

VIRGINIA STANDARDS OF LEARNING

Spring 2006 Released Test

END OF COURSE BIOLOGY

CORE 1

Property of the Virginia Department of Education

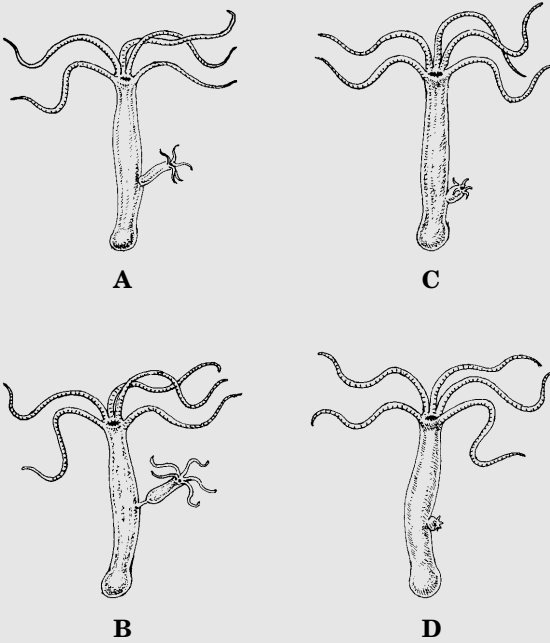
©2007 by the Commonwealth of Virginia, Department of Education, P.O. Box 2120, Richmond, Virginia 23218-2120. All rights reserved. Except as permitted by law, this material may not be reproduced or used in any form or by any means, electronic or mechanical, including photocopying or recording, or by any information storage or retrieval system, without written permission from the copyright owner. Commonwealth of Virginia public school educators may reproduce any portion of these released tests for noncommercial educational purposes without requesting permission. All others should direct their written requests to the Virginia Department of Education, Division of Assessment and Reporting, at the above address or by e-mail to darfax@doe.virginia.gov.

DIRECTIONS

Read each question carefully and choose the best answer. Then mark the space on your answer document for the answer you have chosen.

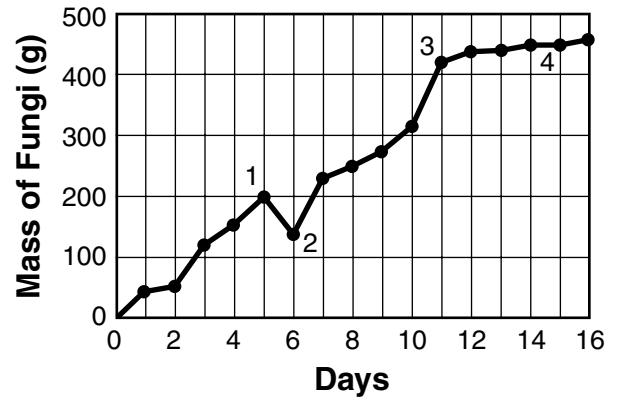
SAMPLE

The following pictures show some stages during asexual reproduction of a hydra. Which picture shows the first step?



1

Mass of Fungi Grown in Forest Leaf Litter



Which data point on the graph is probably invalid?

- A 1
- B 2
- C 3
- D 4

2 Which method of fly control would be *most* harmful to other organisms in the environment?

- F Spraying broad-range insecticides
- G Using fly traps
- H Planting carnivorous plants
- J Releasing sterilized male flies

3 In conditions of stress or fear, the human adrenal gland may produce adrenaline. Which of the following is an effect adrenaline can have on the body?

- A Increased blood pressure
- B Decreased rate of breathing
- C Increased production of red blood cells
- D Decreased heart rate

4 After a culture of cells is allowed to multiply and is viewed through a microscope, the cells are x-rayed with high-energy radiation for less than 1/100th of a second. After the radiation, many newly reproduced cells appear different. What has probably occurred?

- F Contamination
- G Mutation
- H Bacterial infection
- J Speciation

5 Which pair of structures *best* shows that plant cells have functions different from animal cells?

- A Cytoplasm and mitochondria
- B Chloroplasts and cell walls
- C Nuclei and centrioles
- D Ribosomes and cell membranes

6 Two plants are crossed, and the traits of height and color are assessed in the offspring. The following cross was conducted: $TTPP \times ttp$.

