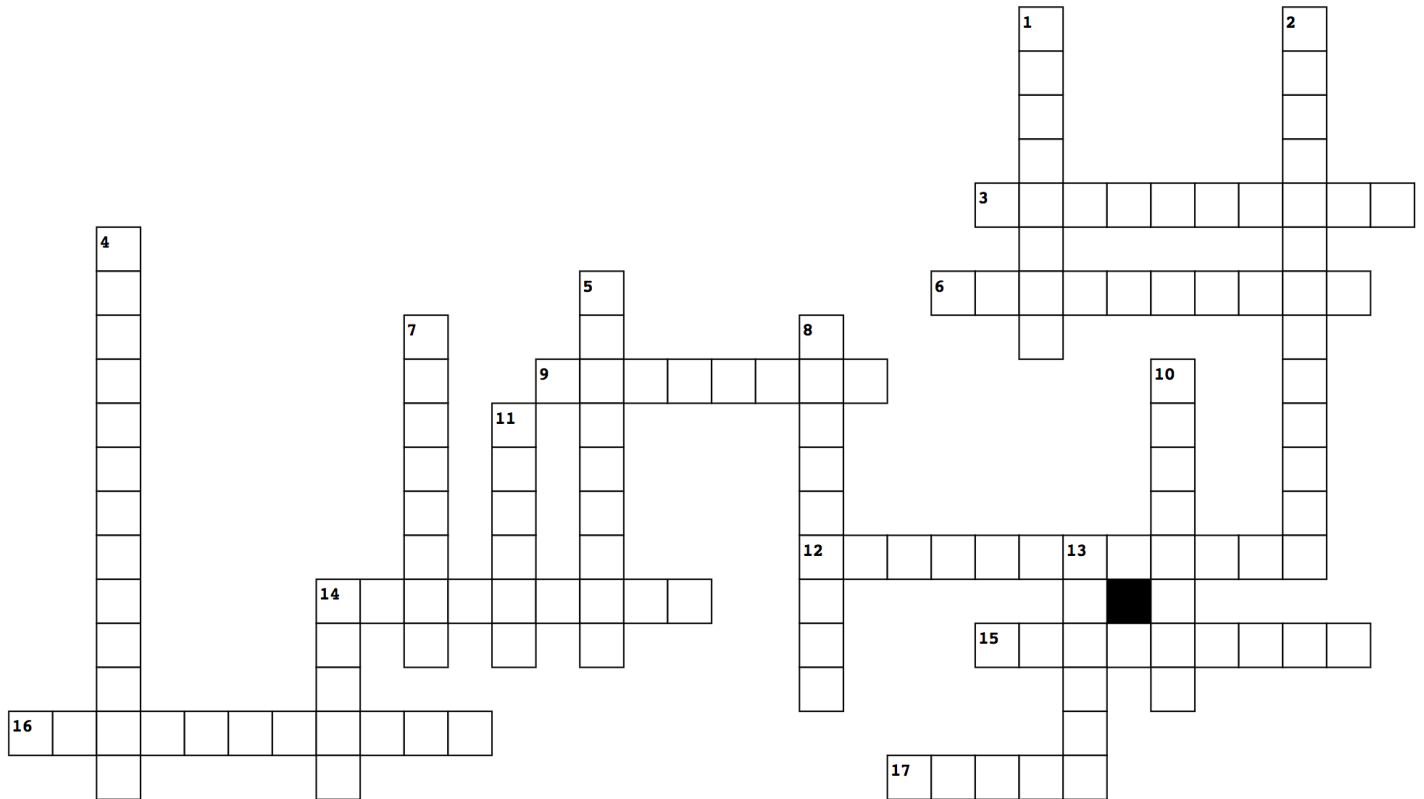
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Crossword

Name: _____

Use the correct vocabulary word for each definition.



