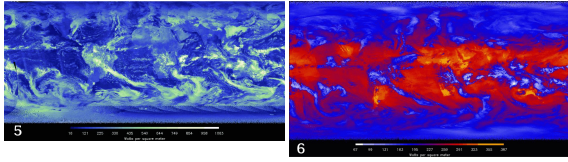


## ATX Science Olympiad Samples

- 1 Refer to Images 5 and 6.



What are the names of the two types of radiation in these respective images?

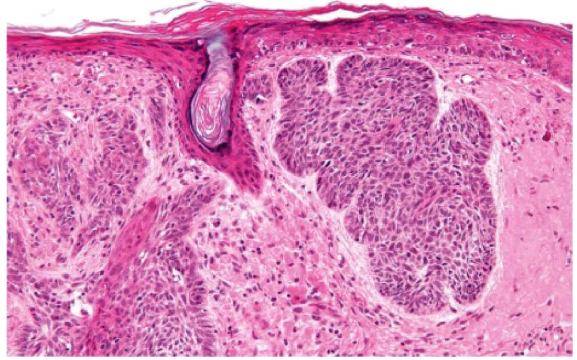
- 2 Image 5 can be considered a relatively direct measurement of what radiative property?

- 3 What factor primarily influenced the wavelengths chosen for those two spectral bands in the instrument that produced this image?

- 4 There is a taut rope bound at one end to a fixed pole, and with you holding the other end. If you shake the rope up and then down once, causing a single oscillation to travel down the length of the rope, how will the wave act as it hits the fixed endpoint?

- A. Reflect right-side-up
- B. Reflect upside-down
- C. Disappear
- D. Split into two separate waves

5



This disease is almost always fatal.

- A. True
- B. False

- 6 Which colors of light are most important for plant growth and flowering?

- A. Blue and red
- B. Green and blue
- C. Red and green
- D. Orange and red

7



D:

Which of the following are preyed on by members of organism D?

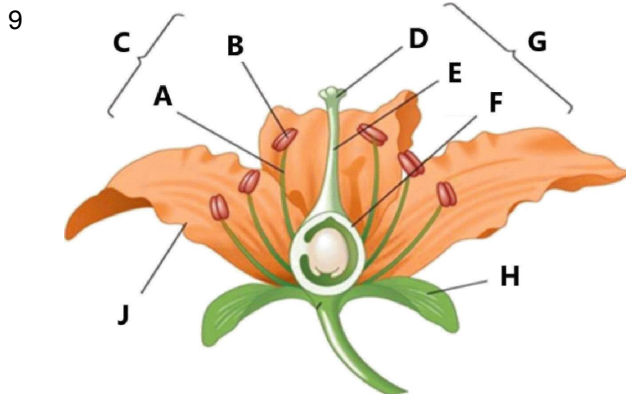
- Crown of thorns starfish
- Sea cucumbers
- Snappers
- Bumphead parrotfish
- Lobsters

You will be asked to identify and answer some questions about the celestial objects in the table below. For each picture, please match the object to a letter in the table. Only write the letter (Example: If you think the answer is A. M31 (Andromeda Galaxy), in the fill in the blank just write the letter A.) When writing the constellation the object is located in, please be sure to spell the name correctly, as you will not earn partial credit for incorrectly spelled answers.

A. M31 (Andromeda Galaxy)	F. NGC5128	K. NGC4555	O. NGC4038/4039	S. Dragonfish Nebula
B. 30 Doradus	G. Large Magellanic Cloud	L. Rho Ophiuchi Cloud Complex	P. M42 (Orion Nebula)	T. NGC1333
C. Sgr A*	H. M8 (Lagoon Nebula)	M. Baby Boom Galaxy	Q. NGC6357	U. NGC6334
D. T Tauri	I. Small Magellanic Cloud	N. GN-z11	R. M101	V. NGC4676
E. M60	J. M104			



- 8 a) What object is this?
- b) In what wavelength(s) is this picture taken?  
(Mark *all* correct answers)
- A. Optical
  - B. Infrared
  - C. X-ray
  - D. Ultraviolet
  - E. Radio
- c) In what constellation is this object located?
- d) What type of celestial object is this?  
(Mark the correct answer)
- A. Star
  - B. Galaxy
  - C. Nebula
  - D. Black hole
  - E. Supernova
  - F. None of the above

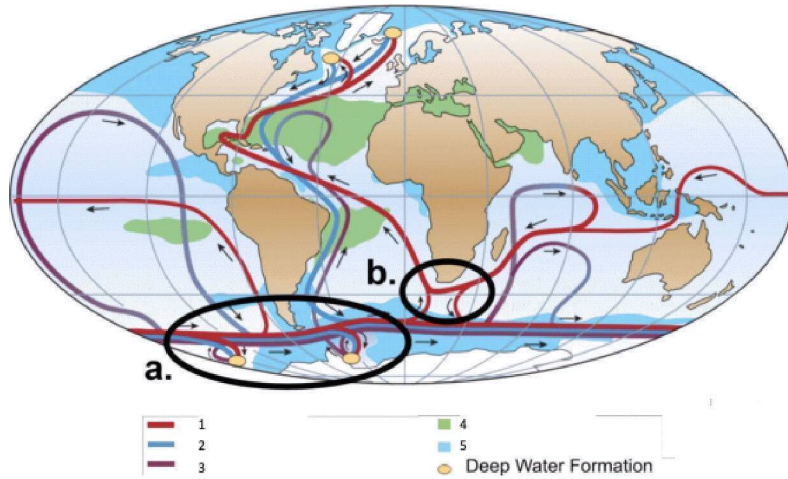


In which lettered part of the flower shown are the pollen grains produced?

- A. Part C
- B. Part B
- C. Part D
- D. Part F

- 10 What does item F become when fully mature?
- A. Seed
  - B. Ovary
  - C. Shell
  - D. Fruit
  - E. Exocarp
- 11 Which is not a pollination method used by flowering plants?
- A. Wind
  - B. Birds
  - C. Lizards
  - D. Bats
  - E. All are used

- 12 The average temperature of a lake has increased in the last year. Select all likely sources of this increase:
- Hypoxic conditions
  - Fertilizer runoff
  - Decrease in sedimentation
  - Wastewater leak
  - Acid rain



Match the red, blue, and purple lines (1, 2, 3) in the diagram below with the following: Surface flow, Bottom flow, and Deep flow.

Fill in the blanks with your answers for labels 1, 2, 3, in that order.

- 14 Match the blue and green oceanic regions (4, 5) in the diagram below with the following: Low Salinity, High Salinity

Fill in the blanks with your answers to labels 4 and 5, in that order.

- 15 Match regions a) and b) in the diagram below with: Warm Tropical Surface Water, Cold Deep Bottom Water

Fill in the blanks with your answers to label a) and b), in that order.

- 16 El Niño events bring  rainfall to Indonesia and Australia and can  the monsoons of India.

- 17 Primary sedimentary structures are structures formed simultaneously with the sedimentary rock. For each of the following, describe what the structure tells you about the depositional process that formed it. You do not need to describe the structure itself, although you can if it helps explain your answer.

1. Cross-bedding
2. Ripple marks
3. Graded bedding
4. Fossil tracks/trails



- 25 What is the voltage at point A?
- A. 4.5 V      B. 0.9 V      C. 6 V  
D. 0 V      E. 1.5 V
- 26 As viewed from nodes A and B, what is the Norton equivalent current of this circuit?
- A. 0.45 A      B. 0.6 A      C. 1.5 A  
D. 1.8 A      E. 2.4 A
- 27 (Select all that apply) Which of these national agencies are involved in public health prevention activities?
- CDC
- FDA, US Food and Drug Administration
- EPA, Environmental Protection Agency
- HUD, Department of Housing and Urban Development
- USDA, Department of Agriculture
- 28 Identify which level of prevention is best associated in each scenario
- Papanicolaou (Pap) smear for cervical cancer
- A. Primordial      B. Primary  
C. Secondary      D. Tertiary  
E. Quaternary
- 29 Improving access to an urban neighborhood to safe sidewalks to promote physical activity
- A. Primordial      B. Primary  
C. Secondary      D. Tertiary  
E. Quaternary

- 30 Use this image to answer the questions.

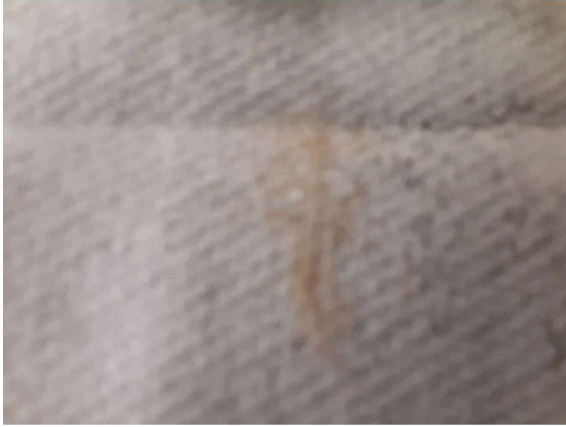


Identify this species.

- 31 In what sort of habitat would you be *least* likely to encounter this species?
- A. northern bog      B. low desert  
C. western estuary      D. eastern forest
- 32 This individual can best be described as:
- A. first-year immature  
B. second-year immature  
C. third-year immature  
D. fourth/fifth year immature  
E. adult
- 33 For each of the following groups of species, name the habitat or natural history trait they share, identify one conservation threats they share, and one effort being made to conserve and protect them.
- Wood Thrush, Kentucky Warbler
- 34 Bobolink, Loggerhead Shrike, Western Meadowlark

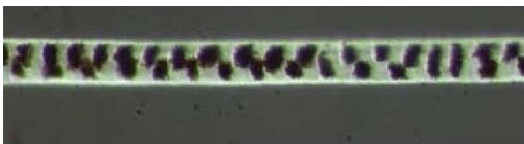


35 What is the ID of Unknown Hair 2?



- A. Cow
- B. Horse
- C. Human
- D. Squirrel
- E. Rabbet

36 What is the ID of unknown Hair 3?



- A. Bat
- B. Horse
- C. Human
- D. Squirrel
- E. Rabbet

37 Which statements are true of plant fibers?

- They are made of cellulose
- They are made of protein
- They are made of amino acids
- They are made of keratin
- They are made of cells
- They catch on fire when put in heat without actually touching any flame

38 What was designed with the purpose of making international trade more fair and encouraging development while subverting national environmental laws and hurting small businesses?

- A. Madrid protocol
- B. The World Trade Organization (WTO)
- C. North American Free Trade Agreement (NAFTA)
- D. Montreal protocol

39 This act established primary and secondary air quality standards throughout the nation, leading to set emission standards for cars along with limits for the release of air pollutants.

- A. Clean Air Act (CAA)
- B. Pollution Prevention Act (PPA)
- C. Occupational Safety and Health Act (OSHA)
- D. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

40 Otterpop the Sea Otter feeds on sea urchins to such an extent that he is helping to maintain the coastal marine ecosystem he resides in. Without Otterpop, the environment would have an oversaturated amount of sea urchins. Since he has such a significant role in his environment, we can say that Otterpop the Sea Otter is a(n)...?

- A. Exotic Species
- B. Indicator Species
- C. Keystone Species
- D. Endangered Species

41 Kliver-Busy syndrome is a disorder associated with damage to or removal of both temporal lobes of the brain. Which of the following behavioral symptoms is unlikely to result from this condition?

- A. Docility
- B. Aggression
- C. Indifference
- D. Placidity

42 Choose the menu item which applies to coenocytes in botany:

- a) have  a single  multiple membrane(s)
- b) have  a single  multiple nucleus/nuclei
- c)  does  does not undergo cytokinesis
- d)  are  are not present in endosperm
- e)  includes  does not include some kinds of algae
- f)  includes  does not include some kinds of fungi

43 Root knot nematodes often enter the roots of tomatoes and peppers, becoming a parasite. What are some characteristics of infected plants? (If applicable, select all that apply)

- Stunted growth
- Wilting
- Galls on roots
- Chlorosis

44 The United Kingdom has banned the use of asbestos since 1999. Which of the following Brits is at the highest risk for asbestosis?

- A. Marcus, a 30 year old male salesman who works in an office that has asbestos in the flooring.
- B. Tacko, a 65 year old male retired teacher who lives in a house with asbestos in the roofing.
- C. Diane, a 25 year old female freelance journalist who is in rehab for alcoholism.
- D. Bojack, a 50 year old male electrician who works in houses with asbestos in the insulation system.

45 Examine the image below, which shows an ecosystem recovering after a disturbance.



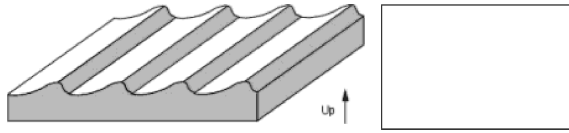
Image source: Wikimedia Commons 2015.

Which of the following best describes the process of succession it undergoes:

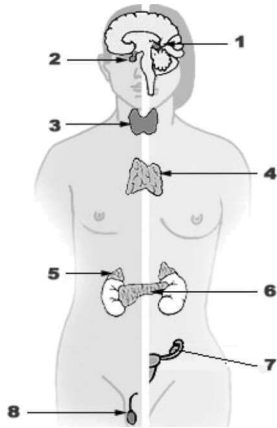
- A. Primary succession
- B. Secondary succession
- C. Tertiary succession
- D. Superorganism succession



- 46 In the box below, draw the direction(s) the current was flowing to create the feature shown on the left.



- 47 Refer to the diagram for the following questions:



The zona reticularis of which gland is known to produce glucocorticoids and androgens?

- A. Gland #1
- B. Gland #3
- C. Gland #5
- D. Gland #7
- E. None of the above

- 48 Gland #4 plays an important role in the immune system and secretes all of the following hormones *except*:

- A. Thyroxine
- B. Thymopoietin
- C. Thymosin
- D. Thymulin
- E. None of the above

49



Sometimes, an oxbow lake like the one shown above forms from a meandering river. Explain the formation of an oxbow lake.

- 50 Shown below is an image of a very well-known karst landscape in China.



Explain the formation of this unique landscape, and why they generally occur more rapidly in tropical climates.