

Breast Cancer Risk: Genes and the Environment

Teacher Information



just add students™

Summary

Explore environmental and genetic risk factors for developing breast cancer. Students complete pedigree-based cancer occurrence and BRCA1 DNA tests for a family. They complete a survey on risk factors associated with breast cancer and then analyze their survey responses based on information in a *Breast Cancer Risks* poster. They analyze models to determine if childhood exposure to DDT increases risks of breast cancer.

Core Concepts

- An individual's risk of developing breast cancer is influenced by a number of factors such as specific genes, lifestyle choices, hormonal factors, and environmental exposures.
- People's perception of breast cancer risks may, or may not, be supported by scientific evidences.
- Exposure to DDT before birth or during childhood may increase risks for breast cancer.

Time Required

Two 40-minute class periods + homework

Kit contains

- Simulated BRCA1 Genetic Test sheet in plastic bag used for staining
- Tube of DNA stain
- Graduated measuring cup
- Plastic stirrer
- 3 plastic bags and beads to model effects of DDT insecticide exposure: no exposure, exposure before puberty, exposure after puberty
- *My Family Pedigree*
- *Breast Cancer Risks* poster

Teacher Provides

- Tap water
- Safety goggles
- Paper towels for clean up

Warning: Choking Hazard

This Science Take-Out kit contains small parts. Do not allow children under the age of seven to have access to any kit components.

Suggested Resources

Breast Cancer Risk and Environmental Factors by the National Institute of Environmental Health Sciences describes research being done on environmental risk factors related to breast cancer. http://www.niehs.nih.gov/health/assets/docs_a_e/environmental_factors_and_breast_cancer_risk.pdf

The National Geographic article **DDT Linked to Fourfold Increase in Breast Cancer Risk** provides a summary of research that links prenatal DDT exposure and breast cancer. Particularly interesting is the researchers' analysis of the limitations of the research study that clearly indicates the need for additional environmental health research. <http://news.nationalgeographic.com/2015/06/15616-breast-cancer-ddt-pesticide-environment/>

Reusing *Breast Cancer Risk: Genes and the Environment* kits

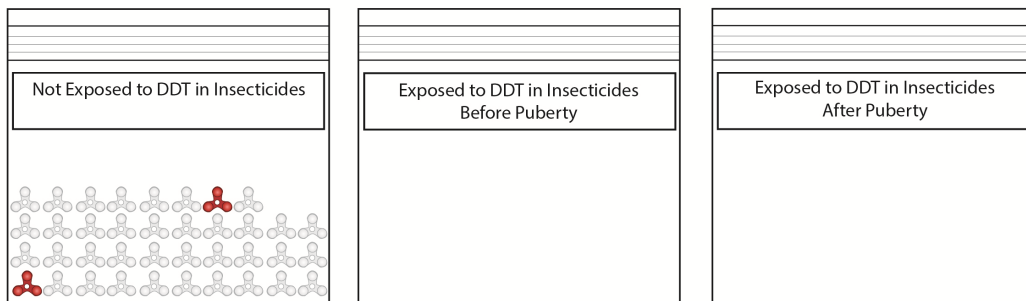
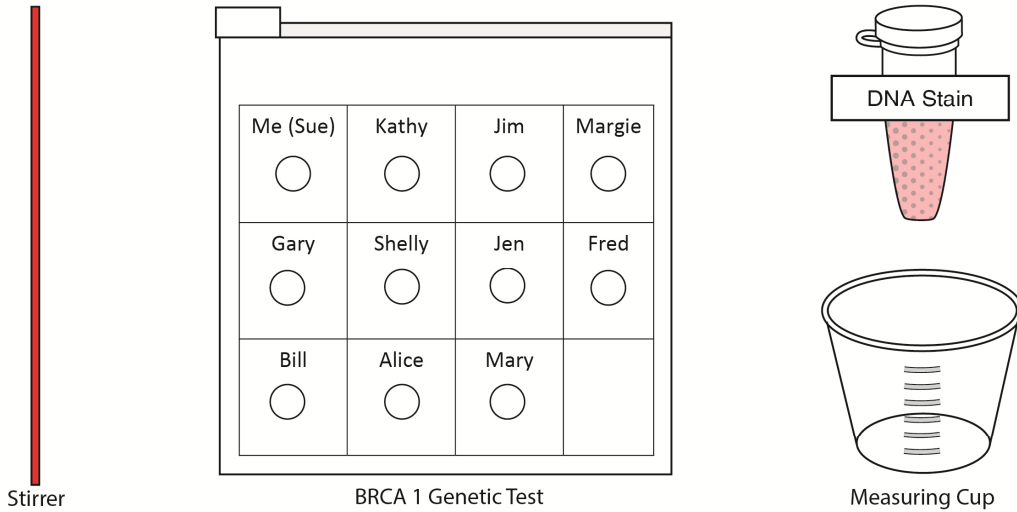
Teachers will need to instruct students on how to handle clean-up and return of the reusable kit materials. For example, teachers might provide the following information for students:

