Sam Cota Worksheet 2.2: My Family Testing Advantages in re: Shape

Here you will find test questions that Sam is more likely to know something about because he is are part of a family that knows certain things well. For instance, Sam heard many stories when his dad got home from work. Sam's dad worked with him on his homework like math and science and history. Sam's father taught Sam how to build things beginning with the basic skills like measuring things right and then more advanced skills (like in the tests from 3rd grade to high school). Sam visited him at work. Sam worked for him when he was older, starting as a laborer and learning from the ground up. Sam and his father and sisters built their house in Maine.

1) What is a short story from Worksheet One?

My uncle and father built their own houses next door to each other. My uncle was the chief carpenter from Rutgers University, running its wood shop for 30 years. When he retired they had to close down the shop. His own custom work can be seen in places like his home, our home, on the old Rutgers yacht, and in the cathedral. Custom woodwork means that you can form wood into many shapes like spiral staircases, yacht decks, and altars.

2) Pick one fact from this story.

Custom woodwork means that you can form wood into many shapes like spiral staircases, yacht decks, and altars.

3) Choose a single word or term that is important to the story.

Shape

4) Go to a test-question bank[1] site [2] and look it up. Try answering any questions that you find.[3]

Keep track of your studies. Do so in any way you wish, but do it. You'll be glad.

Shape = 157 questions.

A lot were the same as for building and measurement, but a lot branched out into life sciences, geography, biology, chemistry, evolution and biodiversity, and from physics...).

I found out that my knowing shapes in building and measuring seems to translate more than I thought to some of these things that I didn't get before were interconnected.

Paste in the questions, below, or provide links so you can can get back to them.

5) Interconnected terms will come up as you search. Add them to your (re)collection.[4]

6) Keep going until you are done, or want to change it up, or can't find anything else. Then, go to another Worksheet 2. Do not rinse. Repeat.

See my Worksheet 2.3 Immigration, Geography

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[1] Go to "If You Want to Go Straight to the Tests" in "By Way of Introduction"

[2] The questions below are from a Massachusetts (MCAS) Test Bank that is a few years old (http://www.doe.mass.edu/mcas/search/). When these were used, Wheelock College had permission from Superintendant David Driscoll as secured to Dean Donna McKibbens for use in any teacher testing preparation. This arrangement is now likely moot, and copyright is, as it was then, to Now many of these are collected on the MCAS Resource Center, Any of these questions are illustrative of what the search term "building" will bring up on multiple tests across the land.

[3] Unlike 'sample test" items, some or all "released items" are available after students have taken that season's tests, making this a goldmine for those preparing for them. All sites have answers, best found on the searchable sites. In this worksheet are most of the MCAS released items over the whole course of this particular timeframe. They were searched in terms of seasons, grade-levels, and topics. (Questions below are usually given in rough relationship to grade level, but don't get hung-up there as all age-levels are useful as you build or rebuild your knowledge.) On the website you can see the answers (see "show answer" below for what to look for. You also have "see student work" examples at different levels of ability Click in "View Student Work" to see some of those.

[4] Some words yield a little, some a lot. Play around with versions of the word. If you don't find any questions to words you choose, you can experiment with any other stories that are familiar to you from your own life and times. As you get more familiar with the databanks, you will start to see the types of words that yield lots of questions. Enjoy the hunt for more things you know, never knew you wanted to know, need to know, and now can find out.

Questions on Shape

2016 February Biology, Biology - High School
Question 1: Multiple-Choice

Reporting Category: Biochemistry and Cell Biology
Standard: 1.1 - Recognize that biological organisms are composed primarily of very few elements. The six most common are C, H, N, O, P, and S.

Structures called microtubules are found in the cytoplasm of most eukaryotic cells. Microtubules are made up of proteins and help shape and support the cell.
Which of the following elements are most abundant in microtubules?

