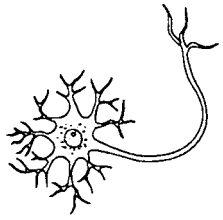
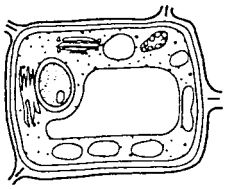
Released items HST in Science 2000



Cell 1

Cell 2

Cell 3



Cell 4

1 Which of these cells uses sunlight to produce food?

A Cell 1

B Cell 2

C Cell 3

D Cell 4

3 A researcher was trying to determine the effects of the drug AZT on the HIV virus, using 200 infected rats. One hundred of the rats were each given a daily injection of 10 ml of a solution of AZT and water for a period of 3 months. What should the researcher give the remaining 100 rats each day?

A an injection of 10 ml of AZT

B an injection of 10 ml of water

C an oral dose of 10 ml of water

D food containing 10 ml of AZT

5 A student filled four identical containers with pond water. A different concentration of nitrogen fertilizer was added to each container. Each container was placed on the same windowsill. One day each week for four weeks, the organisms in each container were identified and counted to see how the different concentrations of fertilizer had affected the growth of the organisms. What was the variable being tested in this experiment?

A the amount of light

B the type of container

C the concentration of fertilizer

D the types of organisms in the water

Read the following investigation carefully. The answer questions 15 and 16.

INVESTIGATION

Problem

Does skipping breakfast help a person to lose weight?

Hypothesis

Skipping breakfast will cause a person to lose weight.

Procedure

1. Three students will weigh themselves to obtain their starting weight.
2. The three students will not eat breakfast for a period of three weeks.
3. At the end of three weeks, the students will re-weigh themselves.

Results

	Starting Weight	Weight After 3 Weeks
Student A	100	99
Student B	90	92
Student C	120	114

Conclusion

Skipping breakfast causes weight loss.

15 **(2 points)** Two out of the three students lost weight during this experiment. Identify two reasons other than skipping breakfast that could account for weight loss in these two students.

ANSWER THIS ITEM IN YOUR ANSWER BOOKLET. NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

16 **(2 points)** A scientist might complain that this investigation "lacks a control."

- How could you change the experiment to give it a control?
- Why is it necessary to have a control?

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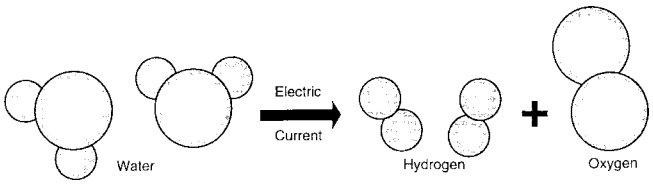


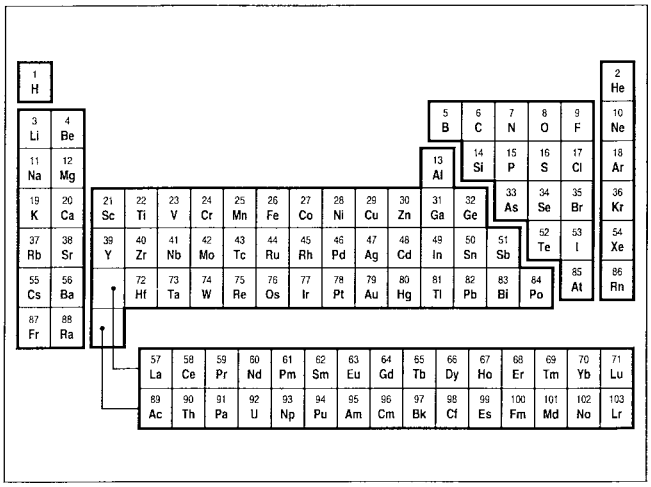
17 The diagram shows a chemical reaction in which

A energy is released.

B energy is required.

C energy is neither released nor absorbed.

D energy is first released, then absorbed.



18

A chemist is looking for an element that will behave chemically like calcium (Ca)— atomic number 20. Which of the following would be the best choice?

A Ba

B K

C Ga

D C

19 Four identical vehicles were traveling at 60 km/hr on the same road. **EACH DRIVER APPLIED A DIFFERENT AMOUNT OF PRESSURE TO THE** BRAKES. Their speeds were then measured every 0.5 seconds for the next 5 seconds and recorded in the following table. Study the table carefully.