Discard	Rinse with water and dry with paper towel	Return to kit
<ul style="list-style-type: none"> • Bag containing used BRCA1 Genetic Test and DNA stain solution <p>Note: Students may keep the <i>My Family Pedigree</i></p>	<ul style="list-style-type: none"> • Graduated measuring cup • Stirrer 	<ul style="list-style-type: none"> • Graduated measuring cup • All bags with labels and/or beads • Tube labeled "DNA Stain" • Stirrer • <i>Breast Cancer Risks</i> poster

Refills for *Breast Cancer Risk: Genes and the Environment* kits are available at www.sciencetakeout.com. The **10 Kit Refill Pack** includes the following materials:

- DNA Stain
- Scoop for refilling DNA Stain tubes
- 10 simulated BRCA1 Genetic Tests sheets
- 10 plastic bags for BRCA1 Genetic Tests
- 10 copies of *My Family Pedigree*

Kit Contents Quick Guide



BREAST CANCER RISKS

Known Risk Factors
Multiple scientific research studies provide evidence that these factors increase the risks for breast cancer.

- Gender:** Females are more at risk for breast cancer than males.
- Age:** The risk of developing breast cancer increases with age.
- Family history:** Having a first-degree relative with breast cancer increases a woman's risk for breast cancer.
- Reproductive history:** Women who have a slightly higher body fat percentage, are obese, and/or are overweight.
- Being Overweight:** Overweight and obese women have a higher risk of breast cancer.
- Smoking Alcohol:** Women who have smoked three or more packs of cigarettes per day for 15 years or more have a higher risk of breast cancer.
- Lack of Exercise:** Women who do not get at least 150 minutes of moderate-intensity exercise each week have a higher risk of breast cancer.
- Smoking:** Women who smoke or are exposed to second-hand smoke have a higher risk of breast cancer.
- Exposure to Hormone Medication:** Women who use hormone therapy or other types of medication that increase high levels of estrogen have a higher risk of breast cancer.

Possible Risk Factors
The data from these scientific research studies suggest that these factors may increase the risks for breast cancer.

- Low Vitamin D Levels:** Women who have lower levels of vitamin D may have a higher risk of breast cancer.
- Exposure to Light at Night:** Women who work night shifts may have a higher risk of breast cancer compared to women who work during the day.
- Chemicals in Cosmetics:** Some chemicals in cosmetics may increase the risks for breast cancer.
- Chemicals in Food:** Foods that contain pesticides, antibiotics, or hormones may increase breast cancer risk.
- Chemicals in Air and Dust:** Some pollutants, such as diesel exhaust, may increase the risks for breast cancer.
- Chemicals in Plastic:** Some chemicals in plastic products, such as BPA and phthalates, may increase the risks for breast cancer.

Not Risk Factors
Multiple scientific research studies have provided evidence that these factors do NOT increase the risks for breast cancer:

- Cell-phones
- Exposure to electromagnetic fields
- Coffee
- Hot Tubs and hair relaxers
- Diets and undergarments
- Wearing bras
- Breast implants

My Family Pedigree

KEY:
 ● Breast Cancer
 ○ No Breast Cancer
 □ Deceased (dead)

Read these instructions before using Science Take-Out kits

Parental or Adult Supervision Required

This kit should be used only under the supervision of an adult who is committed to ensuring that the safety precautions below, and in the specific laboratory activity, are followed.

Safety Goggles and Gloves Strongly Recommended

We encourage students to adopt safe lab practices, and wear safety goggles and gloves when performing laboratory activities involving chemicals. Safety goggles and gloves are not provided in Science Take-Out kits. They may be purchased from a local hardware store or pharmacy.

Warning: Choking and Chemical Hazard

Science Take-Out kits contain small parts that could pose a choking hazard and chemicals that could be hazardous if ingested. Do not allow children under the age of seven to have access to any kit components. Safety Data Sheets (SDS) provide specific safety information regarding the chemical contents of the kits. SDS information for each kit is provided in the accompanying teacher instructions.

Chemicals Used in Science Take-Out Kits

Every effort has been made to reduce the use of hazardous chemicals in Science Take-Out kits. Most kits contain common household chemicals or chemicals that pose little or no risk.

General Safety Precautions

1. Work in a clean, uncluttered area. Cover the work area to protect the work surface.
2. Read and follow all instructions carefully.
3. Pay particular attention to following the specific safety precautions included in the kit activity instructions.
4. Goggles and gloves should be worn while performing experiments using chemicals.
5. Do not use the contents of this kit for any other purpose beyond those described in the kit instructions.
6. Do not leave experiment parts or kits where they could be used inappropriately by others.
7. Never taste or ingest any chemicals provided in the kit – they may be toxic.
8. Do not eat, drink, or apply make-up or contact lenses while performing experiments.
9. Wash your hands before and after performing experiments.
10. Chemicals used in Science Take-Out experiments may stain or damage skin, clothing or work surfaces. If spills occur, wash the area immediately and thoroughly.
11. At the end of the experiment, return ALL kit components to the kit plastic bag. Dispose of the plastic bag and contents in your regular household trash.

