July 1, 2014

Environmental Quiz - Answers

1. The population of the world in 1950 was about 2.6 billion. The world population is currently about:

   a. 3.4 billion
   b. 7.2 billion
   c. 9.3 billion
   d. 11.5 billion

   As of July 1, 2014 the world population was estimated to be 7.2 billion (b).

2. The population of the world is currently increasing at a rate of about 8,900 people per _____.

   a. month
   b. week
   c. day
   d. hour

   The world population is currently increasing at an estimated 8,880 per hour (d).

3. The estimated world population in the year 2050 is about:

   a. 3.4 billion
   b. 6.8 billion
   c. 9.4 billion
   d. 11.5 billion

   The medium projection of world population for the year 2050 by the International Programs Center of the U.S. Census Bureau is 9.4 billion (c). The Population Reference Bureau estimate for the year 2050 is 9.6 billion.

4. The population of the United States in 1960 (54 years ago) was 181 million. On July 1, 2014 the U.S. population was estimated to be _____.

   a. 220 million
   b. 319 million
   c. 420 million
   d. 511 million

   The population of the United States July 1, 2014 was about 319 million (b).

5. The medium (most likely) estimate of the U.S. population in the year 2060 is:

   a. 220 million
   b. 319 million
   c. 420 million
   d. 511 million

   The projected population of the U.S. in 2060 is 420 million (c), an increase of just over 100 million from mid-year 2014. The population of the U.S. in 1914 was about 99 million.

6. China's current population (mid-year 2014) is 1.36 billion. Assuming a continuation of the current U.S. population growth (0.72% annually), how many years would it take for the U.S. population to become equal to the current population of China?

   a. 50
   b. 100
   c. 200
   d. 400
   e. 1,000

If the U.S. population were to continue growing at a rate of 0.72% annually the U.S. population would surpass China's current population level in 200 years, or by 2214. At that point the U.S. population would be 4 times larger than it is today.

If the U.S. population were to continue its current rate of growth (a rate of growth that many people would say is negligible) for the next 400 years, the population would increase to over 5.1 billion (the current world population is 7.2 billion). Continuation of the current rate of growth for the next 1,000 years would result in a U.S. population of over 326 billion!

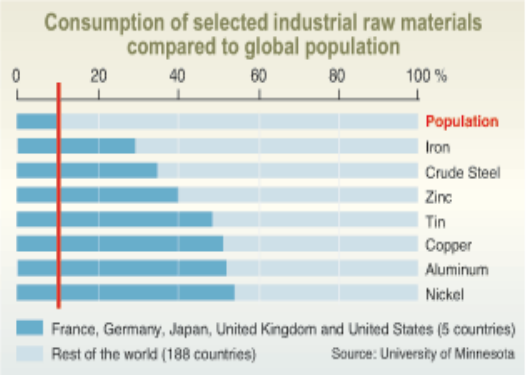
China's population is also growing, currently at an annual rate of 0.48% annually. If this rate of growth were to continue, China's population in the year 2100 would approximate 2 billion (as compared to 1.36 billion in 2014).

___ 7. True (T) or False (F). Consumption of mineral resources globally has increased sharply over the past 30 years.

True. Rapidly rising consumption in China and other developing countries has sharply increased demand for mineral, timber, and fuel resources, with consumption of minerals rising globally more rapidly than the rate of population growth.

___ 8. True (T) or False (F). The world's most economically developed countries consume a far larger share of the world's industrial raw materials than their collective share of world population.

True. As an example of this, a 2004 study commissioned by the United Nations Environment Program (UNEP) found that just five countries – the United States, UK, France, Germany, and Japan – that together accounted for 10.2% of the world population, consumed 28, 33, 40, 44, 45, 45, and 47%, respectively, of the world's iron, crude steel, zinc, tin, copper, aluminum, and nickel. Cement and wood consumption on a per capita basis was also significantly greater.



Source: UNEP. 2004. Vital Waste Graphics. GRID Arendal (http://www.grida.no/publications/vg/waste/page/2857.aspx)

Recently, the world's second most populous country – China – until recently classed as economically underdeveloped, has begun to consume vast quantities of raw materials. Addition of China to the list above would yield truly stunning consumption numbers.

___ 9. True (T) or False (F). The United States is a net exporter of most raw materials used by industry today.

False. The U.S. is today a net <u>importer</u> of most categories of industrial raw materials, including metals, Portland and masonry cement, petroleum (the basis for plastics), and wood and wood products.

