The Life Cycle of 🕲 a Soccer Ball

S occer—the most popular sport in the world—is played by people young and old in countries near and far. Whether you play on a school team or with friends on the weekends, you know that what makes the sport so great is that you can play anywhere; Il you really need is open space, teammates, and a ball. And while that may appear simple enough, the making of a soccer ball isn't quite as simple. Have you ever wondered how soccer balls are made and what happens to them when you're finished playing

As with any product, making a soccer ball uses natural resources and energy, which can impact the air, land, and water.

Follow the life cycle of a soccer ball on this poster to learn more about how it is made and how you can help reduce its environmental impacts. Understanding this life cycle can help you make environmental choices about the products you use, and how you dispose of them.



Getting Rid



out, you can save resources, save energy, and

Recycling a soccer ball is difficult because most of the materials used to make a ball are glued, titched, or printed and cannot be separated out for recycling. Wondering what to do with your soccer ball when you are done with it? There are two options: reuse it or throw it away. Which one s better for the environment?

Share your love of the sport.

- · Donate your used soccer ball to an organization that sends the balls to children who cannot buy their own.
- · Donate your soccer gear-shin guards, cleats, or clothes-that you've grown out of or no longer need (see "Global Gear Giveaway" on the back of this poster for more information).

· Organize a "swap" day at your school, camp, or soccer club. Swap your gear for something "new!"

Get Creative.

- · Hang your old soccer ball from the ceiling of your garage to mark where the car should stop. The soft ball won't harm the car and may help prevent you from hitting a wall, shelf, or other item in the garage.
- . If your ball just won't hold air anymore or is too beat up to be donated, you can give it to your dog or a neighbor's dog as a chew toy. Larger dogs, in particular, love old soccer balls.

Gathering the Materials

O occer balls are made from a variety of raw naterials that come from the Earth. For exam

- · Crude oil and other materials extracted from the Earth are used to make various kinds of plastic and polymers, including polyurethane (PU), thermoplastic polyurethane (TPU), butyl, and silicone.
- Natural latex rubber is extracted from plants.
- · Glue is made from natural substances such as natural rubber, animal bones, fish, starch, milk protein, or casein, or from cyanoacrylate, a clear plastic invented by Dr. Harry Coover.
- · Cotton is picked from plants, which grow throughout the United States and other countries



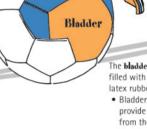


When you buy a ball, try putting a few drops of silicone oil into the valve. The oil will help the ball retain air, and make it easier to insert the needle when refilling it.

Using the Ball

- · Check the air pressure frequently to maintain proper pressurization
- Remove excessive dirt with a damp cloth and
- Play on soft, smooth surfaces, such as grass or turf.

- . Use harsh chemicals for cleaning.
- · Play on hard or rough surfaces such as gravel, asphalt, or concrete
- · Play with a wet ball during freezing temperatures.
- . Stand or sit on your soccer ball.



Preparing the Materials

> ne bladder is the inside part of the ball that is filled with air and is typically made from natural latex rubber or butyl (plastic)

- · Bladders made from natural latex rubber provide the softest feel and proper bounce
- · Bladders made from butyl can hold air longer and retain the ball's shape better than bladders made from latex rubber



Getting the Soccer Bal to You

very material used to make a soccer ball, as

well as the finished ball itself, has to get from one

place to another-and ultimately to you! Soccer balls

are made overseas and are transported by plane, and

fuels for energy. Emissions created from the burning of fossil fuels contributes to air pollution and global

Product packaging helps protect an item from damage,

identify the contents, and provide information about

crude oil in the Earth), aluminum (from ore), or other

materials, excessive or unnecessary packaging can be

wasteful. The good news is that the packaging for

cardboard box or often nothing at all.

soccer balls is fairly minimal, usually consisting of a

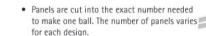
the product. But, since it uses valuable natural

resources such as paper (from trees), plastic (from

then truck or train, which requires the use of fossil

climate change.





- or logos, with each panel printed separately. After printing, the material may have another layer of clear urethane (or other clear plastic substance) applied for protection.
- · Holes are pre-punched in each panel and the ball is either hand-stitched or machinestitched with a polyester thread. A handstitched ball takes one person approximately 1.5 hours to sew. A machine-stitched ball takes approximately 10 minutes to be stitched together by many workers.
- stitches will show and the bladder is inserted and inflated.
- Soccer balls that are used for professional play or those that include the seal of approva of a soccer organization go through a series of tests performed by an independent laboratory





Ithough soccer balls can vary in size, weight, and quality, the process to make

- Surface material is rolled out—usually seven layers of synthetic foam-filled panels are glued (laminated) together to make a stron vet smooth exterior.
- . The lining, made of multiple sheets of fabric, is glued to the cover. The lining goes between the cover and the bladder to provide shape, feel, control, and structure. Balls can have up to four layers of polyester and cotton lining-the more layers, the better the shape and durability of the ball.
- · Exterior panels are silk-screened with graphics
- The stitched ball is reversed so none of the
- to ensure quality of performance





· Lining is composed of polyester and/or cotton bonded together.

throughout the panels.

ost raw materials must be processed ost raw materials must be processed before manufacturers can use them to

converting raw materials into usable plastics and

The eover (surface) of most soccer balls is visible

to everyone. It may be patterned with black and

white hexagons or a variety of different colors.

synthetic leather or rubber, which is typically

Stitching or glue holds the hexagon panels of the

polyester or similar thread, while other halls

The lining of a ball plays an important role in its

strength, structure, and bounce. Layers of lining

are placed between the cover and bladder to make sure the thickness of the ball is the same

· The surface of soccer balls is made from

made from plastics such as types of

· Some balls are stitched together using

use glue to hold the panels together.

make products. For soccer balls, this means

other materials

polyurethane.

Fast Fact place in 1872

Coccer balls come in a variety of different sizes of for different age groups, so choosing the right size can impact how you play. In addition, the higher quality soccer balls will likely last longer than cheaper, lower quality balls, One way to ensure quality is to look for a soccer organization's "approval" imprinted on the ball. These designations let you know that the ball has passed tests for proper shape, balance, bounce,

Taking good care of your soccer ball will increase

and other requirements at an independent

when you finish using them? Do you know how each of the products you use impacts the environment?

Just as living things are born, get older, and die, products also complete a life cycle. Each stage of a product's life cycle can affect the environment in different ways. Some products have many different components, each of which has its own life cycle in addition to the life cycle of the composite product. The stages of a product's

- ✓ Design. A product's design can influence each stage of its life cycle and, in turn, the environment. Design ffects which materials will be used to manufacture a product. For example, cheaper materials are often less durable, which means the product will have a short useful life. Product design can prevent waste in many ways. Products can be designed with modular components that can be easily replaced so that the entire product does not have to be thrown away if only one piece breaks. Items meant to last a long time can avoid trendy designs so they are not thrown away when they go out of style.
- ✓ Materials Extraction. All products are made from materials found in or on the Earth. "Virgin" or "raw" naterials, such as trees or ore, are directly mined or harvested from the Earth, a process that can create pollution, use large amounts of energy, and deplete limited natural resources. Making new products from materials that have already been used (recycled materials) can reduce the amount of raw materials we need
- ✓ Material Processing. Once materials are extracted, they must be converted into a form that can be used to make products. For example, paper is made from trees, but the wood has to undergo several different processes before we can use it.
- ✓ Manufacturing. Products are made in factories and require a great deal of energy to create. The manufacturing process can also produce pollution. Many products require the use of packaging as well, to prevent spoilage, damage, contamination, and tampering.
- ✓ Packaging and Transportation. The use of packaging can protect products from damage and provide. product information. However, packaging consumes valuable natural resources and when used excessively can be wasteful. Some packaging can be made from recycled materials. Finished products are transported in trucks, planes, and trains to different locations where they are sold. All of these forms of transportation burn fossil fuels, which can contribute to global climate change.
- ✓ Use. The way products are used can impact the environment. For example, products that are only used once ate more waste than products that are used again and again.
- ✓ Reuse/Recycling/Disposal. Using a product over and over again prevents the need to create the h saves resources and energy while also preventing pollution. Recycling or remanufacturing products also reduces the amount of new materials that have to be extracted from the Earth. Throwing a product away means that it will end up in a landfill or incinerator and will not be useful again.

What's in That Ball?

titched-up cloth, pig or cow bladders, and even animal and human skulls. Today's soccer balls are made from synthetic leather and other raw materials so that they maintain their shape, and are fast in flight. waterproof, soft to the touch, and safe to head. The timeline at the bottom of this poster shows how the content and design of the soccer ball has changed over the years.

From the list below, match the raw material found in the Earth to the product that is created and used to

Product	Source
Plastic	Plants
Natural latex rubber	Animal bones, fish, starch, milk protein
Glue	Plant extract
Silicone	Crude oil Cotton = plants, Cotton = plants,
Cotton	Plastic – crude oil; Natural latex nubber – plant extract; Glue – animal bones, fish, starch,
	Answers:

1862

H.J. Lindon

veloped one

of the first

inflatable

rubber

bladders

for balls.

1855

Charles Goodyear

first treated rubber

soccer balls

designed and built the

The newly formed nglish Football Association, or EFA named so because soccer is known as football in every nation except the United States), met to decide on the laws of the game No description of

1872

of soccer, including that the ball "must be spherical with a ircumference of 27 to 28 nches." That rule remains n todav's Fédération ternationale de Football Association (FIFA) laws. FFA and FIFA are both the ball was members of the offered in the first International Football set of rules. Association Board.

South American Soccer Smarts

Soccer is played all over the world and is especially popular in South America, where reducing waste is as important as it is in the United States. In many of lese countries environmental laws are not strict enough to enforce wise use of natural resources, so common activities like logging and pollution can cause environmental concern

Use the following clues to determine which South American country

To learn more about these countries, you can conduct your own research on the Internet or at your-school library. What kind of language, culture, and climate do these countries have? Do they face any particular kind of mental problems, such as air pollution? Why? What can be done to improve the state of the environment of these countries?

- _____ 1. This country has more than 1,920 recorded species of birds and is home to Carlos Valderrama, who led the country to three World Cups
- This country, which boasts both deserts and glaciers, suffers from extensive logging outside of protected areas. It also hosted the World Cup in 1962.
- Due to the dense human population in the eastern part of this country, mammals such as the giant anteater, maned wolf, Brazilian tapir, and jaguar are quickly disappearing. In 1998, it also had the first Golden Goal scored in a World Cup match by Laurent Blanc.

Global Gear Giveaway

and difficult to find. You can help others and be environmentally friendly by sending your used sporting

Here are some tips for organizing a successful equipment drive in your school or community. You can

1. Check in with the organization you will be working with on what kind of equipment they accept,

2. Set up bins, cardboard boxes, or trash cans in a central location so people can drop off their gear.

These can be set up at your school, church, local businesses, sports and recreation fields, etc.

3. Determine a time frame for your collection. For your first drive, a shorter time frame might be more

4. Try to get as many people as possible involved. Inform people through your school, local sports

will be more than willing to help out and happy to know that their old gear will be of use.

5. Make sure you record the amount you send off so you can report back to the families that

Organizations That Collect Used Sporting Equipment

. The Passback program collects playable soccer gear and sends it to teams and organizations that

. One World Running collects, washes, and sends new and "near-new" athletic shoes, T-shirts, and

shorts, along with medicine and school supplies, to athletes and children in developing countries.

. Goodwill sorts and prices your sporting equipment (as well as other items) and then sells it in one of

. The Nike Reuse-A-Shoe program takes old, worn-out, unusable footwear and converts them into

basketball and tennis courts, running tracks, and athletic fields. http://nikereuseashoe.com

programs that give people job training and other career services. <www.goodwill.org>

their 1,900 well-known retail stores across North America. The revenue from the stores helps fund

Make sure to check with the individual organizations to confirm their donation policies

cannot afford even the most basic equipment. <www.passback.com>

nanageable, so as to control the amount of gear you receive. Pick a specific date to end the drive

leagues and teams, local newspapers or other media outlets, or simply word-of-mouth. Most people

collect lots of used gear to donate, and prevent useful items from ending up in the trash.

equipment (either individually or by organizing a collection drive) to kids and teams who would otherwise

ed with it. In many parts of the world, balls and other sporting equipment are very expensive



- 4. No bigger than the state of Nevada, this country suffered an oil spil oast of the Galapagos Islands in 2001. It also participated in the World Cup for the first time in 2002
- This country has won three World Cups with the help of Pelé, who scored more than 1,000 goals in his career. The Amazon, the world's longest river, is
- 6. Well-known striker Teofilio Cubillas, who scored 10 World Cup goals, is from this South American country, which claims paper-making as a primary industry.
- This country is the fifth-largest in South America, measuring roughly the size of France and Spain combined. The country lost to Spain 3-1 in the 1994 World Cup.
- More than 30 percent of this country is taken up by the grassland plain of the central Llanos, which is drained by the continent's third-largest river, the Rio Orinoco. It is also the only South American country where baseball is more popular
- Five rivers flow westward across this country and drain into the Rio U been more than half a century since this country won the World Cup
- 10. This country's national parks preserve unique thorn forests, virgin rainfo lowering cacti, and extensive forests of monkey-puzzle trees. It is also hom Diego Maradona, one of the best dribblers in soccer history.

Crafts for Kicks

o you have an old soccer ball that you can't use anymore but can't hear to nart with? Perhaps is nymore but can't bear to part with? Perhaps it vas the game ball from the first time you scored, or the first soccer ball you ever received. Whatever its sentimental value, an old ball sitting on the shelf isn't very useful, so why not try to extend its life by turning

Ball Handler

Make a decorative flower pot out of your soccer ball.

- An old soccer ball
- Two small potted plants
- A pencil

Directions:

- 1. With your pencil, draw a line around the center of the soccer ball. This will be the line you follow to cut your soccer ball in half.
- 2. Begin cutting the cover of the soccer ball. You may find that it is easier to cut along the panel stitching rather than trying to cut a straight line.
- 3. When the soccer ball has been cut, begin removing the lining and the bladder so that all that is left is the two halves of the soccer ball cover
- 4. Take your potted plant and place it, with its pot, inside one half of the soccer ball. Do the same thing with the second potted plant and the other half of
- 5. Place your plant and new holder in a spot that is appropriate for the plant to grow. You might want to put the holder on a plate to catch excess water.

For a more fitted pot holder, transfer the plant from it's existing pot directly into the half soccer ball. Before doing this, line the soccer ball with plastic wrap or aluminum foil to keep water from leaking. Add extra soil as necessary to fill the soccer ball.

