

THE TINSTAAFLOFE

Energy, Matter and the Environment OFE

Name:

Due:

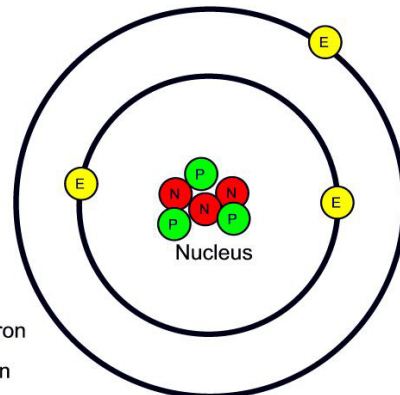
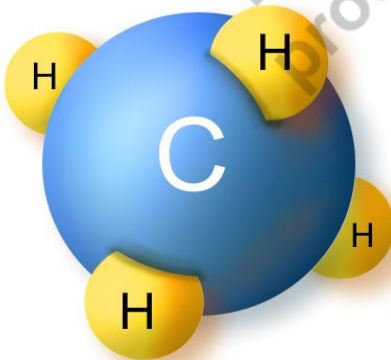


How does the picture on the left relate to the concept that "There is no such thing as a free lunch, AKA TINSTAAFL".

Sketch of Matter

Why is your sketch made of matter? How do you know?

Which of the following drawings are of an element, and which is of a compound? Describe your reasoning in the spaces around each picture.

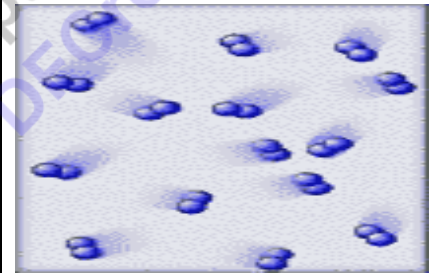
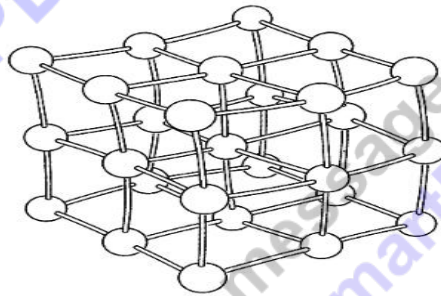
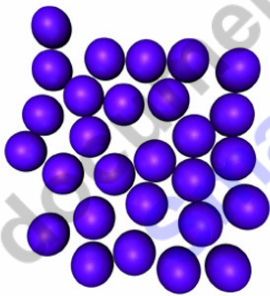


- Electron
- Proton
- Neutron

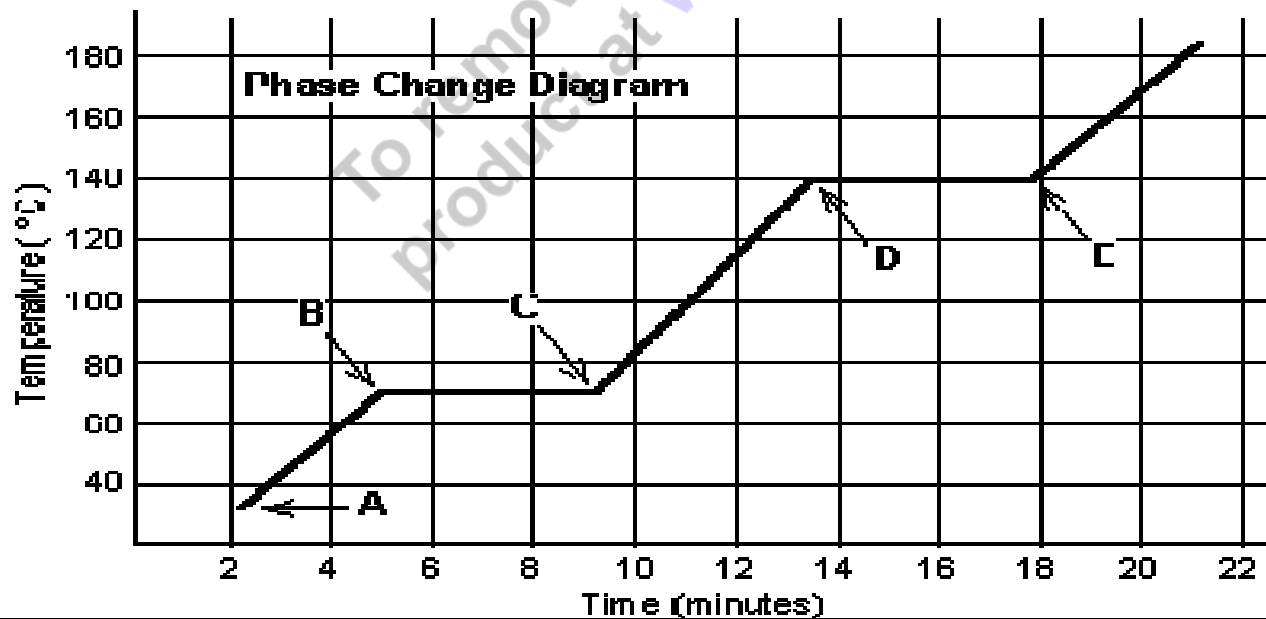
Please describe the states of matter below. Provide some properties of each state of matter.



