PRACTICE 3

A snowflake originates from countless water molecules that initially come together in small groups as a result of a weak attractive force between oxygen and hydrogen atoms. The same forces subsequently organize the groups into a frozen molecular crystal, a perfectly organized lattice of molecules. Finally, several molecular crystals join to form a snowflake. Scientists have realized for some time that the forces that assemble molecules into natural crystals can be utilized to produce a variety of important materials. They have determined the structure of more than 90,000 different molecular crystals, the most common examples of which are aspirin and mothballs.

In recent years, researchers have studies how molecules organize themselves to form crystals in the hope of better understanding what types of molecules and what conditions will produce molecular crystals with unusual and useful properties. Scientists are aware that the material properties of a crystal depend in large part on the organization of the molecules in the crystal, yet they know little about the factors controlling the assembly of such crystals.

Synthesizing a molecular crystal is similar to designing a building. Before construction can begin, the architect must specify the shapes and sizes of the girders and the number and placement of the rivets. Similarly, to produce new molecular crystals, chemists must choose molecules of the appropriate sizes and shapes and select the molecular forces that will hold the crystals together. A chemist can normally find many molecules of various shapes and sizes, but the challenge is to find ones that assemble in a predictable manner.

1. According to the passage, a snowflake is formed by
   A. the attractive force between oxygen and hydrogen
   B. molecular crystals with new and useful properties
   C. the synthesizing of molecular crystals
   D. the joining of several molecular crystals
2. According to the passage, water molecules join together as a result of
   A. an attraction between oxygen and hydrogen atoms
   B. the organization of the molecules in a crystal
   C. a strong force that assembles crystal atoms
   D. the unusual and useful properties of molecular crystals
3. By making use of forces that assemble molecules into natural crystals, scientists can
   A. find molecules of various shapes and sizes
   B. determine the structure of different molecular crystals
   C. organize molecules into a perfect lattice
   D. create new and useful materials

LIVEWORKSHEETS

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4. According to the passage, what reason do researchers haves for studying how molecules organize themselves to form crystals?
   A. To assemble molecules into natural crystals
   B. To learn how to synthesize molecular crystals
   C. To make aspirin and mothballs
   D. To change the material properties of a crystal
5. According to the passage, what do scientists still need to learn about the organization of molecules?
   A. What determines the material property of a crystal
   B. The molecular forces that hold molecules together
   C. The conditions that produce molecular crystals
   D. The factors controlling the way crystals are assembled
6. To produce new molecular crystals, chemists must choose all of the following EXCEPT
   A. molecules of the right size
   B. molecules of the appropriate shape
   C. the right molecular organization
   D. the proper molecular forces
7. According to the passage, the task of synthesizing a molecular crystal can be compared to
   A. designing a building
   B. building a house
   C. making materials
   D. constructing a lattice

LIVEWORKSHEETS

Directions Read the following passage and select the best answer.

Cattle ranchers throughout the American West owe much of their traditional culture to the Spaniards, who first introduced cattle to the New World and first developed cattle ranching in the Western Hemisphere. The vaquero, or Mexican cowboy, was born of the necessity to look after the cattle that grazed open ranges. He was not a romantic figure but a poor laborer on horseback, who wore what clothes he had on his back and eventually found certain types of dress more appropriate than others, a blend of Spanish dress and that worn by the natives.

Working in the hot sun brought the adoption of Spanish sombreros and bandannas. Because it was waterproof and wind resistant, leather was eventually the chosen material for jackets and leggings, or *botas*, the predecessor to chaps. A large pair of iron spurs were the badge of the vaquero, and a *lazo* (lasso) – a rope with slipknot – was the vaquero's primary working tool, especially on the trail drives that became commonplace by the sixteenth century. Saddle makers added a large saddle horn to the Spanish saddle to accommodate the lasso during the roping technique, in which the vaquero tossed the rope around the cow and then quickly tied and wrapped the end of the rope around the horn. Later, American cowboys north of the Rio Grande learned this technique.

As the size of cattle herds grew and rustlers became a problem, the Spanish cattlemen asked the authorities to put a stop to them. The Spanish crown responded with the establishment of the *Mesta* to enact ordinances to benefit and increase the herds and to remedy and punish crimes. The Mesta served the special interests of cattle raisers and preceded the American West's cattlemen's associations. Moreover, the Mesta's ordinances were similar to modern American laws relating to ranching, and today's laws, in fact, are essentially variations and adaptations of the regulations first established in the New World more than four centuries ago.

1. According to the passage, which of the following best describes the vaquero?

- o A. A romantic figure
- o B. A wealthy cattle rancher
- o C. A poor working man
- o D. A Spanish explorer

2. According to the passage, who introduced cattle to the Western Hemisphere?

- o A. The American cowboys
- o B. The Spaniards
- o C. The Mexicans
- o D. The native Americans

3. According to the passage, what kind of clothing was worn by the Mexican cowboy?

- o A. A combination of formal and informal dress
- o B. A variation on the style worn by American cattlemen
- o C. The same type of garments that cowboys wore in their villages
- o D. A blend of native and Spanish dress

4. According to the passage, what element of nature inspired the vaqueros to wear hats and bandannas?

- o A. Sun
- o B. Wind
- o C. Rain
- o D. Cold

5. According to the passage, leather was chosen as the material for a cowboy's jacket and leggings because

- o A. it was warm
- o B. it was waterproof
- o C. it made good padding for horseback riding
- o D. it was good protection from the sun

6. According to the passage, which of the following is NOT mentioned as being among a vaqueros' possessions during trail drives?

- o A. A pair of spurs
- o B. A lass
- o C. A pair of botas
- o D. A pair of leather gloves

7. According to the passage, why did saddle makers eventually put a horn on the Spanish saddle?

- o A. To make a place on which to tie the lasso
- o B. So the cowboy would have something to hold onto
- o C. To add something to hang things on
- o D. To make it easier to get on and off the horse

LIVEWORKSHEETS