A. lead and zinc

B. nitrogen and carbon

C. sodium and chlorine

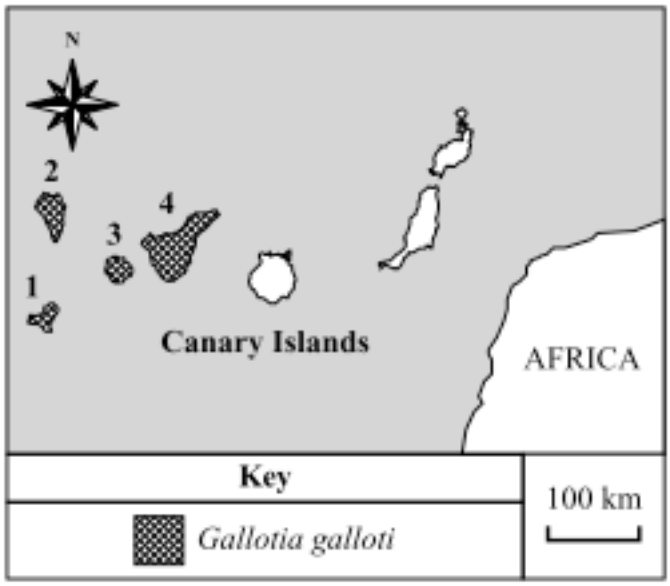
D. iodine and magnesium

State Average = 92%

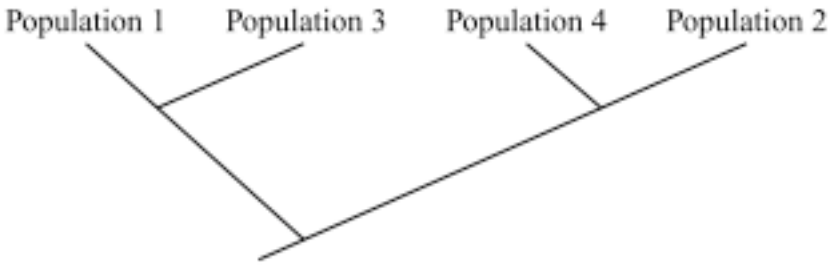
2016 Spring Release, Biology - High School
Question 23: Open-Response

Reporting Category: Evolution and Biodiversity
Standard: 5.2 - Describe species as reproductively distinct groups of organisms. Recognize that species are further classified into a hierarchical taxonomic system (kingdom, phylum, class, order, family, genus, species) based on morphological, behavioral, and molecular similarities. Describe the role that geographic isolation can play in speciation.

The lizard Gallotia galloti lives on four of the Canary Islands, as shown on the map below. Each island has its own population of lizards, numbered 1 to 4 on the map.



Scientists have sequenced and compared DNA from lizards in each population. The cladogram below shows one hypothesis regarding how the lizard populations are related.



The DNA sequences of individuals from population 3 are probably most similar to the DNA sequences of individuals from which other population (1, 2, or 4)? Explain your answer.

Scientists also sometimes analyze behaviors when investigating relatedness among organisms. Besides DNA and behavior, identify one type of evidence scientists could have used to investigate relatedness among the four lizard populations.

Scientists predict that, much like the finches on the Galápagos Islands, the four populations of Gallotia galloti will become separate species over time.
Describe the roles of both the environment and geographic isolation in the lizards' becoming different species.

View Student Work

2016 February Biology, Biology - High School
Question 29: Multiple-Choice

Reporting Category: Evolution and Biodiversity
Standard: 5.1 - Explain how evolution is demonstrated by evidence from the fossil record, comparative anatomy, genetics, molecular biology, and examples of natural selection.

The pictures below show the shells of some species of land snails found on a Pacific island. Each species was found on a different hill on the island.

$5t + 15 \leq 140$

$15t + 5 \geq 140$

$15t + 5 \leq 140$

Based on the snails' shell shapes, scientists made hypotheses about the evolutionary relationships among the snails. Which of the following would be the best characteristic to compare in order to test these hypotheses?

A. the size of the snails

B. the diet of the snails

C. the DNA of the snails

D. the average age of the snails

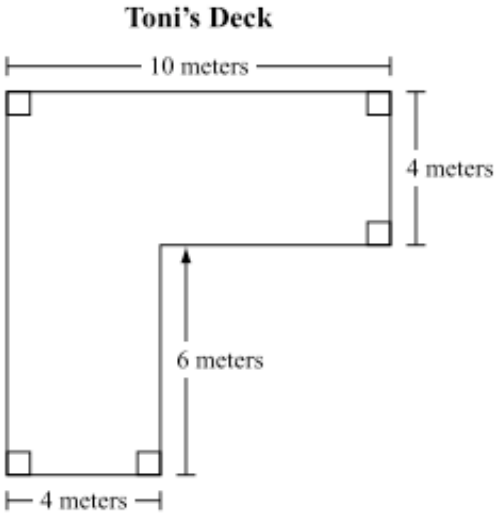
the average age of the snails

State Average = 84%

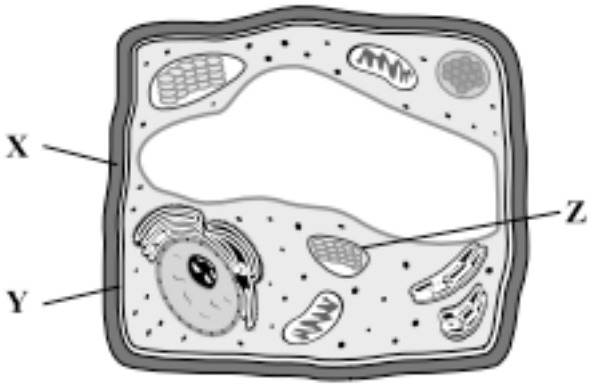
Sam Cota Worksheet 2.2: My Family Testing Advantages in re: Shape

