(c)

Criteria	Dentist	At home
Cost	more expensive	less expensive
Strength of chemicals	stronger bleaching agents are used, resulting in shorter treatment time	weaker bleaching agents are used, requiring longer treatment times
Results	should give good results since the procedure is being performed by a professional	results can vary depending on the diligence of the user
Time required	less time, compared to at-home treatments	more time required: some home treatments can take up to 14 days.
Convenience	requires only a few treatments in the dentist's office; client must take time off work or school for treatment	can be tedious because of the number of treatments required; some treatments require the user to sleep with the whitening tray in the mouth can be done at home

8. Hair is made mainly of a protein called keratin. Proteins are long molecules made of smaller repeating units called amino acids. A particular amino acid called cysteine is responsible for the natural waviness of hair. Each cysteine unit along a protein chain has a –SH side-chain. In naturally wavy hair, cysteines on adjacent protein chains lose their hydrogen atoms and form sulfur-to-sulfur covalent bonds (disulfide crosslinks) between each other. Naturally wavy hair has far more disulfide cross-links than straight hair. In order to permanently reshape curly hair, these cross-links must be chemically broken. One commonly used reagent is ammonium thioglycolate. This chemical breaks the disulfide bond by reducing (in the redox sense) the sulfur atoms. Once the links between the protein chains are broken, the chains can move past each other freely, allowing the hair to be reshaped.

5.3 ACTIVITY: DEVELOPING AN ACTIVITY SERIES OF METALS

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Observations

(a) Copper and tin did not react at all with the acid. The rate of production of gas bubbles was used to order the remaining metals: iron (fewest bubbles), zinc (a moderate number of bubbles), and magnesium (most bubbles).

Analysis

(b) The metals listed in order from least to most reactive are: copper and tin, iron, zinc, and magnesium.

(c) $Fe_{(s)} + 2\ HCl_{(aq)} \rightarrow FeCl_{2(aq)} + H_{2(g)}$
$Zn_{(s)} + 2\ HCl_{(aq)} \rightarrow ZnCl_{2(aq)} + H_{2(g)}$
$Mg_{(s)} + 2\ HCl_{(aq)} \rightarrow MgCl_{2(aq)} + H_{2(g)}$

Evaluation

(d) Generally, it was not difficult to determine the order of reactivity. Most of the metals reacted at different rates with the acid. The only exceptions to this generalization were tin and copper. Neither of these metals appeared to react with the acid.

To improve the Procedure, more uniform-sized pieces of metals could be used. Furthermore, a different, or more concentrated, acid could be used to determine if there is a difference in reactivity between tin and copper.

Synthesis

(e) Copper piping is now preferred because it is much less reactive than iron.