STO-163

Sea Otter Forensics

Teacher Information

science take-out just add students™

Summary

Investigate possible causes for the death of a sea otter:

- Conduct lab tests to determine what caused a sea otter's death.
- Interpret lab tests, maps, and photos to explain the source of the toxin that is killing sea otters.
- Use a food web diagram to explain how sea otters could have high toxin concentrations.
- Conduct lab tests to determine the concentration of toxin that causes damage to human liver cells.
- Design a sign to provide information about health effects of an algal bloom and ways to avoid exposure.
- Optional extension: Consider possible actions to reduce harmful algal blooms.

Core Concepts

- Algal blooms can harm wildlife and humans.
- Health problems in wildlife can provide warnings of potential health problems in humans.
- Extension Activity: Human actions can harm the environment and lead to human health problems.

Time Required

Two or three 40-minute class periods

Kit contains

- **Sea Otter Photos**
- Biological Toxin Test Kit containing:
  - Sea Otter Plasma (simulated)
  - Toxin Test Strips (simulated)
- **Map and Photos of Area Surrounding Monterey Bay**
- Liver Toxicity Test Kit containing:
  - Human Liver Cells (simulated)
  - Blood (simulated)
  - Dropper
  - 4 tubes with different concentrations of microcystin (simulated)

Teacher Provides

- Tap water
- Safety goggles
- Paper towels for clean-up
- Paper/art supplies for sign (optional)
- Internet access for video (optional) and research (optional)

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.

Teacher Suggestions

- After students have completed Parts 1-3, show the **Mini Doc: Microcystin** video that reviews Dr. Miller's research on sea otters. *Do NOT show the video as an introduction to this kit.*

  Mini Doc: Microcystin
  https://www.youtube.com/watch?v=NDnZH3ahJhA
  This 10 minute video includes interviews of the scientists who worked together to determine what was causing the sea otter deaths. They discover that more than just sea otters are at risk. *NOTE: Some people might find images in this video of a sea otter necropsy to be mildly graphic.*

- Ideally, students would work in pairs to complete the kit activities. If your students have difficulty following directions, consider giving them the instructions and materials for one part at a time.

- Provide local examples of harmful algal blooms that may impact your students.

- The extension activity on the next page can be used to explore causes of algal blooms and ways to prevent algal blooms.

- Consider having students research the effects of decreasing sea otter populations on ecosystems OR the effects of algal blooms on organisms in ecosystems.

Teacher Resources

- **Evidence for a Novel Marine Harmful Algal Bloom: Cyanotoxin (Microcystin) Transfer from Land to Sea Otters**
  https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0012576
  This journal article was the basis for the scenario in Parts 1 through 3 of this kit.

- **CDC: Harmful Algal Bloom (HAB) -Associated Illnesses**
  https://www.cdc.gov/habs/index.html
  This website includes information on harmful algal blooms (HABs), and detailed sections on illnesses and symptoms, sources of exposure and risk factors, HABs the environment, prevention and control, publications, data and statistics, and health promotion materials.

Extension Activity: Preventing Harmful Algal Blooms

Core Concept: Actions can be taken to prevent or reduce the effects of harmful algal blooms.

Suggestion: Have students do a "Gallery Walk" to learn from other students' infographics. Students could add 3 sticky notes to each infographic: 1) an idea that was not on their infographic, 2) a question, and 3) a suggestion for improvement.

Preventing Harmful Algal Blooms

An **infographic** is a collection of imagery, charts, and minimal text that gives an easy-to-understand overview of a topic. Infographics use striking, engaging visuals to communicate information quickly and clearly.

A. There are human actions that have led to harmful algal blooms. Use information from the websites listed below to create an **infographic** that communicates information on human actions that have led to algal blooms. *Include 8 human actions that may have increased the frequency and severity of algal blooms in fresh water or salt water environments.*

B. There are many things that individuals, communities, organizations, or governments can do to reduce the frequency and severity of algal bloom. Use information from the websites listed below to create an **infographic** that communicates information on things people could do to prevent algal blooms. *Include 4 things you could do and 4 things that groups (communities, organizations, or governments) could do.*

The following websites provide information on factors that contribute to algal blooms and/or ways to prevent algal blooms.