2016 Spring Release, Biology - High School
Question 32: Open-Response

Reporting Category: Biochemistry and Cell Biology
Standard: 2.1 - Relate cell parts/organelles (plasma membrane, nuclear envelope, nucleus, nucleolus, cytoplasm, mitochondrion, endoplasmic reticulum, Golgi apparatus, lysosome, ribosome, vacuole, cell wall, chloroplast, cytoskeleton, centriole, cilium, flagellum, pseudopod) to their functions. Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, facilitated diffusion, and active transport).



The diagram below represents a plant cell with three structures labeled X, Y, and Z.



Plant cells and fungal cells have many of the same types of organelles. Structures X and Y are found in both plant cells and fungal cells. Structure Z is found in plant cells, but not in fungal cells.

1. Identify structure Y and describe its main function.

2. Identify structure Z and explain how plants use this structure to survive.

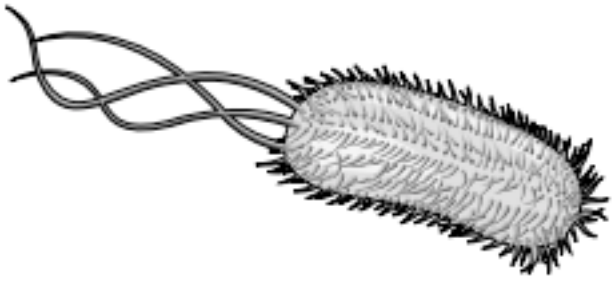
3. Explain how fungi can survive without structure Z.

View Student Work

2016 February Biology, Biology - High School
Question 4: Multiple-Choice

Reporting Category: Biochemistry and Cell Biology
Standard: 2.2 - Compare and contrast, at the cellular level, the general structures and degrees of complexity of prokaryotes and eukaryotes.

The illustration below shows the external features of a prokaryotic organism.



Which of the following can be concluded about the internal cellular contents of this prokaryote?

A. The cell does not contain ribosomes.

B. The cell does not contain a nucleus.

C. The cell contains mitochondria.

D. The cell contains a vacuole.

State Average = 89%

2016 Spring Release, Mathematics - Grade 10
Question 25: Multiple-Choice

Reporting Category: Geometry
Standard: 10.M.2 - Given the formula, find the lateral area, surface area, and volume of prisms, pyramids, spheres, cylinders, and cones, e.g., find the volume of a sphere with a specified surface area.
Standard: CCSS.Math.Content.HSG-GMD.A.3 - Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*

The core of a baseball is in the shape of a sphere. The diameter of the core is 2.06 centimeters. Which of the following is closest to the volume of the core?

A. 2.57 cubic centimeters

B. 4.58 cubic centimeters

C. 12.94 cubic centimeters

D. 36.62 cubic centimeters

State Average = 73%

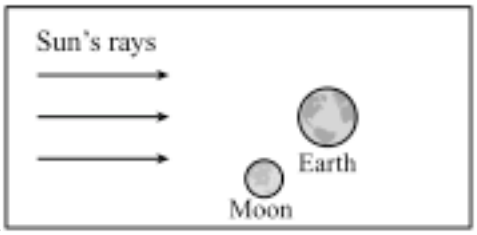
2016 Spring Release, Science and Technology/Engineering - Grade 8
Question 14: Multiple-Choice

Reporting Category: Earth and Space Science
Standard: 9 - Describe lunar and solar eclipses, the observed moon phases, and tides. Relate them to the relative positions of the earth, moon, and sun.

The following diagram illustrates the appearance of the Moon from Earth.

Which of the following arrangements of the Sun, the Moon, and Earth will cause the Moon to appear as it does above?

A.



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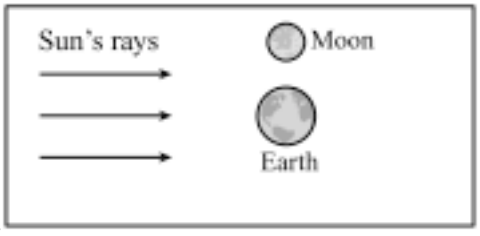
B.



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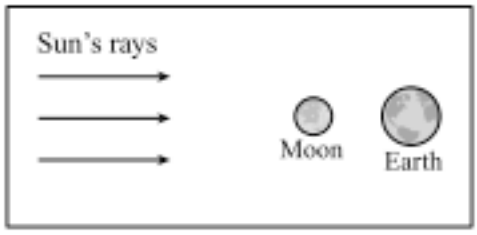
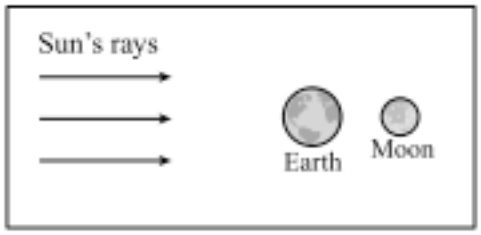
C.



D.



State Average = 66%

2016 Spring Release, Science and Technology/Engineering - Grade 5
Question 20: Open-Response

Reporting Category: Earth and Space Science
Standard: 12 - Give examples of how the surface of the earth changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes.

The shape of Earth's surface is continually being changed over time. The picture below shows some mountains that are being changed by slow and rapid processes.

Scenes from Yellowstone, Andrew, M ©2005

4. Identify one natural process that can slowly change the shape of these mountains over many thousands of years.
5. Describe how the process you identified in part (a) can slowly change the shape of these mountains.
6. Identify one natural process that can rapidly change the shape of these mountains in a short period of time, such as days or weeks.
7. Describe how the process you identified in part (c) can rapidly change the shape of these mountains.

View Student Work

2015 February Biology, Biology - High School
Question 27: Multiple-Choice

Reporting Category: Evolution and Biodiversity
Standard: 5.1 - Explain how evolution is demonstrated by evidence from the fossil record, comparative anatomy, genetics, molecular biology, and examples of natural selection.

The illustrations below show a crab and a barnacle.

Which of the following observations would best support the conclusion that crabs and barnacles have a common ancestor?

A. Crabs and barnacles are found in the same habitats.

B. Fossils of some crabs and barnacles are found in the same rock layers.

C. Crabs and barnacles look very similar in their early developmental stages.

D. Predators of crabs and barnacles use similar adaptations to break the animals' exoskeletons.

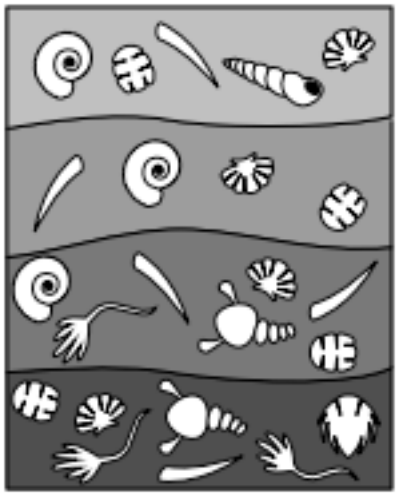
State Average = 66%

Sam Cota Worksheet 2.2: My Family Testing Advantages in re: Shape

2015 Spring Release, Biology - High School
Question 36: Multiple-Choice

Reporting Category: Evolution and Biodiversity
Standard: 5.1 - Explain how evolution is demonstrated by evidence from the fossil record, comparative anatomy, genetics, molecular biology, and examples of natural selection.

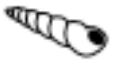
The diagram below represents several undisturbed rock layers and the fossils they contain.



According to this fossil record, which of the following organisms became extinct first?

A. 

B. 

C. 

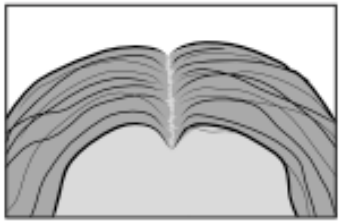
D. 

State Average = 86%

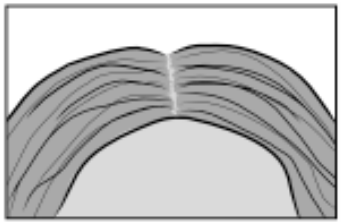
2015 February Biology, Biology - High School
Question 39: Multiple-Choice

Reporting Category: Genetics
Standard: 3.6 - Use a Punnett Square to determine the probabilities for genotype and phenotype combinations in monohybrid crosses.

The pictures below show two types of hairlines that children can inherit from their parents.



Widow's peak hairline



Straight hairline

The allele for a widow's peak hairline (W) is dominant, and the allele for a straight hairline (w) is recessive. If both parents are heterozygous (Ww) for this trait, what is the probability that their child will have a straight hairline?

A. 0%

B. 25%

C. 50%

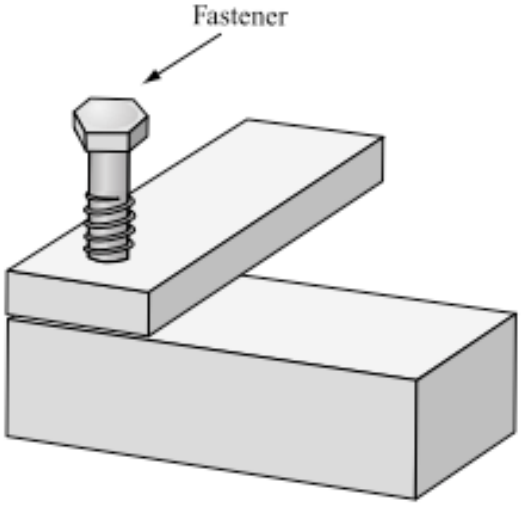
D. 75%

State Average = 80%

2014 Spring Release, Science and Technology/Engineering - Grade 5
Question 2: Multiple-Choice

Reporting Category: Technology/Engineering
Standard: 1.2 - Identify and explain the appropriate materials and tools (e.g., hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasterners) to construct a given prototype safely.

Adele wants to fasten two pieces of wood together, as shown below.



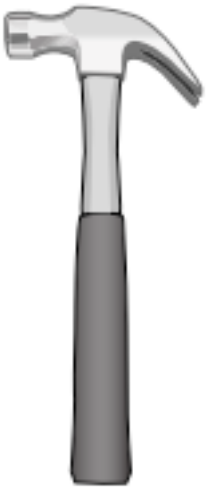
Which of the following tools would be best for Adele to use to turn the fastener?

A. 

Sam Cota Worksheet 2.2: My Family Testing Advantages in re: Shape

B. 

C. 

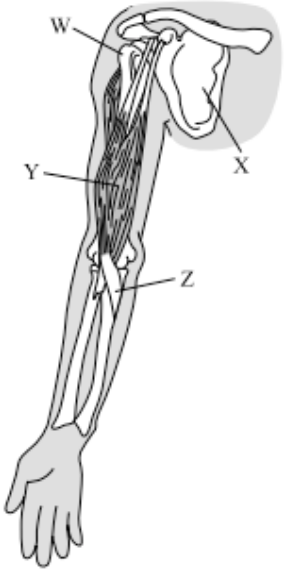
D. 

State Average = 88%

2014 February Biology, Biology - High School
Question 4: Multiple-Choice

Reporting Category: Anatomy and Physiology
Standard: 4.5 - Explain how the muscular/skeletal system (skeletal, smooth and cardiac muscle, bones, cartilage, ligaments, tendons) works with other systems to support and allow for movement. Recognize that bones produce blood cells.

The diagram below shows a portion of the anatomy of the human arm.



Which letter on the diagram indicates a tendon?

A. W

B. X

C. Y

D. Z

State Average = 59%

2014 Spring Release, Biology - High School
Question 18: Multiple-Choice

Reporting Category: Genetics
Standard: 3.5 - Describe how Mendel's laws of segregation and independent assortment can be observed through patterns of inheritance (e.g., dihybrid crosses).

Based on the results of genetic crosses, Mendel concluded that the alleles for seed color and seed shape in pea plants assorted independently. Which of the following statements best explains why the alleles for each trait assorted independently in Mendel's experiments?

A. The alleles were all recessive.

B. The alleles were all dominant.

C. The alleles were on separate chromosomes.

D. The alleles were inherited in a sex-linked manner.

State Average = 58%

2014 Spring Release, Biology - High School
Question 25: Multiple-Choice

Reporting Category: Biochemistry and Cell Biology
Standard: 2.1 - Relate cell parts/organelles (plasma membrane, nuclear envelope, nucleus, nucleolus, cytoplasm, mitochondrion, endoplasmic reticulum, Golgi apparatus, lysosome, ribosome, vacuole, cell wall, chloroplast, cytoskeleton, centriole, cilium, flagellum, pseudopod) to their functions. Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, facilitated diffusion, and active transport).

Which of the following structures helps maintain the shape of a plant cell even when water is scarce?

A. cell wall

B. endoplasmic reticulum

C. Golgi apparatus

D. plasma membrane

State Average = 84%

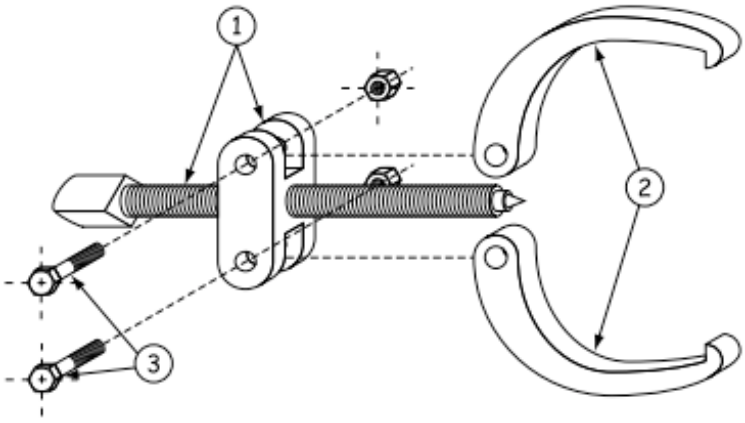
2013 Spring Release, Technology/Engineering - High School
Question 38: Multiple-Choice

Reporting Category: Engineering Design
Standard: 1.5 - Interpret plans, diagrams, and working drawings in the construction of prototypes or models.

A working drawing of a mechanical puller is shown below.

Parts List

Description	Quantity
Screw and yoke	1
D hook	2
Hex bolt and nut, $\frac{5}{16}" \times 1\frac{1}{4}"$	2



What do the circled numbers on the drawing represent?

A. the size of the parts

B. the quantity of the parts

C. the order in which to assemble the parts

D. the order of importance of detailed parts

2012 Spring Release, Biology - High School
Question 44: Open-Response

Reporting Category: Genetics
Standard: 3.5 - Describe how Mendel's laws of segregation and independent assortment can be observed through patterns of inheritance (e.g., dihybrid crosses).

In tomato plants, the allele for red fruit color (R) is dominant to the allele for yellow fruit color (r). The allele for round-shaped fruit (F) is dominant to the allele for pear-shaped

fruit (f).Two tomato plants, heterozygous for fruit color and fruit shape, are crossed. The Punnett square for this dihybrid cross is shown below.

	RF	**Rf**	**rF**	**rf**
RF	RRFF	RRFf	RrFF	RrFf
Rf	RRFf	RRff	RrFf	Rrff
rF	RrFF	RrFf	rrFF	rrFf
rf	RrFf	Rrff	rrFf	rrff

1. For this cross, identify all the possible phenotypes of the offspring.

2. Considering only fruit color, determine the ratio of offspring with red fruit to offspring with yellow fruit predicted by the Punnett square.

3. Considering only fruit shape, determine the ratio of offspring with round-shaped fruit to offspring with pear-shaped fruit predicted by the Punnett square.

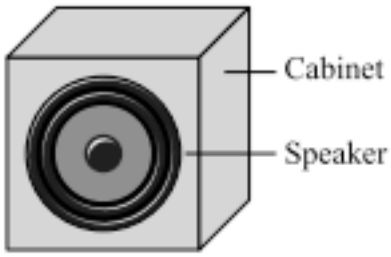
4. Explain what is meant by independent assortment and describe one way in which your answers to parts (a), (b), and (c) support the conclusion that the genes for fruit color and fruit shape sort independently.

View Student Work

2012 Spring Release, Intro Physics - High School
Question 2: Multiple-Choice

Reporting Category: Waves and Radiation
Standard: 4.3 - Distinguish between the two types of mechanical waves, transverse and longitudinal.

The picture below shows a sound speaker in a cabinet with its front panel removed.



When music plays through the speaker, the speaker rapidly moves back and forth in the cabinet. Which of the following conclusions is best supported by this observation?

A. Sound travels only in air.

B. Sound is a transverse wave.

C. Sound is a longitudinal wave.

D. Sound travels at the speed of light.

State Average = 51%

2012 Spring Release, Technology/Engineering - High School
Question 22: Multiple-Choice

Reporting Category: Fluid and Thermal Systems
Standard: 3.3 - Calculate and describe the ability of a hydraulic system to multiply distance, multiply force, and effect directional change.

The diagram below represents a hydraulic system.

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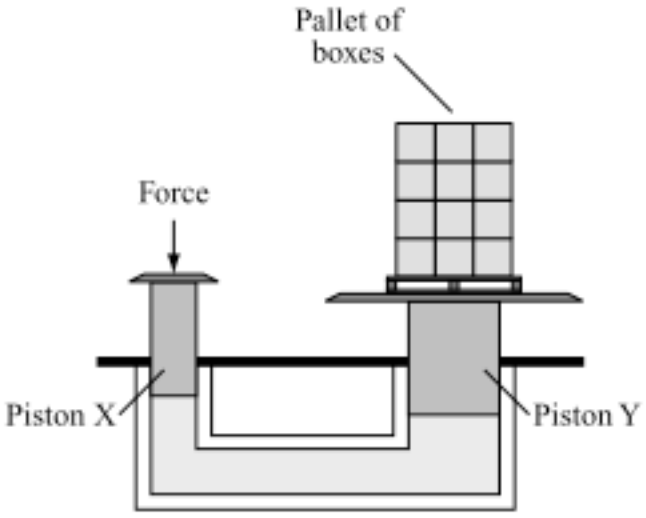


When a force of 1700 lb. is applied to piston X, the 6800 lb. pallet of boxes moves upward. The hydraulic system serves as which of the following?

A. area multiplier

B. direction stabilizer

C. force multiplier

D. force stabilizer

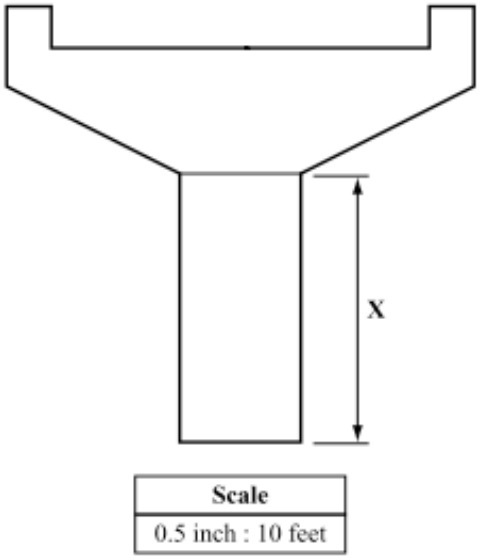
State Average = 51%

2012 Spring Release, Technology/Engineering - High School
Question 35: Multiple-Choice

Reporting Category: Engineering Design
Standard: 1.4 - Interpret and apply scale and proportion to orthographic projections and pictorial drawings (e.g., 1/4" = 1'0", 1 cm = 1 m).

The diagram below shows a vertical section of a support for a highway overpass.

Sam Cota Worksheet 2.2: My Family Testing Advantages in re: Shape



What is the height of the supporting column labeled X?

A. 17 ft. 6 in.

B. 35 ft. 0 in.

C. 70 ft. 0 in.

D. 87 ft. 6 in.

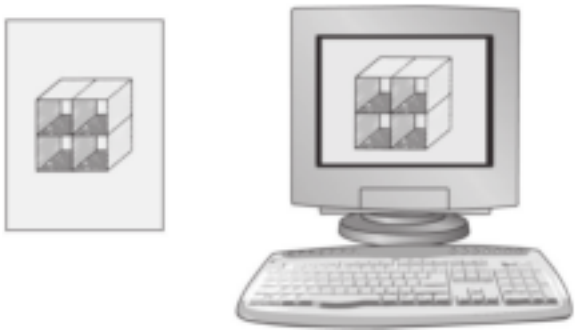
State Average = 51%

2012 Spring Release, Science and Technology/Engineering - Grade 8
Question 1: Multiple-Choice

Reporting Category: Technology/Engineering
Standard: 3.2 - Identify and explain the appropriate tools, machines, and electronic devices (e.g., drawing tools, computer-aided design, and cameras) used to produce and/or reproduce design solutions (e.g., engineering drawings, prototypes, and reports).

The pictures below show a drawing on paper and the same drawing in an electronic format on a computer screen.

Sam Cota Worksheet 2.2: My Family Testing Advantages in re: Shape



Which of the following devices was most likely used to convert the drawing on paper into an electronic format that could be viewed on a computer screen?

A. Internet modem

B. network router

C. printer

D. scanner

State Average = 83%

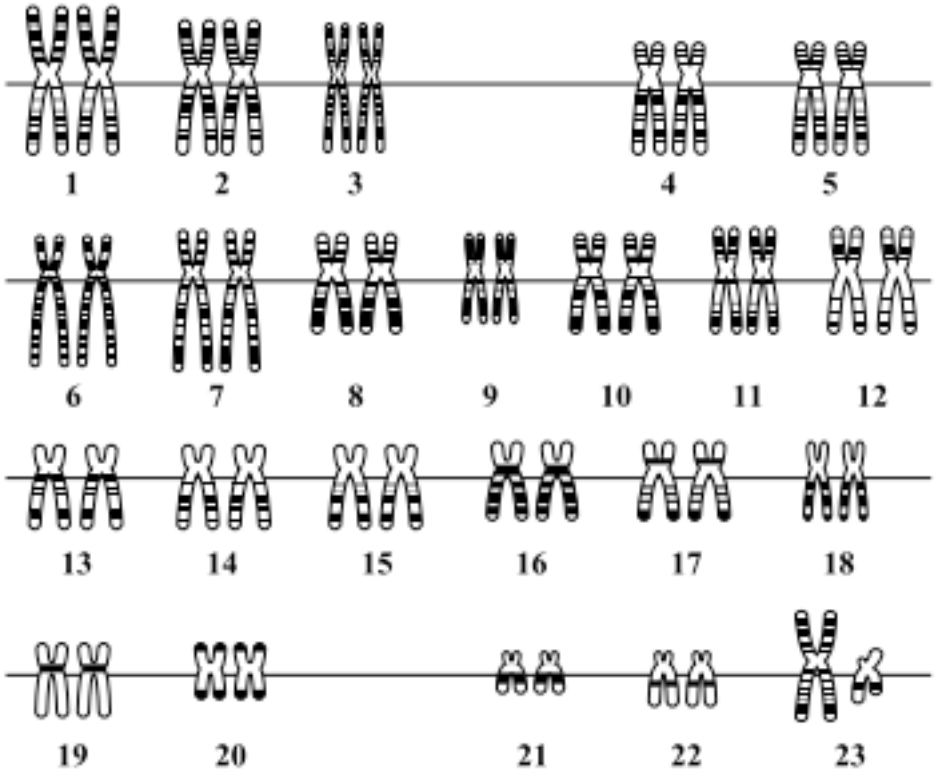
2012 Spring Release, Science and Technology/Engineering - Grade 8
Question 21: Open-Response

Show Questions

Reporting Category: Life Science
Standard: 8 - Recognize that hereditary information is contained in genes located in the chromosomes of each cell. A human cell contains about 30,000 different genes on 23 different chromosomes.

The diagram below represents 23 pairs of structures taken from the nucleus of a human body cell.

Sam Cota Worksheet 2.2: My Family Testing Advantages in re: Shape



Identify the structures shown in the diagram.

Identify the information that is contained within these structures.

Describe how the structures from this cell would compare to the structures in the nucleus of another body cell from the same person.

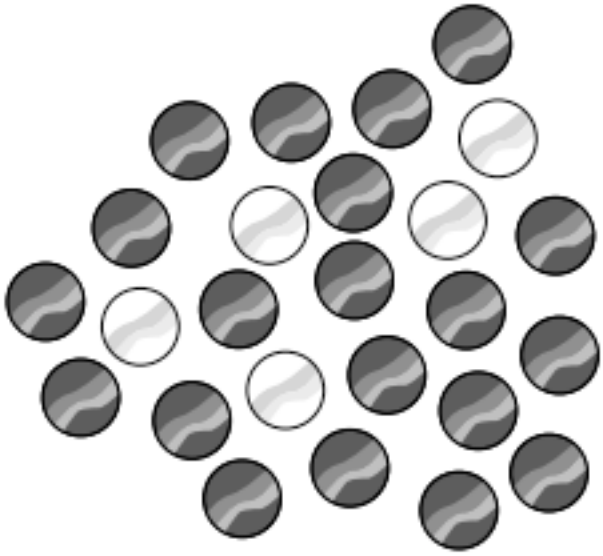
Explain why the structures are in pairs.
View Student Work

2011 Spring Release, Mathematics - Grade 4
Question 5: Short-Answer

Reporting Category: Data Analysis, Statistics, and Probability
Standard: 4.D.6 - Classify outcomes as certain, likely, unlikely, or impossible by designing and conducting experiments using concrete objects such as counters, number cubes, spinners, or coins.

Sam Cota Worksheet 2.2: My Family Testing Advantages in re: Shape

Brett put the nine tiles shown below into a jar.



All the tiles are the same size and shape. Brett is going to pick one tile out of the jar without looking.What color tile is Brett least likely to pick?

State Average = 90%

And so on...