Playing With Polymers

Name _____

1. Crude oil, one form of _____, has been called _____ _____, because of its importance as an _____ source and use in making thousands of products.

2. Petroleum is a made from the remains of _____ and _____ that have been buried beneath sediments at the bottom of the ocean. Over time, _____ and _____ changed the remains into petroleum.

3. Petroleum is a _____ resource, which means that it cannot be replaced once it is used up.

4. Petroleum is separated into useful parts by a process called _____ _____ and takes place in an oil _____.

5. What percentage of a barrel of crude oil is used as gasoline? _____ % Petrochemicals? _____ %

6. Identify each of the products of petroleum based on the description provided.

_____ - Main material used for building roads.

_____ - Burns easily and release large amounts of energy

_____ - Used in furniture polish and as a coating for milk cartons

_____ - Substances that reduce friction between moving parts of equipment

7. A product made from petroleum is called a _____ product. These products usually consist of long chains. Each link in the chain is called a _____, while the entire chain is called a _____.

8. Cotton, silk, wool, and natural rubber are all _____ _____. _____, another natural polymer, is an essential ingredient in living matter and is made up of monomers called _____ _____.

9. _____ is the process of chemically bonding monomers to form polymers. Polymers made from petrochemicals are called _____ _____. Some synthetic polymers are natural _____, _____ wrap, and fabrics such as _____ and rayon. One of the most important synthetic polymers we use everyday is _____, which are used in products from kitchen utensils to rocket engines.

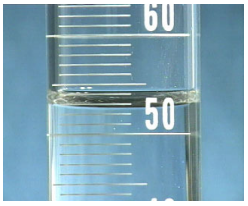
10. Polymers are also used in medicine as substitutes for _____ _____, such as bones and arteries.

11. Answer these questions about polymers as you watch the "Nature's Polymers" video.

- A _____ is a molecule made from groups of smaller molecules called _____.
- Proteins are polymers made from _____ _____ joined together in long chains.
- Plants produce strands of _____, which is found in the walls of plant cells.
- Polymers are also used to make synthetic materials, such as rubber and _____.
- One polymer may consist of 100s or _____s of monomers.

- ❖ Spider silk is made of long chains of amino acids linked together by chemical _____. It is the strongest natural _____ known, is elastic enough to stretch to ____Xs its starting length, and is ____Xs stronger than steel.
- ❖ Synthetic polymers are often used in place of natural fibers because they are _____ and cheaper.
- ❖ Plastic bottles made of PET belong to a class of polymers called _____ and they can be recycled.
- ❖ It takes about _____ plastic bottles to make a man's fleece pullover.

12. To measure liquids, we will be using _____ _____.



13. What is the name of the "bubble" that forms at the top of the liquid? _____

14. What is the volume of water in this graduated cylinder? _____ ml

15. Fill in each blank as you discuss the safety rules in class.

(1) Read _____ carefully! If you are not sure what to do, ask for help. Do not make up your own recipes!

(2) _____ should always be worn when experimenting with chemicals.

(3) Do not _____ directly from the container! If you need to sniff slime, hold it several inches away from your face and use your hand to wave fumes towards your nose.

(4) No eating or drinking during the lab, which also means that you should NOT eat the slime or _____ any substances used to make slime! Keep your slime out of reach of small _____ and _____.

(5) Do not put the slime where it doesn't belong, such as on _____, carpeting, or other people!

(6) Dispose of slime materials properly. All slime must be thrown away in the trash can. Use a dry towel to clean your hands, cup, and plate. DO NOT put any amount of slime in the _____!

(7) Clean up _____ immediately! Your lab area should be clean when you start and clean when you leave.

(8) _____ your hands before you leave class.

(9) _____! No hitting, shoving, or other horseplay is allowed!

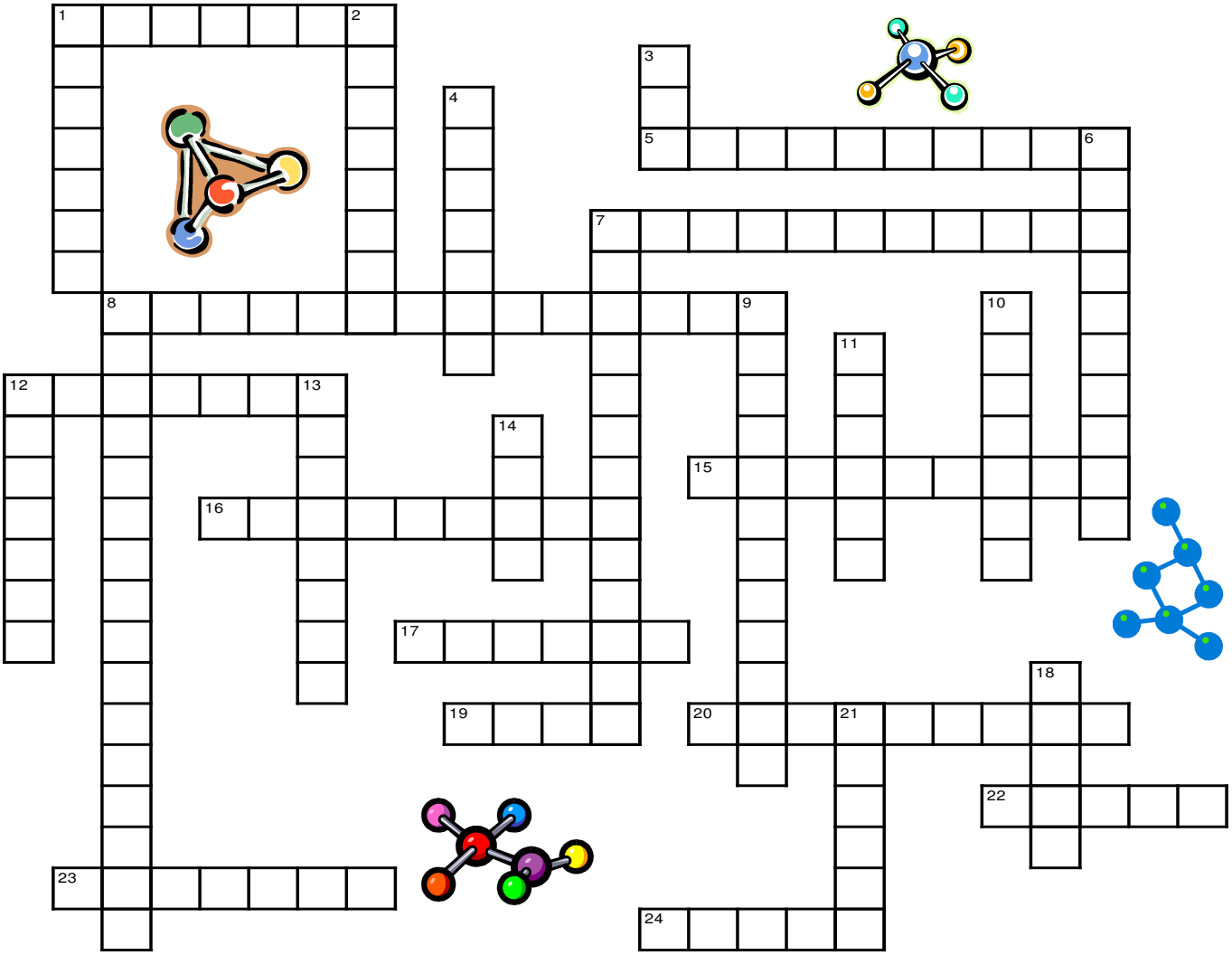
(10) Slime must remain in the _____! You are not allowed to take it to other classes. You will be able to take the slime home on the last day!

(11) Most of the slime will keep for 3-4 days. After your slime goes bad, throw it away! Do not dump in a sink!

(12) If you do not follow the rules, you will not be allowed to do the experiments and will earn a _____ grade for this unit. If you agree to follow these safety rules, sign your name in the shaded box on your data chart worksheet.

Playing With Polymers

Name _____



Across

1. Thickening agent used in many foods (or in goobers)
5. Building blocks of proteins
7. A synthetic polymer used to cover food to prevent spoilage and contamination
8. Process by which polymers are formed
12. Chain of monomers that are chemically bonded together
15. Created by the remains of plants and animals that have been buried in the earth and changed over time by heat and pressure
16. A common adhesive used for making slime
17. Used to help prevent wrinkles in your clothes
19. A natural polymer used for clothing, such as coats and socks
20. Another name for crude oil
22. Used as a laundry agent; sodium tetraborate
23. Links in a polymer chain
24. A synthetic polymer that is used to make silky fabrics, such as pantyhose

Down

1. A slime made from guar gum and borax solution
2. Polymers may be used in this field as substitutes for human tissues
3. The code of life found in each of our cells
4. Polymer made up of chains of amino acids
6. Slime made from PVA and borax solution
7. A product made from petroleum
8. Substance found in white glue and is used to make Super Slime
9. A resource that cannot be replaced once it is used up
10. Slime made from laundry starch and borax solution
11. Released by the burning of fuel
12. Synthetic polymer used to make many products, such as water bottles and toys
13. Place where petroleum is processed
14. A natural polymer created by many caterpillars and spiders
18. Slime made from white glue and borax solution
21. A natural polymer used to make "soft" clothing

How would you describe your slime-making experience?

Find 18 words in the puzzle below that could be used to describe your experience!
Write the words on the lines at the bottom of this page.

N	T	Z	D	G	N	I	T	S	U	G	S	I	D	Q
V	V	E	B	R	E	P	U	L	S	I	V	E	B	Y
D	W	H	L	M	A	G	C	S	H	Y	Q	D	M	H
R	F	C	V	B	O	N	Z	H	G	R	T	I	C	O
W	S	H	I	O	A	W	F	F	N	D	L	B	O	R
H	S	C	E	S	Y	R	U	C	I	S	J	M	O	R
U	O	Y	T	G	K	N	O	E	T	I	I	Q	L	I
M	R	Y	L	V	C	I	R	M	A	O	K	O	Z	D
O	G	N	I	N	I	A	T	R	E	T	N	E	H	W
R	Y	U	C	K	Y	G	H	D	S	M	S	X	I	U
O	A	P	N	V	J	W	B	K	U	Y	Z	O	O	A
U	L	R	U	D	A	C	I	W	A	L	L	B	C	P
S	T	E	R	R	I	B	L	E	N	K	H	G	K	U
W	J	S	S	I	C	K	E	N	I	N	G	W	A	H
F	X	X	D	C	R	J	D	H	S	K	N	D	O	A

C_____ H_____ O_____

D_____ H_____ R_____

E_____ I_____ S_____

F_____ M_____ S_____

G_____ N_____ T_____

G_____ N_____ Y_____

Playing With Polymers

Data Chart

I agree to follow the safety rules. I understand that if I do not follow the rules, I will not be allowed to do any experiments and will receive a zero grade for this unit.

Name _____ Date _____

Test	Gloop	Boogers	Goobers	Super Slime
Description Color, texture, odor, or other observations				
Slime Rating 1 = not very slimy to 4 = very slimy				
Slow Poke Test Slowly poke your finger into the slime. What happens?				
Quick Poke Test Quickly poke your finger into the slime. What happens?				
Slow Pull Test Slowly pull on the ends of a piece of the slime. What happens?				
Quick Pull Test Quickly pull on the ends of a piece of the slime. What happens?				
Blob Test Roll your slime into a ball and let it sit for a minute. What happens?				
Hang Test How long does it take for the slime to reach the table from a height of 30 cm?				
Bounce Test Roll into a ball and drop it on the table. Rate the bounce – 1 – poor to 5 -great!				

Slime Tests

Description
What does the slime look like? Does it smell? How would you describe its texture/feel?

Slime Rating
How slimy is your slime? Rate it from 1 = not very slimy to 4 = very slimy.

Slow Poke Test
Roll the slime into a ball, and then slowly poke your finger into it. What happens? How far does your finger go into the slime?

Quick Poke Test
Roll the slime into a ball, and then quickly poke the slime with your finger. What happens? How far does your finger go into the slime?

NOTE: If you are not able to do a test (slime too runny or plops), write a note in that space on your chart to explain why you were not able to do the test.

Slow Pull Test
Grab a glob of goop with your fingers and slowly pull on the ends. What happens?

Quick Pull Test
Grab a glob of goop with your fingers and quickly pull on the ends. What happens?

Blob Test – Need a timer!
Roll your goop into a ball and then sit the ball of slime on your plate or the table and time how long it takes for it to be a "blob" or flatten out. Write the time in your data chart.

Hang Test - Need a timer and a ruler!
Hold a glob of slime at a height of 30 cm above the table. Time how long it takes for the goop to reach the table. Write the time in your data chart.

Bounce Test - Need a ruler!
Roll your goop into a ball and drop from a height of 30 cm above the table. What happens?