The 2013 U.S. import situation is outlined below:

Net U.S. Imports of Selected Materials as a Percent of Apparent Consumption—2013, and by Major Foreign Sources[a/b/c/d/]

Material	% Imported	Principal Foreign Sources (2009-2012)
Niobium (Columbium)	100	Brazil, Canada
Manganese	100	South Africa, Gabon, Australia, Georgia
Graphite	100	China, Mexico, Canada, Brazil
Strontium (Celestite)	100	Mexico, Germany, China
Arsenic (trioxide)	100	Morocco, China, Belgium
Bauxite/Alumina	100	Jamaica, Brazil, Guinea, Australia
Fluorspar	100	Mexico, China, S. Africa, Mongolia
Yttrium	100	China, Japan, Austria, France
Indium	100	China, Canada, Japan, Belgium
Thallium	100	Germany, Russia
Thorium	100	India, France
Asbestos	100	Canada, Brazil
Quartz crystal (industrial)	100	China, Japan, Russia
Rare earth metals	100	China, France, Estonia, Japan
Rubidium	100	Canada
Cesium	100	Canada
Tantalum	100	Mexico, Germany, China
Mica (natural)	100	China, Brazil, Belgium, India
Scandium	100	China
Vanadium	100	Canada, Czech Rep., S. Korea, Austria
Gallium	99	Germany, UK, China, Canada
Gemstones	99	Israel, India, Belgium, S. Africa
Bismuth	91	China, Belgium, UK
Iodine	91	Chile, Japan
Diamond (dust, grit, powder)	88	China, Ireland, S. Korea, Romania
Antimony	85	China, Mexico, Belgium, Bolivia
Germanium	85	China, Belgium, Russia, Germany
Potash	82	Canada, Russia, Israel, Chile
Lithium	80+	Argentina, Chile, China
Rhenium	80	Chile, Poland, Germany
Stone (dimension)	80	China, Brazil, Italy, Turkey
Platinum	79	Germany, South Africa, UK, Canada

Titanium mineral concentrates	79	South Africa, Australia, Canada, Mozambique
Material	**% Imported**	**Principal Foreign Sources (2009-2012)**
Cobalt	76	China, Norway, Russia, Finland
Garnet (industrial)	76	Australia, India, China
Barium (Barite)	75	China, India, Morocco
Zinc	74	Canada, Mexico, Peru
Tin	73	Peru, Bolivia, Indonesia, Malaysia
Silicon carbide (crude)	72	China, S. Africa, Netherlands, Romania
Peat	66	Canada
Palladium	60	Russia, S. Africa, UK, Norway
Silver	58	Mexico, Canada, Poland, Peru
Chromium	50	South Africa, Kazakhstan, Russia, Mexico
Nickel	48	Canada, Russia, Australia, Norway
Magnesium compounds	47	China, Brazil, Canada, Australia
Titanium (sponge)	45	Japan, Kazakhstan, China
Tungsten	41	China, Bolivia, Germany, Portugal
Silicon	40	Russia, Brazil, Canada, S. Africa
Copper	36	Chile, Canada, Peru, Mexico
Mica, scrap/flake (natural)	36	Canada, China, India, Finland
Nitrogen (fixed), Ammonia	36	Trinidad/Tobago, Canada, Russia, Ukraine
Petroleum (crude & refined)	35	Canada, Saudi Arabia, Mexico, Venezuela, Russia, Colombia, Iraq, Kuwait
Vermiculite	30	S. Africa, China, Brazil
Aluminum	28	Canada, Russia, China, Mexico
Lead	25	Canada, Mexico
Magnesium metal	25	Israel, Canada, China,
Softwood lumber	24	Canada, EU, Chile, New Zealand
Salt	22	Canada, Chile, Mexico, The Bahamas
Perlite	20	Greece
Sulfur	18	Canada, Mexico, Venezuela
Iron and Steel	13	Canada, Mexico, S. Korea, Brazil
Talc	12	China, Canada, Pakistan, Japan
Beryllium	11	Russia, Kazakhstan, China, Japan
Gypsum	9	Canada, Mexico, Spain
Iron and steel slag	8	Canada, Japan, Italy, S. Africa
Portland and masonry cement	7	Canada, S. Korea, China, Mexico
Pumice	5	Greece, Iceland, Mexico, Montserrat

[a/] Principal foreign sources arranged by most important supplier to the left, next most important supplier to the right of that, and so on.

[b/] Minerals data from U.S. Geological Survey. 2014. Mineral Commodity Summaries – 2014.

[c/] Petroleum data from U.S. Department of Energy, Energy Information Administration, 2014 (July).

[d/] Data for wood, wood products, and wood pulp products are from RISI, Random Lengths, 2013, 2014.

___10. True (T) or False (F). The raw material that is used in the greatest quantity in the United States today, and which accounts for almost one-third (by weight) of the total raw materials used annually, is steel.

False. More wood is consumed annually in the United States, on both a volume and weight basis, than <u>all</u> metals and <u>all</u> types of plastics combined.