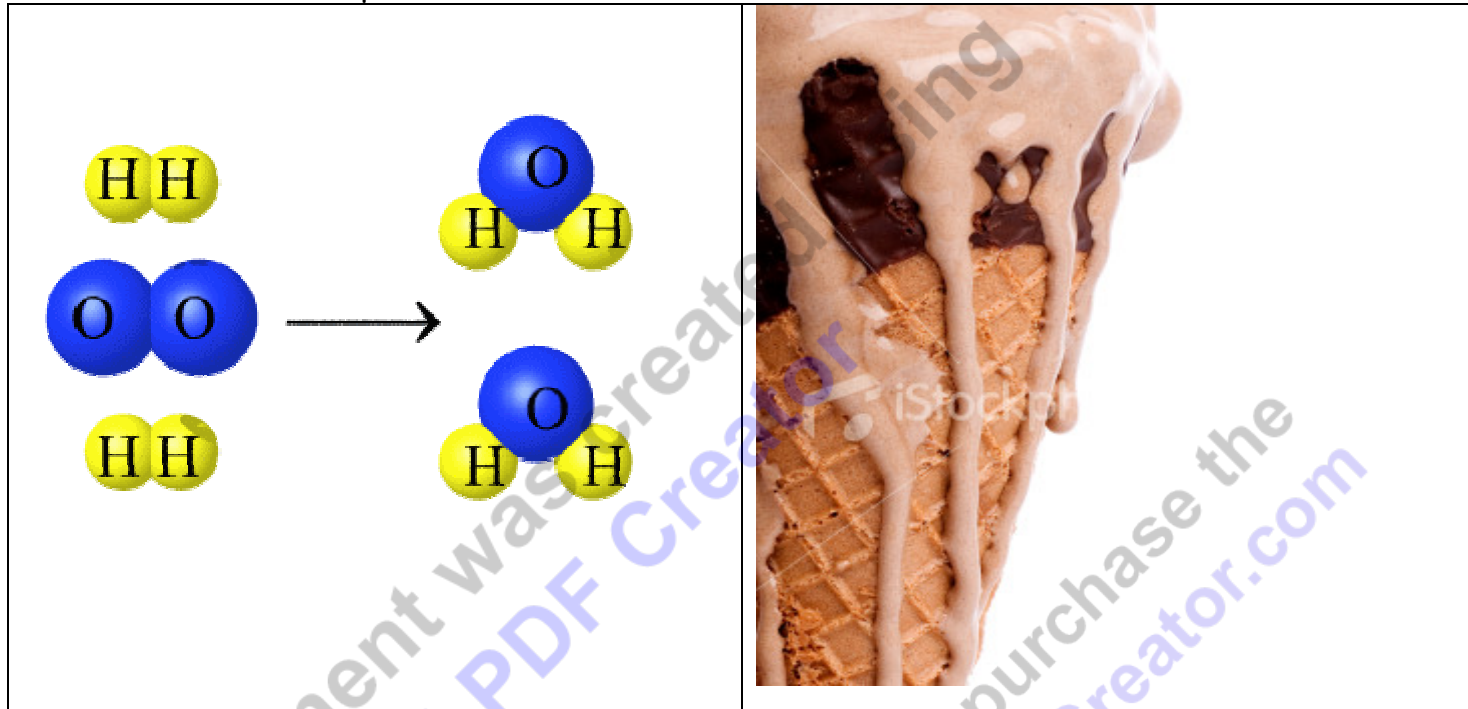
Name each state of matter on a molecular level. (Solid, Liquid, Gas)