Down

1. engrave (metal, glass, or stone) by coating it with a protective layer, drawing on it with a needle, and then covering it with acid to attack the parts the needle has exposed, especially in order to produce prints from it
2. a mechanical process developed by Jacob Perkins in the early 1800s enabling the unlimited reproduction of engraved steel plates
4. an image produced from a photographic negative transferred to a metal plate and etched in
5. relating to or denoting the application of scientific methods and techniques to the investigation of crime
7. a person whose job or business is commercial printing
10. the action of forging or producing a copy of a document, signature, banknote, or work of art
11. printing, commercial printing, widely used printing technique in which the inked image on a printing plate is printed on a rubber cylinder and then transferred
14. a thing made to be similar or identical to another or matter to be printed

Across

3. a person's name written in a distinctive way as a form of identification
6. the process or art of cutting or carving a design on a hard surface, especially so as to make a print
9. press, a mechanical device for applying pressure to an inked surface resting upon a print medium, thereby transferring the ink
12. printing from a hard raised image under pressure, using viscous ink
14. a system of money in general use in a particular country
15. detailed examination of the elements or structure of something
16. a relief printing plate cast in a mold made from composed type or an original plate
17. a place where money is coined, especially under state authority

How Money is Made

Name: _____

A step-by-step introduction to printing money

Currency production at the Bureau of Engraving and Printing (BEP) is quite different from its beginnings in 1862, which consisted of a handful of people separating notes with a hand-cranked machine in the basement of the Treasury building. The production of U.S. currency is not an easy or simple task, but one that involves highly trained and skilled craftspeople, specialized equipment, and a combination of traditional old world printing techniques merged with sophisticated, cutting edge technology. There are numerous, distinctive steps required in the production process.



Designing, Engraving & Siderography

The first step in creating currency is designing the look of it. Over time, American money has gone through many changes and what we use now, doesn't look the same it did a hundred years ago. Once the designers design the money, it goes through the engraving and etching process. An artist etches a intricate web of lines and details for the money, making it harder to forge. Next is the siderography, where individually engraved elements such as the portrait, border, counters and text are first combined like pieces of a jigsaw puzzle to form one complete face or back of a note using a transfer press.

Paper & Ink

Right after the siderography is complete, the plastic master plates are transferred from siderography and used by plate makers to create hundreds of identical printing plates — identical because they are all based on the same plate. All money is made with specific ink and paper to make it harder to create counterfeit money. It's unique to the bureau's ingredients. The ordinary paper that consumers use throughout their everyday life such as newspapers, books, cereal boxes, etc., is primarily made of wood pulp; however, United States currency paper is composed of 75 percent cotton and 25 percent linen.



Printing Plates & Offset Printing

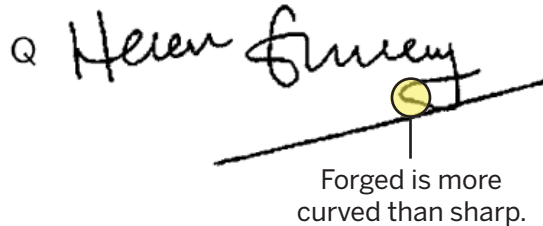
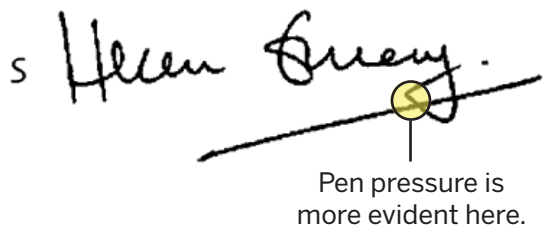
All though the processes can be lengthy, there is a specific way to print money, along with specific machines to give authentic detailed money. Offset printing is Offset printing utilizes aluminum based plates, or plates made from a similar metallic material. For every color during the printing process a separate metal plate has to be used. In the plate printing process, ink is applied to a plate so that it remains only in the engraved areas. Paper is then laid atop the plate, and the two are pressed together under great pressure. As a result, the ink from the recessed areas is pulled onto paper, creating a finished image.

Analyzing Signatures

Name: _____

Each person has a unique handwriting style that is developed overtime BUT there are different factors that cause variation in a person's handwriting, like different writing instruments, mood, age, or how hurried the person is. Read the list of important handwriting characteristics to take note of.

Below is an example of forged handwriting. The top (S) is the original, and the bottom (Q) is the forged signature. using the list to the right, annotate all the differences or key aspects of the signatures.



Line Quality

Do the letters flow or are they erratic and shaky?

Spacing

Are the letters equally spaced or crowded?

Size consistency

Is the ratio of height to width consistent?

Continuous

Is the writing continuous or does the writer lift the pen?

Connecting Letters

Are capitals and lowercase letters connected and continuous?

Letters Complete

Are letters completely formed or is a part of it missing?

Cursive and printed letters

Are there printed letters, cursive letters, or both?

Pen Pressure

Is pressure equal when applied to upward and downward strokes?

Fancy curls or loops

Are there fancy curls in parts of the signature?