- **CDC – Harmful Algal Bloom-Associated Illnesses** https://www.cdc.gov/habs/
- **EPA – Nutrient Pollution** https://www.epa.gov/nutrientpollution
- **U.S. Geological Survey (USGS) – The Science of Harmful Algal Blooms** https://www.usgs.gov/news/science-harmful-algae-blooms
- **National Oceanic and Atmospheric Administration (NOAA) – Harmful Algal Blooms** https://oceanservice.noaa.gov/hazards/hab/

Reusing the Kit

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	Return to kit bag
• Used Toxin Test Strip • Contents of the 4 Human Liver Cells tubes Provide a plastic bag or trash can for disposal of the contents of the Human Liver Cells tubes. **Warning: The contents of the Human Liver Cell tubes should be discarded in the trash and NOT down the drain. When mixed with water, the gel will swell and block plumbing.**	• **Sea Otter Photos** • **Map and Photos of Area Surrounding Monterey Bay** • Part 1 Biological Toxin Test Kit bag and contents: o Sea Otter #2 Plasma tube o Instructions • Part 4 Liver Toxicity Tests bag and contents: o 4 tubes for Human Liver Cells o 4 tubes for Microcystin o Blood tube o dropper

Hints:

- If you rinse the tubes, do not get the labels wet. Consider covering the labels with tape.
- To avoid spills or loss of kit materials, have students clean up after Parts 1, 3, and 4.
- Consider laminating the printed parts of the kits that will be reused.

Refills for **Sea Otter Forensics** kits are available at www.sciencetakeout.com. Allow at least 30 minutes to refill 10 kits. The **10 Kit Refill Pack** includes the following materials:

- 25 mL Sea Otter #2 Plasma (simulated)
- 10 Toxin Test Strips (simulated)
- Bag of Simulated Human Liver Cells with small measuring scoop
- Ingredients for preparing 200 mL of Blood (simulated)
- 25 mL of each Microcystin concentration (simulated)
- 6 transfer pipets

NGSS Correlation

Working Towards Performance Expectations

HS-LS2-6. Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

Disciplinary Core Ideas

A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. **(HS-LS2-2) (HS-LS2-6)**

Plants or algae form the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter reacts to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved. **(HS-LS2-4)**

Science and Engineering Practices

Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.

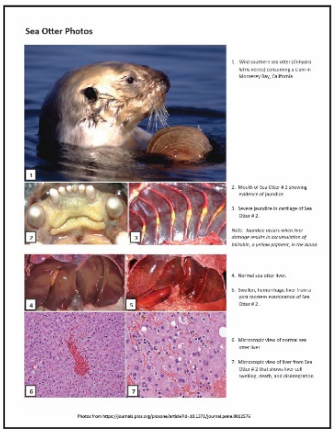
Evaluate the impact of new data on a working explanation and/or model of a proposed process or system.

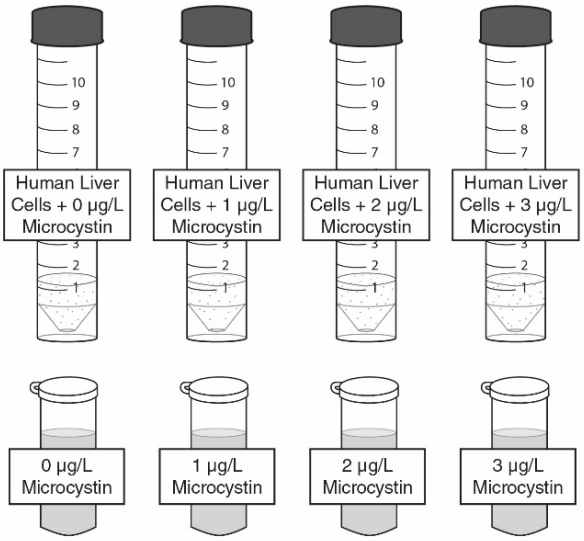
Cross Cutting Concepts

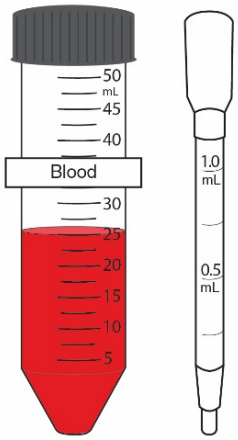
Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.

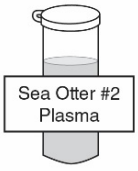
The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs.

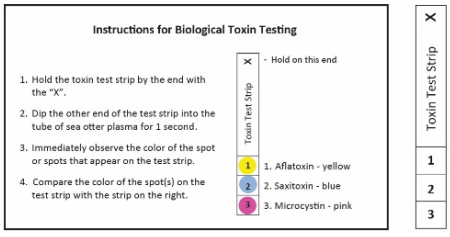
Kit Contents Quick Guide











Read these instructions before using Science Take-Out kits

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.