No blood or body fluids from humans or animals are used in Science Take-Out kits. Chemical mixtures are substituted as simulations of these substances.

Breast Cancer Risk: Genes and the Environment

Part I: A Family History of Breast Cancer

My family reunion began with a memorial service for my cousin Laura, who died from breast cancer when she was only 45 years old. After the service, three of my cousins (Margie, Shelly and Alice) revealed that they had breast cancer.

My cousin Margie explained that she had a genetic test that showed she has a mutated BRCA1 gene that increases the risk for breast and ovarian cancer. Once my cousins and I realized that we might have inherited the mutant BRCA1 gene, all of my cousins agreed to be tested for the mutant BRCA1 gene.

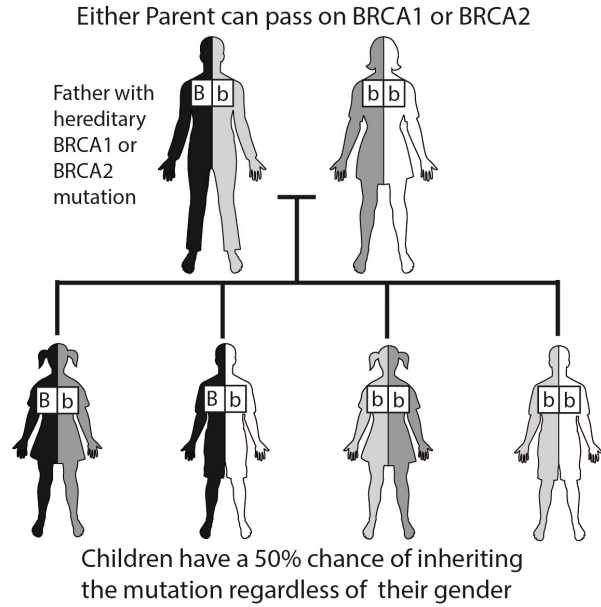
BRCA1 Gene and Cancer Risk

Mutations in the BRCA1 gene are known to increase the risk of breast and ovarian cancers in women. Approximately 50% to 65% of women born with a mutation in the BRCA1 gene will develop breast cancer by age 70, and 35% to 46% will develop ovarian cancer by age 70. For males, a BRCA1 gene mutation increases their risk for breast cancer and prostate cancer.

1. Your lab kit contains a pedigree for my family. List the names of family members who have or had breast cancer.
-

BRCA1 Gene and Inheritance

Because the BRCA1 gene mutation is dominant, it only takes one copy of the mutant gene to increase a person's risk for breast cancer. The BRCA1 gene is located on chromosome 17 which is an autosome, not a sex (X or Y) chromosome. This means that the mutated BRCA1 gene can be inherited from either your mother or your father.



2. Does having one normal BRCA gene and one mutant BRCA1 gene increase a person's risk for developing breast cancer? Support your answer with information from the text and diagram above.

3. Explain how a woman could inherit a mutant BRCA1 gene from her father.

4. Your lab kit contains a bag with a **BRCA1 Genetic Test** sheet that has been spotted with DNA (gene) samples from my family. You will analyze the genetic test to determine which family members inherited the mutated BRCA1 gene. *Note: Leave the test sheet in the bag.*

BRCA1 Genetic Test

Me (Sue)	Kathy	Jim	Margie
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gary	Shelly	Jen	Fred
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bill	Alice	Mary	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Each circle contains a DNA (gene) sample from a family member.

5. To make the DNA visible on the genetic test, you need to stain the BRCA1 Genetic Test with a DNA stain:
 - a) Fill the plastic measuring cup with 20 ml of tap water.
 - b) Pour the contents of the **DNA Stain** tube into the water in the cup.
 - c) Stir until the DNA stain has dissolved.
 - d) Pour the DNA stain solution from the cup into the plastic bag that contains the BRCA1 Genetic Test.
 - e) Close the bag completely then lay the bag flat on your desk or table so that the DNA stain comes in contact with all parts of the BRCA1 Genetic Test paper.

6. Look at the BRCA1 Genetic Test paper in the bag. Do not remove the paper from the bag.
 - A pink spot indicates the presence of a BRCA1 gene mutation that increases the risk for breast cancer.
 - Lack of a pink spot indicates that the BRCA1 gene mutation is not present.

7. Darken the circles in the diagram below to show the pink spots that indicate the family members who carry a BRCA1 gene mutation.