T = dominant allele for height, tall plant
t = recessive allele for height, short plant
P = dominant allele for color, purple
p = recessive allele for color, white

	TP	TP	TP	TP
tp				
tp				
tp				
tp				

Which of the following choices correctly describes the offspring?

- F Three-quarters of the plants are tall and purple.
- G Three-quarters of the plants are short and white.
- H All are short and white.
- J All are tall and purple.

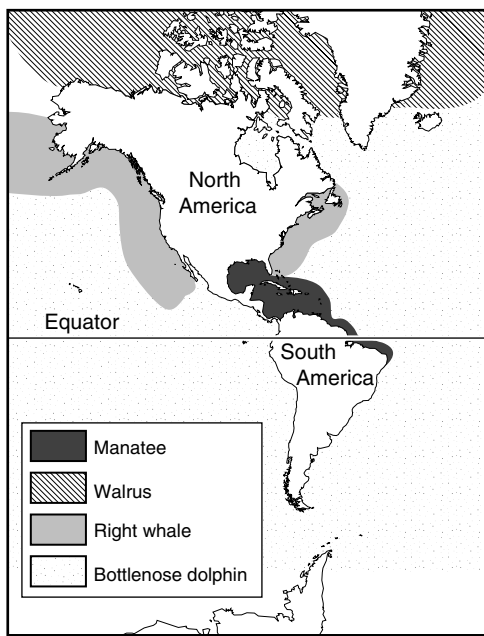
7 One strand of DNA could be as long as a football field if it were stretched out lengthwise. One of the factors allowing DNA to fit inside the nucleus of a cell is its ability to —

- A break apart into separate genes
- B extend to form very long, thin molecules
- C coil tightly around associated proteins
- D denature from the effect of an enzyme

8 In an experiment, the height of several plants was recorded daily in millimeters. Which tool would be the *most* accurate and appropriate for this measurement?

- F Digital scale
- G Graduated cylinder
- H Yardstick
- J Metric ruler

9



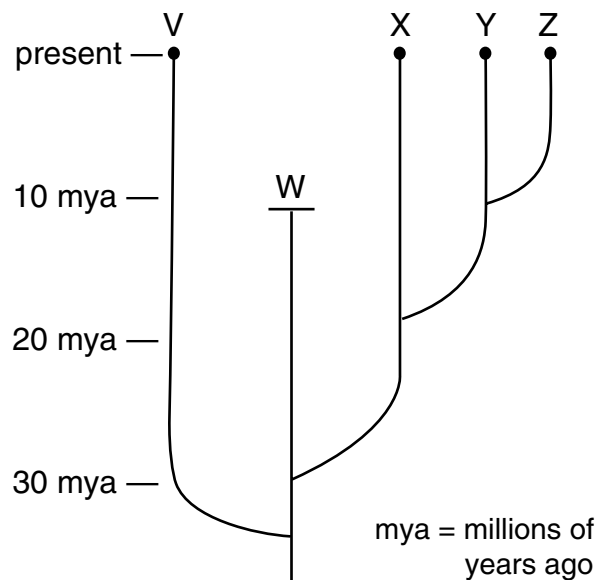
According to this map, which animal would *most likely* avoid cold waters?

- A Manatee
- B Walrus
- C Right whale
- D Bottlenose dolphin

10 In squash plants, yellow fruit (Y) is dominant to white fruit (y). If two plants heterozygous for yellow fruit are crossed, what are the possible genotypes of the offspring?

- F Yy only
- G YY, yy only
- H Yy, yy only
- J YY, Yy, yy only

11



Which statement is *best* supported by the phylogenetic tree shown?

- A Species V is still alive today and is the oldest species.
- B Species W is still developing from a prior species.
- C Species X, Y, and Z became extinct 20 million years ago.
- D Species W first came into existence 10 million years ago.

12 Meiosis is the process by which gametes are produced. In which of the following human organs does meiosis occur?

- F Testis
- G Liver
- H Skin
- J Pancreas

13 When an animal eats, food stays in the stomach for a period of time. When a unicellular organism, such as *Paramecium*, takes in food, the food is contained in which organelle?

- A Chloroplast
- B Mitochondrion
- C Nucleus
- D Vacuole

14 Heart Chambers in Different Animals

	Fish	Bird	Turtle	Frog	Dog
Number of atria	1	2	2	2	2
Number of ventricles	1	2	2	1	2
Separation of ventricles	—	Total	Partial	—	Total

Which type of animal is most closely related to a mammal, based on heart structure?

