

ALIEN CSI

Welcome to the world of ALIEN CSI!

Alien CSI started off with the idea that half, if not more, of the students we engaged, whether they were in third grade or college, had a fascination with CSI. And we thought it would be an interesting smash up of CSI and Alien stuff, and thus ALIEN CSI was born! The first competition we did was rather simple and off-the-cuff, and even that had the kids really engaged. So, we really dived in and made it a comprehensive, dynamic and exciting experience!

But most importantly, it needed to be **USER-FRIENDLY**...for EVERYBODY, but especially the teacher/facilitator. Youth want to learn and have fun and it shouldn't be a burden for the teacher to make that happen. So, we made it turn-key. We included everything you need in the kit and you can use it as-is or customize it to your heart's content. You can even sit back in your chair and watch your students dig in and follow the step-by-step directions and get an amazing experience. And heck, that's even before you have an in-school tournament...if you want to do an in-school tournament, because again, everything is included to make it happen. And if you want us to come out and run your school tournament, we can do that, too!



At some point, you're going to have to decide who will represent your school/organization at the Regional Tournament, but that's what the in-school tournament can help with. Or, you can choose another way to pick the team. Either way, we want to see your school/organization representing!

It's a "lot of BANG" for a very modest buck!

Below is a stripped-down sample module (there are FIVE in the full kit) for you to get an idea of what you get. Okay...some "Questions and Answers" you may have:

- **How long does it take to complete the Kit?** You could do the whole Kit in a week, but we suggest a minimum of six weeks and a maximum of thirteen weeks, but definitely before the Regional Tournament.
- **Is it affordable?** Less than \$10/student...for all the stuff you get...come on!
- **Can we send multiple teams to the Regional Tournament?** If space allows.
- **What are the Modules?** Alien Biopsy ("What is it?"), Interstellar Astronomy ("Alien Home"), Navigation/Orienteering ("A What?"), Cryptography ("It's Greek to Me!"), Excavation ("Dig It?").
- **Is there any multimedia support?** Absolutely! Weekly on-line tournaments (with prizes!) and multimedia lesson plans.
- **How do I get started?** Let your principal know you want the school to register.

Sooooo...that about sums it up. If you have any questions, comments or concerns, just let us know.

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ALIEN BIOPSY MODULE (Teacher Version)

DESCRIPTION: Student Teams will prepare, analyze and report out a biopsy of an alien biological sample.

TIME: 45 - 60 minutes

GENERAL STANDARDS: Design and conduct scientific investigations to expose and excite student interest and motivate their curiosity to continue in and out-of-classroom pursuit of knowledge in Science. In addition, to initially provide a structured Scientific Inquiry process with the incentive and environment for students to deploy Scientific Inquiry in an innovative, yet auditable manner.

STATE STANDARDS: State of Ohio Department of Education

SCIENCE			
GRADE	BAND THEME	BAND DESCRIPTION	STRAND CONNECTION
4th	INTERCONNECTIONS WITHIN SYSTEMS	Students explore the components of various systems and then investigate dynamic and sustainable relationships within systems using scientific inquiry.	Heat and electrical energy are forms of energy that can be transferred from one location to another. Matter has properties that allow the transfer of heat and electrical energy.
5th	INTERCONNECTIONS WITHIN SYSTEMS	Students explore the components of various systems and then investigate dynamic and sustainable relationships within systems using scientific inquiry.	The transfer of energy drives changes in systems, including ecosystems and physical systems.
6th	ORDER AND ORGANIZATION	Students use scientific inquiry to discover patterns, trends, structures and relationships that may be inferred by simple principles. These principles are related to the properties or interactions within and between systems	All matter is made of small particles called atoms. The properties of matter are based on the order and organization of atoms and molecules. Cells, minerals, rocks and soil are all examples of matter.
7th	ORDER AND ORGANIZATION	Students use scientific inquiry to discover patterns, trends, structures and relationships that may be inferred by simple principles. These principles are related to the properties or interactions within and between systems	Systems can exchange energy and/or matter when interactions occur within systems and between systems. Systems cycle matter and energy in observable and predictable patterns
8th	ORDER AND ORGANIZATION	Students explore the components of various systems and then investigate dynamic and sustainable relationships within systems using scientific inquiry.	Systems can be described and understood by analysis of the interaction of their components. For species to continue, reproduction must be successful.
HS	PHYSICAL SCIENCE	Physical science comprises the systematic study of the physical world as it relates to fundamental concepts about matter, energy and motion. A unified understanding of phenomena in physical, living, Earth and space systems.	STUDY OF MATTER: Matter includes differences in the physical properties of solids, liquids and gases, elements, Compounds, mixtures, molecules, kinetic and potential energy and the particulate nature of matter.
HS	CHEMISTRY	Chemistry comprises a systematic study of the predictive physical interactions of matter and subsequent events that occur in the natural world. The study of matter through the exploration of classification, its structure and its interactions is how this course is organized.	STRUCTURE AND PROPERTIES OF MATTER: The physical science syllabus included properties and locations of protons, neutrons and electrons, atomic number, mass number, cations and anions, isotopes and the strong nuclear force that hold the nucleus together.
HS	CHEMISTRY	Chemistry comprises a systematic study of the predictive physical interactions of matter and subsequent events that occur in the natural world. The study of matter through the exploration of classification, its structure and its interactions is how this course is organized.	INTERACTIONS OF MATTER: Classifying reactions into types can be a helpful organizational tool in recognizing patterns of what may happen when two substances are mixed.

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MATH			
GRADE	BAND THEME	BAND DESCRIPTION	STRAND CONNECTION
4th	MULTI-DIGIT MULTIPLICATION	Developing an understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends as part of effectively and efficiently performing multi-digit arithmetic	Generalized understanding of place value, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, and area models), place value, and properties of operations.
4th	<ul style="list-style-type: none"> • FRACTION EQUIVALENCE • ADDITION AND SUBTRACTION OF FRACTIONS WITH LIKE DENOMINATORS • MULTIPLICATION OF FRACTIONS BY WHOLE NUMBERS 	Developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers	Students develop understanding of fraction equivalence and operations with fractions. Develop methods such as using models for generating and recognizing equivalent fractions. Students solve measurement problems involving conversion of measurements and fractions.
5th	ADDITION AND SUBTRACTION OF FRACTIONS	Developing fluency with addition and subtraction of fractions and developing understanding of the multiplication of fractions.	Students apply fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators.
5th	UNDERSTANDING VOLUME	Recognizing volume as an attribute of three-dimensional space.	Students select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume.
6th	RATIO AND RATE	Connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems.	Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. Students solve a wide variety of problems involving ratios and rates.
7th	PROPORTIONAL RELATIONSHIPS	Developing understanding of and applying proportional relationships	Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems.
8th	FUNCTION CONCEPTS	Grasping the concept of a function and using functions to describe quantitative relationships	Students grasp the concept of a function as a rule that assigns to each input exactly one output. They understand that functions describe situations where one quantity determines another.
HS	MODELING	Linking classroom mathematics and statistics to everyday life, work, and decision-making.	Students will choose and use appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions.
HS	NUMBER AND QUANTITY	Quantification as a means of conceiving attributes of interest.	Students will quantify relevant attributes and create or choose suitable measures for them.
HS	ALGEBRA	Algebraic manipulations are governed by the properties of operations and exponents, and the conventions of algebraic notation.	Students will create or use expressions that describes a computation involving a general quantity requiring the ability to express the computation in general terms.
HS	FUNCTIONS	Functions describe situations where one quantity determines another.	Students will understand and apply the concept of a function, and use function notation.

GENERAL OBJECTIVES

Students will be able to:

1. Properly employ laboratory methods in conducting a biochemical process and to avoid contamination.
2. Prepare and test a foreign substance for a specific chemical reaction.
3. Determine alien's biochemical composition.
4. Draw a simple structure and general formula of the biochemical structure of the alien.

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5. Prepare and deliver a scientific biopsy report.
6. Identify different types of laboratory equipment and supplies.
7. Apply Scientific Method in a laboratory experiment.
8. Apply conversion rates to standard measurement systems.

VOCABULARY:

Analysis	Aqueous	Atom
Biochemical	Biopsy	Chemical Reaction
Compound	Concentration	Cubic Centimeter (cc)
Delta	Detritus	Element
Frozen Section	Hydrocarbon	Milliliter (ml)
Minerals	Mohs Surgery	Molecule
Physical Reaction	Pipette	Protein
Radiography	Reagent	Silicon
Skeletal formula	Solvent	Test Tube
Vigorously		

MATERIALS (All materials/supplies are located in Alien CSI Biopsy Kit)

- 1 – “Description of Supplies and Equipment” Worksheet Template
Teacher/facilitator will need to make enough copies for each member of the team
- 1 – “Biopsy Report” Form Template
Teacher/facilitator will need to make enough copies for each member of the team, plus one to be officially submitted to the teacher/facilitator.
- 1 – Biochemical Color Analysis and Chemical Structures Chart
- 1 – “Biopsy Team Step-by-Step Process” Sheet Template
Teacher/facilitator should make three (3) copies for each team
- 1 – “Biopsy Glossary and Definition” Sheet
Teacher/facilitator will need to make enough copies for each member of the team
- 1 – Pre-/Post-Assessment Master Template
- 1 – “Salty Aliens: Carbon-based life isn’t the only way to live!” Sheet
- 1 – Lab Report Check List
- 1 – Biopsy Career Sheet
- 2 – Empty test tubes with caps
- 3 – Pipettes
- 1 – Set of Magic Markers (Blue, Red, Green, Black)
- 1 – Test tube of Life Form Reagent Solution
- 2 – Empty test tubes with caps
- 1 – Test tubes with distilled water
- 1 – Test tube marked and containing Alien “cells”
- 1 – Protective Mat

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PRE-LESSON (Preparation)

1. Have students take pre-assessment
2. Have students watch lesson video: "Getting Ready for the Alien Biopsy".
3. Have the CSI Biopsy Kit available

LESSON STEPS:

1. Form biopsy teams of 3-6 students (4 preferred)
 2. Each team shall elect from one of their members a Team Representative. The Team Representative will be responsible for completing the Official Team "Biopsy Report".
 3. Each Team Member should complete Section 1 of the "Biopsy Report"
 4. All team members should review the "Biopsy Glossary and Definition" Sheet.
 5. Practice the Procedure. As one member of the team reads the "Biopsy Team Step-by-Step Process" Sheet, the remaining team members should act out their steps. Leave the caps on the test tubes during the Practice.
 6. Open the Protective Mat and lay on table. With your BLACK magic marker draw a line down the Protective Mat. At the top of the left side of the Protective Mat write "CLEAN" and at the top of the right side of the Protective Mat, write "DIRTY".
 7. Match each item (and quantity) from the Alien CSI Kit with the "Biopsy Description of Supplies and Equipment" Worksheet and place on the Protective Mat.
 8. Mark the top of one (1) pipette with the BLUE magic marker, one (1) pipette with the RED magic marker and one (1) pipette with the GREEN magic marker. Lay the marked pipettes on the "CLEAN" side of the Protective Mat.
- ***IMPORTANT:** To keep the testing process accurate, ALWAYS keep the cap on its test tube until absolutely necessary. Once ready to add to (or remove from) the test tube, remove the cap, add the substance and immediately replace the cap and make sure it is TIGHTLY sealed. ***
9. Team Member 1 should hold the test tube (marked "AM") containing the Alien Material. The cap should still be on the test tube. All team members should study the material in the "AM" test tube, agree on a description and neatly write it in Section 2 of the Biopsy Report Form. If the "AM" test tube appears to be undamaged and not leaking, then circle "Adequate for Analysis" in Section 2 of the Biopsy Report. If the "AM" test tube does appear to be damaged or leaking, IMMEDIATELY see your teacher or facilitator.
 10. Team Member 2 should hold the test tube containing the Distilled Water (marked "DW"). The cap should still be on the test tube.
 11. Team Member 3 should hold the Testing test tube (marked "TT"). The cap should still be on the test tube.
 12. Team Member 4 will now take the BLUE pipette and remove three (3) ml (= 3 cc) of distilled water from the "DW" test tube and add to "TT" Testing test tube.
 13. Team Member 4 will lay the BLUE pipette on the "DIRTY" side of the Protective Mat.
 14. Team Member 4 will now pick up the RED pipette and remove three (3) ml (= 3 cc) of fluid from the "AM" Alien Material test tube. It is ok if detritus (pieces) of the Alien Material are sucked into the pipette.

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15. Team Member 1 should immediately and tightly replace the cap back on the “AM” Alien Material test tube.
16. Team Member 4 will now add the Alien Material from the RED pipette into the “TT” Testing tube and lay the RED pipette on the “DIRTY” side of the Protective Mat.
17. Team Member 3 should IMMEDIATELY replace the cap tightly on the “TT” Testing tube and shake vigorously for 30 seconds.
18. Team Member 4 will pick-up the GREEN pipette and remove two (2) ml (=2cc) of the reagent solution from the Reagent Solution test tube (“RS”) and add to the Testing test tube (“TT”). Avoid touching the “TT” Testing test tube with the GREEN pipette – you want to avoid contaminating the Reagent Solution with the Alien Material.
19. Team Member 1 should immediately and tightly place the cap onto the “TT” Testing test tube and shake vigorously for 30 seconds. After shaking, wait one minute.
20. Team Member 4 should lay the “TT” Testing test tube on the “DIRTY” side of the Protective Map.
21. With the sunlight or indoor lights behind Team Member 1, Team Member 1 should place the “TT” Testing test tube next to the Biochemical Color Analysis Chart to determine the closest color match.
22. Each Team Member should illustrate on their individual “Biopsy Report Form”, the Biochemical Name, and a modeling format (General Formula, Ball and Stick, etc.) of the identified compound.
23. Each Team Member will share their Biopsy Report Form with other members of the team.
24. If all Team Members agree on the conclusion, then the Team Representative shall complete the Official Biopsy Report, each Team Member will write and sign their name and the Team Representative will turn in the Official Biopsy Report to the Teacher/Facilitator.
25. If any member(s) of the team disagree(s) with the result and a consensus (where everyone agrees) cannot be reached, then the Team Members who dissent from the majority may write their conclusions in the “Note” section and write their name and sign their signature in the “Alternative Conclusion” section. The Team Representative will turn in the Official Biopsy Report to the Teacher/Facilitator.
26. Return the Reagent test tube and unused equipment /supplies to the Kit. All other used equipment (including the Testing Test Tube, Alien Material Test Tube and pipettes should be wrapped in the Protective mat and returned to the Teacher/Facilitator for recycling pickup. Optional: the school/organization may choose to internally recycle the used supplies.
27. All Team Members should take the post-assessment and turn into the Teacher/Facilitator.

OPTIONAL LESSON PLAN ADD-ON COMPONENTS:

Conservation of Mass: Measure all test tube, before and after the experiment and compare all equipment supplies before and after use compare total weight. Conservation of mass

Fine Art: Team Members sketch laboratory equipment

Career Readiness: Team Members review the Biopsy Career Sheet, perform additional on-line research and handwrite a one-paragraph report on careers that use or execute biopsies.

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DESCRIPTION OF SUPPLIES AND EQUIPMENT (per Student Team)



x1

ALIEN BIOLOGICAL
MATERIAL



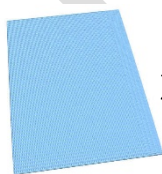
x3

PIPETTE: Pasteur pipettes
are plastic or glass pipettes
used to transfer small
amounts of liquids.



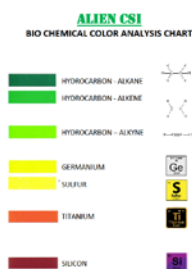
x1

DISTILLED WATER: Distilled
water does not contain
other components that
may affect an experiment.



x1

PROTECTIVE MAT: Used to
contain used or non-sterile
equipment and supplies.



x1

COLOR SCALE: When a
universal indicator is added
to a solution, the color
change can indicate the
type of substance being
tested.



x1

REAGENT/REACTANT:
substance or compound
added to a system to cause
a chemical reaction or
added to test if a reaction
occurs.



x1
set

MAGIC MARKERS: Red,
Black, Green, Blue



x2

TEST TUBE (empty): Used
to contain chemicals for
experiments. Their
spherical bottom and
vertical sides reduce mass
loss when pouring.

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STEP-BY-STEP CHECKLIST

<input type="checkbox"/>	STEP	TASK
<input type="checkbox"/>	1	Form biopsy teams of 3-6 students (4 preferred)
<input type="checkbox"/>	2	Each team shall elect from one of their members a Team Representative. The Team Representative will be responsible for completing the Official Team "Biopsy Report".
<input type="checkbox"/>	3	Each Team Member should complete Section 1 of the "Biopsy Report".
<input type="checkbox"/>	4	All team members should review the "Biopsy Glossary and Definition" Sheet.
<input type="checkbox"/>	5	Practice the Procedure. As one member of the team reads the "Biopsy Team Step-by-Step Process" Sheet, the remaining team members should act out their steps. Leave the caps on the test tubes during the Practice.
<input type="checkbox"/>	6	Open the Protective Mat and lay on table. With your BLACK magic marker draw a line down the Protective Mat. At the top of the left side of the Protective Mat write "CLEAN" and at the top of the right side of the Protective Mat, write "DIRTY".
<input type="checkbox"/>	7	Match each item (and quantity) from the Alien CSI Kit with the "Biopsy Description of Supplies and Equipment" Worksheet and place on the Protective Mat.
<input type="checkbox"/>	8	Mark the top of one (1) pipette with the BLUE magic marker, one (1) pipette with the RED magic marker and one (1) pipette with the GREEN magic marker. Lay the marked pipettes on the "CLEAN" side of the Protective Mat.
***IMPORTANT: To keep the testing process accurate, ALWAYS keep the cap on its test tube until absolutely necessary. Once ready to add to (or remove from) the test tube, remove the cap, add the substance and immediately replace the cap and make sure it is TIGHTLY sealed. ***		
<input type="checkbox"/>	9	Team Member 1 should hold the test tube (marked "AM") containing the Alien Material. The cap should still be on the test tube. All team members should study the material in the "AM" test tube, agree on a description and neatly write it in Section 2 of the Biopsy Report Form. If the "AM" test tube appears to be undamaged and not leaking, then circle "Adequate for Analysis" in Section 2 of the Biopsy Report. If the "AM" test tube does appear to be damaged or leaking, IMMEDIATELY see your teacher or facilitator.
<input type="checkbox"/>	10	Team Member 2 should hold the test tube containing the Distilled Water (marked "DW"). The cap should still be on the test tube.
<input type="checkbox"/>	11	Team Member 3 should hold the Testing test tube (marked "TT"). The cap should still be on the test tube.
<input type="checkbox"/>	12	Team Member 4 will now take the BLUE pipette and remove three (3) ml (= 3 cc) of distilled water from the "DW" test tube and add to "TT" Testing test tube.
<input type="checkbox"/>	13	Team Member 4 will lay the BLUE pipette on the "DIRTY" side of the Protective Mat.
<input type="checkbox"/>	14	Team Member 4 will now pick up the RED pipette and remove three (3) ml (= 3 cc) of fluid from the "AM" Alien Material test tube. It is ok if detritus (pieces) of the Alien Material are sucked into the pipette.
<input type="checkbox"/>	15	Team Member 1 should immediately and tightly replace the cap back on the "AM" Alien Material test tube.
<input type="checkbox"/>	16	Team Member 4 will now add the Alien Material from the RED pipette into the "TT" Testing tube and lay the RED pipette on the "DIRTY" side of the Protective Mat.

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STEP-BY-STEP CHECKLIST

<input type="checkbox"/>	17	Team Member 3 should IMMEDIATELY replace the cap tightly on the "TT" Testing tube and shake vigorously for 30 seconds.
<input type="checkbox"/>	18	Team Member 4 will pick-up the GREEN pipette and remove two (2) ml (=2cc) of the reagent solution from the Reagent Solution test tube ("RS") and add to the Testing test tube ("TT"). Avoid touching the "TT" Testing test tube with the GREEN pipette - you want to avoid contaminating the Reagent Solution with the Alien Material.
<input type="checkbox"/>	19	Team Member 1 should immediately and tightly place the cap onto the "TT" Testing test tube and shake vigorously for 30 seconds. After shaking, wait one minute.
<input type="checkbox"/>	20	Team Member 4 should lay the "TT" Testing test tube on the "DIRTY" side of the Protective Map.
<input type="checkbox"/>	21	With the sunlight or indoor lights behind Team Member 1, Team Member 1 should place the "TT" Testing test tube next to the Biochemical Color Analysis Chart to determine the closest color match.
<input type="checkbox"/>	22	Each Team Member should illustrate on their individual "Biopsy Report Form", the Biochemical Name, and a modeling format (General Formula, Ball and Stick, etc.) of the identified compound.
<input type="checkbox"/>	23	Each Team Member will share their Biopsy Report Form with other members of the team.
<input type="checkbox"/>	24	If all Team Members agree on the conclusion, then the Team Representative shall complete the Official Biopsy Report, each Team Member will write and sign their name and the Team Representative will turn in the Official Biopsy Report to the Teacher/Facilitator.
<input type="checkbox"/>	25	If any member(s) of the team disagree(s) with the result and a consensus (where everyone agrees) cannot be reached, then the Team Members who dissent from the majority may write their conclusions in the "Note" section and write their name and sign their signature in the "Alternative Conclusion" section. The Team Representative will turn in the Official Biopsy Report to the Teacher/Facilitator.
<input type="checkbox"/>	26	Return the Reagent test tube and unused equipment /supplies to the Kit. All other used equipment (including the Testing Test Tube, Alien Material Test Tube and pipettes should be wrapped in the Protective mat and returned to the Teacher/Facilitator for recycling pickup. Optional: the school/organization may choose to internally recycle the used supplies.
<input type="checkbox"/>	27	All Team Members should take the post-assessment and turn into the Teacher/Facilitator.

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GLOSSARY OF TERMS

Analysis	Detailed examination of the elements or structure of something, typically as a basis for discussion or interpretation.
Aqueous	Of or containing water, typically as a solvent or medium.
Atom	An atom is the smallest constituent unit of ordinary matter that has the properties of a chemical element.
Biochemical	Relating to the chemical processes and substances which occur within living organisms.
Biopsy	An examination of tissue removed from a living body.
Carbon	The chemical element with an atomic number of 6 on the periodic table.
Chemical Reaction	A process that involves rearrangement of the molecular or ionic structure of a substance, as opposed to a change in physical form or a nuclear reaction.
Chemical Reaction	A reaction where a new substance is formed and changing back to its original form will be extremely difficult.
Compound	A substance formed when two or more chemical elements are chemically bonded together.
Concentration	Is the abundance of a constituent divided by the total volume of a mixture.
Crystalline	Solid matter whose atoms are arranged in regular, repeating patterns.
Cubic Centimeter (cc)	A cubic centimetre (cc) is a unit of volume that corresponds to the volume of a cube that measures 1 cm × 1 cm × 1 cm.
Delta	The delta symbol is used to represent change.
Detritus	Dead particulate organic material - typically includes the bodies or fragments of dead organisms as well as fecal material.
Distilled Water	Distilled water does not contain other components that may affect an
Divisor	A number by which another number, a dividend, is divided.
Element	The simplest substance whose atoms all have the same number of protons.
Fraction	A numerical quantity that is not a whole number (e.g., 1/2, 0.5).
Hydrocarbon	An organic compound consisting entirely of hydrogen and carbon.
Hydrogen	A chemical element with symbol H and atomic number 1 on the Periodic Table.
Inorganic	NOT relating to or coming from (derived) from living matter.
Ionic	A chemical bond formed between two ions with opposite charges.
Laboratory	A room or building equipped for scientific experimentation or research.
Medium	A substance in which bacteria or other microorganisms are grown for scientific purposes.
Milliliter (ml)	A unit of volume equal to one thousandth of a liter, 1 cubic centimeter.
Minerals	Any naturally occurring inorganic solid that has a definite chemical composition and possesses a crystalline structure.
Molecule	A group of atoms bonded together, representing the smallest fundamental unit of a chemical compound that can take part in a chemical reaction.

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GLOSSARY OF TERMS

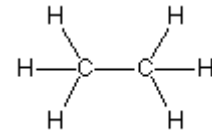
Organic	Relating to or coming from (derived) from living matter.
Organism	An individual form of life composed of a single cell or a complex of cells.
Periodic Table	A table of the chemical elements arranged in order of atomic number,
Physical Reaction	A reaction where a substance doesn't change and can be reversed.
Pipette	Pasteur pipettes are plastic or glass pipettes used to transfer small amounts of
Protein	Large molecules composed of one or more chains of amino acids in a specific order.
Reaction	Process in which one or more substances, the reactants, are converted to one or more different substances, the products.
Reagent / Reactant	A substance or compound added to a system to cause a chemical reaction, or added to test if a reaction occurs.
Silicon	A chemical element with symbol Si and atomic number 14 on the Periodic Table.
Skeletal formula	A diagrammatic representation of a molecule in which lines represent bonds between atoms that are represented by their symbols.
Solute	A substance dissolved in another substance.
Solvent	A substance that dissolves a solute (a chemically distinct liquid, solid or gas), resulting in a solution.
Test Tube	A piece of laboratory glassware consisting of a finger-like length of glass or clear plastic tubing, open at the top and closed at the bottom.
Tissue	A large mass of similar cells that make up a part of an organism and perform a specific function.
Vigorously	in a way that involves physical strength, effort, or energy; strenuously.
Volume	The quantity of three-dimensional space occupied by a liquid, solid, or gas.

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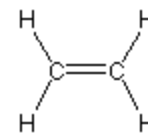
BIO CHEMICAL COLOR ANALYSIS CHART



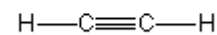
HYDROCARBON - ALKANE



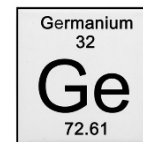
HYDROCARBON - ALKENE



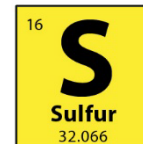
HYDROCARBON - ALKYNE



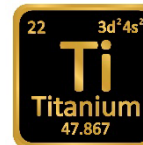
GERMANIUM



SULFUR



TITANIUM



SILICON

