Pre-AP Biology Syllabus

2019-2020

Course Overview

Biology is the study of living organisms, their origins, how they survive, reproduce, change over time and interact with each other and their environments. The PAP Biology curriculum is an introductory course taught in two semesters of high school. The primary objective of the course is to provide students with a fundamental understanding of biology and scientific processes, building a foundation for success in the college level AP Courses to follow.

PAP Biology is recommended for high-achieving students and for students who have a particular interest in biology and the natural sciences, including students who are traditionally underrepresented in AP courses. *Students will be ultimately responsible for their learning; therefore, they should be organized, prepared, and motivated to learn every day. Students are expected to maintain a passing grade.*

The PAP course places a high priority on developing critical thinking skills by examining real world problems. The PAP curriculum examines topics with more depth and includes more advanced resource material in addition to the adopted text. Laboratory investigations play a prominent role in the Pre-AP course. Labs are more sophisticated than in the regular curriculum and students are expected to design and carry out experiments using appropriate methods and resources.

Students who are interested in the PAP Biology course need to have the ability to read and write at grade level and be very familiar with computer applications. They need to make use of available time such as after school, activity period, or extra time made available during the school day. They should also take advantage of all available resources, including the library.

Academic Integrity

Any form of cheating, including but not limited to copying, plagiarism, forgery, and falsification will not be tolerated in this course. Any student caught cheating, as defined by the student handbook, will receive a zero for that assignment and the teacher will notify the parent/guardian. Disciplinary action will be taken in accordance with the school policy.

Cheating as defined by the student handbook

Cheating/Plagiarism- cheating is defined as **giving or receiving** and/or using unauthorized information on a test or submitting duplicated work for class or outside assignments. Plagiarism consists of representing another person's ideas or writings as one's own. Plagiarism will be considered as cheating.

Grading Procedures

Grading Scale:		**Learn to access your grades through Skyward. This is a great benefit for your parent/guardian and you.**
90-100	**A**	
80-89	**B**	
75-79	**C**	
70-74	**D**	
Below 70	**F**	

Major Grades: 60%

Tests/Exams, Labs, Projects

Minor Grades: 40%

Quizzes, Labs, Daily Activities, Homework

Major Grades:

We are required to have at least 3 major grades per six weeks, but there could be grading periods that include more. If this occurs, then students need to take advantage of any additional labs or projects given to ensure they can maintain their averages

Exams

Exams will be over material covered in class, including handouts, labs, and other activities, in addition to other supplemental readings assigned. The tests may include multiple choice questions, labeling, short answer questions, essays, and lab practicums. If you are absent for any reason on the day of an exam, you will make up that exam on the day you return - no excuses. If you are going to miss due to a school related event, such as athletics, band, agriculture, academic, etc., then you are expected to take the exam prior to the absence if it is available. If you miss three or more days consecutively due to situations beyond your control (illnesses, deaths, or family emergencies) prior to the exam, you will be provided the appropriate amount of time to complete the assignments. **The teacher reserves the right to administer a different form of an exam for any reason.**

Labs

Laboratory experiments and exploration are a large part of this course. The labs are not just here for fun; they are designed to increase the understanding of a particular topic. It is vital that the students follow all laboratory procedures and safety rules/guidelines. Failure to comply with behavior expectations can result in removal from lab activities. A safety contract will be sent home and must be filled out by the student and the parent/guardian. These documents will be kept on file and are required before a student can participate in any lab.

Note: Please keep in mind that Labs can take longer to grade due to the detail of the grading rubrics.

Projects

A project rubric will be provided ahead of time so that expectations are clear and understood. Points will be deducted for late projects. If you know that you are going to be absent on the project due date, then you must turn your project in the day before. If you are at a school related event, then you must turn in your project before/during your class period or it will be considered late.

Note: Please keep in mind that Projects can take longer to grade due to the detail of the grading rubrics.

Quizzes

Quizzes may be given at any time, covering any materials assigned such as readings, lectures, homework, or labs. The teacher reserves the right to administer a different form of a quiz for any reason. There are no re-takes on quizzes; you must study.

Homework

Students will be provided a calendar every six weeks to keep track of homework every day. This should be a place where parents can check to see if their students have homework, tests, or projects. Homework is an essential part of learning. It is assigned regularly for purposes of practicing, reinforcing skills, enhancing learning, and providing feedback to students. Homework assignments can be followed with a quiz to assess understanding of that work.

Late Work

Work is late if not submitted when called for by the teacher. Late work will be graded according to the late work policy posted in the classroom. For Pre-AP Biology, the following late work policy will be posted in each classroom:

1 day late= 10 points off

2 days late= 20 points off

3 days late= 30 points off

After that= Grade stays a "0"

Due dates on homework, classwork, labs, projects, or any other assignments are firm. We will not offer extra credit opportunities.

Your opportunity for your best grade is the due date.

If you know that you are going to be absent, you should get with your teacher to complete all missing assignments before your absence. This means you must plan ahead and do not wait until the day before you are leaving. *It is the* ***student's responsibility*** **(not the teacher's)** to make up assignments if the student has been absent. *Late work will be graded, however grading priority is given to current assignments.*

Zero Grades

Zero grades will be entered on the date that an assignment is due if the assignment has not been turned in when called for by the teacher. If the student turns in an assignment late, a "TI" may be coded into the grade system until it can be graded by the teacher. That grade will reflect the late policy as previously stated.

If "TI" is coded, you would see a circle with an "I" symbol when logged into the student gradebook by way of a computer (not cell phones). If you click on that symbol, it will show you the "TI" (turned in) code.

Waller High School Retest/Redo Policy

A student should have a minimum of one opportunity each grading period in each course to retake a test or redo an assignment for which he/she earned a failing grade (a grade below 70).

❖ The maximum grade received for any retest or redo will be a 70. If the student scores lower on the retest or redo, the original grade will be recorded.

❖ The student must be required to attend tutorials prior to retesting or redoing an assignment.

❖ The retest or redo grade will count in the same grading period as the original grade.

❖ Retest or redo opportunity may be given in a different format from the original.

❖ Semester/Final exams and benchmark exams are not eligible for retesting.

❖ Retesting will not be available for major grades that are compositions or projects.

❖ If a student is found to be academically dishonest he/she forfeits any chance for retesting or redoing and will receive a zero.

Textbook

Your textbook is available to you in hard print and online. You will be expected to access your textbook outside of class for certain assignments. The textbook does come with an APP for iPhones and other smartphones and tablets. You can only access one chapter at a time through this APP. You will be given this access at the beginning of the school year.

Communication

Email information:

Mrs. Marshall can be reached at jmarshall@wallerisd.net

Mr. Prestwood can be reached at cprestwood@wallerisd.net

Please make sure the name of the student is in the email.

REMIND.com:

We expect that all parents and students sign into REMIND.com for Pre-AP Biology. This is imperative to relay upcoming grades or important reminders for students.

For Parents: When you sign-up, please enter your name as "Parent of your student's name." This lets us know who is messaging or receiving messages.

For Students: You must sign-up with your real name.

Please refer to sign-up instructions for further details.

The most common challenge for new students is increasing their study skills to meet advanced high school classes. The following are suggestions to improve your grade in biology and other high school courses:

1. **Prepare for each class by reviewing your notes and reading the sections of your text that will be covered in that day's lecture.**
2. **Make and use a vocabulary list as you go.**
3. **Do all worksheets, study questions, etc.**
4. **Keep your handouts, lecture notes, and study questions organized in a binder.**
5. **Always read assigned material and make sure you outline all the main ideas (not just a single item in a section).**
6. **Stay focused and engaged in each lesson.**
7. **Study frequently and in small doses. Cramming does not foster long-term understanding that will stick with you!**
8. **Set up a study group and study with friends.**
9. **Understand figures and diagrams from lecture and from your text.**
10. **If you are having trouble with the material, get help early. Do not wait until TEST DAY!!!**

----------Pre-AP Biology 2018-2019 *Return this to your PAP Biology teacher*

By signing this syllabus and returning to the teacher, "We", both parent/guardian and student, are acknowledging that "we" are aware of the expectations of this Pre-AP Biology course and will be expected to follow them.

Student name: _____ Signature: _____Date: _____

Class Period: _____ Teacher: _____

Parent/Guardian name: _____ Signature: _____

Confirm Parent Email: _____ Date: _____

REMIND Confirmation

Please return this form to your Pre-AP Biology teacher once both the student and parent have signed into Remind either by email or by text.

Teacher's name: _____

Student's name: _____

Student signature: _____

Parent signature: _____

Date: _____

***Parent's sign up as "Parent of Your Student's Name."**

***Student's sign up with your first and last name.**

remind

Sign up for important updates from Mr. Prestwood.

Get information for **Waller High School** right on your phone—not on handouts.

Pick a way to receive messages for **2019WHSPAPBiology**:

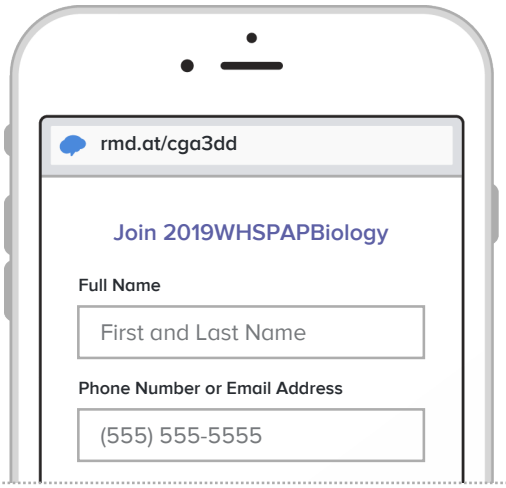
A

If you have a smartphone, get push notifications.

On your iPhone or Android phone, open your web browser and go to the following link:

rmd.at/cga3dd

Follow the instructions to sign up for Remind. You'll be prompted to download the mobile app.



B

If you don't have a smartphone, get text notifications.

Text the message @cga3dd to the number 81010.

If you're having trouble with 81010, try texting @cga3dd to (804) 577-5519.

** Standard text message rates apply.*

Don't have a mobile phone? Go to rmd.at/cga3dd on a desktop computer to sign up for email notifications.

remind

Inscríbete y recibe avisos importantes de parte de Mr. Prestwood.

Obtén información sobre **Waller High School** directamente en tu celular, no en impresos.

Elige como quieres recibir los mensajes de **2019WHSPAPBiology**:

A **Si tienes un teléfono inteligente, obtén notificaciones push.**

En tu iPhone o teléfono Android, abre el navegador y usa este enlace:

rmd.at/cga3dd

Sigue las instrucciones para inscribirte en Remind. Se te pedirá descargar la aplicación móvil.

B **Si no tienes un teléfono inteligente, obtén avisos de texto.**

Envía el mensaje @cga3dd al número 81010.

Si tienes problemas con 81010, prueba enviar @cga3dd to (804) 577-5519.

** Se aplican las tarifas normales de SMS.*

¿No tienes un teléfono celular? Ve a rmd.at/cga3dd en una computadora para inscribirte para recibir mensajes por correo electrónico.

WHS Prep Assignment

Pre-AP 9th Grade Biology

2019-2020

PAP Biology Goal:

This prep assignment is given ahead of time for those that would like to get started before school begins. Please note the due dates below give ample time to complete assignments whether you are new to the district or did not complete the assignment during the summer. A prep assignment is needed to give students a chance to prepare for higher level learning and practice some necessary process skills. The objectives include but are not limited to:

1) take ownership of learning through exploring and memorizing new science vocabulary terms;
2) practice using Cornell-style notes and "amoebasisters.com" animations, which will be used during the school year; and
3) become familiar with lab safety to perform labs more efficiently and safely.

Due dates:

Assignment Section(s)	Date Due
Section 3 – Lab Safety	**August 30th** (the Friday of the first week of school)
Sections 1, 2, 4, & 5	**September 6th** (the Friday of the second week of school)

This is plenty of time to complete all sections. Time management is very important.

Grades:

1) All five sections will be combined for a major grade (completion/quality).
2) The Lab Safety assignment will help prepare for a lab safety quiz (minor daily grade).
3) There will also be a quiz over the common science word parts (memorize).

Section one: Common Science Word Parts (25 pts)

This section focuses on learning some common science word parts. Learning these word parts will help in developing content area vocabulary. This will be of use in all future science classes.

The student is expected to find a biology or science word that is composed partly of the word parts listed on the following page. The student is also expected to find the definition of the word.

The student must also learn these 25 word parts as we will have a quiz over them on 9/6.

This section can be typed or hand written and should be formatted according to the following example:

1. Word part - cephal- head

Science Word – Encephalitis

Definition – Inflammation of the brain.

Scientific Root Words, Prefixes, And Suffixes

a-, an-	not, without, lacking
-able	capable of
-aceous	of or pertaining to
adip-	fat
aero-	air
agri-	field, soil
ambi-	both
amyl-	starch
ante-	before, ahead of time
antho-	flower
anti-	against, opposite
aqu-	water
-ase	forms names of enzymes
auto-	self
bacter-, bactr-	bacterium, stick, club
bi-	(Latin) two twice
bi-, bio-	(Greek) life, living
-blast-	sprout, germ, bud
brev-	short
calor-	heat
carcin-	cancer
cardi-	heart
carn-	meat, flesh
carp-	fruit
carpal-	wrist

Section two: Cornell Notes on Articles (20 pts)

The student will need to read two assigned science articles and create “Cornell Notes” for each article.

Article 1 - Nature's dangerous decline 'unprecedented,' species extinction rates 'accelerating'

Article 2 - Science fairs: Teaching students to think like scientists

- The student will need to read and take notes over each article using the Cornell Notes template- write detailed notes. (Hint: Try highlighting key words or ideas.) The notes must be written by hand, **DO NOT type notes** . If you have messy handwriting, then please give yourself time, and use bullets. Please refer to the example to help you.
- At least one page of notes is expected for each article.
- You must follow the provided format of Cornell Notes.

An example of how to write Cornell Notes and the Cornell Notes template is provided.

Cornell Notes	Topic/Objective/Article:	Name:
		Class/Period:
		Date:

Essential Question:

Questions:	Notes:
	➢
	➢
	➢
	➢

Summary:

Cornell Notes	Topic/Objective/Article:	Name:
		Class/Period:
		Date:

Essential Question:

Questions:	Notes:
	➢
	➢
	➢
	➢

Summary:

Cornell Notes	Topic/Objective/Article:	Name: Student Name
	Example to show how to write Cornell notes	Class/Period: Biology 2nd Period
		Date: 6/1/19

Essential Question: What is the value of creating Cornell notes?

Questions:	Notes:
Chunking?	➢ By chunking notes you can separate information. Use bullets and look for important details to write down?
Questions/Labelling?	➢ Using questions or labelling can help you navigate your notes and find information quickly?
What is considered important?	➢ Words, names, titles, captions, key concepts, revelations, conclusions, and supporting words
Can I use drawings to help?	➢ Anything that helps you is welcome.
Should I use the whole page?	➢ There is no set limit, but if you want to be thorough and detailed then one page should be sufficient to ensure you understand your notes.

Summary: Cornell notes are important because it will help you chunk your notes and give you a chance to really understand what you are reading. By organizing and summarizing your article it forces you to analyze your what you are reading.

ScienceDaily®

Your source for the latest research news

Nature's dangerous decline 'unprecedented,' species extinction rates 'accelerating'

Date: May 6, 2019

Source: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

Summary: Nature is declining globally at rates unprecedented in human history -- and the rate of species extinctions is accelerating, with grave impacts on people around the world now likely, warns a landmark new report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

FULL STORY

Pacific Ocean.

Credit: Copyright Michele Hogan

Nature is declining globally at rates unprecedented in human history -- and the rate of species extinctions is accelerating, with grave impacts on people around the world now likely, warns a landmark new report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the summary of which was approved at the 7th session of the IPBES Plenary, meeting last week (29 April -- 4 May) in Paris.

"The overwhelming evidence of the IPBES Global Assessment, from a wide range of different fields of knowledge, presents an ominous picture," said IPBES Chair, Sir Robert Watson. "The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide."

"The Report also tells us that it is not too late to make a difference, but only if we start now at every level from local to global," he said. "Through 'transformative change', nature can still be conserved, restored and used sustainably -- this is also key to meeting most other global goals. By transformative change, we mean a fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values."

"The member States of IPBES Plenary have now acknowledged that, by its very nature, transformative change can expect opposition from those with interests vested in the status quo, but also that such opposition can be overcome for the broader public good," Watson said.

The IPBES Global Assessment Report on Biodiversity and Ecosystem Services is the most comprehensive ever completed. It is the first intergovernmental Report of its kind and builds on the landmark Millennium Ecosystem Assessment of 2005, introducing innovative ways of evaluating evidence.

Compiled by 145 expert authors from 50 countries over the past three years, with inputs from another 310 contributing authors, the Report assesses changes over the past five decades, providing a comprehensive picture of the relationship between economic development pathways and their impacts on nature. It also offers a range of possible scenarios for the coming decades.

Based on the systematic review of about 15,000 scientific and government sources, the Report also draws (for the first time ever at this scale) on indigenous and local knowledge, particularly addressing issues relevant to Indigenous Peoples and Local Communities.

"Biodiversity and nature's contributions to people are our common heritage and humanity's most important life-supporting 'safety net'. But our safety net is stretched almost to breaking point," said Prof. Sandra Díaz (Argentina), who co-chaired the Assessment with Prof. Josef Settele (Germany) and Prof. Eduardo S. Brondízio (Brazil and USA).

"The diversity within species, between species and of ecosystems, as well as many fundamental contributions we derive from nature, are declining fast, although we still have the means to ensure a sustainable future for people and the planet."

The Report finds that around 1 million animal and plant species are now threatened with extinction, many within decades, more than ever before in human history.

The average abundance of native species in most major land-based habitats has fallen by at least 20%, mostly since 1900. More than 40% of amphibian species, almost 33% of reef-forming corals and more than a third of all marine mammals are threatened. The picture is less clear for insect species, but available evidence supports a tentative estimate of 10% being threatened. At least 680 vertebrate species had been driven to extinction since the 16th century and more than 9% of all domesticated breeds of mammals used for food and agriculture had become extinct by 2016, with at least 1,000 more breeds still threatened.

"Ecosystems, species, wild populations, local varieties and breeds of domesticated plants and animals are shrinking, deteriorating or vanishing. The essential, interconnected web of life on Earth is getting smaller and increasingly frayed," said Prof. Settele. "This loss is a direct result of human activity and constitutes a direct threat to human well-being in all regions of the world."

To increase the policy-relevance of the Report, the assessment's authors have ranked, for the first time at this scale and based on a thorough analysis of the available evidence, the five direct drivers of change in nature with the largest relative global impacts so far. These culprits are, in descending order: (1) changes in land and sea use; (2) direct exploitation of organisms; (3) climate change; (4) pollution and (5) invasive alien species.

The Report notes that, since 1980, greenhouse gas emissions have doubled, raising average global temperatures by at least 0.7 degrees Celsius -- with climate change already impacting nature from the level of ecosystems to that of genetics -- impacts expected to increase over the coming decades, in some cases surpassing the impact of land and sea use change and other drivers.

Despite progress to conserve nature and implement policies, the Report also finds that global goals for conserving and sustainably using nature and achieving sustainability cannot be met by current trajectories, and goals for 2030 and beyond may only be achieved through transformative changes across economic, social, political and

technological factors. With good progress on components of only four of the 20 Aichi Biodiversity Targets, it is likely that most will be missed by the 2020 deadline. Current negative trends in biodiversity and ecosystems will undermine progress towards 80% (35 out of 44) of the assessed targets of the Sustainable Development Goals, related to poverty, hunger, health, water, cities, climate, oceans and land (SDGs 1, 2, 3, 6, 11, 13, 14 and 15). Loss of biodiversity is therefore shown to be not only an environmental issue, but also a developmental, economic, security, social and moral issue as well.

"To better understand and, more importantly, to address the main causes of damage to biodiversity and nature's contributions to people, we need to understand the history and global interconnection of complex demographic and economic indirect drivers of change, as well as the social values that underpin them," said Prof. Brondízio. "Key indirect drivers include increased population and per capita consumption; technological innovation, which in some cases has lowered and in other cases increased the damage to nature; and, critically, issues of governance and accountability. A pattern that emerges is one of global interconnectivity and 'telecoupling' -- with resource extraction and production often occurring in one part of the world to satisfy the needs of distant consumers in other regions."

Other notable findings of the Report include:

- Three-quarters of the land-based environment and about 66% of the marine environment have been significantly altered by human actions. On average these trends have been less severe or avoided in areas held or managed by Indigenous Peoples and Local Communities.
- More than a third of the world's land surface and nearly 75% of freshwater resources are now devoted to crop or livestock production.
- The value of agricultural crop production has increased by about 300% since 1970, raw timber harvest has risen by 45% and approximately 60 billion tons of renewable and non-renewable resources are now extracted globally every year -- having nearly doubled since 1980.
- Land degradation has reduced the productivity of 23% of the global land surface, up to US$577 billion in annual global crops are at risk from pollinator loss and 100-300 million people are at increased risk of floods and hurricanes because of loss of coastal habitats and protection.
- In 2015, 33% of marine fish stocks were being harvested at unsustainable levels; 60% were maximally sustainably fished, with just 7% harvested at levels lower than what can be sustainably fished.
- Urban areas have more than doubled since 1992.
- Plastic pollution has increased tenfold since 1980, 300-400 million tons of heavy metals, solvents, toxic sludge and other wastes from industrial facilities are dumped annually into the world's waters, and fertilizers entering coastal ecosystems have produced more than 400 ocean 'dead zones', totalling more than 245,000 km^2 (591-595) -- a combined area greater than that of the United Kingdom.
- Negative trends in nature will continue to 2050 and beyond in all of the policy scenarios explored in the Report, except those that include transformative change -- due to the projected impacts of increasing land-use change, exploitation of organisms and climate change, although with significant differences between regions.

The Report also presents a wide range of illustrative actions for sustainability and pathways for achieving them across and between sectors such as agriculture, forestry, marine systems, freshwater systems, urban areas, energy, finance and many others. It highlights the importance of, among others, adopting integrated management and cross-sectoral approaches that take into account the trade-offs of food and energy production, infrastructure, freshwater and coastal management, and biodiversity conservation.

Also identified as a key element of more sustainable future policies is the evolution of global financial and economic systems to build a global sustainable economy, steering away from the current limited paradigm of economic growth.

"IPBES presents the authoritative science, knowledge and the policy options to decision-makers for their consideration," said IPBES Executive Secretary, Dr. Anne Larigauderie. "We thank the hundreds of experts, from around the world, who have volunteered their time and knowledge to help address the loss of species, ecosystems and genetic diversity -- a truly global and generational threat to human well-being."

Story Source:

Materials provided by **Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)**. *Note: Content may be edited for style and length.*

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ScienceNews for Students

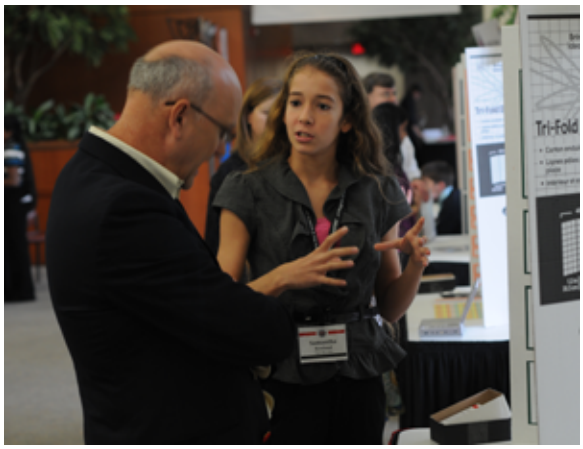
SCIENCE EDUCATION TEACHING SCIENCE

Science fairs: Teaching students to think like scientists

Broadcom MASTERS competition encourages science as interactive, live process, not just memorization

BY AMANDA LEIGH MASCARELLI OCT 5, 2011 — 7:35 PM EST

If you grew up learning that science is a class where you memorize clunky, four-syllable words and follow instructions straight out of the lab manual, raise your hand.



Samantha-Rowland

That's just the kind of thinking that Len Kenyon is working to change when he helps his students develop ideas for science fairs. Too often, students think that science is about rote memorization and step-by-step procedures, rather than active and live processes, he says.

"Students have these misconceptions…they think science must be conducted in a cookbook sequence," says Kenyon, a former marine science researcher who teaches sixth-grade science at Tippecanoe Middle School in Tipp City, Ohio. "I teach my kids that science is a process. It's messy, it's here, it's there. They might be doing something and all of a sudden they get data they didn't expect to get and suddenly they're off on a tangent. That's real science."

Kenyon has been mentoring students through science fair projects since he began teaching six years ago. This year, one of his students — Samantha Rowland, 14, now an eighth-grade student — was selected as a finalist for the first-ever Broadcom MASTERS (short for math, applied science, technology and engineering for rising stars) science competition, a national contest for middle school students. The competition is cosponsored by Society for Science & the Public, which publishes *Science News for Kids*. Out of an initial 1,476 applicants who were nominated from 45 states, Washington, D.C., and Puerto Rico, 30 finalists were chosen to represent their schools and communities in Washington, D.C., from September 30 to October 5. Students were judged on their science fair projects and their mastery of science, problem-solving skills and communication in both individual and team events. Students vied for more than $75,000 in earnings, and the winning student, Daniel Feeny, was awarded $25,000.

"Daniel Feeny is a young adult who possesses a keen scientific mind and a true interest in making a positive difference in the World," said his teacher Yogi Sullivan. "In class, Daniel is a natural leader who brings out the best in both himself and his classmates. The entire Woodside Elementary Community is so proud," Sullivan said of the boy's national recognition. And, he adds jubilantly, "He is JUST GETTING STARTED!!!"

For most finalists, reaching the Broadcom science competition was the culmination of a year — sometimes years — of preparing largely outside of class and participating in competitions at local, regional and state levels. Some students elected to carry out science fair projects as extracurricular work, either through science clubs or with the help of their teachers, parents and volunteers in the community. In other cases, science fair projects were integral to the school science curriculum. Though a science fair is time-consuming, the payoff is gratifying.

"It keeps you sharp because you are learning," says Kenyon. "The student is actually educating you as a teacher, which I think is wonderful. They're getting to tell you their discoveries. The roles get reversed there; that's what I think is exciting for me."

At Tippecanoe Middle School, science fair projects are optional and students develop projects with help from their science teachers and through a local science club. For Rowland's seventh-grade project, she investigated something of highly practical value to her: She wanted to know if the type of light you put on your Christmas tree affects how many needles it loses.

"There's always an argument in my family about whether to get an artificial or live Christmas tree," says Rowland. "I prefer live. But at the end of the season, I always have to clean up the extra needles, and I wanted to find out whether there was a way to reduce the amount of needles. I thought that was a problem that other people had, too."

Rowland gathered the tops of 14 Christmas trees from a local tree farm and set up an experiment in her basement. She tested both incandescent and high-efficiency light-emitting diode (LED) lights in red, white and blue. She found that trees with red LED lights lost a whopping 21,000 fewer needles than trees with the other types and colors of light. Rowland also observed that the trees that drank more water tended to lose more needles, suggesting that those trees were drier and more fire-prone than trees with longer-lasting needles.

Science teachers agree on the importance of guiding students toward ideas that allow them to become part of the scientific process. Michaela Iiames, who teaches fifth- and seventh-grade science at St. Timothy's School in Raleigh, N.C., has been doing science fairs with her students for eight years. At St. Timothy's, a kindergarten through eighth-grade school, science fair projects are required for certain grades, including fourth and seventh. To help students develop projects, Iiames asks them to begin with journaling about their everyday interests. "We're trying to really hook them into science and seeing how science concepts can be applied in their everyday life, not just with test tubes and chemicals," says Iiames, whose student — Justin Barber — competed in the Broadcom competition. His project focused on discovering the pitch of roof that is best able to withstand hurricanes.

Key to a positive experience for students — whether or not they win — is steering them toward ideas they can "own," says Iiames. "I emphasize that I don't want you to come into science fair with a turbine engine if the last thing in your world that interests you is a turbine engine but your dad is really interested in that. Having grown up in schools where I had to do science fairs, it really was that research project that you dreaded — and hated every minute of."

In Iiames' classes, students develop their ideas independently and "peer review" — or critique — each other's topics in the classroom. If projects involve data collection from human volunteers, such as one past project in which a student was investigating the effects of different types of music on homework performance, Iiames sometimes allows for class activities related to the projects.

Several finalists were able to work on their projects under the guidance of community volunteers. Debra Beckett, who teaches eighth-grade science at Sequim Middle School in rural Sequim, Wash., started a local after-school science fair club six years ago that helps elementary, middle and high

school students develop science fair projects. Beckett enlists the help of volunteers such as other science teachers, retired state teachers, an engineering mentor and an environmental scientist. Teachers and mentors in the science fair club first help the students do background literature searches and refine their project problem and questions. Then volunteers walk students through the steps of designing a research plan.

One of Beckett's students, Katherine Landoni, competed in the Broadcom MASTERS competition after being nominated for her eighth-grade project that looked at genetic differences in populations of New Zealand mud snails and the animals' ability to tolerate changes in salinity. Landoni received some guidance from local marine biology experts and coordinated with a retired high school biology teacher in Oregon to collect mud snails in the state. "It was like a whole bunch of people helping her pursue her passion," says Beckett.

Beckett says that in a rural area that does not have the benefit of a nearby university, the support and resources of the community are instrumental in helping students carry out science fair projects. And the relationships can help set students up for success as they prepare for high school and beyond. "We build up a nice community of kids, and I get to work with scientists in the area who like to work with young people and help them think about their future and the possibilities that can happen for them," says Beckett. "[The students] can continue to work through high school with the same cadre of people that really know them."

In some cases, the communities themselves can benefit from the students' projects. Derek Esibill, who teaches seventh- and eighth-grade science at Kailua Intermediate School in Kailua, Hawaii, mentored Robert Heckman, a student who became a finalist for Broadcom. For his project on coral tumors, parrotfish predation and bacterial colonization, Heckman produced data that could be used to benefit the health of Hawaii's coral reefs, says Esibill.

The amount of time that teachers spend with students in preparation for science fairs varies widely, depending on how independent the students are, how much support they have at home and whether the project is elective or part of the classroom curriculum. Beckett's science club meets once a week for a couple of hours, and she estimates that in the fall and winter she spends about 12 to 15 hours per month outside of class on science fair activities. When spring rolls around, the usual time that science fairs are held, the time commitment may double. "It's crazy hectic," says Beckett. Though most of the data are collected by this point, students now rush to polish their posters and written reports and practice for interviews with judges.

Although science fairs require a significant commitment, teachers agree that the process is gratifying for students and teachers alike. Susan Duncan, a science teacher at Summa Academy at Meadow Park Middle School in Beaverton, Ore., had two students, Valerie Ding and Anirudh Jain, who became finalists in the Broadcom competition. Duncan keeps in mind a lesson that her own mentor taught her: The main goal should be to teach students how to become researchers. "So whether they go on to language arts or to become journalists or lawyers or doctors, they'll leave with these research skills," says Duncan. In teaching this, she finds that the teachers learn to become researchers themselves.

The Broadcom MASTERS competition is cosponsored by Society for Science & the Public, publisher of *Science News for Kids*.

NGSS:

- HS-ETS1-2

Section three: Lab Safety (15 pts)

The student will refer to the Lab Safety Guide provided (Flinn Scientific Student Safety Contract). Read and study all parts of the guide then choose 15 of the rules.

- The student should read, sign, and get a parent/guardian to sign the Safety Contract provided. **Return this to your Pre-AP Biology teacher**
- The student will choose 15 rules.
- The student will create a cartoon or picture depicting a science classroom. This drawing should depict students breaking the 15 safety rules the student has chosen from the lab safety guide.
- The student should list the 15 rules depicted in their picture on the back of the drawing.

Section four: Videos and Worksheets (15 pts)

The student will need internet access to watch 2 videos, one from amoebasisters.com and one from Bozeman science.

- Go to https://www.youtube.com/watch?v=8IlzKri08kk or search Youtube for Amoebasisters introduction to cells, the grand tour.
- Watch the following video and complete the worksheet
    - "Introduction to Cells, the grand tour"
- Go to http://www.bozemanscience.com/ecological-succession or search Bozeman science ecological succession on Youtube.
- Watch the video and complete the attached handout
- Internet access can be found at your local library if you do not have access at home. The videos are on youtube.com so mobile devices can access these videos as well. Videos can be paused or replayed so these are great ways to practice or study information.
- Handouts are provided.

Student Safety Contract

School Name _____ **Teacher** _____

PURPOSE

Science is a hands-on laboratory class. You will be doing many laboratory activities which require the use of hazardous chemicals. Safety in the science classroom is the #1 priority for students, teachers, and parents. To ensure a safe science classroom, a list of rules has been developed and provided to you in this student safety contract. These rules must be followed at all times. Two copies of the contract are provided. One copy must be signed by both you and a parent or guardian before you can participate in the laboratory. The second copy is to be kept in your science notebook as a constant reminder of the safety rules.

GENERAL RULES

1. Conduct yourself in a responsible manner at all times in the laboratory.
2. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ask the instructor before proceeding.
3. Never work alone. No student may work in the laboratory without an instructor present.
4. When first entering a science room, do not touch any equipment, chemicals, or other materials in the laboratory area until you are instructed to do so.
5. Do not eat food, drink beverages, or chew gum in the laboratory. Do not use laboratory glassware as containers for food or beverages.
6. Perform only those experiments authorized by the instructor. Never do anything in the laboratory that is not called for in the laboratory procedures or by your instructor. Carefully follow all instructions, both written and oral. Unauthorized experiments are prohibited.
7. Be prepared for your work in the laboratory. Read all procedures thoroughly before entering the laboratory.
8. Never fool around in the laboratory. Horseplay, practical jokes, and pranks are dangerous and prohibited.
9. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times. Bring only your laboratory instructions, worksheets, and/or reports to the work area. Other materials (books, purses, backpacks, etc.) should be stored in the classroom area.
10. Keep aisles clear. Push your chair under the desk when not in use.
11. Know the locations and operating procedures, where appropriate, for all safety equipment including first aid kit, eyewash station, safety shower, fire extinguisher, and fire blanket. Know where the fire alarm and exits are located.
12. Always work in a well-ventilated area. Use the fume hood when working with volatile substances or poisonous vapors. Never place your head into the fume hood.
13. Be alert and proceed with caution at all times in the laboratory. Notify the instructor immediately of any unsafe conditions you observe.
14. Dispose of all chemical waste properly. Never mix chemicals in sink drains. Sinks are to be used only for water and those solutions designated by the instructor. Solid chemicals, metals, matches, filter paper, and all other insoluble materials are to be disposed of in the proper waste containers, not in the sink. Check the label of all waste containers twice before adding your chemical waste to the container.
15. Labels and equipment instructions must be read carefully before use. Set up and use the prescribed apparatus as directed in the laboratory instructions or by your instructor.
16. Keep hands away from face, eyes, mouth and body while using chemicals or preserved specimens. Wash your hands with soap and water after performing all experiments. Clean all work surfaces and apparatus at the end of the experiment. Return all equipment clean and in working order to the proper storage area.
17. Experiments must be personally monitored at all times. You will be assigned a laboratory station at which to work. Do not wander around the room, distract other students, or interfere with the laboratory experiments of others.
18. Students are never permitted in the science storage rooms or preparation areas unless given specific permission by their instructor.
19. Know what to do if there is a fire drill during a laboratory period; containers must be closed, gas valves turned off, fume hoods turned off, and any electrical equipment turned off.
20. Handle all living organisms used in a laboratory activity in a humane manner. Preserved biological materials are to be treated with respect and disposed of properly.
21. When using knives and other sharp instruments, always carry with tips and points pointing down and away. Always cut away from your body. Never try to catch falling sharp instruments. Grasp sharp instruments only by the handles.
22. If you have a medical condition (e.g., allergies, pregnancy, etc.), check with your physician prior to working in lab.

CLOTHING

23. Any time chemicals, heat, or glassware are used, students will wear laboratory goggles. There will be no exceptions to this rule!
24. Contact lenses may be worn provided adequate face and eye protection is provided by specially marked, non-vented safety goggles. The instructor should know which students are wearing contact lenses in the event of eye exposure to hazardous chemicals.
25. Dress properly for lab activities. Long hair, dangling jewelry, and loose or baggy clothing are hazardous. Long hair must be tied back and dangling jewelry and loose or baggy clothing must be secured. Shoes must completely cover the foot. No sandals allowed.
26. Lab aprons have been provided for your use and should be worn during laboratory activities.

ACCIDENTS AND INJURIES

27. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the instructor immediately, no matter how trivial it may appear.
28. If you or your lab partner are hurt, immediately yell out “Code one, Code one” to get the instructor’s attention.
29. If a chemical splashes in your eye(s) or on your skin, immediately flush with running water from the eyewash station or safety shower for at least 20 minutes. Notify the instructor immediately.
30. When mercury thermometers are broken, mercury must not be touched. Notify the instructor immediately.

HANDLING CHEMICALS

31. All chemicals in the laboratory are to be considered dangerous. Do not touch, taste, or smell any chemicals unless specifically instructed to do so. The proper technique for wafting chemical vapors will be demonstrated to you.
32. Check the label on chemical bottles twice before removing any of the contents. Take only as much chemical as you need.

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Student Safety Contract
Continued

33. Never return unused chemicals to their original containers.
34. Never use mouth suction to fill a pipet. Use a rubber bulb or pipet pump.
35. When transferring reagents from one container to another, hold the containers away from your body.
36. Acids must be handled with extreme care. You will be shown the proper method for diluting strong acids. Always add acid to water, swirl or stir the solution and be careful of the heat produced, particularly with sulfuric acid.
37. Handle flammable hazardous liquids over a pan to contain spills. Never dispense flammable liquids anywhere near an open flame or source of heat.
38. Never remove chemicals or other materials from the laboratory area.
39. Take great care when transporting acids and other chemicals from one part of the laboratory to another. Hold them securely and walk carefully.

HANDLING GLASSWARE AND EQUIPMENT

40. Carry glass tubing, especially long pieces, in a vertical position to minimize the likelihood of breakage and injury.
41. Never handle broken glass with your bare hands. Use a brush and dustpan to clean up broken glass. Place broken or waste glassware in the designated glass disposal container.
42. Inserting and removing glass tubing from rubber stoppers can be dangerous. Always lubricate glassware (tubing, thistle tubes, thermometers, etc.) before attempting to insert it in a stopper. Always protect your hands with towels or cotton gloves when inserting glass tubing into, or removing it from, a rubber stopper. If a piece of glassware becomes "frozen" in a stopper, take it to your instructor for removal.
43. Fill wash bottles only with distilled water and use only as intended, e.g., rinsing glassware and equipment, or adding water to a container.
44. When removing an electrical plug from its socket, grasp the plug, not the electrical cord. Hands must be completely dry before touching an electrical switch, plug, or outlet.
45. Examine glassware before each use. Never use chipped or cracked glassware. Never use dirty glassware.
46. Report damaged electrical equipment immediately. Look for things such as frayed cords, exposed wires, and loose connections. Do not use damaged electrical equipment.
47. If you do not understand how to use a piece of equipment, ask the instructor for help.
48. Do not immerse hot glassware in cold water; it may shatter.

HEATING SUBSTANCES

49. Exercise extreme caution when using a gas burner. Take care that hair, clothing and hands are a safe distance from the flame at all times. Do not put any substance into the flame unless specifically instructed to do so. Never reach over an exposed flame. Light gas (or alcohol) burners only as instructed by the teacher.
50. Never leave a lit burner unattended. Never leave anything that is being heated or is visibly reacting unattended. Always turn the burner or hot plate off when not in use.
51. You will be instructed in the proper method of heating and boiling liquids in test tubes. Do not point the open end of a test tube being heated at yourself or anyone else.
52. Heated metals and glass remain very hot for a long time. They should be set aside to cool and picked up with caution. Use tongs or heat-protective gloves if necessary.
53. Never look into a container that is being heated.
54. Do not place hot apparatus directly on the laboratory desk. Always use an insulating pad. Allow plenty of time for hot apparatus to cool before touching it.
55. When bending glass, allow time for the glass to cool before further handling. Hot and cold glass have the same visual appearance. Determine if an object is hot by bringing the back of your hand close to it prior to grasping it.

QUESTIONS

56. Do you wear contact lenses?
    ☐ YES ☐ NO
57. Are you color blind?
    ☐ YES ☐ NO
58. Do you have allergies?
    ☐ YES ☐ NO

    If so, list specific allergies _____

    _____

AGREEMENT

I, _____
_____(student's name) have read and agree to follow all of the safety rules set forth in this contract. I realize that I must obey these rules to ensure my own safety, and that of my fellow students and instructors. I will cooperate to the fullest extent with my instructor and fellow students to maintain a safe lab environment. I will also closely follow the oral and written instructions provided by the instructor. I am aware that any violation of this safety contract that results in unsafe conduct in the laboratory or misbehavior on my part, may result in being removed from the laboratory, detention, receiving a failing grade, and/or dismissal from the course.

_____
Student Signature

_____
Date

Dear Parent or Guardian:

We feel that you should be informed regarding the school's effort to create and maintain a safe science classroom/laboratory environment.

With the cooperation of the instructors, parents, and students, a safety instruction program can eliminate, prevent, and correct possible hazards.

You should be aware of the safety instructions your son/daughter will receive before engaging in any laboratory work. Please read the list of safety rules above. No student will be permitted to perform laboratory activities unless this contract is signed by both the student and parent/guardian and is on file with the teacher.

Your signature on this contract indicates that you have read this Student Safety Contract, are aware of the measures taken to ensure the safety of your son/daughter in the science laboratory, and will instruct your son/daughter to uphold his/her agreement to follow these rules and procedures in the laboratory.

_____
Parent/Guardian Signature

_____
Date

IN10494

FLINN SCIENTIFIC

Contrato de Seguridad para el Estudiante

Nombre de Escuela _____ **Maestro** _____

Propósito

La clase de ciencias es una clase de laboratorio con actividades manuales. Usted hará muchas actividades que requieren el uso de productos químicos peligrosos. La seguridad en la clase de ciencias es la prioridad número uno para los alumnus, maestros, y padres. Para asegurar una seguridad en la clase de ciencias, una lista de reglas ha sido desarrollada y ha sido proveida para Ud. en este contrato de seguridad del alumno. Estas reglas deben ser seguidas a todo momento. Dos copias del contrato han sido proveidas. Una copia debe ser firmada por Ud. y su padre, madre o guardián antes de que pueda participar en el laboratorio. La segunda copia debe ser guardada en su cuaderno de ciencias como un recuerdo constante de las reglas de seguridad.

Reglas generales

1. Compórtese siempre de una manera responsable en el laboratorio a todo momento.
2. Siga todas las instruciones verbales o escritas cuidadosamente. Si no entiende una instrucción o parte de un procedimiento, pregúntele al instructor antes de seguir.
3. Nunca trabaje solo. Ningún alumno debe trabajar en el laboratorio sin que esté un instructor presente.
4. Cuando entre a una sala de ciencias por primera vez, no toque ningún equipo, producto químico, u otros materiales en el area del laboratorio hasta que el instructor le diga que puede hacerlo.
5. No coma, beba, o mastique chicle en el laboratorio. No utilice la cristalería del laboratorio como envase de comida o bebida.
6. Lleve a cabo solamente esos experimentos autorizados por el instructor. Nunca haga nada en el laboratorio que no siga los trámites del laboratorio o del instructor. Siga todas la reglas cuidadosamente, escritas y orales. Los experimentos que no hayan sido autorizados son prohibidos.
7. Esté preparado para su trabajo en el laboratorio. Lea todos los procedimientos con cuidado antes de entrar al laboratorio.
8. Jugar o bromear en el laboratorio es peligroso y es prohibido.
9. Las areas de trabajo deben mantenerse limpias y en orden siempre. Traiga solamente las instucciones del laboratorio, ejercicios o informes. Otros materiales (libros, bolsas, mochilas, etc.) deben guardarse en la zona de la clase.
10. Mantenga los pasillos vacios. Empuje la silla debajo del pupitre mientras no sea utilizada.
11. Aprenda donde se localiza y como se usa todo el equipo de seguridad incluyendo el botiquín medical, la estación de lavabo de ojos, y la manta de fuego. Sepa donde se sitúa la alarma de incendios y las salidas.
12. Trabaje siempre en una area que esté bien ventilada. Utilice el extractor de vapores cuando esté trabajando con substancias volitales o vapores venenosos.
13. Esté alerto y proceda con precaución en todo momento en el laboratorio. Notifique al instructor inmediatamente de cualquier condición insegura que observe.
14. Disponga de todos los desechos químicos apropiadamente. No tire nunca productos químicos en el lavabo. Los lavabos son utilizados solamente para agua y otros productos químicos designados por el instructor. Productos químicos sólidos, metales, cerillos, papel de filtro y otros materiales insolubles deben ser tirados, pero no en el lavabo. Verifique la etiqueta de los contenedores dos veces antes de tirar cualquier producto químico.
15. Las etiquetas y las instrucciones del equipo deben ser leidas cuidadosamente antes de utilizarlas. Coloque y utilice los aparatos siguiendo las reglas del laboratorio o de su instructor.
16. No ponga las manos en la cara, los ojos, la boca y el cuerpo mientras esté utilizando productos químicos o espécimenes en conserva. Lávese las manos con jabón y agua después de hacer experimentos. Limpie (con detergente), enjuague y seque todas las superficies de trabajo (incluyendo el lavabo) y aparatos al final del experimento. Devuelva todo el equipo limpio y en buen estado al sitio que le corresponde.
17. Los experimentos deben ser personalmente controlados a todo tiempo. Se le asignará una estación en el laboratorio donde trabajar. No pasee por la clase, o distraiga a otros alumnos, o interfiera con los experimentos de laboratorio de otros.
18. Los alumnos nunca están permitidos en el almacén de ciencias o zonas de preparación a no ser que el instructor dé permiso.
19. Aprenda y sepa lo que debe hacer si hay un entrenamiento en caso de fuego durante la clase de laboratorio. Debe cerrar los recipientes, cerrar las válvulas de gas, y apagar cualquier otra máquina eléctrica.
20. Trate a todos los organismos vivos utilizados en el laboratorio de una forma humana. Los materiales biológicos en conserva deben ser tratados con respeto y deben ser deshechos apropiadamente.
21. Cuando utilice cuchillos y otros instrumentos afilados, cójalos de forma que la punta esté hacia el suelo. No intente nunca coger un intrumento afilado que se esté cayendo. Coja los instrumentos filosos solamente del mango.
22. Si sufre de alguna condición médica (por ejemplo, alergías, embarazo, etc.) consulte con su médico antes de trabajar en el laboratorio.

Ropa

23. En cualquier momento que se utilicen productos químicos, lumbre, u objetos de vidrio, los alumnos deben llevar gafas de laboratorio. ¡No habrán exepciones a esta regla!
24. No se deben utilizar lentes de contacto en el laboratorio a no ser que tenga permiso del instructor.
25. Vístase apropiadamente durante una actividad de laboratorio. Pelo largo joyas colgantes y ropa ancha o grande es un peligro en el laboratorio. El pelo largo debe ser atado al fondo de la cabeza y las joyas colgantes y ropa ancha deben estar aseguradas. Debe llevar zapatos cerrados que cubran todo el pie. No se permite llevar sandalias.
26. En el laboratorio hay delantales que deben ser utilizados durante las actividades.

Accidentes y heridas

27. Al saber de cualquier accidente (derrames, algo roto, etc.) o heridas (una cortada, quemadura, etc.) repórteselo al instructor no importa como sea de pequeñp o trivial el accidente o herida.
28. Si Ud. o su compañero de laboratorio se han hecho daño, grite inmediatamente “Code one, Code one” para llamar la atención del instructor.
29. Si un material químico le cae o le rocía los ojos o a la cara, enjuágueselos inmediatamente con agua en la estación de lavado de ojos por lo mínimo de 20 minutos. Notifique al instructor inmediatamente.
30. Cuando un termómetro de mercurio se rompe, no debe tocar el mercurio. Notifique al instructor inmediatamente.

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Como tratar productos químicos

31. Todos los productos químicos en el laboratorio se deben considerer peligrosos. No toque, pruebe o huela ningún producto químico a menos que su instructor específicamente le instruya que lo haga. La técnica apropiada para oler productos químicos será demostrada.
32. Verifique la etiqueta en las botellas de productos químicos dos veces antes de sacar su contenido. Coja solo la cantidad que necesite.
33. Nunca regrese el producto químico que no haya utilizado al recipiente o envase.
34. Nunca utilice succión de boca para llenar los tubos. Use un colador.
35. Cuando traslade un reactivo de un recipiente o envace a otro, mantenga el recipiente lejos del cuerpo.
36. Los ácidos deben ser tratados con mucho cuidado. Se le demostrará el método apropiado para diluir ácidos fuertes. Siempre hay que añadir ácido al agua, agitar la solución y tener cuidado del calor que producen, en particular con el ácido sulfúrico.
37. Trabaje con líquidos flamables y peligrosos sobre un recipiente para así contener los derrames. Nunca tire líquidos flamables cerca de una llama o algo caliente.
38. Nunca saque productos químicos u otros materiales de la zona del laboratorio.
39. Tenga mucho cuidado cuando traslade ácidos y otros productos químicos de una parte del laboratorio a otra. Cójalos bien y camine con cuidado.

Como tratar el vidrio y el equipo

40. Lleve tubos de vidrio, especialmente las piezas largas en posición vertical para minimizar que se rompan o que alguien se haga daño.
41. Nunca toque el vidrio roto con las manos. Use una escoba y recogedor. Ponga el vidrio roto en el contenedor designado para vidrio.
42. Introducir y remover tubos de vidrio del corcho puede ser peligroso. Siempre hay que lubricar el vaso (tubos, termómetros, ect.) antes de introducirlo en un corcho. Siempre proteja las manos con toallas o guantes de algodón antes de meter un tubo de vidrio o removerlo de un corcho. Si un trozo de vidrio se "congela" en un corcho, lléveselo al instructor para que lo remueva.
43. Llene las botellas de agua con agua destilada y utilice solamente como se debe, ejemplo, para enjuagar el vidrio y el equipo, o para añadir agua al recipiente.
44. Cuando saque un enchufe, coja el enchufe y no el cordon eléctrico. Debe tener las manos completamente secas antes de tocar cualquier objeto eléctrico.
45. Examine los envaces de vidrio antes de utilizarlos. Nunca utilice envaces de vidrio rotos o sucios.
46. Haga saber inmediatamente si el equipo eléctrico está dañado. Mire si las cuerdas están sueltas o rotas. No utilice equipo eléctrico que esté dañado.
47. Si no entiende como utilizar un instrumento, pida al instructor que le ayude.
48. No meta vidrio caliente en agua fría; se puede estrellar.

Sustancias Calientes

49. Tenga mucha percaución al utilizar un quemador de gas. Tenga cuidado de que el pelo, la ropa y las manos estén a una buena distancia de la llama a todo tiempo. No ponga ninguna sustancia en la llama a no ser que el instructor le diga que lo haga. Nunca se incline sobre la llama. Prenda el quemador de gas (o de alcohol) solamente como le diga el instructor.
50. Nunca deje una llama encendida desatendida. Nunca deje nada que se esté calentando o reaccionando desatendido. Siempre apague la estufa cuando no esté siendo utilizada.
51. Será instruido apropiadamente del método de calentamiento y como hervir líquidos en tubos de prueba. Nunca dirija en la dirección de otra persona o a si mismo con la parte abierta de un tubo de ensayo caliente.
52. Metales y vidrio caliente permanecen calientes por mucho tiempo. Se deben poner en una parte para que se enfríen y cogerlos con cuidado. Use unas pinzas o guantes protectores del calor si es necesario.
53. Nunca mire dentro de un recipiente que se esté calentando.
54. No ponga aparatos calientes directamente en el pupitre del laboratorio. Siempre utilice una almohadilla insulada. Permita suficiente tiempo para que los aparatos calientes se enfríen.
55. Cuando curve vidrio, deje que el vidrio se enfríe antes de tocarlo. El vidrio caliente y frío tiene la misma apariencia visual. Para determiner si un objeto está caliente ponga la mano (no la palma) cerca antes de tocarlo.

Preguntas

56. ¿Lleva lentes de contacto?
    ☐ Si ☐ No
57. ¿Ve bien los colores?
    ☐ Si ☐ No
58. ¿Tiene alergías?
    ☐ Si ☐ No

_____
_____
_____
_____

Acuerdo

Yo,_____
(nombre del alumno) he leido y estoy de acuerdo en seguir todas las reglas de seguridad de este contrato. Sé que debo seguir estas reglas para asegurar mi seguridad, y la de mis compañeros e instructores. Yo cooperaré con mi instructor y mis compañeros para mantener un laboratorio seguro. Támbien seguiré las instrucciones orales y escritas dadas por el instructor. Sé que cualquier infracción de este contrato de seguridad que sea resultado de una conducta peligrosa en el laboratorio o de mi mala conducta, puede resultar en ser sacado del laboratorio, detención, no aprobar esta clase, y/o ser expulsado de esta clase.

_____
Firma del estudiante

_____
Fecha

Estimado Padre o Guardián,

Pensamos que usted debe ser informado del esfuerzo de la escuela de crear y mantener la clase/laboratorio de ciencias segura.

Con la cooperación de los instructores, padres, y alumnos, un programa de instrucción seguro puede eliminar, prevenir, y corregir posibles riesgos.

Usted debe conocer las instrucciones de seguridad que su hijo o hija recibirá antes de empezar cualquier actividad en el laboratorio. Por favor, lea la lista de reglas de seguridad en la parte de arriba. No se permitirá a ningún alumno empezar a hacer actividades en el laboratorio a no ser que este contrato haya sido firmado por el alumno y el padre o guardián y este en el archivo del maestro.

Su firma en este contrato indica que usted ha leído este Contrato de Seguridad del Alumno, que sabe de las medidas tomadas para asegurar la seguridad de su hijo o hija en el laboratorio de ciencias, y que hablará con su hijo o hija sobre mantener este contrato y seguir las reglas y procesos en el laboratorio.

_____
Firma del Padre o Guardián

_____
Fecha

Amoeba Sisters Video Recap: *Introduction to Cells*

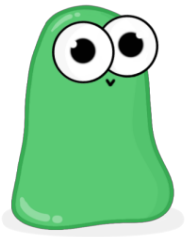
Directions: *For each statement, write a "P" if it best applies to **prokaryotes only**, "E" if it best applies to **eukaryotes only**, and "both" if it applies to **both prokaryotes and eukaryotes**.*

1. _____ I have a **cell membrane** (**plasma membrane**).

2. _____ I have a **nucleus**.

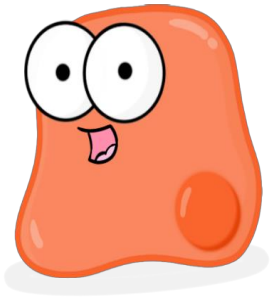
3. _____ **Bacteria** are an example of me.

4. _____ **Fungi** are an example of me.



5. _____ **Animals** are an example of me.

6. _____ I contain **ribosomes**.



7. _____ I contain **membrane-bound organelles**.

8. _____ I contain **cytoplasm**.

9. _____ **Your body cells** are made of this type of cell.

10. _____ **Protists** are an example of me.

11. _____ **Plants** are an example of me.

12. _____ I contain **genetic material** such as **DNA**.

13. The **cell theory** makes several fascinating statements about cells! What are three statements mentioned in the video that are included in the cell theory?

A Tour Inside the Cell!

Let's do a recap of the structures discovered inside the cell after the video tour! Fill in the below chart to help you organize what was visited! Remember there are more functions and structures that you can discover online.

Structure or Organelle on the Tour:	***Makes Me Think of…*** *(provide an illustration or analogy!)*	***Function(s):***	****Type of Cell?*** **Is it in both prokaryotes and eukaryotes? Or just eukaryotes?*
Cell Membrane	14.	15.	16.
Cytoplasm	17.	18.	19.
Ribosome	20.	21.	22.
Nucleus	23.	24.	25.
Endoplasmic Reticulum (Rough and Smooth)	26.	27.	28.
Golgi apparatus	29.	30.	31.
Mitochondria (Singular: Mitochondrion)	32.	33.	*Eukaryote Cells (in both animal and plant cells)*
Cell Wall	34.	35.	36.
Chloroplast	37.	38.	39.
Vacuole	40.	41.	42.

Ecological Succession Name _____

A)Ecological succession - Bozeman Science

1. Succession is a series of steps by which _____.

2.Succession occurs at a _____rate.

3.Primary succession starts with _____.

4.In secondary succession the _____ remains.

5.The first organisms to colonize an area are _____ species.

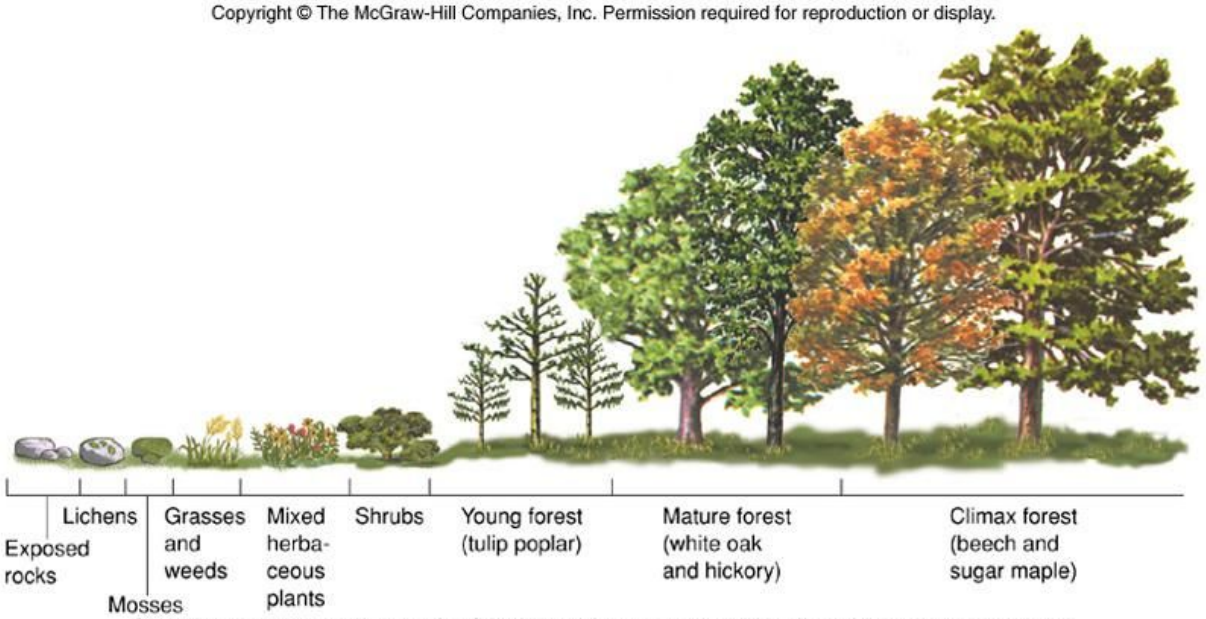
6.Two examples are _____ and _____.

7.What adaptation allows the lodgepole pine to colonize the area?

8. The final stage of succession is the _____community.

Forest Succession:

1.bare rock
2.mosses
3. _____
4. shrubs
5.fast growing trees
6.mature forest



© From Biosphere 2000: Protecting Our Global Environment, 3d ed. by Donald G. Kaufman and Cecilia M. Franz. (New York: HarperCollins Publishers, 2000), Fig. 5.3, p. 86.

B)Stages of Primary Succession on a Lava Flow

Stage 1 _____

Stage 2 _____

Stage 3 _____

Stage 4 _____

C)Primary vs Secondary Succession

1.What is the main feature of Primary Succession? _____

2.The first organisms to colonize an area are _____ species.

3.Two examples are _____ and _____.

4.There are 3 steps to soil formation:

- Lichens create soil by secreting _____
- Rocks are worn down by _____and _____
- Mosses and lichens _____

5.Secondary succession occurs after _____.

6.Two examples are _____and _____.

7.Why is secondary succession faster than primary succession?

8.What is the main difference between primary and secondary succession?

Section five: Experiment Using Scientific Method (25 pts)

The student will perform a simple experiment and write a lab report.

- The student must chose one of the labs to perform, either the Drops on the Penny Lab or the Paper Airplane and the Scientific Method Lab.
- The student will read the instructions for their chosen lab completely before performing the lab.
- The student will follow the procedures and answer the questions.
- When finished, use the experiment information to draft a lab report.
- A template lab report has been provided along with a guide to help keep the parts of the lab report organized.
- Section five has a rubric for 25 of the points that go towards the total Prep Assignment major grade.

Lab Report Rubric

Section	Possible Points	Points Earned
Quality – Neatness and in correct order.	2pts.	
Problem	2pts.	
Hypothesis	3 pts.	
Detailed Procedures – Clear number instructions includes use of equipment and purpose for the equipment.	3 pts.	
Data Table	2pts.	
Graph – Title, Labeled axes, numbered	4 pts.	
Variables	3pts.	
Conclusion	6 pts.	
Total Points	25 pts.	

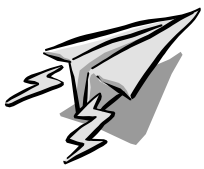
Name_____

Paper Airplanes & Scientific Methods

Scientific Inquiry refers to the many different ways in which scientists investigate the world. Scientific investigations are done to answer questions and solve problems. Many times investigations are said to follow a Scientific Method. Scientific methods are steps that are followed during an investigation to make sure that the information gained during the investigation is accurate and true. The steps usually followed are:

- A Question or Problem is Identified and Stated.
- Background Research or Literature Review is done to find out what is already known about the topic.
- A Hypothesis is formed – this is an educated guess about the result of the experiment based on the information learned during background research.
- A very detailed, step-by-step Procedure is developed to test the hypothesis. This is also called the Experimental Design or Methodology. It includes a list of Materials.
- The investigation is conducted and Data is Collected.
- The Data is Analyzed.
- Conclusions are Drawn. What does the data mean?
- Results are Communicated. Other scientists review the results of the investigation.

During this investigation, you will practice the steps listed above as well as different science skills. Be sure to read everything in this handout and refer to your textbook handout whenever you find it necessary.



Part 1: Identify and State the Question or Problem.

You want to know which paper airplane design is best. The first thing you have to do is decide what ***best*** means. This is called an operational definition – the definition you will use during the investigation. For this investigation, we will define best as the plane that flies the farthest. We will not be concerned with height or loops or straight flight.

Now, as a group, decide what you would like to test: the length of the plane, the weight of the plane, the style of the plane, position of weights on the plane, or something else. Write a question that that states what your group would like to investigate:

_____

_____

Part 2: Background Research.

Find out what is already known about paper airplanes. There is research material available in the classroom on paper airplanes and flight. You may also use the Internet.

Spend a little time reading up on paper airplanes. Write 3 – 5 notes here:

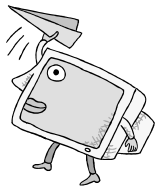
_____

_____

_____

_____

_____



Part 3: State a hypothesis.

Based on how we defined ***best*** and what you now know about paper airplanes, write a hypothesis that states which type of paper airplane (that you are testing) will fly the greatest distance and why you think this. Use complete sentences.

_____

_____

_____

Part 4: Write a Procedure.

When you design an experiment, you must first pick one thing to test, the length of the plane, the weight of the plane, the style of the plane, position of weights on the plane, and so on. This is called the Manipulated or Independent Variable – it is what *you, the scientist* will change or test. Everything else that could possibly change, but doesn't is called a Controlled Variable. Scientists control all the variables they can so that they can be sure that the results of the investigation are due to the change in the one variable that is tested.

You must decide what kind of data you will collect or what you will observe and measure. This is called the Responding or Dependent Variable.

You need to repeat the experiment several times. These are called Trials. Multiple trials help make sure that your data in consistent. If you only do an experiment one time, you might get some very unusual data for many reasons. Repeating the experiment allows you to be confident in your findings.

A list of Materials is needed so that other scientists can repeat your experiment.

The procedure for this investigation is partially done for you. Add any extra steps needed for your investigation.

List the planes you will use here.
Type of plane or changes made to a plane.

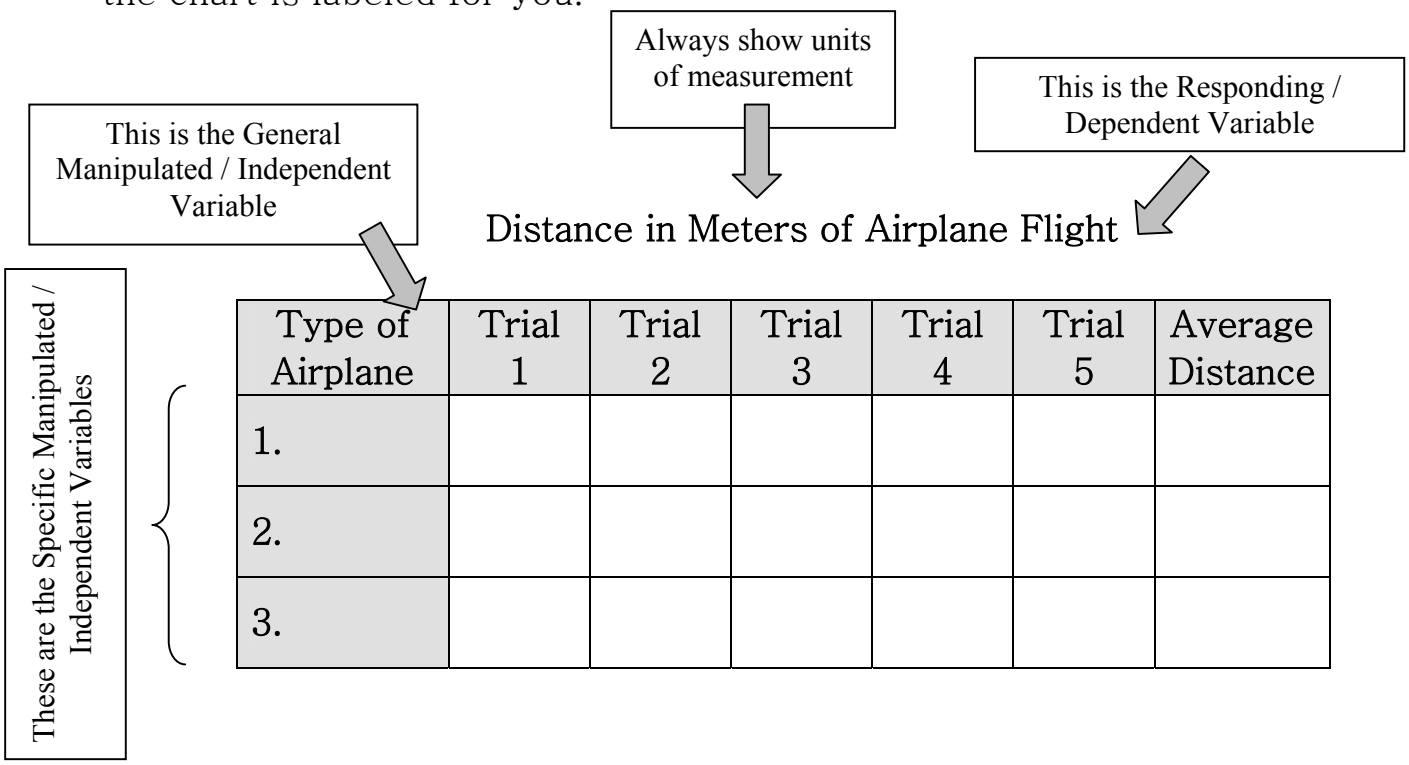
1. Select 3 different paper airplanes.
   a. _____
   b. _____
   c. _____
2. Pick a spot to launch the planes each time.
3. Throw the first airplane.
4. Measure _____
5. Record the data.
6. Repeat 4 more times.
7. Throw the second airplane.
8. Measure _____
9. Record the data.
10. Repeat 4 more times.
11. Throw the third airplane.
12. Measure _____
13. Record the data.
14. Repeat 4 more times.

List all of your materials below:

Part 5: Collect & Record Data

The responding or dependent variable is the Data you collect. Data is frequently recorded in some type of chart or table. The chart has a place to show each specific manipulated / independent variable, a place to record measurements (data), and a place to show averages or other statistics.

You will use the chart below to record your data; each part of the chart is labeled for you.



Type of Airplane	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average Distance
1.						
2.						
3.						

Part 6: Analyze Data

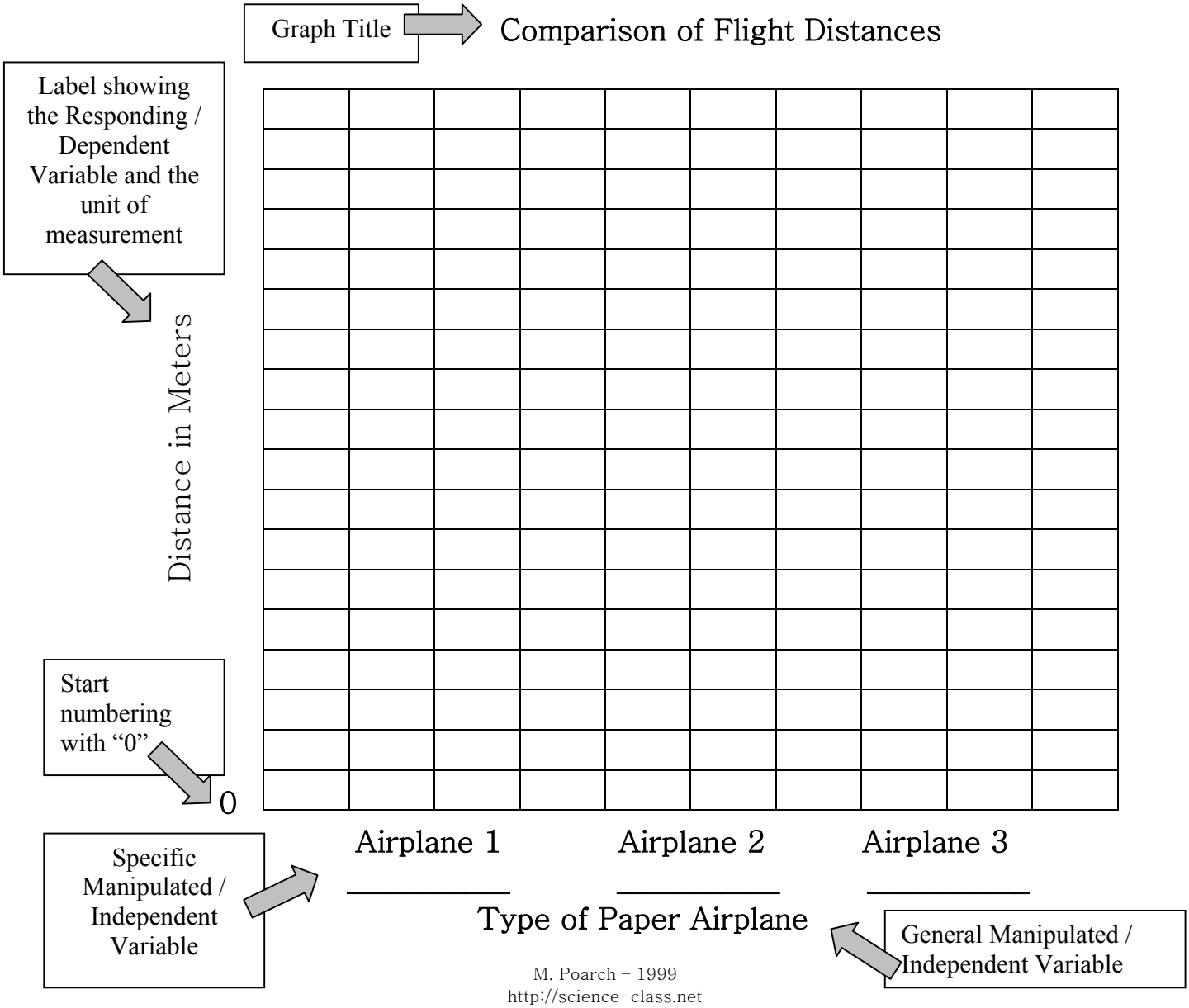
After your data is collected and recorded, you have to make sense of it. You look for patterns, trends, and relationships. You are really asking yourself, "What does this data mean?" Making a graph is a good way to help analyze data. A graph makes a picture of the data and can help you visualize the patterns, trends, and relationships.

It is very important to use the right kind of graph when analyzing data. In this investigation, you *compared* different kinds of paper airplanes. Any time you are comparing data, a Bar Graph is the most appropriate type of graph to use.

All graphs have some things in common;

- The manipulated / independent variable is on the X-axis (bottom).
- The responding / dependent variable is on the Y-axis (side).
- Each axis is labeled to identify the variables.
- Units of measurement are included in the labels.
- The graph has a descriptive title.
- The information on the graph is spread out so that most of the graph is used.

You will use the graph below to record your data; each part of the graph is labeled for you.



Part 7: Draw Conclusions

A conclusion is a discussion of the data. The data is described and explained and the hypothesis is accepted or rejected. A hypothesis is never "right" or "wrong" – it is either supported by the data or it is not supported by the data.

The conclusion also discusses the usefulness of the results (why was the investigation practical?), how the investigation can be improved, and other questions raised during the investigation.

The conclusion for this investigation has been started for you. Fill in the blanks with your information.

The hypothesis, _____

is _____ (accepted / rejected). The data shows

that _____

_____

_____

_____.

The results of this investigation are useful _____

_____

_____

_____

_____.

This investigation can be improved by _____

_____

_____

_____

_____.

Other questions that need to be answered are _____

_____

_____

_____

_____

_____.

Part 8: Communicate Results

Professional scientists must be able to share the results of their investigations with other scientists all over the world. The scientific community discusses investigations with each other, repeats them, refines them, compares them to what is already known, all in the effort to find what is really true and accurate.

Be prepared to spend 2 – 3 minutes discussing the results of your investigation with your scientific colleagues (classmates).

Name _____ **Date** _____ **Period**_____

DROPS ON A PENNY LAB
Using the Scientific Method

Take a Guess: How many drops of water (H_2O) can fit on one side of a penny? _____

QUESTION: Will soap affect the cohesion and surface tension of water molecules?

HYPOTHESIS:_____

_____

EXPERIMENT (Test your hypothesis!):

MATERIALS: Water, Soapy water, eyedropper, penny, paper towels, calculator

PROCEDURE:

CONTROL GROUP: Perform a CONTROL test for *comparison* with later results.

1. Rinse a penny in tap water and dry completely.
2. Place the penny on paper towel.
3. Use an eyedropper to place drops of WATER on the penny (one at a time) until ANY amount of water runs over the edge of the penny.
4. Record the number of drops for that trial in the table.

Repeat Steps 1 - 4 three more times before calculating your average.

EXPERIMENTAL GROUP: Perform tests with the TESTING LIQUID.

1. Rinse a penny in tap water and dry completely.
2. Place the penny on paper towel.
3. Use an eyedropper to place drops of SOAPY WATER on the penny (one at a time) until ANY amount of water runs over the edge of the penny.
4. Record the number of drops for that trial in the table.

Repeat Steps 1 - 4 three more times before calculating your average.

DATA

	TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	AVERAGE
WATER					
SOAPY WATER					

ANALYZING RESULTS: Answer each question related to the experiment.

1. Explain your results from both parts of the experiment in terms of *cohesion* and *surface tension*.

2. How do your results compare to the other groups in your class? Provide at least 2 possible reasons for any similarities and differences you identified.

3. What is the variable we are testing? _____
4. List variables that you must control to ensure reliable results.

5. How could you change the liquid, coin or method to write another experiment similar to this one? Be sure to include: question, hypothesis, experiment, materials, procedures, control group, experimental group and some type of data collection. **BE CAREFUL to *CONTROL ALL THE VARIABLES*** EXCEPT THE ONE TESTED**!**

Drops On A Penny Lab

Cohesion - Water molecules are _____ to other water molecules. The _____ end of water has a _____ charge and the _____ end has a _____ charge. The hydrogens of one water _____ are attracted to the oxygen from other water molecules. This attractive _____ is what gives water its _____ properties.

Surface Tension - Surface tension is the name we give to the _____ of water molecules at the _____ of a body of _____. The cohesion of water molecules forms a surface "_____" or "_____." Some substances may _____ the cohesive force of water, which will reduce the _____ of the surface "skin" of the water.

Take a guess ...
How many paperclips can you fit into the glass before the water runs over?

_____

Actual Amount = _____

Use this information to help you answer the questions on the lab sheet after you have completed the experiment!

Lab Report

Title: _____

Problem:

_____

_____

Hypothesis:

_____

_____

Variables:

Independent: _____

Dependent: _____

Control: _____

Materials (with amounts):

_____

_____

_____

Procedure (number your steps):

_____

_____

_____

_____

_____

_____

Data: (Draw a Data Table)

Create the appropriate graph on the attached graph paper.

Summary of Results:

_____

_____

_____

_____

_____

Conclusions:

_____

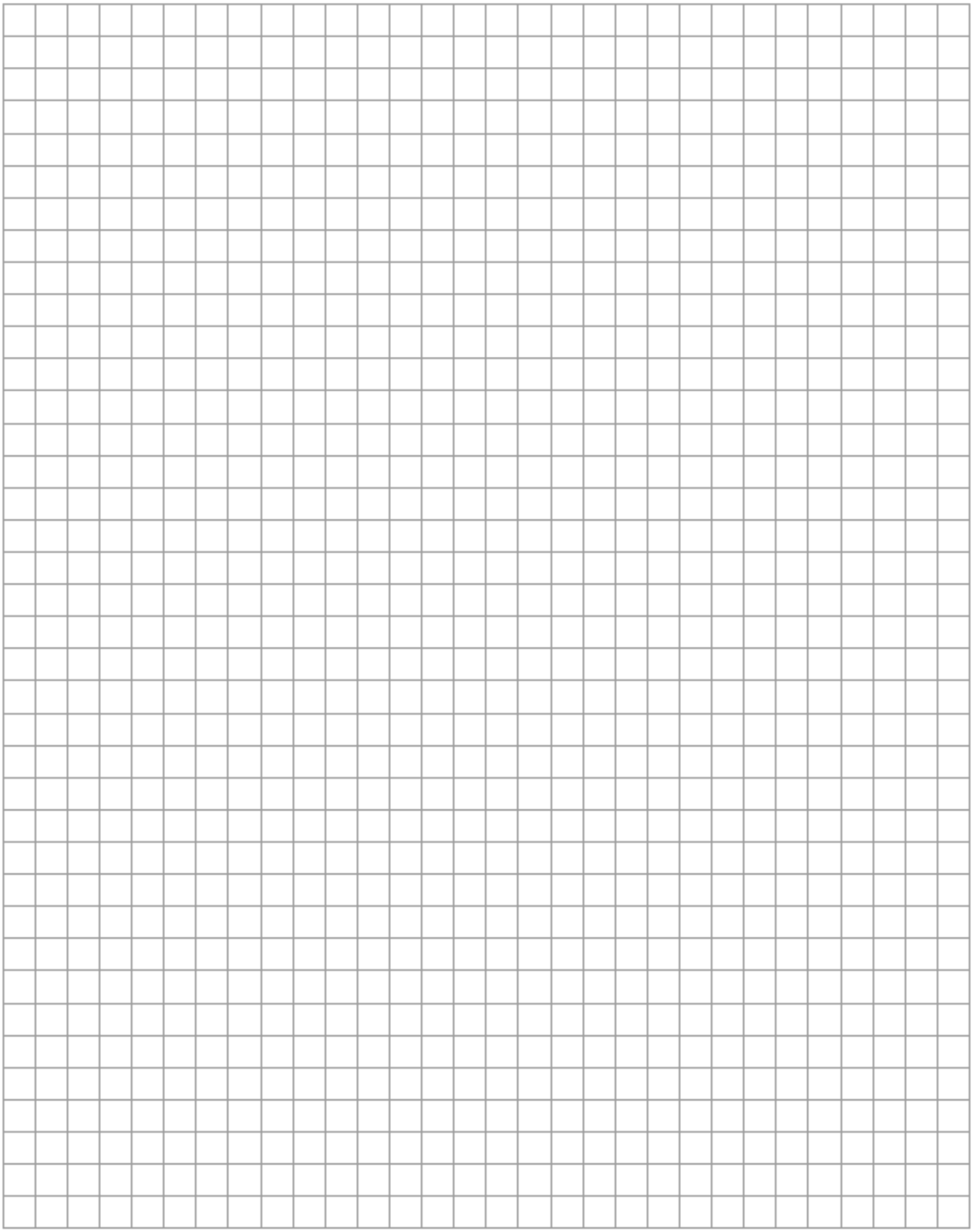
_____

_____

_____

_____

_____



1 Block = 1/4 "

Pre-AP Biology

Prep Assignment Rubric (completion and quality)

5 pts can be deducted from each section for low quality work.

Low quality work means messy, difficult to read, or disorganized.

Section	Possible Points	Points Earned
Section One Common Science Word Parts	25 pts for each word part. Must have example word and definition	
Section Two Cornell Notes on two Articles	Detailed Cornell Notes Article one= 10 pts Article two= 10 pts	
Section Three Lab Safety Cartoon	1 pt. for each rule 15 total points	
Section Four Videos with handouts	Completed handouts Handout 1= 7.5pts Handout 2 =7.5 pts	
Section Five Experiment Using Scientific Method	Refer to Rubric for Point details 25 pts	
Total Points	Possible 100	