Me (Sue) <input type="checkbox"/>	Kathy <input type="checkbox"/>	Jim <input type="checkbox"/>	Margie <input type="checkbox"/>
Gary <input type="checkbox"/>	Shelly <input type="checkbox"/>	Jen <input type="checkbox"/>	Fred <input type="checkbox"/>
Bill <input type="checkbox"/>	Alice <input type="checkbox"/>	Mary <input type="checkbox"/>	

8. Discard the bag that contains the BRCA1 Genetic Test paper.

9. On the **My Family Pedigree** sheet, write "X" under the name of each cousin (the bottom row of symbols) who has the BRCA1 gene. *Note: Laura had not been tested for the mutant BRCA1 gene.*

10. Is it possible to have a mutated BRCA1 gene and not have breast cancer? Support your answer with evidence from the pedigree and results of the genetic tests.

11. Which males on the pedigree have an increased risk for breast cancer and prostate cancer?

12. List TWO reasons why it might be important that both males and females get tested to determine if they inherited the BRCA1 gene mutation.

- ---
- ---

13. Is it possible to have breast cancer and not have a mutated BRCA1 gene? Support your answer with evidence from the pedigree and results of the genetic tests.

Part 2: A Survey - Risk Factors for Breast Cancer

Although genetics is a contributor to breast cancer development, scientific studies have estimated that inherited genes account for only 5–10% of breast cancers. Other risk factors, such as those listed in Column 1 of the chart below, may increase a woman’s chance of developing breast cancer.

1. In Column 2 of the chart below (**What Do YOU Think?**), write **Yes**, **No**, or **Possibly** to indicate whether you think each risk factor increases a woman’s risk of developing breast cancer.

Column 1	Column 2	Column 3
Possible Risk Factors for Breast Cancer	What Do YOU Think? Is it a breast cancer risk factor? Yes, No, or Possibly	Scientific Evidence? Is it a breast cancer risk factor? Yes, No, or Possibly
Aging		
Cell phones		
Being overweight or obese		
High dose estrogen birth control		
Chemicals in plastics and cosmetics		
Drinking alcohol		
Gender		
Heredity (family history)		
Caffeine		
Lack of physical activity		
Night work		
Pesticides such as DDT		
Race/Ethnicity		
Smoking or second-hand smoke		

2. Use the information in the **Breast Cancer Risks** poster to complete Column 3 of the chart above. Write **Yes**, **No**, or **Possibly** to indicate whether scientific research provides evidence that each risk factor increases breast cancer risk.

3. Some factors associated with breast cancer risk cannot be controlled (changed). List at least four risk factors for breast cancer that you cannot control.

- _____
- _____
- _____
- _____

4. Other factors associated with breast cancer risk can be controlled (changed) by making lifestyle choices. List four actions that people could take to reduce their exposure to known risk for breast cancer.

- _____
- _____
- _____
- _____

5. Some of the “possible” risk factors for breast cancer include exposure to chemicals in the environment. What type of research has led scientists to suspect that these chemicals may increase the risks for breast cancer in humans?

6. What should be done to determine if the “possible” risk factors are or are not linked to increased risk for breast cancer in humans?

7. Many scientists recommend taking a “better safe than sorry” approach when considering exposure to possible environmental risk factors. List four things you might be cautious about using if you take the “better safe than sorry” approach to breast cancer risk factors.

- _____
- _____
- _____
- _____

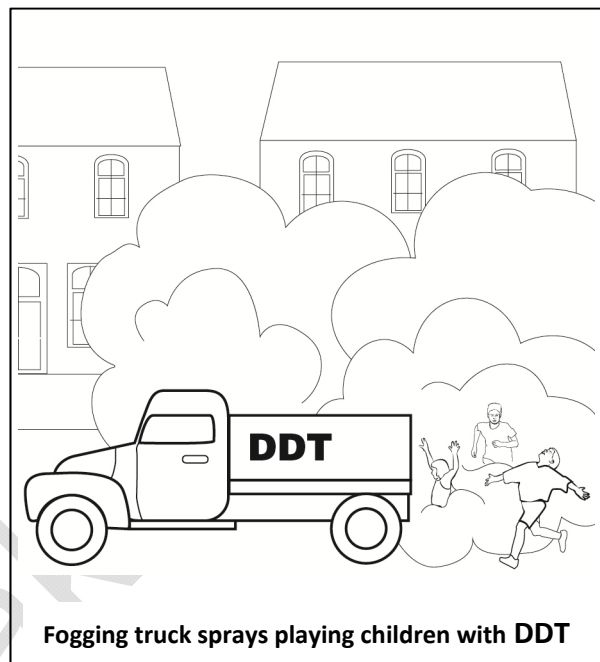
8. Do you think that avoiding all known risk factors will prevent breast cancer? Explain your answer.

Part 3: DDT, Breast Cancer, and Windows of Susceptibility

Shelly and Alice both have breast cancer. They do not have the BRCA1 gene, so they both wonder what caused their breast cancer.