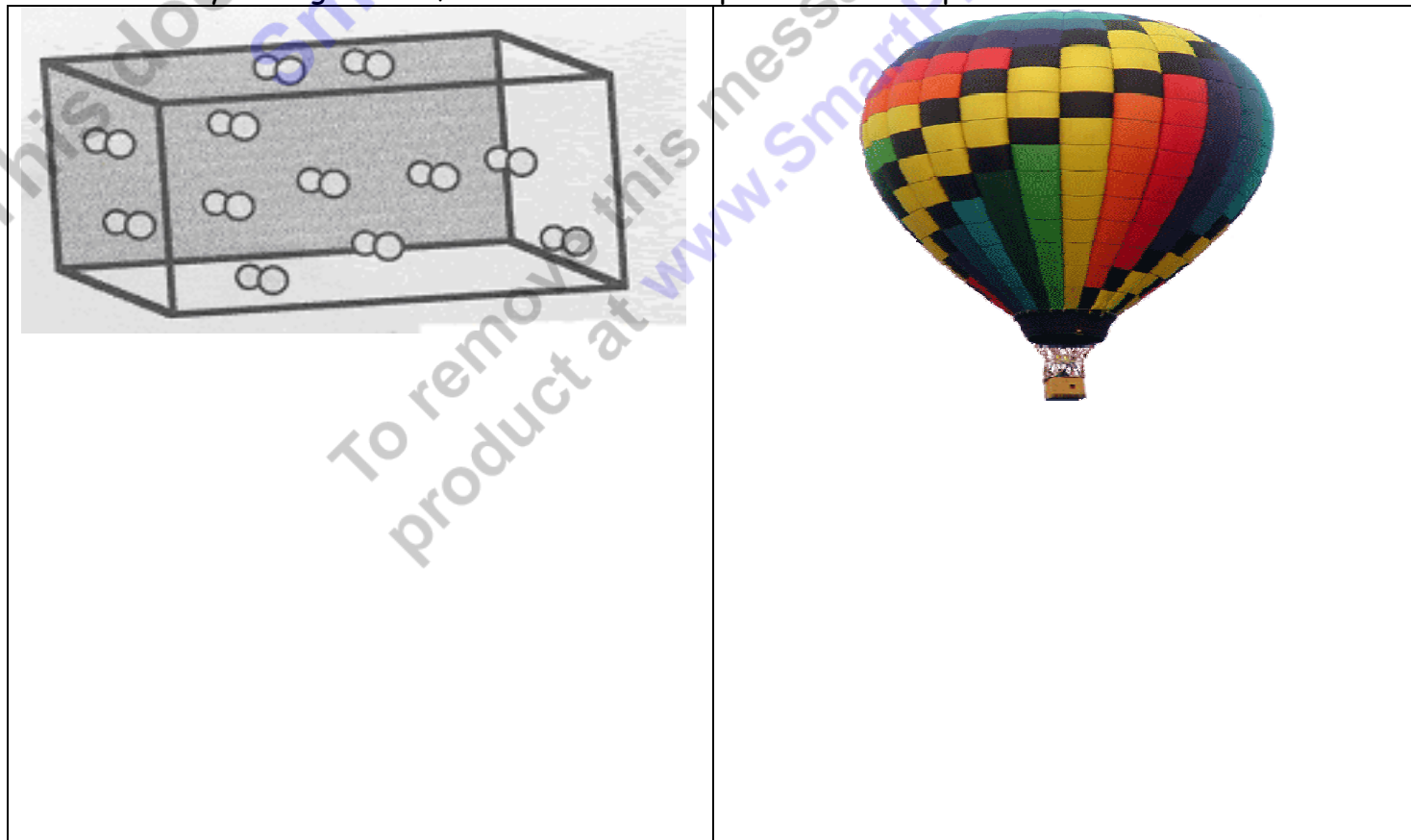
On the graph below, please place the following terms. Latent heat, Gas, Solid, Liquid, latent heat