	SPEED OF CAR IN KILOMETERS/HOUR			
Time (sec)	Car 1	Car 2	Car 3	Car 4
0.5	58	55	56	57
1.0	56	50	52	54
1.5	54	45	48	51
2.0	52	40	44	48
2.5	50	35	40	45
3.0	48	30	36	42
3.5	46	25	32	39
4.0	44	20	28	36
4.5	42	15	24	33
5.0	40	10	20	30

SPEED OF CAR IN KILOMETERS/HOUR

Compared to the total time it will take Car 3 to come to a complete stop, Car 1 will take

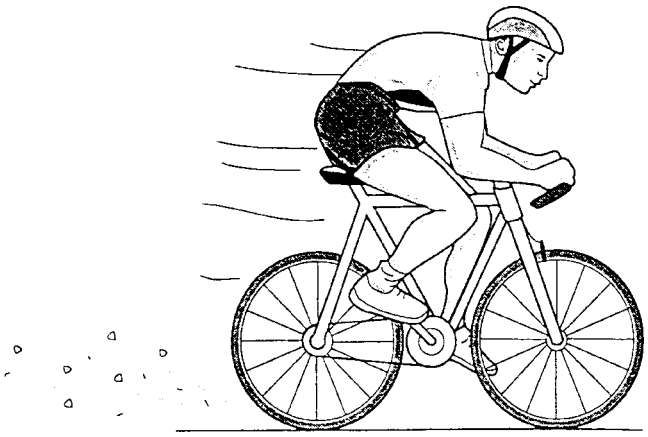
A half as long.

B twice as long.

C four times as long.

D the same amount of time.

21



Look at the following list of events that result in the forward motion of a bicycle.

1. The chain turns the wheel gear and the rear tire.
2. The feet push on the pedals.
3. The rear tire pushes against the road surface.
4. The pedal gear turns the chain.

Which of these shows the correct order for these events?

A 2-1-3-4

B 2-4-1-3

C 2-4-3-1

D 2-3-1-4

23 Some people are concerned about possible health risks associated with electromagnetic fields (EMFs) that surround working electrical appliances. Which of the following observations provides the best evidence for stricter control of EMFs?

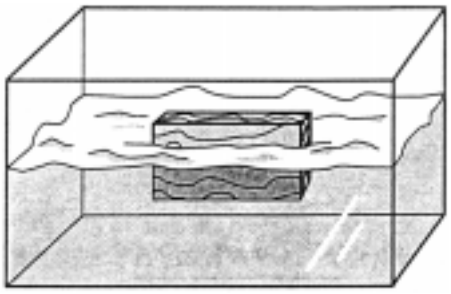
A EMFs flow freely through Earth's atmosphere.

B A prominent politician has argued for stricter control of EMFs.

C Chick embryos exposed to EMFs have more developmental abnormalities than chick embryos **NOT** exposed to EMFs.

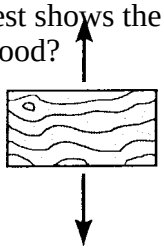
D The strength of the EMF decreases with the square of the distance from the electrical appliance that is generating the EMF.

27

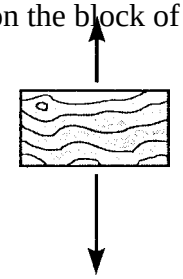


The diagram shows a block of wood floating in water. Which of the following diagrams best shows the forces acting on the block of wood?

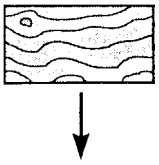
A



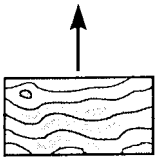
B



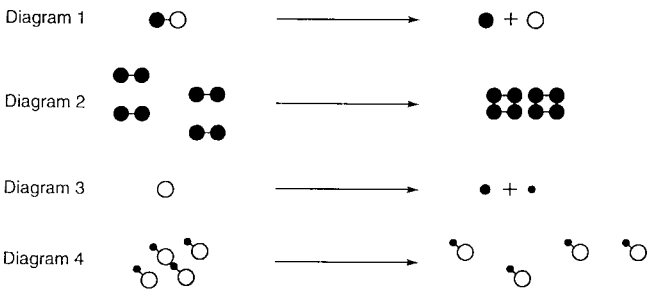
C



D



The diagrams below show atoms and molecules undergoing different types of changes. Study the diagrams. Then answer questions 28 through 31.



Note: ●, ○, ●, and • represent different types of atoms.

28 What is shown in Diagram 1?

A two atoms that join to form a molecule

B a molecule that breaks down into two different atoms

C an atom that splits to form two different atoms

D a pair of molecules that spread farther apart

29 Which diagram represents a nuclear change?

A Diagram 1

B Diagram 2

C Diagram 3

D Diagram 4

30 The energy changes associated with Diagram 3 are explained by the theories of

A Kepler.

B Newton.

C Galileo.

D Einstein.

31 **(3 points)**

Compare and contrast physical and chemical changes. In your response, describe two similarities and two differences.

ANSWER THIS ITEM IN YOUR ANSWER BOOKLET. NOTHING WRITTEN IN THE SPACE BELOW WILL BE SCORED.

Read the following article carefully. Then answer questions 32 and 33.

