

# ACTIVITY 10-3

## EXAMINATION OF U.S. CURRENCY: IS IT REAL OR A FORGERY?



### Scenario:

Camille handed the cashier her \$50 bill. The cashier held it up against the light and looked at it. Perplexed, Camille asked the cashier why he held the \$50 bill up to the light. He told her that cashiers were required to examine all \$50 bills to be sure that they were legitimate and not counterfeit bills. Camille couldn't imagine how holding the bill up against the light could help him determine if it was a genuine-issue bill or a counterfeit bill. What was he looking for?

### Objectives:

*By the end of this activity, you will be able to:*

1. Identify who is on the front of \$1, \$5, \$10, and \$20 bills.
2. Describe what images appear on the back of the bills.
3. Describe the seals, signatures, and images that appear on American currency bills.
4. Given a counterfeit-detecting pen, determine if a bill is genuine or a forgery.
5. Given U.S. paper currency, describe methods used to determine if the currency is counterfeit or legitimate.
6. Explain why it is difficult to counterfeit U.S. currency.

### Time Required to Complete Activity:

- Part A: Pre-test (5 minutes)
- Part B: \$1 examination (30 minutes)
- Part C: Hidden feature exploration (30 minutes)
- Part D: \$10 bill analysis (30 minutes)
- Part E: Internet tutorial (30 minutes)

### Materials:

- (students should work in pairs)
- stereo or compound microscopes or hand lens
- counterfeit-detecting pen (to share with other groups)
- an assortment of various denominations of U.S. currency (\$1, \$10, \$20, \$50) to share
- computers (optional)
- digital camera (optional)

### Safety Precautions:

None





## Procedure:

1. Complete the pre-test questions in Part A
2. Complete Part B: \$1 bill examination
3. Complete Part C: Hidden feature exploration
4. Complete Part D: \$10 bill analysis
5. Complete Part E: Internet tutorial

If computers are available, examine the following web site:

<http://moneyfactory.gov/newmoney/main.cfm/learning/download>

## Part A

Take the pre-test before starting the lab to determine how much you know about our paper currency. For this part of the lab, you should not be looking at any money but answering the questions from memory. *Record your answers on Data Table 1.*

## Procedure:

Take the pre-test before starting the lab.

## Pre-test:

1. Whose face appears on the front of a \$1 bill?
2. Whose face appears on the front of a \$5 bill?
3. Whose face appears on the front of a \$20 bill?
4. What building is pictured on the back of a \$5 bill?
5. What building is pictured on the back of a \$10 bill?
6. What building is pictured on the back of a \$20 bill?
7. What pictures appear on the back of a \$1 bill?
8. On the front of \$1, \$5, and \$10 bills, what words are written?
9. On the back of the \$1, \$5, and \$10 bills, what words are written?
10. Is the date the bill was issued printed on the front or back of the bill?
11. What seals appear on the front of a bill?

## True/False:

12. The Secretary of the Treasury and the U.S. Treasurer are the same.
13. The serial number is printed in two places on the front of a bill.
14. Newer bills contain more colors than the older bills.
15. There is only one signature located on the front of a bill.
16. There is a picture of a building located on the back of \$1, \$5, \$10, and \$20 bills.
17. The White House appears on the back of the \$20 bill.
18. Because of the separation of church and state, no mention of a higher being or deity can be printed on the bills.
19. There are "hidden images" on the front side of a bill that can only be seen if you hold the bill up to the light.
20. On the back of \$10 and \$20 bills, small yellow numbers indicating their denominations is stamped in the area surrounding the picture.



Data Table 1: Pre-test

Question	Answer
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

**Part B: Observation of \$1 Bills**

After reviewing your answers to the pre-test, you will be given some time to study a \$1 bill. To help guide you in your observations, answer the following questions and place your answer in Data Table 2. You will need to look at the bill using a hand lens or a stereomicroscope.

**Front of the \$1 bill**

1. Whose picture is on the front of the \$1 bill?
2. What is written across the very top of the front of the \$1 bill?
3. What is printed on the very bottom of the front of the \$1 bill?
4. What seal appears on the front, left-hand side?
5. What seal appears on the front, right-hand side?
6. Find the date on the \$1 bill. Record its date in Data Table 1.
7. Who was the Secretary of Treasury at the time this bill was issued?
8. Who was the U.S. Treasurer at the time the bill was issued?
9. Record the serial number for this bill.
10. How many places on the check is the serial number printed?

**Back of the \$1 bill**

11. What words are printed on the top line?
12. What words are printed on the bottom line?
13. What image appears on the back on the left side?
14. What image appears on the right side?
15. What reference to God appears on the back of the bill?



Data Table 2: \$1 Bill Examination

Question	Answer
Front	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Back	
11	
12	
13	
14	
15	

**Part C: How Many Hidden Images Can You Find?**

Courtesy of  
www.moneyfactory.gov



For this part of the lab, you will need new \$10 bills.