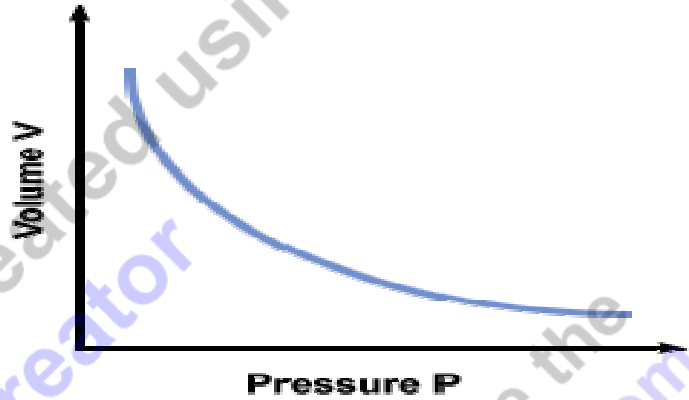
Which of the following pictures is a chemical change, and which is a physical change? Explain in the boxes next to the picture.



Which pictures best represent Charles Law and Avogadro's Law? Explain your reasoning next to each. A really strong answer, worth some bonus points will incorporate V over $T = K$



Describe the following graph where the X-axis is pressure, and the Y-axis is volume. Who's Law are we talking about and how does it relate to the picture and the behavior of middle school boys? A strong answer will incorporate $PV = nrt$



What principle is under suspicion in the drawing below? Why is this not real life?

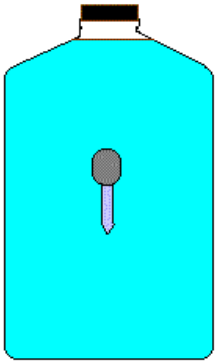


Which Law is being represented below?



Figure 3-3.- Distribution of force.

Please describe how a Cartesian Diver works using the picture below as a resource.



Use the box below to demonstrate knowledge of the seven forms of energy. Make sure to check off each box after you have drawn your specific example. Use text to support your drawings.

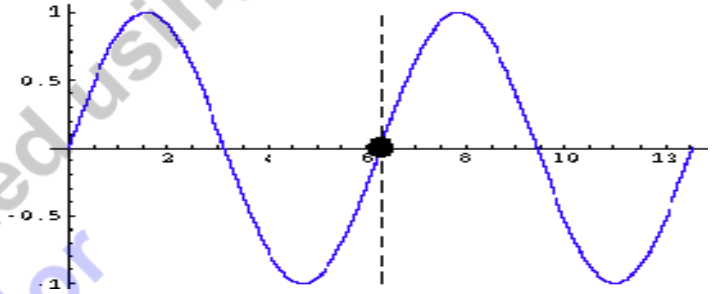
- Mechanical Sound Chemical Electrical Light/EM Radiant Nuclear



Please draw a convex lens and have it light focusing on the dot on the right.



Please label the wave below with the correct terms.



Please fill in the Electromagnetic Spectrum in the box below. Please include the following as well. Check off each box once complete.

- All of the waves names,
 In the correct order,
 From large to small,
 Using colors when appropriate,
 and providing one example of how each wave is utilized on earth.

Please describe your understanding of electricity below.