GLOBAL WARMING

Carbon dioxide levels have increased in recent years, according to figures provided in a report given Wednesday night at a meeting of the Astronomical Society. Some scientists believe increased carbon dioxide levels are responsible for warmer temperatures worldwide over the past 10 years. Yet this global warming trend is far from dramatic, and the effect of increased carbon dioxide levels in Earth's atmosphere remains disputed.

Astronomers speaking at a local chapter meeting of the Astronomical Society cited studies of neighboring planets as evidence in support of the so-called greenhouse effect. The researchers cited Venus as a planet exhibiting extreme planetary warming. Venus has an atmosphere made up of more than 96 percent carbon dioxide. Its surface temperature is about 850°F, far hotter than expected based on its distance from the sun. The researchers voiced warnings that substantial releases of carbon dioxide into Earth's atmosphere could produce a warming trend of similar magnitude.

32 **(2 points)** Some astronomers question using Venus as a model to predict how increased carbon dioxide levels in Earth's atmosphere will affect our planet. Describe three differences between Earth and Venus that might cause astronomers to question whether global warming data from Venus can be applied to Earth.

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33 **(2 points)** Some scientists have concluded that increased carbon dioxide levels in the atmosphere are responsible for the recent global warming trend. Give two reasons why other scientists may be reluctant to agree with this conclusion.

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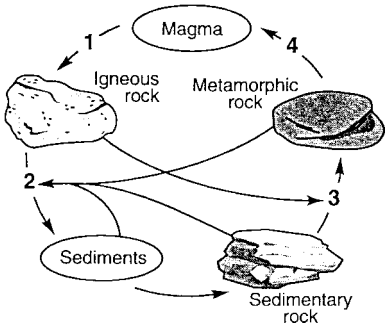
34



Number 4 in the rock-cycle diagram shown above indicates a process of

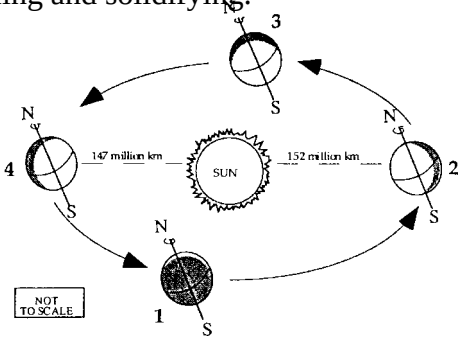
A weathering, erosion, transportation, and deposition.

B crystal formation due to heat and pressure.

C melting under extremely high temperatures.

D cooling and solidifying.

35



Which position of Earth represents winter time in the Northern Hemisphere?

A position 1

B position 2

C position 3

D position 4

36 What formed the basins occupied by the Great Lakes?

A glaciers

B earthquakes

C meteors striking the Earth

D ocean bays being surrounded by land

39 Some scientists believe that the moon and Earth share a common origin. Which statement BEST supports this view?

A The moon and Earth display nearly identical proportions of three forms of the element oxygen in their rocks.

B The moon and Earth both possess gravitational fields.

C The moon and Earth both spin on their axis in the same direction.

D The moon and Earth both revolve around the sun.

40 The presence of an ozone layer high in Earth's atmosphere is thought to be, beneficial to living things because it

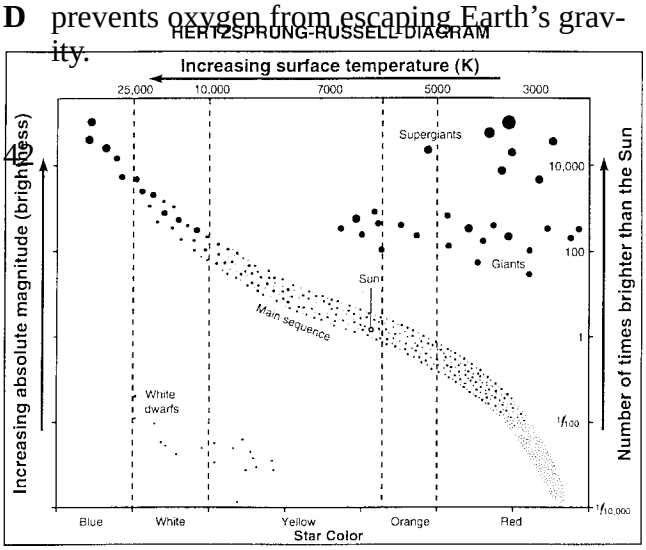
A helps to prevent acid rain.

B blocks harmful rays coming from the sun.

C destroys pollutants in the atmosphere.

D prevents oxygen from escaping Earth's gravity.

42



Stars on the left half of the diagram shown above are

A hotter.

B older.

C larger.

D more luminous.

Key
1-D, 3-B, 5-C, 17-B, 18-A, 19-B, 21-B, 23-C, 27-A, 28-B, 29-C, 30-D, 34-C, 35-D, 36-A, 39-A, 40-B, 42-A