Placement of crosses on t's and dots on i's

Correct or misplaced? Are t's crossed, crossed in the middle, toward top, or toward the bottom? Are the i's dotted, dotted toward the right, left, or centered?

Partner Activity

As noted above, forensic scientists use signatures to protect identities. With a partner, you are going to recreate the exercise above with your own signature.

1. Draw your signature that you practiced on the previous page. Remember it has to be cursive!
2. Switch papers with a partner.
3. Your partner is going to try and copy your signature as best as they can.
4. Switch papers back with your partner.
5. Note/circle and annotate in the extra space around the differences from your original signature.

YOUR SIGNATURE

THE COUNTERFEIT OF YOUR SIGNATURE & ANNOTATION

Understanding Counterfeit

Name: _____

When false documents or other items are copied for the purpose of deception, it's considered counterfeit. Changes to the design of US bills over the years have mostly been for anti-counterfeiting, not aesthetics.. Take a look at the materials and features of real money.

Bank Note Materials

- US dollars made from 75% cotton, 35% linen. It is Often mixed with linen, abaca, or other fibers
- Most paper currency made from cotton paper w 80-90g weight per sq meter
- Average lifespan of a banknote is 2 years
- Infused with polyvinyl or gelatin to give extra strength
- Early Chinese banknotes were printed on mulberry bark
- Watermark and thread incorporated during paper forming process
- Thread is for security purposes, decreases risk of counterfeit
- Varnishing and coatings reduce accumulation of dirt and debris during circulation
- Windows in paper covered by holographic foils add more difficulty for counterfeiting

Features Found in Real Currency

Clear red and blue fibers are woven throughout the bill. Security thread is evident, consisting of a thin, embedded vertical line or strip with the denomination of the bill written on it. There is also a watermark that appears on the right side of the portrait of the bill in the light.

There is minute microprinting on the security threads as well as around the portrait.

Portrait stands out from the background & appears raised off the paper.

Serial number is evenly spaced and the same color as the Treasury seal.



Check letter and Quadrant Number

Federal Reserve seal has no sharp points

Series Identification

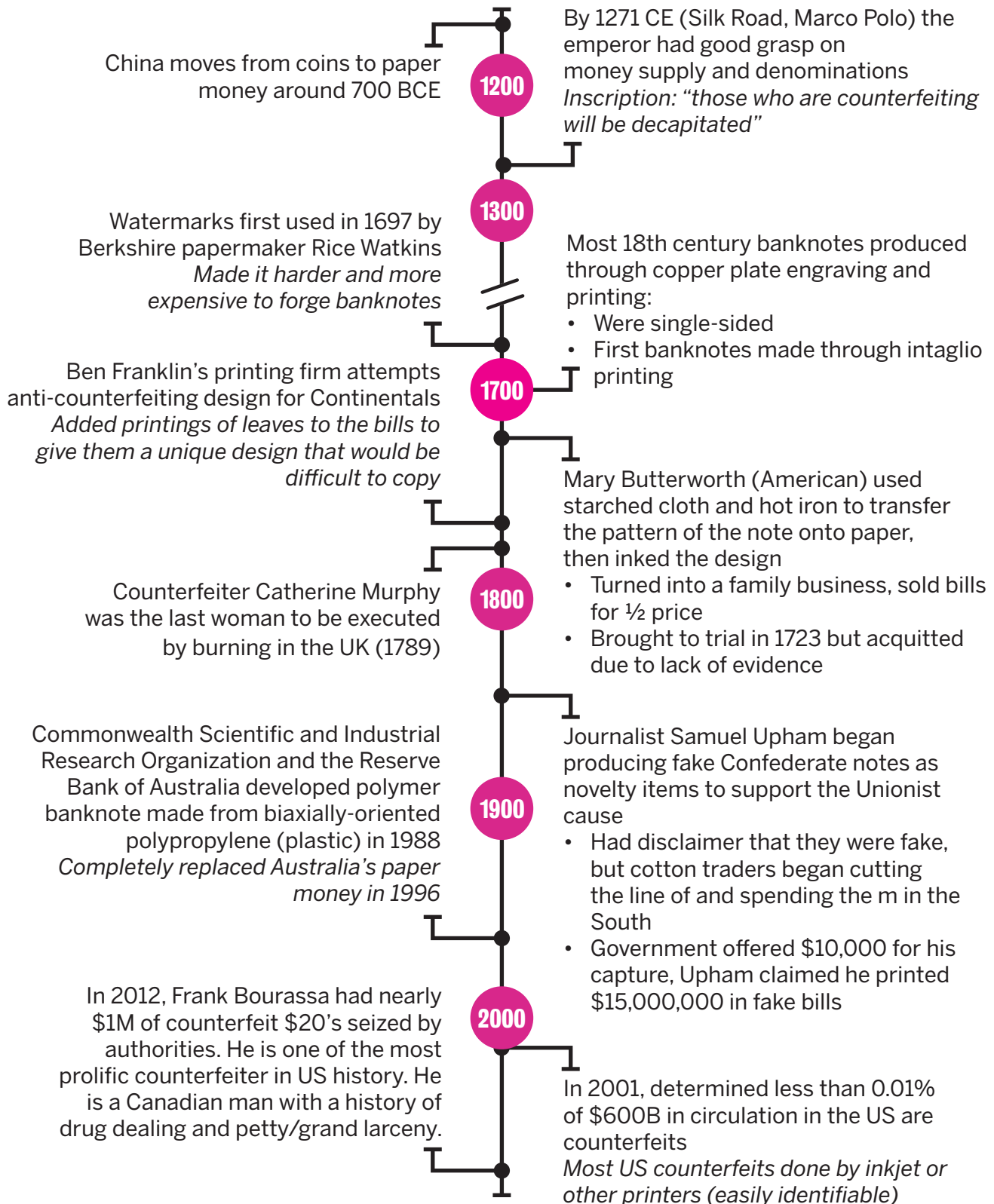
Treasury seal has clear, sharp sawtooth points

Clear, distinct border edge to green resulting from color-shifting ink.

A History of Forgery

Name: _____

Counterfeit has been popularized and glamorized in recent years, but the concept has been around for centuries. Check out the timeline below for a brief history.



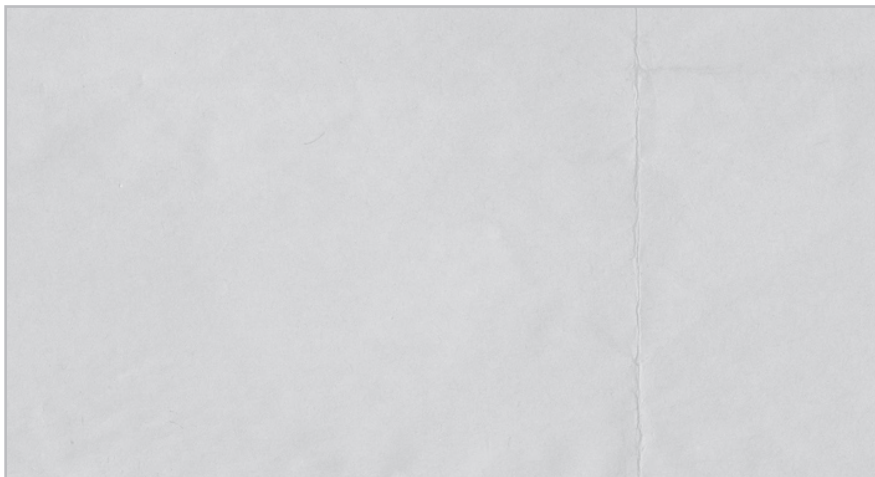
Modern Money

Name: _____

An interpretation of currency

Congratulations! You are now in charge of creating modern money! You are at the first step of creating money: designing it. Below, follow the directions to create new fresh take for today's currency. Keep in mind all the features found in modern currency to prevent forgery.

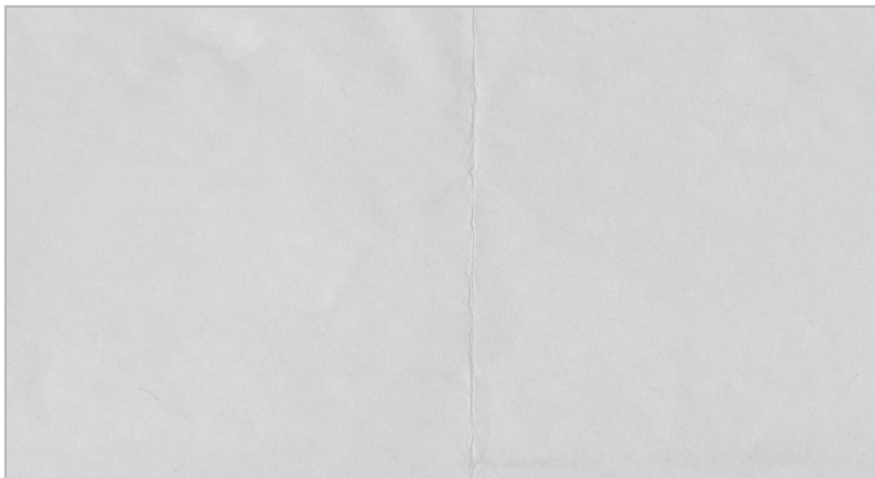
Name of currency:



Flat currency/notes

1. Create three different images for money. Think of leaders or heros that you would like to represent your currency value..
2. Add wording or phrases to your design.
3. Name the three different values (for example, we have the \$1, \$5, \$10, etc.). You could even design the first \$3 bill!
4. Lastly, add your John Hancock so no one can copy your money!

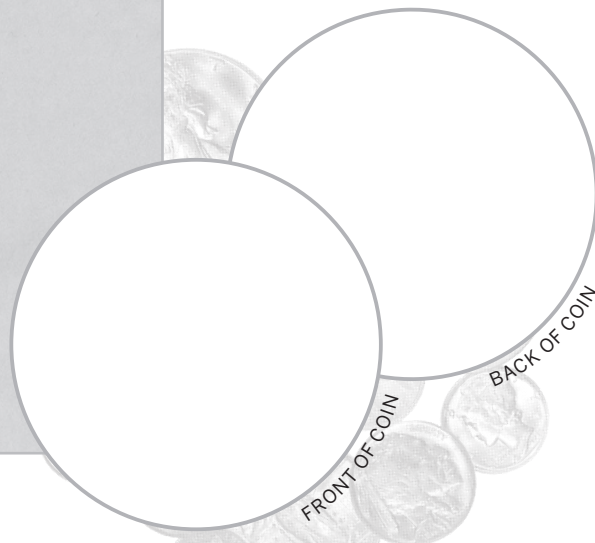
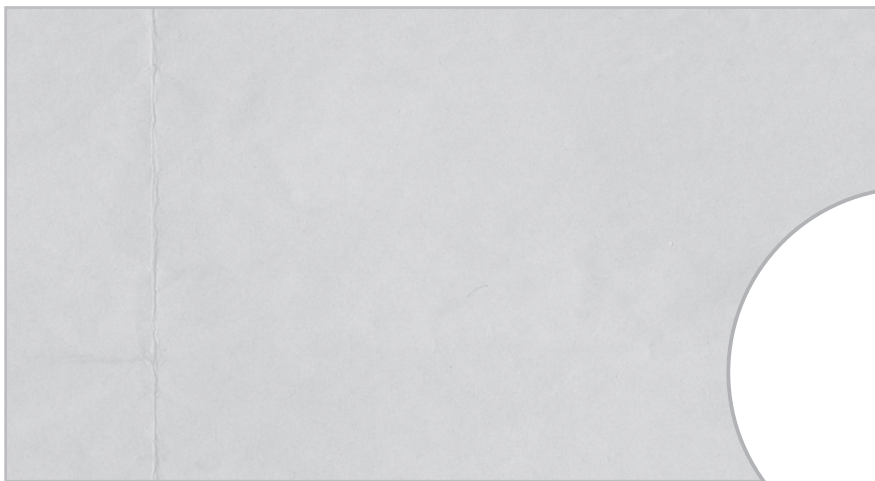
Name of currency:



Coins

1. First, decide what images should be on the two faces of your coins.
2. Next, think about word choice. Every coin has the year it was created and phrases or mottos engraved on it.
3. Lastly, make sure sure you add how much your coin is worth.
4. Have fun and get creative with your design.

Name of currency:



Post-Visit Discussion

Name: _____

Use the questions below to prompt discussion and reflection after the museum trip.

1. What was your favorite exhibit?
2. What's one thing you learned from the activities?
3. What's one thing that surprised you?
4. Is there anything you wished you could have seen more of?
5. Why is a signature important to have?
6. Why do you think the development of the printing press was so important to developing currency?
7. In your own words, how has the development of money changed in the last 200 years?
8. Why do you think we changed from metal currency to printed currency?
9. What are the advantages or disadvantages of paper bills over metal currency?
10. Why is the design so important to the printing and development of modern currency? (Hint: forgery)
11. In this day and age, what is the future of currency?