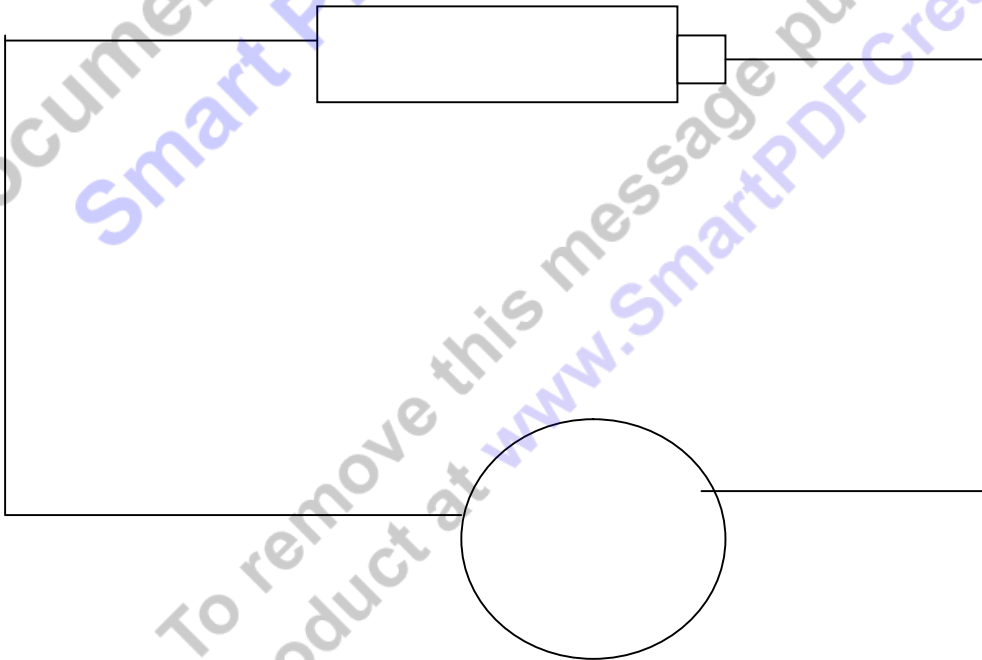


Complete a drawing of the invisible magnetic field based on the bar magnet below.

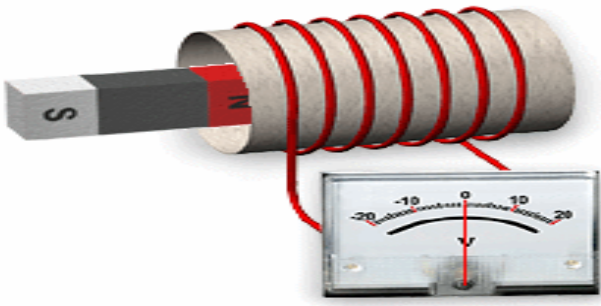


Please label the simple circuit below. Include the following in your diagram.

-Conductor, Insulator, Is it AC or DC, Ampere, Watt, Resistance.



Which law is represented here? Where do we see the usefulness of this law everyday?



What does this mean? Give me your best middle school attempt.

E=MC²

Please fill in the correct words in the paragraph below about the first law of thermodynamics.

First Law of Thermodynamics

This is the law of the conservation of _____. It states that energy can neither be _____, nor can it be _____. This means that the total amount of energy in the universe always remains conserved, or constant. However, energy can be changed from one _____ to _____. There are many different forms of energy, some of which may be more useful than others for a particular process. _____, _____, and _____ are all examples of different forms of energy. The definition of energy is the ability to do _____. Thus, with energy, biochemical reactions, the stuff of life, can proceed.

Please describe how the second law of thermodynamics and the idea of TINSTAAFL "No free Lunch" are connected to the cheap plastic toy below. It was made in Taiwan.



Please read the following. Relate any of the letters to places that they fit throughout this OFE with a * and the letter followed by the sentence in bold.

- 1 A) **Science is a process.**
 - Science is a method of learning more about the world.
 - Science constantly changes the way we understand the world.
- 2 B) **Energy conversions underlie all ecological processes.**
 - Energy cannot be created; it must come from somewhere.
 - As energy flows through systems, at each step more of it becomes unusable.
- 3 C) **The Earth itself is one interconnected system.**
 - Natural systems change over time and space.
 - Biogeochemical systems vary in ability to recover from disturbances.
- 4 D) **Humans alter natural systems.**
 - Humans have an impact on the environment.
 - Technology and population growth have enabled humans to increase both the rate and scale of their impact on the environment.
- 5 E) **Environmental problems have a cultural and social context.**
 - Understanding the role of cultural, social and economic factors is vital to the development of solutions.
- 6 F) **Human survival depends on developing practices that will achieve sustainable systems.**
 - A suitable combination of conservation and development is required.
 - Management of common resources is essential.

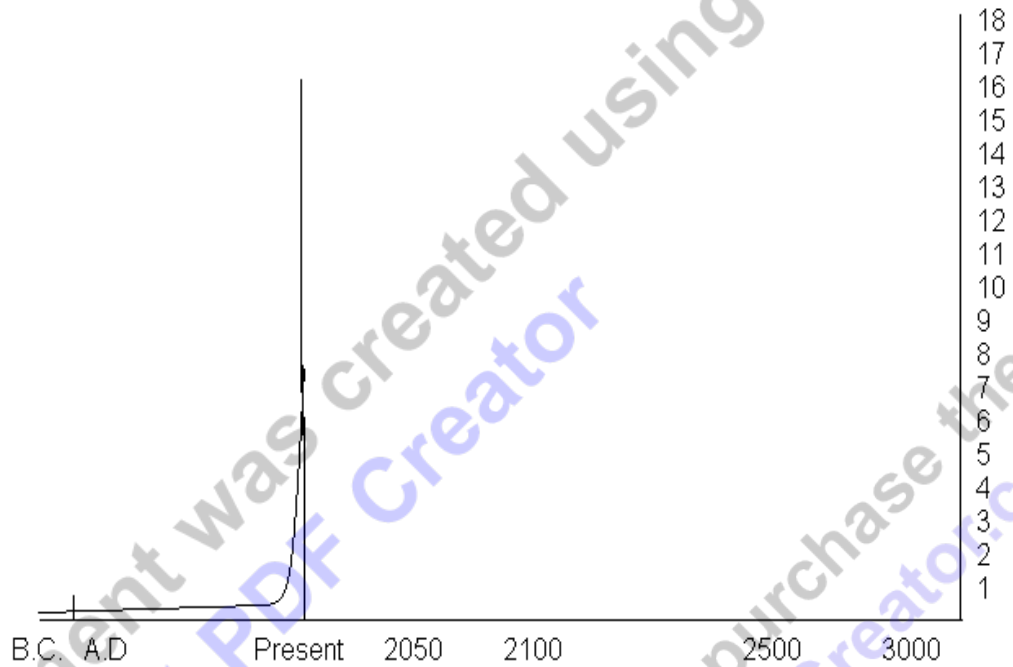
What are the 4 R's, Write them down next to each arrow. Why do we recycle last?



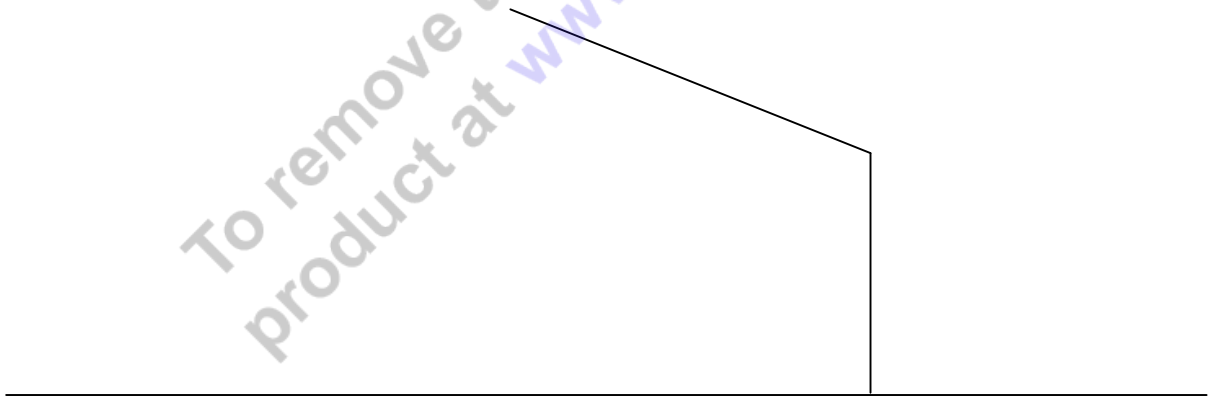
Please fill in the graph below showing human population growth from millions of years ago to present. Please include some key events along that way that affected population growth.



Please reflect on the graph from the previous page. Please make sure you define carrying capacity in your response. Also make a prediction by adding to the graph below.



Please decorate a house below with some features that make it sustainable and one that has a little impact on the environment as possible.



Please describe some forms of renewable energy in the boxes below.

| | | |
|--|--|--|
| | | |
| | | |

Please respond to the movie the 11th hour. Some questions to consider.

Where did * and sentence apply?

Is it really the eleventh hour?

What problems did they highlight?

What solutions did they offer?

What do you think is the future of our civilization?

How will everyone's lifestyle need to change to avoid...?



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