Bank the Shot

- Scissors A pencil
- · A thick sewing needle

Directions:

- 1. Deflate your old soccer ball.
- 2. Cut a slit in the ball. Pull out all of the lining and the bladder. As you begin pulling out the insides of the ball, you may find that you need to widen the slit you cut, do so with scissors instead of allowing the ball cover to rip.
- 3. When all of the insides are out, begin sewing your ball back together. Leave about 11/2 inches open on the ball so that you can add coins to it.
- 4. Begin filling your ball with coins. Watch your ball firm up as you add more and more money. When the ball is full, cut the thread and take out all of the coins. Use your coins to buy tickets to a soccer match, donate the money to a charity, or put the money away in savings
- 5. When you are ready to start collecting money again, sew the slit back together, again leaving an open slot for coins and start the process all over again! You are giving your soccer ball a second life as a bank, and using it over and over

Shipping Out



ransportation is a major part of the environmental impacts of specer balls. Specer balls are n manufactured in the United States, which means they must be transported to your local sport tore by plane, boat, train, and/or truck. The fuel used during this transport releases carbon dioxide (CO2) a greenhouse gas that contributes to global climate change. Kick your math skills into gear by answering

- 1. Out of all the forms of transportation, air travel creates the most CO₂ emissions. Therefore, many soccer ball and equipment manufacturers are attempting to reduce the number of shipments of
 - a. For example, one major soccer apparel manufacturer reduced its air freight shipments by 5 percent from 2000 to 2001 through improved planning and production. If the company had
- b. How many total shipments would the company have if it decreased its number of shipments by
- 2. A one-way flight from Hong Kong, China (where many soccer balls are made), to Los Angeles, California, in the United States is 7,233 miles. To make this trip an average airplane uses 1,500 gallons of fuel, which produces approximately 36,000 pounds of CO2 emiss
 - a. How much fuel (in gallons) is required for a round-trip flight between these two cities?
 - **b.** If a manufacturer requires 500 air shipments a year from Hong Kong to Los Angeles, how much CO2 will be emitted (in pounds)?
 - C. What if the number of trips was reduced by 5 percent? How much less CO. (in pounds) would
 - d. To put these numbers in perspective, the CO₂ emissions for a one-way trip from Hong Kong to Los Angeles is equivalent to the CO2 emitted by 772 cars in one day! Let's say 10 one-way flights were made in one day. That's the equivalent in CO2 emissions of how many cars?

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Sun Safety

Most soccer games around the world are played outside. However, spending too much time in the sun can lead to skin damage, including sunburn, blisters, leathery skin, and skin cancer. Wearing sun tems can protect your skin from the effects of the su

Today's sun rays are so strong because of the loss of ozone. Ozone is a naturally occurring gas found in Earth's upper atmosphere that absorbs the sun's harmful ultraviolet (UV) rays. Until recently, a variety of chemicals. including chlorofluorocarbons, released into the atmosphere reduced the amount of ozone. Realizing the danger they posed, these chemicals were banned from use in manufacturing processes and products. With the depletion of the protective layer of ozone, we receive more UV radiation on Earth, which makes the sun more harmful to

Using a stopwatch, spend 60 seconds memorizing the sun protection items below. When the 60 seconds are up, pull out a blank sheet of paper and write down as many as you can remember. How many of these items can you nember to use when you spend time in the sun? How does each item help protect you from harmful UV rays?

For more information about sun safety, visit <www.epa.gov/sunwise



For more information, check out what these organizations are doing to protect the environment:

Adidas

http://www.adidas-salomon.com/en/sustainability/environment/default.asp

Nike

http://www.nike.com/nikebiz/nikebiz.jhtml?page=27

A new ball made entirely of synthetic materials was introduced as the official soccer ball of the 2002 World Cup. Controversy ensued as some players felt that the materials used made the ball too light and bouncy to contro

Late 1880s

participated, as well as to local papers

<www.oneworldrunning.com>

op-grade ball covers were made with leather from the rump of a cow while lower quality balls were made from the shoulder.

Soccer Balls Through the Ages

The official size and weight of the soccer ball was changed slightly when the official weight range was increased from 13 to 15 ounces to 14 to

The first totally synthetic ball was produced.

1980s

Synthetic leather totally replaced the leather ball.

2002

1850 1860 1870 1880 1920 1930 1940 1950 1960 1990 2000