Shelly saw a news program about animal research on breast cancer. The research showed that rats exposed to the chemical DDT had higher rates of breast cancer than rats that were not exposed to DDT. Shelly thinks that her breast cancer and Alice's breast cancer were caused by DDT that was sprayed to kill mosquitos in the town where they lived when they were children. Shelly and Alice remember playing outdoors when the DDT fogging trucks came through their neighborhood. Alice even has a picture that her mother took of them playing in the DDT fog cloud.

Alice did some Internet research and the information below summarizes what she learned about DDT and breast cancer.



DDT and Breast Cancer

DDT (dichlorodiphenyltrichloroethane) is a chemical insecticide that was used during the 1940s through the 1960s. DDT spraying is an effective way to kill mosquitos that carry diseases such as malaria, encephalitis, and West Nile virus. However, the use of DDT in the United States was banned in 1972 because research showed that DDT persisted in the environment and had devastating effects on some wildlife. Many women were exposed to DDT spraying before DDT was banned. DDT is still sprayed in some countries where diseases caused by mosquitos are a serious health problem.

The chemical structure of DDT is similar to the chemical structure of estrogens (female sex hormones). Because of this, DDT can act as an **endocrine disruptor**. Endocrine disruptors are chemicals that interfere with the normal action of hormones produced by the body's endocrine system. Because estrogen has been associated with breast cancer risk, it was suggested that DDT exposure might also be a risk factor for breast cancer.

Until recently, most research studies found no evidence that DDT exposure increases the risk of breast cancer in humans.

1. What was DDT used for when Shelly and Alice were children?

2. Why was the use of DDT banned in the United States?

3. Why is DDT still used in some countries?

4. What is an endocrine disruptor?

5. Why does DDT interfere with the normal action of female sex hormones?

6. Does DDT increase the risk of breast cancer for women?

Alice saw a TV news interview with a scientist who had done research on the link between DDT exposure and breast cancer. The scientist had a theory that there are certain times during human development, called “windows of susceptibility”, when people are more susceptible to (affected by) exposure to environmental risk factors. The scientist hypothesized that females who were exposed to DDT before puberty (before their breasts are fully developed) or before birth have an increased risk of breast cancer later in life.

7. How would you define “windows of susceptibility”?

8. What is the “window of susceptibility” that the scientist is investigating?

9. Observe the bead model in the bag labeled “**Not Exposed to DDT in Insecticides.**” This bag contains 40 beads. **Do NOT open this bag.**
- White beads represent women who did not develop breast cancer before age 60.
 - Red beads represent women who developed breast cancer before age 60.
10. How many of the 40 beads in the “**Not Exposed to DDT in Insecticides**” model are red beads representing women who developed breast cancer before age 60. _____
11. What is the approximate chance of a woman developing breast cancer before age 60 if she was not exposed to DDT in insecticides? Express your answer as % chance. Explain how you arrived at your answer.

_____ % chance

The scientist found that women who were exposed to DDT before puberty (either during childhood or before birth) were 4 times more likely to develop breast cancer before they reached age 60. Exposure to DDT after puberty did not increase a woman’s risk of developing breast cancer.

12. What is the approximate chance of a woman developing breast cancer before age 60 if she was exposed to DDT before puberty? Express your answer as % chance. Explain how you arrived at your answer.

_____ % chance

13. Make a model using 40 beads to represent the results for 40 women who were exposed to DDT before puberty. Put the appropriate number of white and red beads into the bag labeled “**Exposed to DDT in Insecticides Before Puberty.**” Show your work or explain how you arrived at your answers.

- How many white beads did you put in the bag? _____
- How many red beads did you put in the bag? _____

Show your work or explain how you arrived at your answers.

14. What is the approximate chance of a woman developing breast cancer before age 60 if she was exposed to DDT after puberty? Express your answer as % chance. Explain how you arrived at your answer.

_____ % chance

15. Make a model using 40 beads to represent the results for 40 women who were exposed to DDT after puberty. Put the appropriate number of white and red beads into the bag labeled **“Exposed to DDT in Insecticides After Puberty.”**

- How many white beads did you put in the bag? _____
- How many red beads did you put in the bag? _____

Show your work or explain how you arrived at your answers.

16. Some communities today are considering using DDT spraying programs to control rising mosquito populations.

- What is one benefit of DDT spraying?

- What are two risks of DDT spraying?

- Why are people most concerned about exposure of pregnant women and children to DDT?

- Would you support the use of DDT spraying in your community? Explain why or why not by weighing the risks and benefits?

Section 1 Chemical Product and Company Information

Science Take-Out
80 Office Park Way
Pittsford, NY 14534
(585)764-5400

CHEMTREC 24 Hour Emergency
Phone Number (800) 424-9300
For laboratory use only. Not for drug, food or household use

Product	Sodium Carbonate, Anhydrous
Synonyms	"DNA Stain"

Section 2 Hazards Identification

Signal word: WARNING
Pictograms: GHS07
Target organs: None known.



GHS Classification:
Eye irrit. (Category 2A)

GHS Label information: Hazard statement(s):
H319: Causes serious eye irritation.