- F Fish
- G Bird
- H Turtle
- J Frog

15 **Animals that are the *least* specialized generally stand the best chance of survival when the environment suddenly and drastically changes because they are able to —**

- A adapt to different conditions
- B mutate rapidly
- C move from place to place
- D reproduce abundantly

16 **Ascidians are sac-like marine organisms. Their larvae have well-developed brains and dorsal nerve cords. This suggests that ascidians should be classified with the —**

- F chordates
- G annelids
- H cnidarians
- J sponges

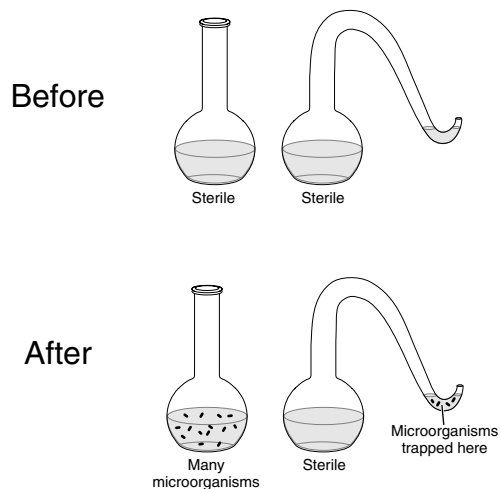
17 **A student's experiment showed that earthworms move away from light. This statement should be classified as —**

- A an inference
- B a hypothesis
- C a prediction
- D a conclusion

18 **What is the function of enzymes in biological systems?**

- F Enzymes act as substrates when the necessary proteins are unavailable.
- G Enzymes act as products to create new chemical reactions.
- H Enzymes act as catalysts to drive chemical reactions forward.
- J Enzymes bond with substrates to create the new reaction products.

19 **Pasteur's Experiment**



The results of Pasteur's experiment helped Pasteur to —

- A reject the theory of spontaneous generation
- B isolate the virus responsible for smallpox
- C produce a vaccine against rabies
- D convince people to cover food

20 Scientists hypothesize that oxygen began to accumulate in Earth's atmosphere *after* the appearance of living things with the ability to —

- F form tissues
- G reproduce sexually
- H photosynthesize
- J breathe air

21 Fossils help scientists classify extinct species and determine their relationships to current species. Fossils provide the *most* information about extinct species' —

- A habitats
- B structures
- C metabolism
- D reproduction

22 Data about the climate in an ecosystem were collected for 30 years. Which hypothesis about a population of eagles could be made based on the climate data collected?

- F Eagle chick survival is directly related to annual rainfall amounts.
- G An outbreak of disease in 1987 killed 82% of the eagle population.
- H Eagles remain with the same mate throughout their lifetime.
- J Mortality of eagles from pesticides after 1992 was less than 5%.

23 As part of their training, biologists learn the history of developments in their field of interest. Which *best* explains the importance of this education?

- A It allows scientists to rule out models that have already been tested.
- B It narrows their field of research because most important discoveries in biology have already been made.
- C It gives biologists an understanding of their field so they can expand on earlier knowledge.
- D It provides background information since most conclusions from before 1950 have been disproven.

24 Which of these organisms contains *no* specialized cells?

- F Paramecium
- G Sponge
- H Jellyfish
- J Sea anemone

25 A mushroom and a humpback whale are alike because both are —

- A motile
- B heterotrophic
- C prokaryotic
- D unicellular

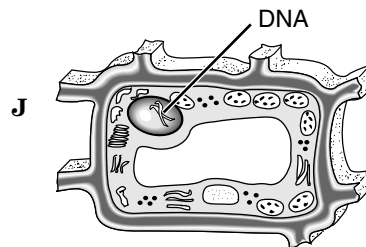
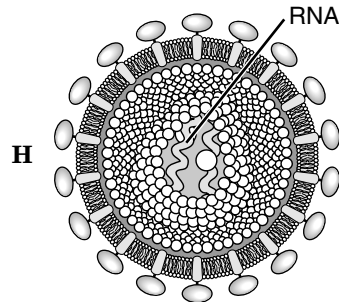
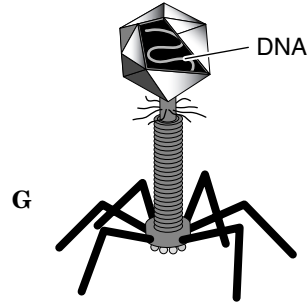
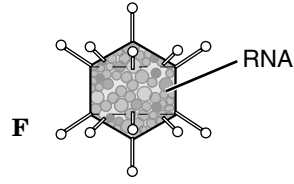
26 Which of the following choices is *not* a method of preventing bacterial illnesses from spreading in a meat-processing plant?

- F Treatment of work areas with chemical disinfectants
- G Use of gloves when handling raw meat products
- H Using antibiotics to treat persons with food poisoning
- J Washing hands and utensils with hot soapy water

27 Bivalves, such as clams, are found in salt water. The clam captures food particles from water that flows over its gills. Which of these is the best classification of the clam?

- A A filter feeder
- B A grazer
- C A chunk feeder
- D A decomposer

28 Which of these could *not* be a virus?



29 An understanding of which of these *best* enabled scientists to determine the approximate ages of fossils?

- A Physics
- B Genetics
- C Gravity
- D Radioactivity

30 An important feature of modern classification systems is that they —

- F apply only to organisms that are alive today
- G can incorporate new scientific discoveries
- H group organisms that live in the same habitat
- J can predict the discovery of new species

31 In an aquatic habitat, an example of organisms from the pioneer community would be —

- A water reeds
- B water lilies
- C grass
- D algae

32 Bird Sightings at Willow Point

Date	# Sparrows	# Wrens	# Jays
May 12	43	12	10
May 13	54	13	8
May 14	44	11	13
May 15	52	14	9
May 16	47	10	10

Based on the data in the table, what is the difference between the mean number of sparrows and the mean number of jays observed at Willow Point between May 12 and May 16?

- F 190
- G 48
- H 38
- J 36

33 Some insects can stand on the surface of water because water —

- A has a high specific heat
- B has a high boiling point
- C is a good evaporative coolant
- D is cohesive and adhesive

- 34** If transpiration stopped completely, how would a plant's homeostasis first be affected?
- F More carbon dioxide molecules would be taken in by leaves.
 - G Fewer sugars stored in roots and stems would diffuse into the soil.
 - H Carbohydrates would no longer be formed.
 - J Water molecules would not be released from leaves.

- 35** The main difference between prokaryotic and eukaryotic cells is that —
- A prokaryotic cells are always much larger
 - B prokaryotic cells do not have a plasma membrane
 - C eukaryotic cells have a smaller cell nucleus
 - D eukaryotic cells have a more advanced cellular organization

- 36** Which of the following macromolecules are a prominent part of animal tissues that function in insulation, helping animals conserve heat?
- F Carbohydrates
 - G Lipids
 - H Proteins
 - J Nucleic acids

- 37** Cells from which of the following organisms would be expected to contain cell walls?
- A Sponge
 - B Cricket
 - C Water lily
 - D Paramecium

- 38** What characteristic do all living things share?
- F They contain DNA.
 - G They are made up of many parts.
 - H They reproduce by mitosis.
 - J They need oxygen to survive.

39

Representative Animals from a Local Ecosystem	
Type of Organism	Number of Individual Species Collected
Grasses	11
Trees	1
Fish	16
Amphibians	12
Reptiles	8
Mammals	3

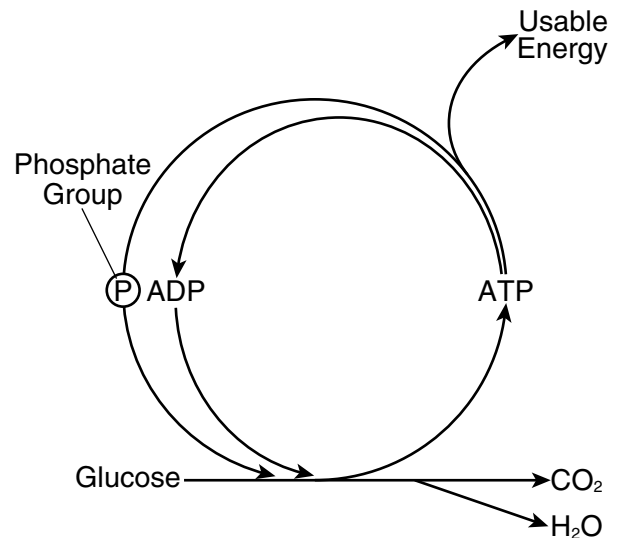
The chart shows the types of organisms and the numbers of species collected from a local ecosystem. According to these data, this ecosystem was most likely a —

- A tundra
- B marsh
- C desert
- D savanna

40 A student researching a new discovery about the activity of mitochondria could find the *most* current and reliable information in a —

- F cell biology textbook
- G newspaper
- H scientific journal
- J popular news magazine

41



The picture models a cellular metabolic process. The *main* purpose of this process is to produce —

- A phosphate groups
- B usable energy
- C ADP
- D H₂O

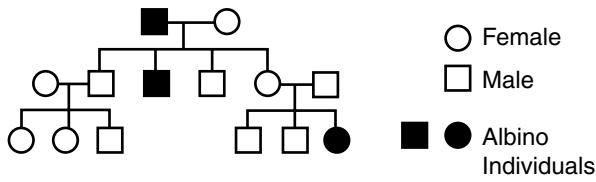
42 A scientist designed an experiment to test the effect of temperature on bacterial growth. He grew three different cultures of the bacterium *E. coli* under three heat lamps at different temperatures. What was the independent variable in this experiment?

- F Length of the experiment
- G Number of bacteria
- H Reproduction rate
- J Temperature

43 Some plant roots grow with mycorrhizal fungi. The fungi absorb water and minerals and pass them on to the plant and receive carbohydrates from the plant. This is an example of —

- A predation
- B mutualism
- C competition
- D parasitism

44



Albino individuals lack all pigmentation so that their hair and skin are white. This family tree shows that albinism —

- F is carried only by females in this family
- G is a recessive genetic trait
- H is a sex-linked gene
- J requires both parents to be albinos

45 Which of the following is most effective in helping rain forest plants trap sunlight so that light energy can be converted to chemical energy?

- A Large leaf size
- B Large root size
- C Small stem
- D Small seed size

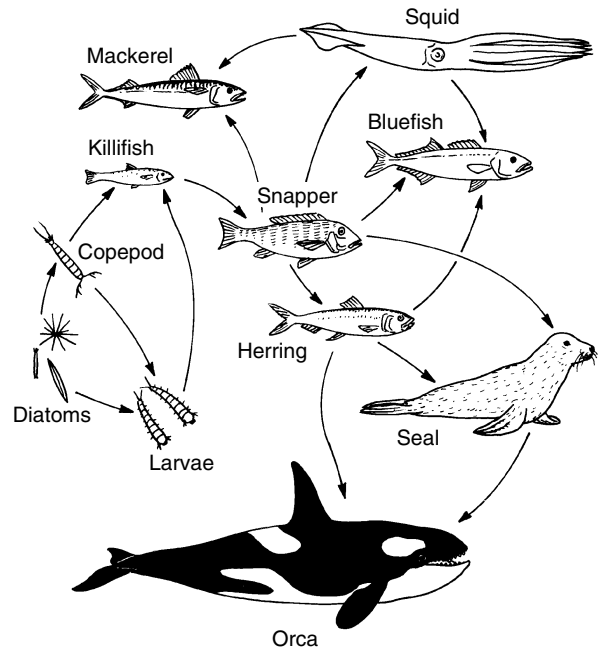
46 Some peeled pieces of apple were placed in distilled water and some in very salty water. The cells in the apple pieces will —

- F lose water in both solutions
- G gain water in both solutions
- H lose water in the distilled water and gain water in the salty water
- J gain water in the distilled water and lose water in the salty water

47 In the human body, muscle cells have an increased need for energy during exercise. To help supply this energy, the body will immediately increase —

- A food intake to increase the substances available for respiration
- B the need for waste products to be retained
- C activity in the nervous system to stimulate intake of carbon dioxide
- D the breathing rate to supply more oxygen to cells for the release of energy

48



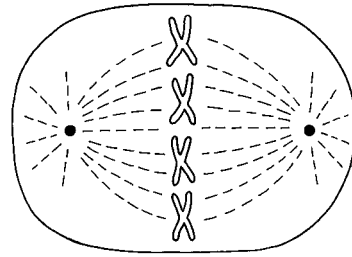
In the diagram, which organism provides nutrients for the largest number of other organisms?

- F Herring
- G Snapper
- H Bluefish
- J Seal

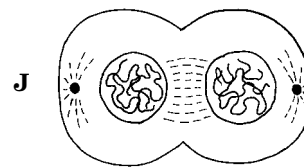
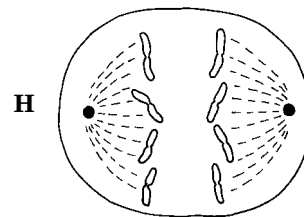
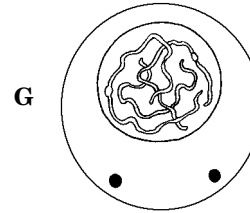
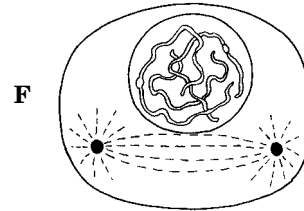
49 Which of these would be measured to determine the density of the polar bear population in Canada?

- A The number of bears per square kilometer
- B The total number of bears seen per day
- C The mass of the bears at the Arctic Circle
- D The total number of bears minus the juvenile bears

50



Which phase of mitosis would be seen next?



Answer Key-2A47N

Test Sequence Number	Correct Answer	Reporting Category	Reporting Category Description
1	B	001	Scientific Investigation
2	F	004	Interaction of Life Forms
3	A	003	Life at the Systems and Organisms Level
4	G	002	Life at the Molecular and Cellular Level
5	B	002	Life at the Molecular and Cellular Level
6	J	003	Life at the Systems and Organisms Level
7	C	002	Life at the Molecular and Cellular Level
8	J	001	Scientific Investigation
9	A	001	Scientific Investigation
10	J	003	Life at the Systems and Organisms Level
11	A	004	Interaction of Life Forms
12	F	002	Life at the Molecular and Cellular Level
13	D	002	Life at the Molecular and Cellular Level
14	G	003	Life at the Systems and Organisms Level
15	A	004	Interaction of Life Forms
16	F	003	Life at the Systems and Organisms Level
17	D	001	Scientific Investigation
18	H	002	Life at the Molecular and Cellular Level
19	A	002	Life at the Molecular and Cellular Level
20	H	003	Life at the Systems and Organisms Level
21	B	004	Interaction of Life Forms
22	F	001	Scientific Investigation
23	C	001	Scientific Investigation
24	F	003	Life at the Systems and Organisms Level
25	B	003	Life at the Systems and Organisms Level
26	H	004	Interaction of Life Forms
27	A	003	Life at the Systems and Organisms Level
28	J	002	Life at the Molecular and Cellular Level
29	D	004	Interaction of Life Forms
30	G	001	Scientific Investigation
31	D	004	Interaction of Life Forms
32	H	001	Scientific Investigation
33	D	002	Life at the Molecular and Cellular Level
34	J	003	Life at the Systems and Organisms Level
35	D	002	Life at the Molecular and Cellular Level
36	G	002	Life at the Molecular and Cellular Level
37	C	003	Life at the Systems and Organisms Level
38	F	003	Life at the Systems and Organisms Level
39	B	004	Interaction of Life Forms
40	H	001	Scientific Investigation
41	B	002	Life at the Molecular and Cellular Level
42	J	001	Scientific Investigation
43	B	004	Interaction of Life Forms
44	G	003	Life at the Systems and Organisms Level
45	A	004	Interaction of Life Forms
46	J	002	Life at the Molecular and Cellular Level
47	D	003	Life at the Systems and Organisms Level
48	G	004	Interaction of Life Forms
49	A	001	Scientific Investigation
50	H	002	Life at the Molecular and Cellular Level

Biology, Core 1

If you get this many items correct:	Then your converted scale score is:
0	000
1	218
2	249
3	268
4	282
5	293
6	303
7	311
8	318
9	325
10	331
11	336
12	342
13	347
14	352
15	357
16	362
17	366
18	370
19	374
20	378
21	383
22	387
23	391
24	394
25	399
26	403
27	407
28	410
29	415
30	419
31	423
32	427
33	432
34	436
35	441
36	446
37	450
38	455
39	461
40	467
41	473
42	480
43	487
44	495
45	505
46	516
47	530
48	549
49	581
50	600

