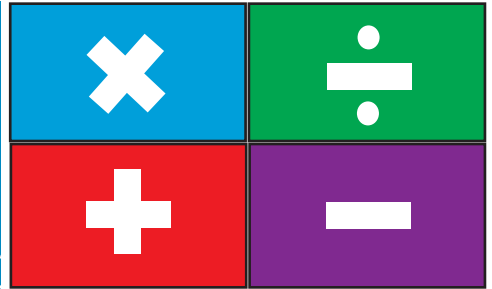
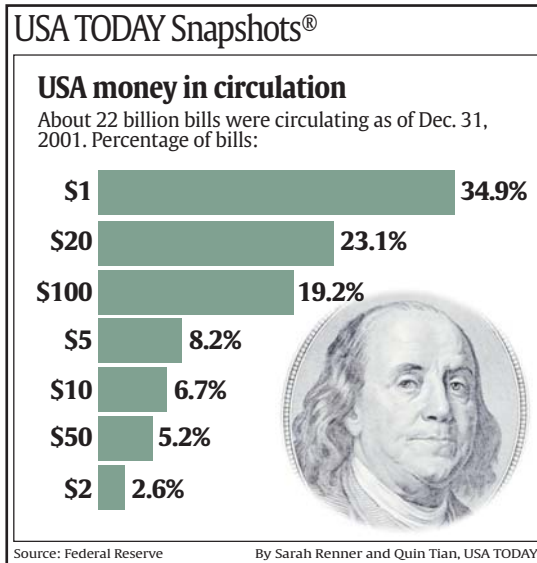


Math TODAY™ Challenge Student Edition



The New Color of Money



Activity Overview:

The United States government has issued newly redesigned currency. The \$20 note is first to be released, and will include both new and enhanced designs and added security features in an effort to reduce the amount of counterfeit currency production. You will read about the changes in the "new money" and then create a graph to represent various combinations of currency produced. You will use percents and total number of bills to determine about how many of each denomination is in circulation.

Activity 1: According to the USA TODAY Snapshot "USA money in circulation" how many \$20 and \$1 bills were in circulation as of Dec. 31, 2001?

- Look at the USA TODAY Snapshot to find what percentage of \$1 bills are in circulation and the number of total bills in circulation.
- Calculate the total number of \$1 bills based on the data and then express your answer in scientific notation.
- Use the same procedure to determine the total number of \$20 bills in circulation and express that number in scientific notation.

Focus Questions:

- According to the USA TODAY Snapshot® "USA money in circulation" how many \$20 and \$1 bills were in circulation as of Dec. 31, 2001?
- Using the USA TODAY Snapshot "USA money in circulation," determine the total percentage of bills in circulation that are \$20 and under.
- According to the USA TODAY article "It's too easy being green" \$130 million in counterfeit U.S. currency is estimated to be circulating around the globe. If the most common notes are the \$1 bill and \$20 bill, create a graph showing all of the possible combinations of \$1 and \$20 bills that could be circulating.
- What is the equation of the graph described above?

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It's too easy being green

MONEY SECTION - TUESDAY - MAY 13, 2003 - PAGE 1B

By Barbara Hagenbaugh
USA TODAY

WASHINGTON -- Few Americans give the money in their wallets more than a glance, but maybe they should.

More than \$130 million in counterfeit U.S. money is estimated to be circulating around the globe. If you put all the counterfeit U.S. bills end-to-end, they would stretch more than 260 miles, about the distance between Las Vegas and Los Angeles.

In an effort to thwart counterfeiters, the government today will unveil a new \$20 bill -- the most commonly copied currency domestically. The bill, which will enter circulation in the fall, will include colors other than green for the first time in modern history. Currency was last redesigned in 1996, and the most recent \$20 has been in circulation for 4 1/2 years.

The redesign in part is in response to the proliferation of inexpensive, high-quality home computers, scanners and printers that have made it easier for counterfeiters to fake money. But most of those bills are still pretty poor in quality, and the feel alone -- standard printer paper doesn't compare to the 25% linen, 75% cotton U.S. currency -- should tip most cashiers off.

The biggest problem continues to be counterfeit currency made in Colombia -- the nexus of fake dollar making. The Colombians have refined counterfeiting of U.S. currency to an art, and many times a fake can't be spotted unless bills are closely scrutinized. Approximately 60% of counterfeit dollars circulated in the USA are made abroad, mostly in the South American country.



A war with several fronts

The Secret Service, the agency responsible for stopping counterfeiters, is fighting the war against counterfeiting today on several fronts. Not only are agents spreading out across the country to catch home counterfeiters, but their mission has become global. That's because some countries have officially adopted the dollar as their own currency, and the greenback has become commonly accepted in other nations. Sixty percent of the more than \$650 billion of U.S. currency in circulation is estimated to be abroad, according to government data.

Officials also worry terrorists could use counterfeit money to undermine currency confidence or to fund acts of terrorism. In December, white supremacist Leo Felton was convicted in Boston of conspiring to blow up buildings with Jewish or African-American links. Felton was partly funding the endeavor with counterfeit money.

In addition to old-fashioned detective work, the Secret Service employs forensic chemists who study counterfeits to determine anything from the type of tree the paper came from to the

kind of ink used. Those clues can be vital in tracking moneymakers down. The Secret Service also has dogs trained to sniff out counterfeit money.

About 20% of seized counterfeit bills are spotted by machines at the 12 Federal Reserve banks, which collect cash from private banks as they meet their requirement to keep money on reserve. The rest is caught or turned into the Secret Service by banks, individuals or other law enforcement. A sample from each group of counterfeits is kept at Secret Service headquarters. The rest is burned at an "undisclosed location."

Focusing on Colombia

The main target is Colombia. The Secret Service seized \$86 million in counterfeit U.S. currency in the South American country in 2002. That's 2 1/2 times the amount seized in all countries outside the USA and Colombia combined and more than seven times the second-place country, Chile.

Tony Chapa, head of the Secret Service's counterfeiting division, says it seems Colombians are upping their output year after year.

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"We're concerned that the amount of counterfeit being produced is still on the rise," he says.

In one case, U.S. and Colombian law-enforcement agents found a metal plate in the middle of a banana plantation that covered a hole leading to an 8-foot vertical tunnel. That, in turn, led to a 10-foot horizontal, narrow passageway.

Inside, they found a 12-foot by 15-foot room filled with counterfeiting equipment, including a printing press, negatives and ink. After matching the style of the money in the room to currency that had been passed, it was determined that the printer made \$20 million that entered circulation over 10 years.

The Secret Service began basing agents in Colombia in 1996. Today, there are three agents who work out of the U.S. embassy.

Why Colombia?

► **Printing expertise.** Colombians have long been known as expert craftsman for making legitimate currency for a variety of countries. So they already had the knowledge and the necessary equipment, which does not come cheap.

► **Drug pipeline connections.** Colombia is the top producer of cocaine and supplies about 90% of the cocaine distributed in the USA, according to the CIA. Not only is fake money used to buy drugs, but those in the drug trade have developed an advanced system for delivering and circulating drugs. The same skills are applicable to counterfeit money.

► **Old laws had no teeth.** Until December, when the Colombian government passed strict laws, counterfeiters barely got a slap on the wrist for faking money. Some counterfeiters were walking out of jail before the

paperwork was even complete. In the USA, counterfeiting is a federal crime. Penalties can include fines and up to 15 years in prison.

The process of producing high-quality counterfeit money is long and requires great skill. Counterfeiters use X-ray-like technology that burns the images onto metal plates. The money passes through a press eight to 10 times before completion. Items like the watermark and the security strip, which will be kept on the new \$20, are generally printed on, rather than being imbedded into the paper, like legit money.

The paper of the Colombian fakes feels a lot like U.S. currency, which has solely been created by Crane Paper in Massachusetts since 1879. After bleaching \$1 bills for years to create \$100s -- the most commonly counterfeited currency abroad -- many Colombians are now using paper that used to be used to make Venezuelan bond currency, a cheaper method.

It's not just paper currency. Officials recently have caught several counterfeiters who were making the \$1 Sacagawea coin, which is popular in Ecuador, a country that has "dollarized," meaning their official currency is U.S. money. Panama and El Salvador also have adopted the dollar, and others are semi-dollarized, meaning the dollar is accepted along with official currency.

Secret Service officials say they are seeing the emergence of "counterfeit cartels" in Colombia as several counterfeiters join together to combine resources and to demand higher prices, much like OPEC, the cartel of oil-producing nations, does.

Homegrown opportunity

As home computers become just as common as telephones, U.S. officials

\$20 bill's features, new and old

(Update note: The \$20 bill was released on October 9, 2003)

The new \$20 bill, which is scheduled to be unveiled today, will be the same size as the current version, but it will look very different.

The biggest difference will be the use of colors other than green for the first time in modern history. There will be one predominant, yet subtle color that will appear in the background and at least one other color elsewhere.

Engravers have also updated the images of Andrew Jackson and the White House.

Other current features will remain, but officials have not said if their locations, sizes or appearances will change:

► Color-shifting ink, which currently is seen in the "20" in the lower right-hand corner on the front. It's the one feature counterfeiters have been unable to reproduce.

► The watermark, which currently is to the right of Jackson's head. Held up to the light, there is a faint image of Jackson.

► The security strip. Currently to the left of the portrait, a thin strip runs vertically that reads "USA TWENTY." It can also only be seen when held up to a light.

are being stretched to catch counterfeiters in the USA. One out of three homes had an ink jet or other high-quality printer in 2002, according to data from Massachusetts-based IDC, a technology research firm.

In fiscal 2002, which ended Sept. 30, 39% of the fake currency in circulation in the USA was made using a computer, up from 8% in 1992.

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"Most every household has the basic tools to produce it," says Chapa of the Secret Service.

The government report issued last month said officials were concerned counterfeiting could grow as computer use gains popularity abroad. And, they note, counterfeiters can easily e-mail prototypes for fake bills in a number of seconds.

Unlike the Colombian counterfeit, which passes through several hands before entering circulation, much of the money made at home is passed by the person making the bills.

Often times you'll see a counterfeiter buying a small, inexpensive item, like a candy bar or a pair of socks, with a \$20 bill to get the genuine greenbacks in change, Secret Service officials say.

To prevent losses, some merchants, especially in cities like Miami that

often are entry points for foreign-made counterfeits, refuse to accept \$100 bills. Others, like Bonnie Clewans, owner of The Bead Gallery in Buffalo, instructs her employees to scan every \$50 and \$100 coming into her shop with a counterfeit-detecting pen.

"Nobody wants to lose merchandise and get ripped off like that," says Clewans, who sells beads ranging from 5 cents to \$25 each for use in jewelry making and in other areas, such as fly-fishing.

In other countries, all money, including dollars, is scrutinized. Government officials hope the additional colors on U.S. bills will lure people to look at their money more carefully.

"It's hard to convince people that they should look at their notes," Bureau of Engraving and Printing Director Tom Ferguson says. "To some degree we're a victim of our own success."

Data Source:

Federal Reserve

Materials:

- TI-83 Plus Silver Edition or TI-83 Plus

Additional Information:

The New Color of Money Program
The USA TODAY Charitable Foundation, in collaboration with the Bureau of Engraving and Printing and the Federal Reserve System, has developed a range of interactive educational activities to raise awareness of the newly redesigned \$20 note. Find additional information at: www.moneyfactory.com/newmoney and www.usatodayfoundation.org.

Activity 2: Using the USA TODAY Snapshot "USA money in circulation," determine the total percentage of bills in circulation that are \$20 and under.

- Complete the table below to help organize the data from the Snapshot.

Bills (denomination)	Percentage for each denomination

- Use the values from the table to answer the question in Activity 2. The total percentage of bills in circulation is _____.

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Activity 3: According to the USA TODAY article "It's too easy being green," \$130 million in counterfeit US currency is estimated to be circulating around the globe. If the most common notes are the \$1 bill and \$20 bill, create a graph showing all of the possible combinations of \$1 and \$20 bills that could be circulating.

- First, find the number of \$1 bills and \$20 bills that will total \$130 million. Complete the table below for the number of bills and remember that the total must equal \$130 million. The first row of the table shows one example.

Number of \$1 bills	Number of \$20 bills	Express the number of \$20 bills in scientific notation
20	6499999	6.499999×10^6

- Enter the data from the table in two lists. In L1 enter the data from the first column "Number of \$1 bills" and in L2 enter the data from the second column "Number of \$20 bills".
- Press $\boxed{2\text{nd}}$, and make the appropriate settings for the scatter plot of L1 and L2.
- Press $\boxed{\text{WINDOW}}$ and set an appropriate window for the data you have entered and wish to graph. Press $\boxed{\text{GRAPH}}$ to see your scatter plot.
- To create a linear regression model for the data press $\boxed{\text{Y=}}$ followed by $\boxed{2\text{nd}}$ $\boxed{[L1]}$, $\boxed{2\text{nd}}$ $\boxed{[L2]}$, $\boxed{\text{VARS}}$, $\boxed{\text{D}}$, $\boxed{\text{ENTER}}$ $\boxed{\text{ENTER}}$ $\boxed{\text{ENTER}}$. Press $\boxed{\text{GRAPH}}$ to see the scatter plot of the data and the linear model graphed together.
- What is the equation of the graph described above?

- Press $\boxed{\text{TRACE}}$ $\boxed{\text{D}}$ so that the cursor is on the linear model to find some other combinations for \$1 and \$20 that will give a total of \$130 million.

Student Notes: