Name: _____

Alternative Methods of Instruction (AMI)
LHS Biology

Directions: In this packet, you will find 10 days worth of educational material that will count for one day of instruction if Lamar High School closes its doors for natural disasters or human interactions that prohibit in class instruction. One days worth of instruction counts for your attendance to school that day missed, if the school district says it is an AMI day.

Notice:This packet is not valid for a day you voluntarily choose to miss an instructional day of school.

Pacing Guide:

- ☐ AMI Day 1: **Take a Deep Dive Into Hydrophobicity:** Construct an Explanation
- ☐ AMI Day 2: **Take a Deep Dive Into Hydrophobicity:** Develop a Model
- ☐ AMI Day 3: **Take a Deep Dive Into Hydrophobicity:** Analyze Data
- ☐ AMI Day 4: **Take a Deep Dive Into Hydrophobicity:** Obtain, Evaluate, and Communicate Information
- ☐ AMI Day 5: **Take a Deep Dive Into Hydrophobicity:** Design a Solution
- ☐ AMI Day 6: **Who Should Fund Product Safety Studies?** Background Knowledge
- ☐ AMI Day 7:**Who Should Fund Product Safety Studies?** Research Viewpoints
- ☐ AMI Day 8: **Who Should Fund Product Safety Studies?** Comparison
- ☐ AMI Day 9:**Who Should Fund Product Safety Studies?** Form an Opinion (Check your assignment for English 10...these go together)
- ☐ AMI Day 10:**Who Should Fund Product Safety Studies?** Form an Opinion (Check your assignment for English 10...these go together)

In order to successfully get credit, you must turn in each assignment, the day you return from the school mandated closure. If you have any questions, please contact me through email, judith.little@apps.lamarwarriors.org. From there, we can set up a google meeting or I can answer your questions through text format.

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Take a Deep Dive Into Hydrophobicity

Read the Following:

If you've ever been caught in a rainstorm, you know how quickly your clothes can get drenched with water. MOst of your everyday clothes are made of materials that absorb water. But some of your clothes - think of you raincoat or your windbreaker--are made of materials that are waterproof.

The leaves of plants are naturally waterproof. The top and bottom surfaces of leaves are covered with athin, waxy layer that acts as a protective barrier. Some leaves are more waterproof than others. In fact, some are so waterproof that scientists call them *hydrophobic*, or "water fearing." The leaves of the lotus flower are a well known example. Water on a lotus leaf immediately beds up and rolls off the leaf surface, almost as if the leaf itself were pushing the water away. Try doing a video search for "lotus effect" and "hydrophobic effect, " and you can see for yourself.

What makes a hydrophobic substance "fear" water?

As you learn about the properties of water and the chemistry of living things, investigate the phenomenon of hydrophobicity on your own or with a partner. Find out what causes the lotus effect, and discuss the technological innovations that have been inspired by it. Use the rubric at the end of the unit to evaluate your work for this task.

Construct an Explanation

Either look at the image above (Water on a lotus leaf will bead up and roll off, carrying away dirt particles and keeping the leaf's surface clean) or watch the video clip that shows the lotus effect (you may also watch other videos than the one supplied): https://youtu.be/aeSpxv1BePg .

1. What do you think causes this phenomenon?

   _____

   _____

   _____

   _____

2. Develop a well written scientific explanation (1 paragraph) of the lotus effect. Make sure to include the following:
   a. Microscopic structure of the leaf surface
   b. Microscopic structure of the physical properties of the materials involved

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c. Identify the function that the lotus effect provides to the plant.
d. What problem or need does the lotus effect solve?

Scientific Explanation:

End of Day 1 Requirements (turn this in for one day of absence the day you return to school).

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Continue: Take a Deep Dive into Hydrophobicity

Develop Models:

Draw a diagram or build a model that illustrates the main points of your explanation. Call one or two classmates to see if they can identify any gaps or weaknesses in your diagram or model. Then refine your work based on the feedback.

Rough Draft Diagram:

Name two people you contacted for their feedback & what were their suggestions:

1._____

2._____

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Final Submission:

Note: Your drawing doesn't have to be Picasso's or Van Gough's but I do expect to see good quality of work and not something printed off of the internet. It must be your original drawings.

End of Day 2 Requirements (turn this in for one day of absence the day you return to school).

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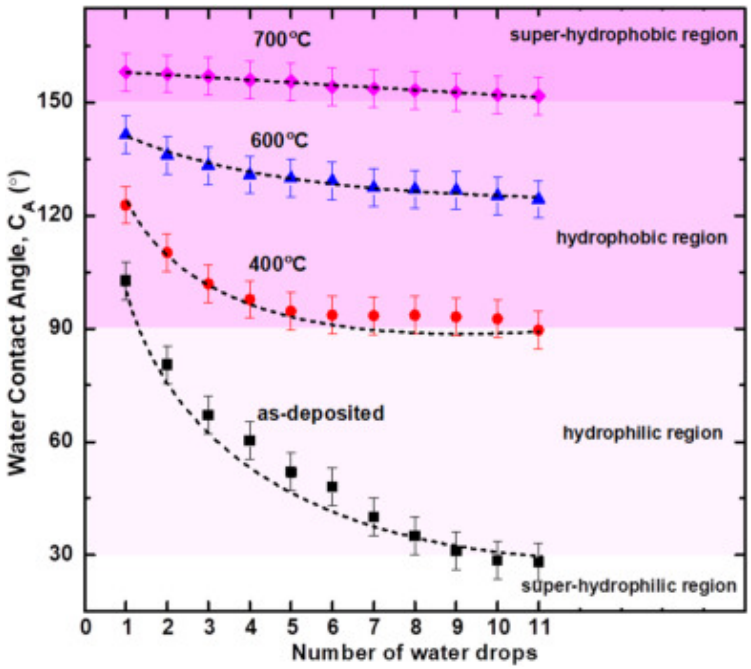
Continue: Take a Deep Dive Into Hydrophobicity

Analyze:

Directions: Using the below graph, answer the following questions.

Enhancement of self-cleaning properties and durability of super-hydrophobic carbon nitride nanostructures by post-annealing treatment



1. What are the items being compared in this graph?

   _____

   _____

2. What is the independent variable? _____
3. What is the dependent variable? _____
4. At what water contact angle (℃) does the substance become hydrophobic?

   _____

5. If the end treatment was to achieve super-hydrophobic durability, at what temperature range and water contact angle median must be met for the carbon nitride nanostructures?

   _____

   _____

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End of Day 3 Requirements (turn this in for one day of absence the day you return to school).

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Continue: Take a Deep Dive Into Hydrophobicity

Obtain, Evaluate, and Communicate Information:

Hydrophobic phenomena in the natural world have inspired inventions in the fields of materials science and nanotechnology.

Image pictured to the right: Fabric treated with hydrophobic technology repels water and dirt for as long as the coating on the fabric lasts.

1. Identify a product that uses hydrophobic technology.

   _____

2. Specify the problem or need that solves the issue:

   _____

   _____

3. What claims have been made about the product's effectiveness?

   _____

   _____

   _____

4. Explain how you could scientifically test the validity of such claims.

   _____

   _____

   _____

   _____

5. How can the data generated from your procedure be used?

   _____

   _____

   _____

   _____

Rewrite the five above questions in a well developed paragraph below:

_____

_____

_____

_____

_____

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_____

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_____

End of Day 4 Requirements (turn this in for one day of absence the day you return to school).

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Continued: Take a Deep Dive Into Hydrophobicity

Design a Solution:

Think of a problem or need in your own world that could be solved by hydrophobic technology. What are the criteria for a successful solution to this problem? Discuss ideas for possible solutions, and then write a proposal outlining how you would design a solution to the problem.

Criteria for a successful solution:

_____
_____
_____
_____
_____
_____
_____
_____

Write a proposal outlining how you would design a solution (this can either be an actual outline or written in paragraph form).

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End of Day 5 Requirements (turn this in for one day of absence the day you return to school).

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Who Should Fund Product Safety Studies?

Directions: After reading the following article, answer the questions below using evidence from the text by underlining or highlighting where you found the information.

Biology plays a major role in the research, development, and production of food, medicine and other consumer items. Companies that make these items profit by selling reliable and useful products in the marketplace. For example, the plastics industry provides countless products for everyday use.

But sometimes questions arise concerning product safety. Bisphenol-A (BPA), for instance, is a chemical found in hard plastics. Those plastics are used to make baby bottles, reusable water bottles and the linings of many food and soft drink cans. Is BPA safe? This type of question can be posed as a scientific hypothesis to be tested. But who does the testing? Who funds the studies and analyzes the results?

Ideally, independent scientists test products for safety and usefulness. That way, the people who gather and analyze data can remain objective--they have nothing to gain by exaggerating the positive effects of products and nothing to lose by stating any risks. However, scientists are often hired by private companies to develop or test their products.

Often, test results are clear: A product is safe or it isn't. Based on these results, the Food and Drug Administration (FDA) or another government agency makes recommendations to protect and promote public health. Sometimes, though, results are tough to interpret.

More than 100 studies have been done on BPA--some funded by the government, some funded by the plastics industry. Most of the independent studies found that low doses of BPA could have negative health effects on laboratory animals. A few studies, mostly funded by the plastics industry, concluded that BPA is safe. In this case the FDA ultimately declared BPA to be safe. When the issue of BPA safety hit the mass media, government investigations began. So, who should sponsor product safety studies?

1. What is the premise of this article?

   _____

   _____

2. What is BPA and how is it used?

   _____

   _____

3. Who tests if this product is considered safe (be specific)?

   _____

   _____

4. True or False: Only the FDA can hire scientists to test products made of BPA.
5. In your opinion, who should sponsor product safety studies?

   _____

   _____

   _____

   _____

End of Day 6 Requirements (turn this in for one day of absence the day you return to school).

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Continued: Who Should Fund Product Safety Studies?

Directions: Read the two viewpoints.

Independent Organizations Should Fund Safety Studies	Private Industries Should Fund Safety Studies
Scientists performing safety studies should have no affiliation with private industries, because conflict of interest seems unavoidable. A company, such as a BPA manufacturer, would naturally benefit if its product is declared to be safe. Rather, safety tests should be funded by independent organizations such as universities and government agencies, which should be as independent as possible. This way, recommendations for public health can remain free of biases.	There are an awful lot of products out there! Who would pay scientists to test all those products? There are simply too many potentially useful and valuable products being developed by private industry for the government to keep track of and test adequately with public funds. It is in a company's best interest to produce safe products, so it would be inclined to maintain high standards and perform rigorous tests.

Research the Viewpoints

Directions: To make an informed decision complete the following:

1. Research the current status of the controversy over BPA by using the Internet and other resources.
    a. What three sources did you use (Write the URL in the space provided).
        i. _____
        _____
        ii. _____
        _____
        iii. _____
        _____
    b. What did you learn from your first source?
    _____
    _____
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    _____
    c. What did you learn from your second source?
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    _____

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d. What did you learn from your third source?

_____

_____

_____

_____

_____

End of Day 7 Requirements (turn this in for one day of absence the day you return to school).

Continue: Who Should Fund Product Safety Studies?

Directions: Using the attached articles or links, ***compare*** this situation with the history of safety studies on cigarette smoke and the chemical Teflon and fill in the chart with your findings.

Safety of Cigarette Smoke	**Safety of the chemical, "Teflon."**

End of Day 8 Requirements (turn this in for one day of absence the day you return to school).

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Continue: Who Should Fund Product Safety Studies?

Form an Opinion:

Directions: Should private industries pay scientists to perform product safety studies? Write an argument to support your claim, with attention to the issue of potential bias in interpreting results. Use all the information you obtained from days six through day 8 to write your claim. Two paragraph minimum requirement for full credit. *Note: To help maintain an objective tone, avoid the pronoun, "I."*

End of Day 9 & 10 Requirements (turn this in for one day of absence the day you return to school).