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. 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. We encourage students to adopt safe laboratory practices when using chemicals.

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.

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.

General Safety Precautions

1. Never taste, smell, or ingest any chemicals provided in the kit - they may be hazardous.
2. 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.
3. Report any chemical spills or contact with chemicals to your teacher.
4. Work in a clean, uncluttered area. Cover the work area to protect the work surface.
5. Read and follow all instructions carefully.
6. Pay particular attention to following the specific safety precautions provided by your teacher or included in the kit activity instructions.
7. Do not use the contents of this kit for any other purpose beyond those described in the kit instructions.
8. Do not leave experiment parts or kits where they could be used inappropriately by others.
9. Do not eat, drink, or apply make-up or contact lenses while performing experiments.
10. Wash your hands before and after performing experiments.

Sea Otter Forensics

Teacher Answer Key

Part 1: What caused the death of the sea otters?

Eleven dead sea otters were discovered on the beaches of Monterey Bay in California. They were delivered to the Marine Wildlife Research Center in Southern California.

Dr. Melissa Miller is a wildlife veterinarian and pathologist at the research center. She runs a laboratory for marine (ocean dwelling) mammals that is similar to a forensics lab. The staff and interns in her lab conduct detailed postmortem (after death) exams to look for the cause of sea otter deaths.

Dr. Miller would like you to help with a postmortem exam to identify possible causes of death for Sea Otter # 2.

1. Observe the **Sea Otter Photos** in your lab kit. You should read the information on the right side of the page to help you understand the photos.

2. Based on the **Sea Otter Photos**, what most likely caused the death of Sea Otter #2? Support your answer using information from two or more photos.

Dr. Miller and her colleagues at the research center tested many hypotheses that might explain the liver damage that caused the sea otter deaths. However, after extensive testing they found no evidence that the liver damage in the sea otters was caused by bacteria, viruses, mercury, lead, pesticides, industrial chemicals, or excess iron.

Another possible explanation for liver damage that caused the sea otter deaths might be **biological toxins** (poisons produced by living organisms) such as:

- Aflatoxin, a toxin produced by mold that grows on crops such as corn and tree nuts
- Saxitoxin, a toxin produced by marine (salt water) algae that cause red tides
- Microcystin, a toxin produced by fresh water cyanobacteria (blue green algae)

Dr. Miller would like you to test the plasma (clear liquid portion of blood) from Sea Otter #2 for the presence of these three biological toxins.

3. Use the materials in the bag labeled **Part 1: Biological Toxin Test Kit.** Follow the **Instructions for Biological Toxin Testing** to test the Sea Otter #2 Plasma.

4. Based on the test results, which biological toxin (or toxins) most likely caused the liver damage for Sea Otter #2? Support your answer with observations from the tests you conducted.

Part 2: How could a toxin from fresh water algae get into Monterey Bay?

Dr. Miller was puzzled. Sea otters live in the salt water of Monterey Bay. Microcystin toxin is produced by *Microcystis* cyanobacteria (also called blue green algae) typically found in fresh water. How could a toxin from fresh water algae get into Monterey Bay?

The lab's water quality chemist tested water samples from five fresh water sources near Monterey Bay. The data table below shows the results of testing for the microcystin concentration in these water samples.

Microcystin Concentration in Fresh Water Collected from Sites Near Monterey Bay

Water Sample Location	**Microcystin Concentration µg/L** (micrograms per liter)
Corralitos Creek	10
Elkhorn Slough	0
Kelly Lake	0
Pajaro River	1
Pinto Lake	100

1. Based on the information in the data table above, identify the location that is most likely the original source of the microcystin toxin. Support your answer with information from the data table.

2. Observe the **Map and Photos of the Area Surrounding Monterey Bay**. What route would the toxin take to get from this source into Monterey Bay?

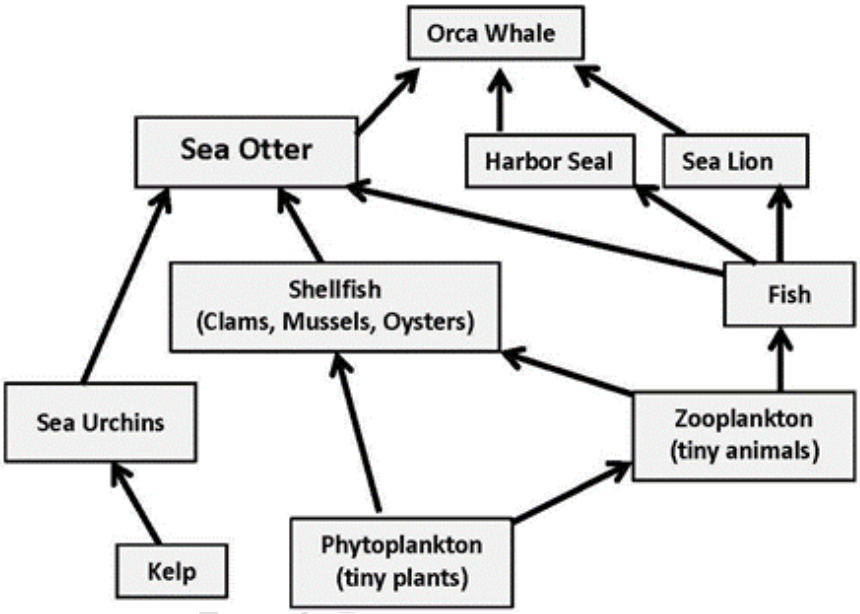
Harmful algal blooms (HABs) are the result of rapid growth of algae that can cause harm to animals, people, or the local ecology. A HAB can look like foam, scum, or mats on or just below the surface of water. HABs can be different colors such as green, red, or black. Some HABs produce toxins that have caused a variety of illnesses in people and animals.

3. Observe the **Photos of the Area Surrounding Monterey Bay.** In which area is there visible evidence of a harmful algal bloom? Support your answer with observations of the photos.

Part 3: How could sea otter bodies have a high concentration of microcystin?

Sea otters live in marine (sea water) environments such as Monterey Bay. The concentration of microcystin toxin in this sea water is very low. How could Sea Otter # 2 have a high concentration of microcystin toxin in its body?

Dr. Miller wondered if the sea otter's food might be the source of the toxin. The diagram below shows a food web that includes a sea otter.



1. List three types of organisms eaten by sea otters that could have been a source of the microcystin that killed the sea otters.

2. What happens when microcystin is passed through a food chain that includes sea otters? Use the information on the left to complete the boxes in the food chain shown on the right.

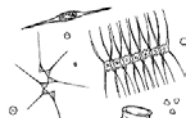
Microcystin is present in extremely low concentrations in the water of Monterrey Bay. Plankton (tiny plants and animals) absorb microcystin from the water around them. **Assume that each plankton contains 1 "dose" of microcystin.**

Shellfish are filter feeders that filter plankton out of the water. The microcystin present in the plankton remain in the shellfish and is concentrated in the shellfish tissue. **Assume that each shellfish eats 1,000 tiny plankton.**

To maintain their body temperature in cold sea water, sea otters consume large amounts of food each day. Microcystin in the food eaten by a sea otter remains and is concentrated in the sea otter's body. **Assume that each sea otter eats 100 shellfish.**

Food Chain

Plankton
Each plankton contains
1 "dose" of microcystin.



Shellfish
Each shellfish contains
_____ "doses"
of microcystin.

Sea Otter
Each sea otter contains
_____ "doses"
of microcystin.

3. **Biomagnification** is the tendency of toxins or pollutants to increase in concentration as they are passed through a food chain. Explain how the food chain above illustrates biomagnification.

Some animals, such as sea otters, may be harmed by the same toxins in the environment that also harm humans. These animals are known as **sentinel animals**. Sentinel animals provide an early warning for hazards to human health.

4. Explain why it was important to research the cause of death of the sea otters (which are sentinel animals).

5. Based on the information in this activity, should people avoid eating shellfish such as clams, oysters, and mussels? Explain why or why not.

Part 4: How does microcystin from algal blooms harm humans?

There have not been any reports of human deaths in the United States caused by exposure to microcystin. However, there are numerous reports of harmful health effects in people who were exposed to microcystin toxin in their food, drinking water, or swimming water. Human health effects from microcystin toxin include liver damage, abdominal pain, headache, sore throat, dry cough, vomiting, nausea, diarrhea, blistering around the mouth, rash, and pneumonia. Microcystin toxin also causes an increased risk of liver cancer in humans.

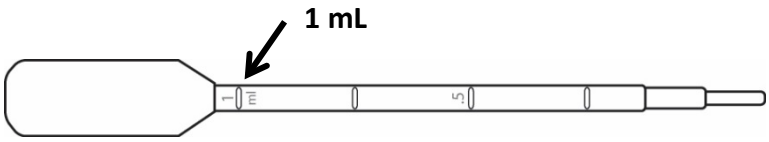
Pinto Lake is the only source of water for the town's water treatment plant. Periodic tests of the treated water flowing from the treatment plant to homes in the community have shown microcystin concentrations ranging from 0 to 20 µg/L (micrograms per liter).

1. How might humans end up with microcystin in their bodies?

2. State three symptoms that might indicate that a person was exposed to microcystin.

Biologists at the local university would like you to conduct toxicity tests to determine the highest concentration of microcystin toxin that is safe for <u>human</u> liver cells. The materials for these toxicity tests are provided in the bag labeled <u>Part 4: Liver Toxicity Tests</u>.

3. You need to first prepare human liver cells for testing. Use the dropper to add 3 mL of **Blood** to each of the four <u>large</u> tubes labeled **Human Liver Cells**.



4. You have four small tubes containing different concentrations of microcystin (3 µg/L, 2 µg/L, 1 µg/L and 0 µg/L). *Note: µg/L = micrograms per liter.*

    a. Match the labels on the small tubes of microcystin with the labels on the large tubes of human liver cells.

    b. Pour the entire contents of each small tube (microcystin) into the appropriate large tube (human liver cells). *Hint: You may need to hold the small tube over the large tube and tap the small tube gently to get all the liquid to pour out of the small tube.*

    c. Tightly screw the lids onto each of the large tubes.

    d. Shake each large tube gently for 1 minute to mix the microcystin with the liver cells. *Hint: You can hold and shake the four tubes at the same time to ensure equal amounts of shaking.*

5. Wait an additional 1 minute for the microcystin to affect the human liver cells.

6. Observe the human liver cells in each of the tubes. If the human liver cells die, you will see them disintegrating (disappearing). Record your observations in the table below.

Concentration of microcystin added to the liver cells	**Observations**
0 µg/L	
1 µg/L	
2 µg/L	
3 µg/L	

7. Explain why this experiment includes a tube with 0 µg/L of microcystin.

8. What is the highest concentration of microcystin that is safe for human liver cells? Support your answer with observations from your data table.

9. Periodic tests of the water in Pinto Lake have shown microcystin concentrations ranging from 0 to 20 µg/L (micrograms per liter). Should town officials issue a warning to humans about the water in Pinto Lake? Support your answer.

10. Some people believe that researchers should focus on human health problems instead of spending time and money on animal health problems. Other people believe that things that cause health problems for animals may also pose a risk to human health. Explain how the research on sea otter deaths is important in preventing human health problems.

Part 5: Preventing health problems caused by harmful algal blooms

Pinto Lake Park is a popular public park that is used for picnicking, swimming, fishing and boating. When the microcystin toxin level in Pinto Lake exceeds safe levels for swimming, the Public Health Department posts a warning sign like the one shown on the right.

Visitors to the park need to understand that the microcystin toxin can make them sick if they have direct contact with a blue-green algae bloom. This can be caused by swallowing water, by having direct skin contact (from swimming), or by breathing airborne droplets containing the toxins (such as during boating or waterskiing). Exposure to a large amount of microcystin from blue-green algae can cause liver damage.

Swallowing water containing blue-green algae/microcystin may cause gastrointestinal symptoms such as stomach pain, nausea, vomiting, diarrhea, severe headaches, and fever. Skin contact with blue-green algae/microcystin may produce a rash, hives, or skin blisters (especially on the lips and under swimsuits). Inhaling water droplets containing blue-green algae/microcystin can cause runny eyes and nose, cough, and sore throat, chest pain, asthma-like symptoms, or allergic reactions.

The Health Department has been receiving a large number of telephone calls with questions about the algal bloom and algal toxins at Pinto Lake. The Health Department Director would like you to design a sign that could be posted in Pinto Lake Park to provide more information for park visitors.

Design a sign that is brief, easy to read, and contains illustrations and text. The reading passage above provides information that can be used to design the sign. Your sign must include at least the following information:

1. Three routes of exposure (ways people can be exposed) to algal toxins
2. Two health effects or symptoms for each route of exposure to algal toxins
3. Three ways to avoid exposure to algal toxins

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	Water
Synonyms	"0 µg/L Microcystin" (simulated); "1 µg/L Microcystin" (simulated)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: Not classified
Pictograms: Not classified
Target organs: None known

GHS Classification: Not classified
GHS Label information: Not classified
Precautionary Statement: Not classified

Supplementary information:
Do not breathe vapors, spray or mist. Do not get in eyes, on skin, or on clothing. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Get medical attention if you feel unwell.

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
Water	7732-18-5	100%	231-791-2

Section 4 First Aid Measures

INGESTION: MAY BE HARMFUL IF SWALLOWED. 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: MAY BE HARMFUL IF INHALED. MAY CAUSE RESPIRATORY TRACT IRRITATION. Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: MAY CAUSE EYE IRRITATION. 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: MAY CAUSE SKIN IRRITATION. 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: In fire conditions, water may evaporate from this solution which may cause hazardous decomposition products to be formed as dust or fume.

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: Absorb with inert dry material, 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 vapors, spray or mist. 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. Protect from light.

Section 8 Exposure controls / Personal Protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
N/A	N/A	N/A	N/A

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: Liquid, clear.
Odor: No odor.
Odor threshold: Data not available.
pH: Data not available
Melting/Freezing point: Approx. 0°C (32°F) (water)
Boiling point: Approx. 100°C (212°F) (water)
Flash point: Data not available

Evaporation rate (Water = 1): <1
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): 14 (water)
Vapor density (Air = 1): 0.7 (water)
Relative density (Specific gravity): Approx. 1.0 (water)
Solubility(ies): Complete in water.

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

Section 10 Stability and Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.

Conditions to avoid: Excessive temperatures which cause evaporation. Protect from light.
Incompatibilities with other materials: Data not available.
Hazardous decomposition products: Data not available.

Section 11 Toxicological Information

Acute toxicity: Data not available
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
Carcinogenity: 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.
Ingestion: May be harmful if swallowed.
Skin: May cause irritation.
Eyes: May cause irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: Data not available

Section 12 Ecological Information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
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: Not applicable
Shipping name: Not Regulated
Hazard class: Not applicable
Packing group: Not applicable
Reportable Quantity: No
Marine pollutant: No
Exceptions: Not applicable
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
N/A						

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: March 22, 2017 Supercedes:

SAFETY DATA SHEET

GENERAL STORAGE CODE GREEN

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 Bicarbonate, 4% solution
Synonyms	"2 µg/L Microcystin" (simulated); "3 µg/L Microcystin" (simulated)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: Not Classified
Pictograms: None required
Target organs: None known

GHS Classification: Not classified

GHS Label information: **Hazard statement(s):** Not classified

Precautionary statement(s):

Do not breathe dust. Do not get in eyes, on skin, or on clothing. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Get medical attention if you feel unwell.

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
Water	7732-18-15	96%	231-791-2
Sodium Bicarbonate	144-55-8	4%	205-633-8

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: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material is commonly used to extinguish fires.

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: Absorb with inert dry material, 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 vapors, spray or mist. 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 bicarbonate	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: Clear, colorless liquid.
Odor: No odor.
Odor threshold: Data not available.
pH: 8.2 (1% solution)
Melting/Freezing point: Data not available
Boiling point: Decomposes
Flash point: Not combustible

Evaporation rate (Water = 1): Data not available
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): Negligible)
Vapor density (Air = 1): Data not available
Relative density (Specific gravity): Data not available
Solubility(ies): Complete in water.

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

Section 10 Stability and Reactivity

Chemical stability: Stable

Hazardous polymerization: Will not occur.

Conditions to avoid: High temperature causes decomposition to sodium carbonate, water and carbon dioxide.
Incompatibilities with other materials: Reacts with acids to yield acid salts, water and carbon dioxide.
Hazardous decomposition products: Gaseous carbon dioxide.

Section 11 Toxicological Information

Acute toxicity: Oral-rat LD50: 4220-4400 mg/kg
Serious eye damage/irritation: Eye-rabbit – not irritating
Germ cell mutagenicity: Data not available

Skin corrosion/irritation: Skin-rabbit – not irritating
Respiratory or skin sensitization: Data not available
Carcinogenity: 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
Aspiration hazard: Data not available

STOT-single exposure: Data not available
STOT-repeated exposure: Data not available

Potential health effects:
Inhalation: Excessive dust may irritate respiratory tract.
Ingestion: May cause gastrointestinal disturbance if ingested.
Skin: No hazard known.
Eyes: May cause very slight irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: VZ0950000

Section 12 Ecological Information

Toxicity to fish: Gambusia affinis (fish, freshwater) LC50: 7550 mg/l/24 hours
Toxicity to daphnia and other aquatic invertebrates: Daphnia magna (Crustacea) EC50: 2350 mg/l/48 hours
Toxicity to algae: Nitcheria linearis (Algae) LC50: 650 mg/l/5 day
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: Not applicable
Shipping name: Not Regulated
Hazard class: Not applicable
Packing group: Not applicable
Reportable Quantity: No
Marine pollutant: No
Exceptions: Not applicable
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 bicarbonate	Listed	Not Listed	Not listed	Listed	Not listed	Uncontrolled product

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: October 12, 2020 Supercedes:

SAFETY DATA SHEET

GENERAL STORAGE CODE GREEN

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	Instant Snow Polymer – Aqua Keep
Synonyms	"Human Liver Cells" (*simulated*)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: None required
Pictograms: None required
Target organs: None known

GHS Classification:
Not classified

GHS Label information: **Hazard statement(s):**
None

Precautionary statement(s):
Call a doctor is you feel unwell.
Product become slippery when it absorbs water

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
Acrylic Acid Polymer Sodium Salt	9003-04-7	>90%	
Water	7732-18-5	<10%	231-791-2

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: IN the presence or an ignition source, dust can form explosive mixture with air (in an enclosed space). At temperatures above 200 degrees Fahrenheit: Thermal decomposition can give toxic products, organic derivatives, and carbon monoxides. Fight fire from windward direction if possible. Sprinkle the container with water if not possible to move.

Section 6 Accidental Release Measures

Personal Precautions: Avoid contact with skin and eyes. Prohibit inhalation of dust.

Environmental Precautions: Product becomes slippery when it absorbs water. 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.

Section 7 Handling and Storage

Precautions for Safe Handling: Avoid dust formation. 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 vapors. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse. Keep away from heat, sparks, flames, and all other ignition sources.

Conditions for Safe Storage: Store in a cool, well-ventilated area. Avoid humidity, especially direct contact with water.

Section 8 Exposure controls / Personal Protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Acrylic Acid Polymer Sodium Salt	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, and non-skid boots. Use adequate ventilation to keep airborne concentrations low.

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

Section 9 Physical and Chemical Properties

Appearance: Solid, granular white powder.
Odor: No odor.
Odor threshold: Data not available.
pH: 6 to 8
Melting/Freezing point: Data not available
Boiling point: Data not available
Flash point: Data not available

Evaporation rate (Water = 1): Data not available
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): Data not available
Vapor density (Air = 1): Data not available
Relative density (Specific gravity): Data not available water)
Solubility(ies): Swells in water.

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

Section 10 Stability and Reactivity

Chemical stability: Stable at room temperature

Hazardous polymerization: Will not occur.

Conditions to avoid: Product becomes slippery when it absorbs water. Keep away from heat and sources of ignition.

Incompatibilities with other materials: Data not available.
Hazardous decomposition products: Thermal decomposition gives toxic products, organic vapors, and carbon monoxide gas.

Section 11 Toxicological Information

Acute toxicity: Oral rat LD50 > 1,600 g/kg, mouse LD50 >3,200 g/kg

Skin corrosion/irritation: None (Human, Rabbit)
Serious eye damage/irritation: None (Rabbit) **Respiratory or skin sensitization:** Data not available
Germ cell mutagenicity: Data not available **Carcinogenity:** 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.
Ingestion: May be harmful if swallowed.
Skin: May cause mild irritation.
Eyes: May cause mild irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: Data not available

Section 12 Ecological Information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: EC50 48 hours >100 mg/L, Daphnia magna
Toxicity to algae: No data available
Persistence and degradability: Not biodegradable **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: Not applicable **Shipping name:** Not Regulated
Hazard class: Not applicable **Packing group:** Not applicable **Reportable Quantity:** No **Marine pollutant:** No
Exceptions: Not applicable **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
Acrylic Acid Polymer Sodium Salt	Listed	Not Listed	Not Listed	Listed	Not Listed	Uncontrolled Product

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.

SAFETY DATA SHEET

GENERAL STORAGE CODE GREEN

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	Water with food coloring
Synonyms	"Blood" (*simulated*)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: None required
Pictograms: None required
Target organs: None known

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

GHS Classification:
Not classified

GHS Label information: **Hazard statement(s):**
None

Precautionary statement(s):
Call a doctor is you feel unwell.

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
Water	7732-18-5	>99%	231-791-2
Food Coloring – Red	Not available	<1%	Not available

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.

Specific Hazards: In the presence or an ignition source, dust can form explosive mixture. At high temperatures, fire is possible:

Section 6 Accidental Release Measures

Personal Precautions: Avoid contact with skin and eyes. Prohibit inhalation of dust.

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.

Section 7 Handling and Storage

Precautions for Safe Handling: Avoid dust formation. 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 vapors. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Keep away from heat, sparks, flames, and all other ignition sources. Keep away from incompatibles such as oxidizing agents, alkalis.