1. Form groups of four students each.
2. Each group should have a \$10 bill, hand lens, and stereomicroscope (optional).
3. Each team is to try to identify as many hidden images on the front and back of the \$10 bill. These will include images that can only be noticed by:
  - a. Holding the bill up against the light
  - b. Viewing the bill with a hand lens or stereomicroscope
  - c. Looking for numbers or words that cannot be seen without the aid of some type of magnification
4. Cooperative Learning Teams: Each team should assign one person to each of the following jobs:
  - a. *Recorder*: Person who will write down each of the discoveries as they are noted. Record the notes in Data Table 3.
  - b. *Presenter*: Person who has the job of reporting to the class what the team has discovered
  - c. *Light specialist*: Person who will hold the bill up against the light source and find hidden images



- d. **Magnification specialist:** Person who will use a hand lens (or stereomicroscope) to view hidden images that are visible only with increased magnification
5. Your team will be allowed a limited amount of time to discover the hidden images.
  6. The team with the greatest number of discoveries reports to the entire class first. Any of the other teams will report any discoveries that were not already mentioned by the first team.



Data Table 3: Hidden Images on the \$10 Bill

Location	Images	Numbers
Front of the Bill		
Back of the Bill		

**Part D: Analysis of a \$10 Bill**

Using a hand lens or dissecting microscope, check your bill for the following:

1. The portrait appears flat on the genuine bills, but appears raised on counterfeit bills.
2. For newer \$10 and \$20 bills, the oval around the portrait is gone.
3. The background details of the portrait are clear and distinct on genuine bills.
4. The border edge of the genuine bill is clear and distinct.
5. Note the hidden numbers and words embedded in fine print.

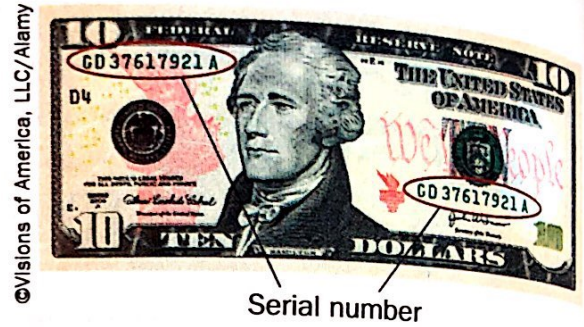




6. On genuine bills, the Treasury seals have clear, sharp, sawtooth points.



7. On genuine bills, the serial number is evenly spaced and the same color as the Treasury seal.  
 8. Genuine paper currency has red and blue fibers woven throughout the bill. You may not be able to see these red and blue fibers without a hand lens or a stereomicroscope.



9. Counterfeit currency uses red and blue inks that are often blurred. This inking may be detected with a hand lens.

10. Examine a bill looking for the following:

a. *Security thread*. Hold the bill up to the light, and a thin line appears with the denomination of the bill written in it. The

position of the thread varies from denomination to denomination but always runs from top to bottom.

b. *Color-shifting ink*. When the bill is tilted, the color of the left-corner 10 shifts from copper to green.

c. *Watermark*. Appears on the right side of the face of the bill if it is held up to a light. The image also appears on the left side of the bill if viewed from the back of the bill.

d. *Color*. The background color on both sides of the bill is enhanced.

e. *Symbols of freedom*. A large, red image of the Statue of Liberty's flame is printed to the left of Hamilton, and a smaller, red metallic



Security thread



Color-shifting ink



Watermark





Symbols of freedom

image is found to the right (\$10). Other seals are affixed to other denominations in the same position.

- f. *Enhanced portrait.* The oval border around the portrait has been removed, and the shoulder extends to the border of the bill. The portrait appears to be in front of the bill.
  - g. *Multiple 10s, 20s, 50s, etc.* Small yellow 10s, 20s, and 50s are printed on the front, back, or both sides of the bill designating its denomination.
11. Using a counterfeit-detecting pen, mark the edge of the bill and examine the color. A genuine bill will be pale yellow to tan, whereas a counterfeit bill will turn brown.

**Part E: Internet Tutorial**

Go to the following web site and click on Interactive Notes.

<http://moneyfactory.gov/newmoney/main.cfm/learning/download>

**Questions:**

1. Counterfeiters sometimes collect dollar bills and bleach them to remove the ink. Using a printer, they will print images of a higher-denomination bill on the bleached paper. What is the advantage of bleaching the dollar bill over just printing the higher-denomination bill onto clean paper?
2. Why has it been necessary to make so many changes to our paper currency in the past 30 years as compared to the last 100 years?
3. Of all the safeguards added to our higher-denomination currency, which do you consider the most important and why?
4. Counterfeiters try to pass off their counterfeit money at public events where many people gather. The Olympics held in Salt Lake City, Utah, employed many volunteers. These people are not necessarily trained in checking larger bills to see if they were genuine or counterfeit. Provide a list of four items to quickly and easily check the authenticity of a \$10 bill.

Enhanced portrait



The old \$10 note, front



The series 2001 \$10 note, front

