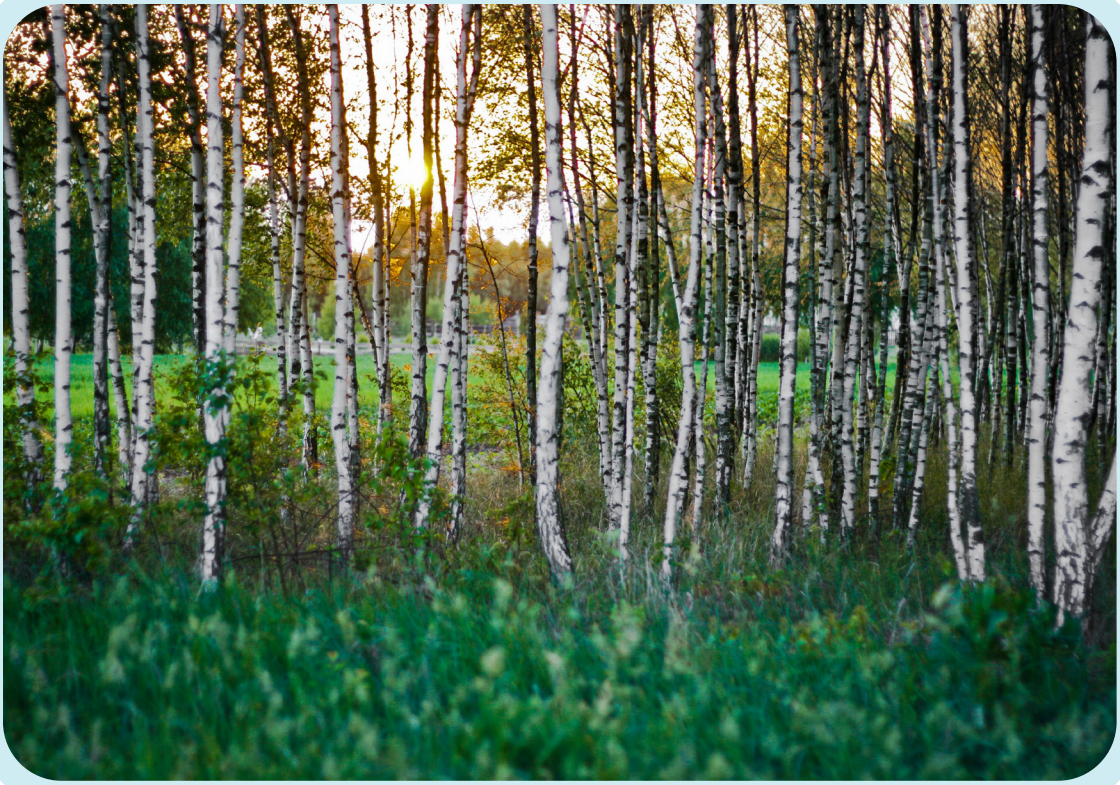
STEM Sims™

Carbon Cycle



Carbon Cycle

Do you need an idea for a scientific study? Try out one of our ideas or make one of your own.

Start learning right now about the wonders of the carbon cycle. Take the following brief quiz to see how much you already know about how carbon moves through the environment. See the bottom of page 4 to check your answers.

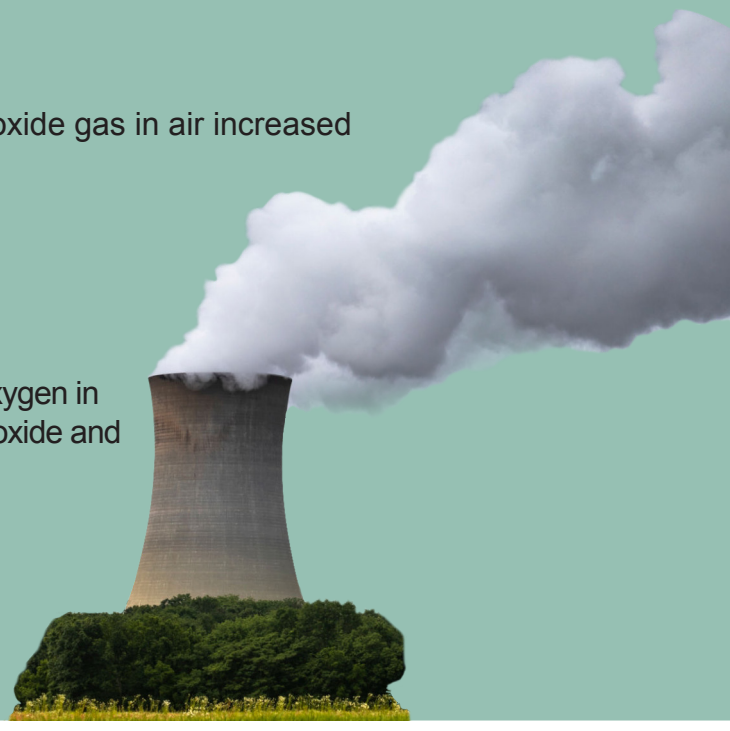
1. About how long will carbon dioxide that is put in the air today be around before it is recaptured by plants?
   a. 20 - 30 months
   b. 20 - 30 years
   c. 100 - 300 years
   d. 500 - 1,000 years

2. All of the following activities add carbon dioxide to the air *except*:
   a. burning wood.
   b. animals exhaling.
   c. plants photosynthesizing.
   d. plants undergoing respiration.

3. Carbon dioxide gas currently makes up about what percentage of the total gases in air?
   a. 0.04%
   b. 1.4%
   c. 4%
   d. 14%

4. By how much has the concentration of carbon dioxide gas in air increased since the start of the Industrial Revolution?
   a. 0.047%
   b. 0.47%
   c. 4.7%
   d. 47%

5. When fossil fuels are burned, the concentration of oxygen in air is decreased and the concentrations of carbon dioxide and water vapor are increased.
   a. true
   b. false



Make Your Own Carbon Paper

Have you ever noticed at the bottom of some formal letters are the initials “cc”? These initials previously meant that a “carbon copy” of the letter was sent to a person other than the intended recipient of the letter. Prior to the common use of the copy machine, a carbon copy was a special sheet that transferred the contents of a letter to a separate piece of paper. This meant the author of the letter did not have to retype or rewrite the letter to send it to multiple people. The sheet was made from a mix of carbon and wax. Are you ready to make your own carbon copy paper? Get started now.

Materials

Picture You Want to Copy	Sheet of Copy Paper 1
1-Pencil	Masking Tape

Directions

1. Make sure to get proper permission before you do this experiment. It can get messy.
2. Make sure the picture you want to copy is not valuable since you will write on the front side of the picture.
3. Take the picture you want to copy and flip it over.
4. Hold your pencil horizontally and use the side of the pencil to darkly shade over the outline of the picture you want to copy.
5. Holding the picture you want to copy up to a light might help you better see the outline you want to shade.
6. Only shade the outline parts of the picture you want to copy, not the entire picture.
7. Flip the picture back over and place the blank sheet of copy paper underneath the picture.
8. Use the making tape to securely tape the picture and copy paper to the hard surface (like a desk).
9. Use your pencil to trace over the outline on the picture you want to copy. Make sure to press down firmly so the image is transferred to the copy paper.
10. Remove the tape and the picture outline will now appear on the copy paper.
11. Use your pencil to trace the outline of the picture on the copy paper and you now have the image copied.

Questions

1. The writing part of a pencil is often called the pencil’s lead. Is this part of the pencil actually made of lead or is it made from some other material? If so, what other material?

2. Propose a description of how you think a modern copy machine makes a copy of an image.

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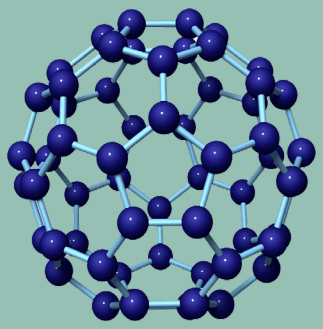
The Wonders of Carbon!

Carbon is a major element that makes up all living things. Yet, as universal as carbon is, it has some highly unusual properties. In fact, carbon shows allotropy, which is the ability to exist in various physical forms under the same conditions. The allotropes of carbon include diamond, graphite, and some really weird shapes know as fullerenes.

- The diamond allotrope is one of the hardest materials known and is prized for its brilliance and durability.
- The graphite allotrope is used to make the writing parts of pencils and serves as a very useful dry lubricant.
- The fullerene allotropes include shapes similar to footballs, soccer balls, and nanotubes, which are tube-like structures that resemble pipes.
- Graphite is the most stable form of carbon and is a good conductor of electricity.
- Nanotubes can provide extraordinary strength when organized correctly.
- Buckminsterfullerene has the appearance of a soccer ball and is part of the black soot that emerges from a fire.



Carbon makes up the backbone of many important molecules including the cellulose that makes up a part of wood, glucose that is the energy store for all living things, and octane that powers many of the vehicles on the road today. Continue your study of carbon and discover more wonders about this super important element.

Please visit our site for more helpful information:
STEMsims.com

Answers: **Page 2 Answers: 1) d, 2) c, 3) a, 4) d, 5) a. Page 3 Make Your own Carbon Paper Answers: 1) The pencil lead is actually made of carbon in the graphite form. 2) Answers will vary. A copier uses electrostatics to "trace" the outline of an image**