Conditions for Safe Storage: Store in a cool, well-ventilated area.

Section 8 Exposure controls / Personal Protection

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, and 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 dusty conditions prevail, work in fume hood or wear a NIOSH/MSHA approved respirator.

Section 9 Physical and Chemical Properties

Appearance: Red liquid.
Odor: No odor.
Odor threshold: Data not available.
pH: Data not available
Melting/Freezing point: Data not available
Boiling point: Data not available
Flash point: Data not available

Evaporation rate (Water = 1): Data not available
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): Data not available
Vapor density (Air = 1): Data not available
Relative density (Specific gravity): Data not available water)
Solubility(ies): Complete in water.

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

Section 10 Stability and Reactivity

Chemical stability: Stable at room temperature

Hazardous polymerization: Will not occur.

Conditions to avoid: Keep away from heat and sources of ignition. Keep away from incompatible materials.

Incompatibilities with other materials: Reactive with oxidizing agents, alkalis.
Hazardous decomposition products: Data not available.

Section 11 Toxicological Information

Acute toxicity: Data not available

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
Carcinogenity: 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.
Ingestion: May be harmful if swallowed.
Skin: May cause mild irritation.
Eyes: May cause mild irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: Data not available

Section 12 Ecological Information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
Toxicity to algae: No data available
Persistence and degradability: Not biodegradable
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: Not applicable
Shipping name: Not Regulated
Hazard class: Not applicable
Packing group: Not applicable
Reportable Quantity: No
Marine pollutant: No
Exceptions: Not applicable
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
Food Color – Red	Not Listed	Not Listed	Not Listed	Listed	Not Listed	Uncontrolled Product

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: October 12, 2020 Supercedes:

SAFETY DATA SHEET

GENERAL STORAGE CODE GREEN

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	Buffer Solution pH10
Synonyms	“Sea Otter #2 Plasma” (simulated)

Section 2 Hazards Identification

This substance or mixture has not been classified at this time according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.

Signal word: WARNING
Pictograms: None required
Target organs: None known

GHS Classification:
Skin irritation (Category 3)
Eye irritation (Category 2B)

GHS Label information: **Hazard statement(s):**
H316: Causes mild skin irritation.
H320: Causes eye irritation.

Precautionary statement(s):

P264: Wash hands thoroughly after handling.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P332+P313: If skin irritation occurs: Get medical attention.

P337+P313: If eye irritation persists: Get medical 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
Water	7732-18-5	99.08%	231-791-2
Potassium chloride	7447-40-7	0.40%	231-211-8
Boric acid	10043-35-3	0.33%	233-139-2
Sodium hydroxide	1310-73-2	0.19%	215-185-5

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: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

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: Absorb with inert dry material, 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 vapors, spray or mist. 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)
Potassium chloride	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: Clear, colorless liquid.
Odor: No odor.
Odor threshold: Data not available.
pH: 10.0
Melting/Freezing point: Approx. 0°C (32°F) (water)
Boiling point: Approx. 100°C (212°F) (water)
Flash point: Data not available

Evaporation rate (Water = 1): <1
Flammability (solid/gas): Data not available.
Explosion limits: Lower/Upper: Data not available
Vapor pressure (mm Hg): 14 (water)
Vapor density (Air = 1): 0.7 (water)
Relative density (Specific gravity): Approx. 1.0 (water)
Solubility(ies): Complete in water.

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

Section 10 Stability and Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.

Conditions to avoid: Excessive temperatures which cause evaporation.
Incompatibilities with other materials: Acids, alkalies, and air will change the buffer's ability.
Hazardous decomposition products: Boron oxide and chlorine gas.

Section 11 Toxicological Information

Acute toxicity: Data not available
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
Carcinogenity: 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.
Ingestion: May be harmful if swallowed.
Skin: May cause mild irritation.
Eyes: May cause mild irritation.

Signs and symptoms of exposure: To the best of our knowledge the chemical, physical and toxicological properties have not been thoroughly investigated. Specific data is not available. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: Data not available

Section 12 Ecological Information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
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: Not applicable
Shipping name: Not Regulated
Hazard class: Not applicable
Packing group: Not applicable
Reportable Quantity: No
Marine pollutant: No
Exceptions: Not applicable
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
Potassium Chloride	Listed	Not Listed	Not Listed	Listed	Not Listed	Uncontrolled Product
Sodium hydroxide	Listed	1,000 lbs (454 kg)	D002	Listed	Not Listed	E

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.

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