The Weather Quiz

Correct answers are given in **bold**. After each question there is a short explanation, you can use this for the review after the quiz. Use as many questions as time/attention of class allows. You can add your own questions if you like!

Question 1 Scientists have determined that if we listen very carefully to the sound this creature makes, we can determine the current temperature quite precisely. This creature is a: a) wooly worm **b) cricket** c) bumble bee d) penguin

The cricket, its activity level corresponds closely to air temperature. The general rule is to count the number of chirps produced by a cricket in a 15 second interval and add this number to 67F for an accurate estimate of the air temperature. Of course, not all regions have crickets and usually these critters are best heard in the quiet of the night. It is important to remember that crickets are at ground level and there can be substantial temperature differences between the ground and six feet above the surface, where official observations are taken!

Question 2 As roofs of houses become steeper, generally the climate becomes warmer. Is this true or false? **a) false** b) true

While there are exceptions to this rule, there is no doubt that the traditional 'A' frame house, typical in Scandinavia, has been used to keep snow from accumulating on roofs in these frigid climes. The thick walled, flat roof houses of Mexico and North Africa, which are some of the hottest regions in the world, typify the architecture of a torrid climate. So, in general, the steeper the roof, the colder the climate.

Question 3 Which of the following precipitation types is in a liquid form as it reaches the ground: a) sleet **b) freezing rain** c) snow d) hail

All these forms of precipitation have liquid water in their formation, however, only freezing rain is still a liquid when reaching the ground. **Freezing rain:** rain droplets fall into a shallow layer of cold air near the surface and freeze upon contact with the ground. **Snow:** frozen precipitation in the form of six-sided ice crystals form within the cloud. Snow requires below freezing temperatures in all or most of the atmosphere, from the surface to cloud level. **Sleet:** frozen precipitation falls as ice pellets. Snowflakes melt into raindrops as they pass through a thin layer of warmer air. Raindrops then refreeze into ice before hitting the ground. Freezing rain occurs when raindrops do not refreeze until they hit the ground.

Question 4 The amount of water in the world that we can use as drinking water is a) 65% b) 10% c) 2% **d) 0,02%**

97% of the worlds water is salt water, of the remaining 3%; 99.4 % of the fresh water is in polar ice caps or too polluted to drink. That leaves us with 0,018% drinkable water!

Question 5 What color of the light spectrum is emitted from a deep hole in the snow? a) red **b) blue** c) orange d) violet

Blue. The light coming from a deep hole (18" or more) in the snow will have a distinct blue hue due to the same light scattering process that causes the sky to be blue. This selective scattering of is called Rayleigh scattering. Ice cave explorers have seen this very often!

Question 6 Erosion is caused by a) human activities such as agriculture and deforestation b) wind and water **c) both of the above** d) none of the above

Question 7 The greenhouse effect causes the surface of the earth to be warmer than it would have been in the absence of an atmosphere, because a) the atmosphere behaves like a greenhouse. b) the atmosphere works like a blanket. c) the greenhouse gases trap heat. **d) the surface is warmed by radiation from both the air and the sun.**

Suffice to say here, the basic explanation is as simple and understandable as that of a person being warmer if exposed to two, rather than one, sources of energy. In this case the two sources are the sun and the earth's atmosphere, which, surprisingly, sends more radiation to the surface of the earth than does the sun itself.

Question 8 The basic cause of the greenhouse effect is a) the burning of fossil fuels. b) forest clearing in the Amazon. c) both of the above **d) none of the above**

If you got this one wrong, I have succeeded in trapping you in the popular confusion between the greenhouse effect and global warming. It may be that global warming is attributable to things such as the burning of fossil fuels and forest clearing, but the greenhouse effect, which the earth has enjoyed for millions of years, is not. The greenhouse effect is the name applied to the effect which causes the surface of the earth to be warmer than it would have been in the absence of an atmosphere. Global warming is the name applied to the change in magnitude, or the augmentation, of the greenhouse effect which is expected to further increase the average temperature of the earth's surface.

Question 9 The blue of the sky is caused when sunlight is scattered primarily by a) dust **b) nitrogen and oxygen.** c) water vapor d) ozone

The blue of the sky is caused because light with shorter wavelengths are preferentially scattered by the molecules which make up our atmosphere: mainly nitrogen and oxygen. Some people hold the erroneous belief that scattering from water molecules is the primary cause of the blue sky. While it is true that the water vapor molecule does preferentially scatter blue, there are two reasons that it is of vanishing importance. First, there are relatively so few water molecules that their contribution is very small, indeed. Second, the water does not do as good a job of the scattering as does the nitrogen and oxygen. Thus, if the, admittedly few, water molecules were replaced by the other major gasses, the sky would be a brighter blue.

Question 10 On the (primary) rainbow, red is seen a) on the inside of the bow **b) on the outside of the bow** c) in the middle (between the other colors) of the bow d) it varies from storm to storm.

Question 11 Can water exist in all its forms (solid, liquid and gas) within clouds? **a) Yes** b) No

Yes, depending on temperatures in and around the cloud.

Question 12 Clouds can form in the atmosphere because cold air cannot hold as much moisture (water vapor) as warm air can hold. **a) false** b) true

Air does not have a holding capacity for water vapor which varies with temperature (or anything else).

Question 13 Washing your car is a necessity during the winter to prevent rust forming from salt accumulations on the roads. Which of the following materials is also used to treat slick highways in some countries? a) peanuts **b) corn** c) potatoes d) bananas

Arguably, salt or cinders are the most effective means of treating slick highways, but the corrosive and abrasive effects on cars and pavements made the search for other material desirable. In parts of the northern states, a corn compound has been successfully used to add traction to slick roads.

http://www.ems.psu.edu/~fraser/Quizzes/Met1Quiz/quiz-solution.cgi