Precautionary statement(s):

P264: Wash hands thoroughly after handling.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.

Ca Prop 65 - This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

Section 3 Composition / Information on Ingredients

Chemical Name	CAS #	%	EINECS
Sodium carbonate	497-19-8	100%	207-838-8

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

Suitable Extinguishing Media: Use any media suitable for extinguishing supporting fire.

Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

Specific Hazards: Sodium carbonate reacts with hydrated lime to form caustic soda. Special care should be taken where lime and sodium carbonate are handled in the same area.

Section 6 Accidental Release Measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and Storage

Precautions for Safe Handling: Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale dusts. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

Conditions for Safe Storage: Store in a cool, well-ventilated area away from incompatible substances.

Section 8 Exposure controls / Personal Protection

Exposure Limits:	Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
	Sodium carbonate	None established.	None established.	None established.

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None should be needed in normal laboratory handling at room temperatures. If misty conditions prevail, work in fume hood or wear a NIOSH/MSHA approved respirator.

Section 9 Physical and Chemical Properties

Appearance: Solid, white powder.
Odor: No odor.
Odor threshold: Data not available.
pH: Data not available.
Melting/Freezing point: 864°C (1587°F)
Boiling point: Decomposes
Flash point: Not flammable.

Evaporation rate (Water = 1): Data not available
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Not flammable.
Vapor pressure (mm Hg): Data not available
Vapor density (Air = 1): 0.7 (water)
Relative density (Specific gravity): 2.533
Solubility(ies): 17% @ 20°C in water.

Partition coefficient: Data not available.
Auto-ignition temp.: Data not available.
Decomposition temp.: Data not available
Viscosity: Data not available.
Molecular formula: Na₂CO₃
Molecular weight: 105.99

Section 10 Stability and Reactivity

Chemical stability: Stable

Hazardous polymerization: Will not occur.

Conditions to avoid: Excessive temperatures. Hygroscopic material, avoid moisture.

Incompatibilities with other materials: Acids cause decomposition liberating gaseous carbon dioxide. When mixed with lime dust and water, corrosive and caustic soda may be produced.

Hazardous decomposition products: Carbon dioxide.

Section 11 Toxicological Information

Acute toxicity: Oral-rat LD50: 4090 mg/kg ; Inhalation-rat LC50: 2.3 mg/l/2 hours ; Dermal-rat LD50: 2210 mg/kg

Skin corrosion/irritation: Data not available

Serious eye damage/irritation: Data not available

Respiratory or skin sensitization: Data not available.

Germ cell mutagenicity: Data not available

Carcinogenicity: Data not available

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: Data not available

STOT-single exposure: Data not available

Aspiration hazard: Data not available

STOT-repeated exposure: Data not available

Potential health effects:

Inhalation: May be harmful if inhaled. Causes respiratory tract irritation.

Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.

Skin: May be harmful if absorbed through skin. Causes skin irritation.

Eyes: Causes eye irritation.

Signs and symptoms of exposure: Burning sensation, cough, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting.

Additional information: RTECS #: VZ4050000

Section 12 Ecological Information

Toxicity to fish: LC50 - Lepomis macrochirus (Bluegill) - 300 mg/l - 96 h.

Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna (Water flea) - 265 mg/l - 48 h

Toxicity to algae: No data available

Persistence and degradability: No data available

Bioaccumulative potential: No data available

Mobility in soil: No data available

PBT and vPvB assessment: No data available

Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: None assigned

Shipping name: Not Regulated

Hazard class: Not applicable

Packing group: Not applicable

Reportable Quantity: No

Marine pollutant: No

Exceptions: No

2012 ERG Guide # Not applicable

Section 15 Regulatory Information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	WHMIS Classification
Sodium carbonate	Listed	Not Listed	Not Listed	Not Listed	Not Listed	E;D2B

Section 16 Additional Information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees.

NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

Revision Date: September 28, 2015 Supercedes:

Section 1 L'information de produit chimique et de compagnie

Science Take-Out
80 Office Park Way
Pittsford, NY 14534
(585)764-5400

**CHEMTREC 24 Numéros De Téléphone
De Secours D'Heure (800) 424-9300**
Pour l'usage de laboratoire seulement.
Pas pour l'usage de drogue, de nourriture ou de ménage.

Produit	Carbonate de sodium, anhydre
Synonymes	"DNA Stain"

Section 2 Identification De Risques

Mention d'avertissement: AVERTISSEMENT

Pictogrammes: GHS07

Les organes cibles: Aucun connu



Classification par le GHS:

Eye irrit. (Catégorie 2A)

Renseignements sur l'étiquette GHS: Mention de danger:

H319: Provoque une sévère irritation des yeux.

Déclarations de précaution:

P264: Se laver les mains après avoir manipulé.

P280: Porter des gants / des vêtements de protection / protection pour les yeux / du visage.

P305+P351+P338: SI DANS LES YEUX: Rincer avec précaution à l'eau pendant plusieurs minutes. Enlever les lentilles cornéennes, si présentes et facile à faire. Continuer à rincer.

P337+P313: Si l'irritation oculaire persiste: consulter un médecin

CA Prop 65 - Ce produit ne contient pas de produits chimiques connus à l'État de Californie pour causer le cancer, des malformations congénitales, ou toute autre atteinte à la reproduction.

Section 3 Composition / Information Sur Des Ingrédients

Nommé Chimique	CAS #	%	EINECS
Carbonate de sodium	497-19-18	100%	207-838-8

Section 4 Mesures De Premiers Soins

INGESTION: Appeler un médecin ou un centre antipoison immédiatement. Provoquer le vomissement seulement si elle est informée par le personnel compétent médicaux. Ne jamais rien donner par la bouche à une personne inconsciente.

INHALATION: Sortir au grand air. Si elle ne respire pas, pratiquer la respiration artificielle. Si la respiration est difficile, donner de l'oxygène. Obtenir des soins médicaux.

CONTACT AVEC LES YEUX: Vérifier et enlever les lentilles de contact. Rincer abondamment à l'eau pendant au moins 15 minutes, en soulevant les paupières inférieures et supérieures de temps en temps. Obtenez une attention médicale immédiate.

ABSORPTION PAR LA PEAU: Enlever les vêtements contaminés. Rincer soigneusement avec du savon doux et d'eau. En cas d'irritation, consulter un médecin.

Section 5 Mesures De Lutte Contre l'Incendie

Moyens d'extinction: Utilisez des supports adaptés pour éteindre le feu à l'appui.

Actions de protection pour les sapeurs-pompiers: En cas d'incendie, porter un appareil respiratoire NIOSH / MSHA approuvé autonome et un équipement complet de protection. Utiliser un jet d'eau pour maintenir incendie refroidir les conteneurs exposés.

Dangers spécifiques: Le carbonate de sodium réagit avec la chaux hydratée à la soude caustique de forme. Le soin spécial devrait être pris où le carbonate de chaux et de sodium sont manipulés dans le même secteur.

Section 6 Mesures De Déchargement Accidentel

Précautions personnelles: Évacuer le personnel vers la zone sûre. Utiliser un équipement de protection personnelle comme indiqué dans la Section 8. Assurer une ventilation adéquate.

Précautions environnementales: Éviter tout ruissellement vers les égouts pluviaux et les fossés qui aboutissent aux voies navigables.

Confinement et de nettoyage: Absorbent avec le matériel sec inerte, balayez ou nettoyez à l'aspirateur vers le haut et placez dans un récipient approprié pour la disposition appropriée. Laver la zone de déversement avec du savon et de l'eau.

Section 7 Manipulation Et Stockage

Précautions pour la manutention en toute sécurité: Lire l'étiquette sur le contenant avant d'utiliser. Ne pas porter de lentilles cornéennes lorsque vous travaillez avec des produits chimiques. Tenir hors de portée des enfants. Éviter tout contact avec les yeux, la peau et les vêtements. Ne pas inhaler les vapeurs, les embruns ou le brouillard. Utiliser avec une ventilation adéquate. Éviter l'ingestion. Bien se laver après la manipulation. Retirer et laver les vêtements avant de les réutiliser.

Conditions de stockage: Stocker dans un endroit frais et bien aéré, loin des substances incompatibles.

Section 8 Commandes D'Exposition / Protection Personnelle

Limites d'exposition:	Nommé Chimique	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
	Carbonate de sodium	Aucun établi.	Aucun établi.	Aucun établi.

Contrôles d'ingénierie: Les installations d'entreposage ou d'utilisation de ce matériel doit être équipé d'une douche oculaire et une douche de sécurité et le matériel d'extinction d'incendie. Le personnel doit porter des lunettes de sécurité, des lunettes, ou un écran facial, une blouse de laboratoire ou tablier, des gants protecteurs appropriés. Utiliser une ventilation adéquate pour maintenir les concentrations atmosphériques faible.

Protection respiratoire: Aucun ne devrait être nécessaire dans le laboratoire normal manipulant aux températures ambiantes. Si les conditions brumeuses prévaloir, travailler dans la hotte ou de porter un masque respiratoire approuvé NIOSH / MSHA.