___11. True (T) or False (F). Energy consumption per capita (per person) in the United States is twice that of the European Union.

This statement is True. Per capita consumption of energy is also significantly higher than in several nations often listed as offering a higher or comparable quality of life as in the United States.

Per Capita Energy Consumption in the U.S.
and the E.U. Countries - 2008

Country	Per Capita Energy Consumption (kilograms of oil equivalent per person)
United States	7885.9
Finland	6555.0
Belgium	5891.7
Sweden	5780.3
Netherlands	5048.8
Czech Republic	4418.6
France	4396.8
Germany	4187.0
Austria	4134.7
UK	3894.6
Estonia	3786.0
Ireland	3656.0
Slovenia	3655.0
Denmark	3634.3
Slovakia	3502.8
Cypress	3367.0
Spain	3339.6
Italy	3169.1
Greece	2794.0
Hungary	2757.4
Bulgaria	2592.0
Portugal	2574.1
Lithuania	2515.0
Poland	2429.0
Malta	2349.0
Latvia	2050.0
Romania	1772.0
Weighted E.U. Average	3773.4

* Values are not provided for Cypress, Malta, or Luxembourg as data for these countries was not included in source documents.

Source: Ewing et al. 2008. The Ecological Footprint Atlas 2008.
(http://www.footprintnetwork.org/images/uploads/Ecological_Footprint_Atlas_2009.pdf)

12. China's emissions of carbon dioxide in 2012 were greater than those of any other nation, and 90% greater than those of the United States. In that same year, China's per capita emissions of carbon dioxide were:

a. 35% greater than the U.S.
b. 15% greater than the U.S.
c. About the same as in the U.S.
d. Less than one-half those of the U.S.
e. Less than one-third those of the U.S.

Carbon dioxide emissions in 2012 for China, the European Union, and the United States were estimated at 9.9, 7.4, and 5.2 billion metric tons, respectively. China's per capita CO_2 emissions in that same year were 7.1 metric tons while emissions for the E.U. were 7.4 metric tons and those of the U.S. 16.4 metric tons. Consequently, China's per capita CO_2 emissions were less than one-half of those of the U.S. in 2012 (d)

___13. True (T) or False (F). Globally, the area of forests is declining, mostly due to human activity.

True. About 12-13 million acres of forest are converted to non-forest uses annually, primarily in the tropical regions where population growth is greatest. In some areas of the world, such as the United States and in Europe, forest cover is increasing.

14. The number one cause of tropical deforestation worldwide is:

a. commercial logging.
b. wildfire.
c. clearing of lands for agricultural use.
d. gathering of firewood.
e. building of roads and cities.

Clearing of lands for agricultural use (c) is by far the leading cause of tropical deforestation worldwide.

15. The area covered by forests in the United States today is approximately _____ of the forested area that existed in 1600.

a. 73 percent
b. 50 percent
c. 33 percent
d. 17 percent

There are 766 million acres of forests in the U.S. today, about 73% of the 1.044 billion acres of forests estimated to have covered what is now the United States in the year 1600.

16. True (T) or False (F). The geographic area that encompasses the United States today has greater forest coverage than the same geographic area did in 1920.
This statement is true. In 1920 there were an estimated 732 million acres of forest covering the area that now comprises the United States. Today there are 766 million acres of forest. The current forested area is greater and within one percent of the forest area of approximately 755 to 760 million acres that existed in 1907.

17. Which of the following statements most accurately describes United States forests:

a. forest harvest exceeds net growth by 20 percent.
b. forest harvest exceeds net growth by 5 percent.
c. forest harvest roughly equals net growth.
d. net forest growth exceeds harvest by 29 percent.
e. net forest growth exceeds harvest by more than 100 percent.

Net growth of forests in the United States substantially exceeds harvest. In the most recent assessment of U.S. forest land (USDA-Forest Service, RPA Assessment Draft 2012) net growth was estimated to exceed removals by 105% (e) – i.e. net growth is more than double net removals. These figures do not include growth within areas designated as parks, reserves, or wilderness areas. If growing on all lands were counted the net growth figure would likely be higher than that indicated above.

___18. True (T) or False (F). Growing trees capture carbon dioxide from the air and release oxygen.

True. In the process of photosynthesis, water from the ground is combined in the leaves with carbon dioxide from the air to form glucose and other sugars, and oxygen that is released to the atmosphere. The sugars are used to form wood.

___19. True (T) or False (F). As originally established, it was never intended that the National Forests of the United States would be periodically harvested to obtain timber that would be used in meeting the nation's need for wood.

False. One of the specifically stated reasons for establishment of the National Forests was to ensure a continuous supply of wood for U.S. citizens.

___20. True (T) or False (F). At current rates of deforestation, 40 percent of current forests in the United States will be lost by 2050.

False. Forests actually increased in area coverage in the United States between 1985 and 2012. However, a 2012 assessment of U.S. forests predicted that 2-5% of the current area of forest land in the U.S. may be converted to non-forest uses by 2060.

___21. True (T) or False (F). In the U.S., more species of plants and animals have been driven to extinction by logging activity than any other activity of mankind.

False. There is no documented evidence of even one plant or animal species having been driven to extinction by logging activity in the United States.

___22. True (T) or False (F). Under current United States law, forest harvesting is allowed within federally designated wilderness areas.

False. Forest harvesting is not allowed in federally designated wilderness areas.

___23. True (T) or False (F). Considering the total annual harvest of forests in the United States and the total consumption of wood and wood fiber products within our country, the U.S. is a net importer of wood and wood products.

True. The United States is a net importer of about a quarter of the softwood lumber consumed annually within the country. When all products are considered, including exports of logs, and chips, the U.S. is a net importer of about 9% of the total wood and wood fiber consumed within its borders. Prior to the recent recession, U.S. net imports of wood were 15-20% of domestic consumption. The United States has been a net importer of wood for over 45 years.

24. As a percentage of all the paper consumed in the United States in 2013, _____ was recovered for reuse.
    a. 15 percent
    b. 38 percent
    c. 63 percent
    d. 81 percent

In 2013, 63.5 percent (c) of all paper used in the United States was collected for reuse.

25. Recovered paper provided _____ of the fiber used in manufacturing paper in the United States in 2013.

    a. 15 percent
    b. 38 percent
    c. 63 percent
    d. 81 percent

    Recovered paper provided about 38 percent of the U.S. paper industry's fiber in 2013 (b). The difference between the wastepaper collection rate (63 percent) and the recovered paper use rate (38 percent) is largely traceable to the fact that the United States is the world's largest exporter of waste paper. Virtually all exported wastepaper is also used in making paper and paperboard.

___26. True (T) or False (F). Reduced paper consumption is likely to result in a greater extent of forest cover in the United States.

This statement is very likely False. The vast majority of wood used for papermaking in the United States comes from privately-owned forest land, two-thirds of which is in the Southeastern part of the country. Should consumption of paper, and thus pulpwood, decline markedly many forest owners are likely to convert their forested lands to agriculture or some other non-forest use.

___27. True (T) or False (F). The manufacture of wood construction materials generally results in far lower environmental impacts than when similar construction materials are manufactured from steel, aluminum, plastic, or concrete.

True. Well-documented environmental life cycle inventories of various raw materials production processes conducted by research organizations around the world show that wood products can be manufactured with relatively little environmental impact compared to potential alternatives. Even when wood products are compared to cement-based and recycled metal products, energy consumption and associated environmental impacts associated with wood-based materials manufacture are generally substantially lower.

Question for Thought:
When someone says "In the United States, we have less than 4% of our original forests left," what are they really saying?

For more information on these and other topics go to:

Dovetail Partners (www.dovetailinc.org)

U.S. Census Bureau, Population Division (http://www.census.gov/main/www/popclock.html)

Population Reference Bureau (http://www.prb.org/Publications/Datasheets/2013/2013-world-population-data-sheet.aspx)

U.S. Geological Survey, Minerals Division (http://minerals.usgs.gov/minerals/)

U.S.G.S. Minerals Commodity Summary, 2014 (http://minerals.usgs.gov/minerals/pubs/mcs/2014/mcs2014.pdf)

Matos, G. 2009. Use of Minerals and Materials in the United States from 1900 through 2006. U.S. Geological Survey. (http://pubs.usgs.gov/fs/2009/3008/pdf/FS2009_3008_v1_1.pdf)

Rogich, D. and Matos. G. 2008. Global Flows of Minerals and Materials. U.S. Geological Survey. (http://pubs.usgs.gov/of/2008/1355/pdf/ofr2008-1355.pdf)

Forest Information Network (http://www.forestinfo.org/)

Forest Resources of the United States, 2007 (U.S. Forest Service) (http://www.nrs.fs.fed.us/pubs/gtr/gtr_wo78.pdf)

Future of America's Forests and Rangelands: Forest Service 2010 Resources Planning Act Assessment (2012) (http://www.fs.fed.us/research/publications/gtr/gtr_wo87.pdf)

State of the World's Forests – 2012 (http://www.fao.org/docrep/016/i3010e/i3010e.pdf)

American Forest and Paper Association, paper recycling statistics (http://paperrecycles.org/stat_pages/recovery_rate.html)

Metafore -The Fiber Cycle (http://www.twosides.info/Content/rsPDF_111.pdf)