5.4 Chemical Changes in the Environment Answers pg. 128

Name: Date:

1. **In our natural environment, where may one find matter?(4 marks)**

Atmosphere, landfill, ocean or buried underground...literally everywhere.

2. **Why can matter sometimes turn into something else and used over and over?(1 mark)**

Matter can change into something else due to chemical changes, but cannot be destroyed simply changed from one form into another.

Chemical Changes in the Living Environment pg. 128

3. **A. What is a spectacular example of chemical changes in the living world?(1 mark)**

Forest Fire, which is a non reversible chemical change.

B. A forest fire may be the end of a forest if it completely burns, but the beginning of what?

A forest fire may become the end of a forest, but the beginning of a new forest.

C. What happens to the leaves and trunks of trees?(3 marks)

The leaves and tree trunks become gases and smoke in the air; ashes are found on the ground...simply the bound up matter in the trees are released into the environment to be used by something else.

D. What do you think happens to the new materials from (C)?(1 mark)

The environment uses these materials for new growth...the birth of a new forest.

4. **What is another example of a chemical changes in a forest, but happen slowly?(2 marks)**

When trees die and decay, chemical changes that break them down return the matter in the trees to the environment as well, but much slower than that of a forest fire.

5. **When things change chemically, such as trees in a forest, what happens to the matter that made them up?(1 mark)**

The matter than made the old forest up is returned into the environment for other things to use.

Chemical Changes in the Non-Living Environment pg. 129

6. **A. What chemical change happens to metals, such as iron, when it gets wet?(1 mark)**

Iron combines with oxygen in the air and starts to rust...becoming iron oxide.

B. Provide 3 examples of products that will rust after sitting in rain and snow over seasons?

Old bicycles, metal gardening tools, old cars, etc...it damages these things over time making them useless.

7. **What happens to iron when it rusts?(2 marks)**

Iron when rusting combines with oxygen in the air becoming iron oxide or simply rust.

8. **What other metals combine with oxygen in the air, and become a different colour from their original forms?(2 marks)**

Other metals such as silver and copper combine with oxygen in the air...silver becomes tarnished, losing its shine becoming dull gray. Copper first tarnishes and loses its shine becoming green over time.

9. **What are examples of materials we use that industries make through chemical changes?(2 marks)**

Plastics such as vinyl and polyester are also products of chemical changes.

10. **In the mining industry, what separates valuable metals from rock?(1 mark)**

Chemical changes with special chemicals are used to separate valuable metals from rock...some chemicals are quite harmful to the environment, so they have to be used carefully and safely.

Science Works pg. 131

11. **What does R & D stand for?(1 mark)**

Research and Development.

12. **Scientists that work in R & D do what? (3 marks)**

In basic research scientists investigate the properties, structures, and composition of matter and how elements and compounds react to each other.

13. **In applied R & D, how do they use the knowledge from research?(2 marks)**

They use the knowledge from research to create new products and processes, or improve existing ones.

14. **Chemistry plays a big role in materials science, because it provides information about what?**

    Provides the properties, structure and composition of matter.

15. **A. How does materials science help in the medical field? Provide 2 examples.(2 marks)**

    To develop materials that can be used to repair and replace body parts.

    B. What sort of things have been developed and invented through materials science for the medical field?(4 marks)

Such as artificial joints, heart valves, ears and even cochlear implants that allow deaf people to hear.

16. **What is Teflon commonly used for?(1 mark)**

Teflon is used to coat non-stick frying pans.

17. **What is Dacron used for?(1 mark)**

Dacron is used in clothing.

18. **What is Gore-Tex used for?(1 mark)**

Gore-Tex is used for rain jackets and also used to make artificial blood vessels.

19. **What does space explorations need from material scientists?(3 marks)**

Special materials that can withstand temperature extremes, radiation, and other hazards of space.

20. **A. What are some improvements found in commonly used materials such as paints?(1 mark)**

Coatings and paints are improved to resist corrosion, which is a break down in the paint and whatever one is covering with the paint, such as metal.

    B. What materials is now in the paints to make this possible?(1 mark)

Paints that resist corrosion contain chromate.

    C. What are the dangers of this material/chemical and what can it pollute?(2 marks)

Chromate is a very poisonous chemical that can pollute water supplies.

21. **A. What is a new material that Materials Scientists are working on that is safer, but still prevents rusting/corrosion?(1 mark)**

Materials scientist are working on a new corrosion resistant paint with a "smart" pigment that absorbs corrosion-causing chemicals and releases a safer corrosion inhibitor.

    B. How does this new product work in reducing/stopping things from rusting?(2 marks)

These new products form a protective film over cracks in the paint that further reduces corrosion(break down) of what is covered.

22. **Regarding electronics, what has scientists done over the years and what has this allowed?(2 marks)**

    Materials scientists have found ways to dramatically reduce the size of integrated circuit ships, allowing for smaller and smaller electronic goods.

    Materials Scientists invent things that range from Non Stick bandages to nanotechnology.