Section 9 Propriétés Physiques Et Chimiques

Apparence: Solide. poudre blanche. Odeur: Aucun odeur. Seuil de l'odeur: Données non disponibles. pH: Données non disponibles Point de fusion / congélation: 864°C (1587°F) Point d'ébullition: Se décompose Point d'éclair: Inflammable	Taux d'évaporation (Eau = 1): Données non disponibles Inflammabilité (solide / gaz): Données non disponibles. Limites d'explosivité: Bas / Max: Données non disponibles Pression de vapeur (mm Hg): Données non disponibles Densité de vapeur (Air = 1): Données non disponibles Densité relative (gravité spécifique): 2.533 Solubilité (s): 17% @ 20°C	Coefficient de partage: Données non disponibles Auto-inflammation: Données non disponibles Température de décomposition: 1000°C (1832°F) Viscosité: Données non disponibles. Formule moléculaire: Na ₂ CO ₃ Poids moléculaire: 105.99
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Section 10 Stabilité Et Réactivité

Stabilité chimique: Stable **Polymérisation dangereuse:** N'aura pas lieu.
Conditions à éviter: Les températures excessives. Le matériel hygroscopique, évitent l'humidité.
Incompatibilités avec d'autres matériaux: Décomposition de cause d'acides libérant l'anhydride carbonique gazeux. Une fois mélangée avec de l'eau la poussière et de chaux, la soude corrosive et caustique peut être produite.
Produits dangereux de décomposition: Anhydride carbonique..

Section 11 L'Information Toxicologique

Toxicité aiguë: Oral-rat LD50: 4090 mg/kg ; Inhalation-rat LC50: 2.3 mg/l/2 hours ; Dermal-rat LD50: 2210 mg/kg
La corrosion de la peau et l'irritation: Données non disponibles
Des lésions oculaires graves / irritation: Données non disponibles
Respiratoire ou sensibilisation de la peau: Données non disponibles
Mutagenicité des cellules germinales: Données non disponibles
Cancérogène: Données non disponibles
NTP: Aucun composant de ce produit présent à des niveaux supérieurs ou égaux à 0,1% n'a été identifié comme cancérogène reconnu ou présumé par NTP.
IARC: Aucun composant de ce produit présent à des niveaux supérieurs ou égaux à 0,1% n'a été identifié comme cancérogène probable, possible ou confirmé par IARC.
OSHA: Aucun composant de ce produit présent à des niveaux supérieurs ou égaux à 0,1% n'a été identifié comme cancérogène ni comme cancérogène possible par OSHA.
Reproductive toxicity: Données non disponibles
STOT-exposition unique: Données non disponibles.
STOT-une exposition répétée: Données non disponibles
Risque d'aspiration: Données non disponibles
Effets d'une surexposition:
Inhalation: Peut être nocif en cas d'inhalation.
Ingestion: Peut être nocif en cas d'ingestion.
Peau: Peut causer une légère irritation.
Yeux: Peut causer une légère irritation.
Les signes et les symptômes de l'exposition: Pour le meilleur de notre connaissance les propriétés chimiques, physiques et toxicologiques n'ont pas été étudiées à fond.
Les données spécifiques n'est pas disponible. Exercice des procédures appropriées afin de minimiser les dangers potentiels.
Informations complémentaires: RTECS #: VZ4050000

Section 12 L'Information Écologique

Toxicité pour les poissons: LC50 - Lepomis macrochirus (Bluegill) - 300 mg/l - 96 h
Toxicité pour les daphnies et autres invertébrés aquatiques: EC50 - Daphnia magna (Water fl ea) - 265 mg/l - 48 h
Toxicité pour les algues: Pas de données disponible
Persistance et dégradabilité: Pas de données disponible **Potentiel de bioaccumulation:** Pas de données disponible
Mobilité dans le sol: Pas de données disponibles **Évaluation PBT et vPvB:** Pas de données disponibles
Autres effets indésirables: Un danger pour l'environnement ne peut pas être exclu dans l'éventualité d'une manipulation ou d'élimination.

Section 13 Considérations De Disposition

Ces lignes directrices sont destinées à l'élimination de la disposition d'un catalogue de taille seules les quantités. Les règlements fédéraux peuvent s'appliquer aux contenants vides. Des réglementations nationales et / ou local peut être différent. Éliminer conformément à toutes les réglementations locales, provinciales et fédérales ou d'un contrat avec une agence élimination des produits chimiques sous licence..

Section 14 L'Information De Transport

Numéro UN / NA: Non applicable **Nom d'expédition:** Non réglé
Classe de danger: Non applicable **Groupe d'emballage:** Non applicable **Quantité à déclarer:** Non **Polluant marin:** Non
Exceptions: Non applicable **2012 ERG Guide #:** Non applicable

Section 15 L'Information De Normalisation

Un produit chimique est considéré comme inscrit si le numéro CAS pour la forme anhydre est sur la liste d'inventaire.

Composant	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	Classification SIMDUT
Carbonate de sodium	Listed	Not Listed	Not Listed	Listed	Not Listed	D2B; E

Section 16 L'Information Additionnelle

Les informations contenues dans ce document sont fournis sans garantie d'aucune sorte. Les employeurs devraient considérer cette information seulement comme complément à d'autres informations recueillies par eux et doivent prendre des décisions indépendantes de la pertinence et l'exhaustivité de l'information de toutes les sources afin d'assurer une utilisation correcte de ces matériaux et de la sécurité et la santé des employés. NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure.