

1 A rocket accelerates from the launch pad. The forces on the rocket are

- A action forces.
- B balanced.
- C reaction forces.
- D unbalanced.

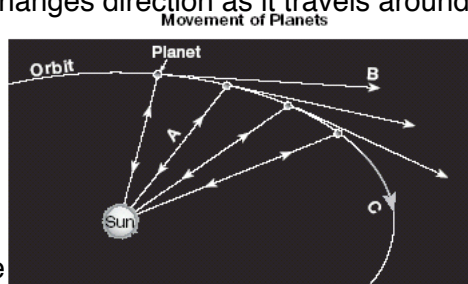
2 What force(s) act(s) on a rocket that is accelerating upward?

- A centripetal force and gravity
- B gravity and thrust
- C gravity only
- D thrust only

3 At a certain point in a rocket's path, the force of gravity becomes greater than the other forces acting on the rocket. What will happen to the rocket when this occurs?

- A It will move in a curved path around Earth.
- B It will move in an ellipse.
- C It will move in a straight line away from Earth.
- D It will move toward Earth.

4 The planet constantly changes direction as it travels around its orbit. Therefore, you know that the

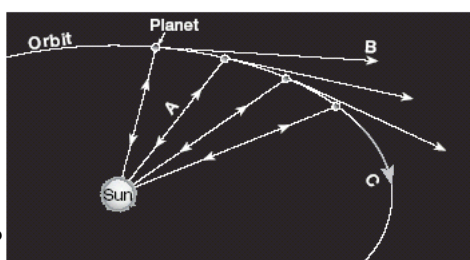


forces on the planet are

- A accelerating.
- B balanced.
- C constant.
- D unbalanced.

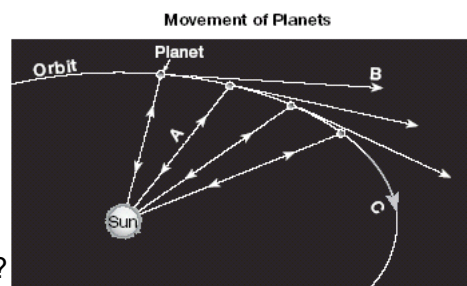
- 5 The planet moves in the direction marked C. What force(s) contribute to the planet's

motion?



- A A only
- B B only
- C A and B
- D neither A nor B

6



What would happen if the force labeled A were *not* present?

- A The planet would move away from the sun.
- B The planet would move toward the sun.
- C The planet would stop moving.
- D The planet would travel in a straight line.

- 7 The two factors that combine to keep the planets in orbit are

- A gravity and orbital speed.
- B orbital speed and mass.
- C mass and inertia.
- D gravity and inertia.

- 8 Earth's gravity pulls everything on or near it

- A toward the moon.
- B toward any lower surface.
- C toward the surface of Earth.
- D toward the center of Earth.

- 9 An object weighs 300 newtons on Earth. The same object weighs only 50 newtons on the moon. Why does an object weigh less on the moon than on Earth?

- A because objects have less mass on the moon
- B because there is weightlessness in space
- C because the moon's mass is about $\frac{1}{6}$ that of the Earth
- D because the moon lacks gravitational force

10 A space suit that can be worn on Mars is being developed. The gravity on Mars is 0.38 that of Earth. The gravity on the moon is 0.16 that of Earth. Why wouldn't astronauts wear the same space suits on Mars that they have worn on the moon?

- A Moon space suits would be too heavy on Mars.
- B Moon space suits would be too light on Mars.
- C Moon space suits would have too much mass on Mars.
- D Moon space suits would have too little mass on Mars.

11 What would cause the gravity on the surface of Mars to be greater than the gravity on the surface of the moon?

- A Mars is more massive than the moon.
- B Mars is solid and the moon is not.
- C Mars is farther away from the sun than the moon.
- D Mars is farther away from Earth than the moon.

12 What would happen immediately if the sun stopped exerting a force on Earth?

- A Earth's axis would no longer be tilted.
- B Earth's North and South Poles would be reversed.
- C Earth's path would become erratic, but Earth would continue to orbit the sun.
- D Earth would leave its orbit and travel in a straight line.

13 Which of the following holds together all objects in the universe?

- A inertia
- B friction
- C gravity
- D momentum

14 What determines the strength of the gravitational attraction between two objects?

- A charge
- B density
- C mass
- D size

15 The force of gravity decreases as which of the following increases?

- A distance
- B volume
- C weight
- D mass

16 What is a galaxy?

- A a solar system containing more than one star larger than our sun
- B a collection of asteroids, dust, and gases orbiting each other in space
- C an unidentified object in space that can be seen using a powerful telescope
- D a collection of billions of stars and their satellites held together by gravity

17



What type of galaxy is shown in the picture?

- A nebula
- B irregular
- C elliptical
- D spiral

18 How are elliptical galaxies and spiral galaxies different?

- A Elliptical galaxies have almost no gas or dust.
- B Elliptical galaxies vary more in shape than spiral galaxies.
- C Spiral galaxies have almost no gas or dust.
- D Spiral galaxies contain only old stars.

19 The Milky Way is an example of

- A an elliptical galaxy.
- B an irregular galaxy.
- C a spiral galaxy.
- D a quasar.

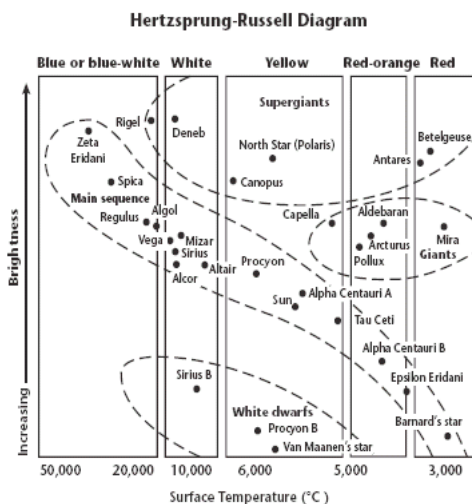
20 The universe contains billions of galaxies. The largest galaxies contain a trillion stars. What holds each galaxy together?

- A gravity
- B the sun
- C star clusters
- D infrared radiation

21 How do astronomers classify galaxies?

- A by color
- B by location
- C by shape
- D by size

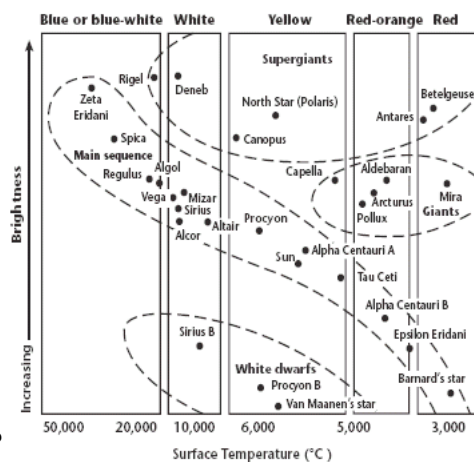
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The sun is one of a group of stars called

- A the main sequence.
- B supergiants.
- C white dwarfs.
- D giants.

- 23 Jody used the diagram to compare our sun with Alpha Centauri A. Which statement *best* describes her

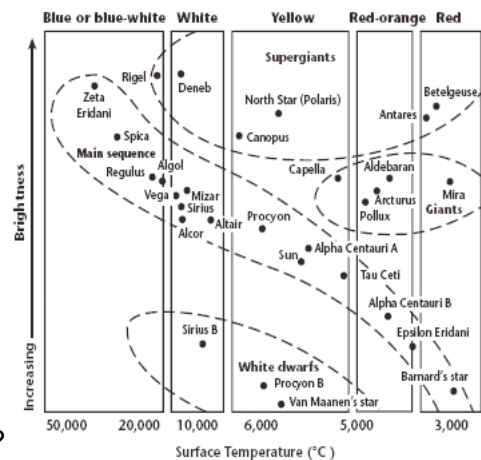


conclusion?

- A Alpha Centauri A is slightly cooler and slightly brighter than our sun.
- B Our sun is slightly cooler and slightly brighter than Alpha Centauri A.
- C Alpha Centauri A and our sun are exactly alike.
- D Our sun is hotter and brighter than Alpha Centauri A.

24

Hertzsprung-Russell Diagram



Where are the coolest, dimmest stars found on the diagram?

- A in the upper left-hand corner near Zeta Eridani
- B in the center of the diagram near Procyon
- C anywhere along the main sequence
- D in the lower right-hand corner near Barnard's star

- 25 What are the two chief components of a star such as the sun?

- A oxygen and hydrogen
- B nitrogen and carbon dioxide
- C nitrogen and hydrogen
- D hydrogen and helium

26 The more mass a star has the

- A faster it dies.
- B longer its life span.
- C slower it uses up its fuel.
- D more likely it is to become a nebula.

27 The sun that warms our solar system is one of billions of stars in the universe. How is the sun like all the other stars?

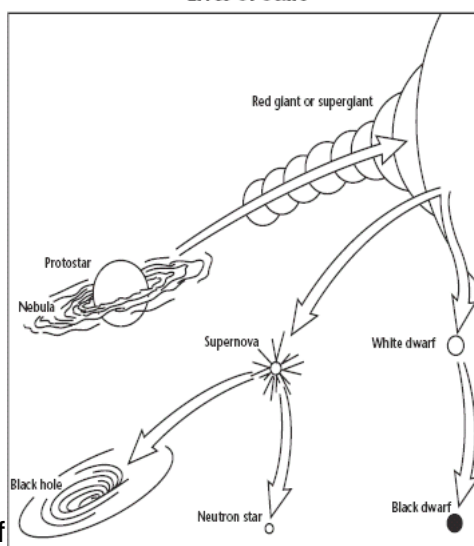
- A It is the same age.
- B It is the same size.
- C It is the same temperature.
- D It is made of the same materials.

28 Why does our galaxy, the Milky Way, look hazy when viewed on a clear, dark night?

- A The Milky Way is very far away.
- B Clouds of dust make the galaxy seem hazy.
- C City lights obscure a clear view of the Milky Way.
- D Other stars are too distant to see them individually.

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Lives of Stars

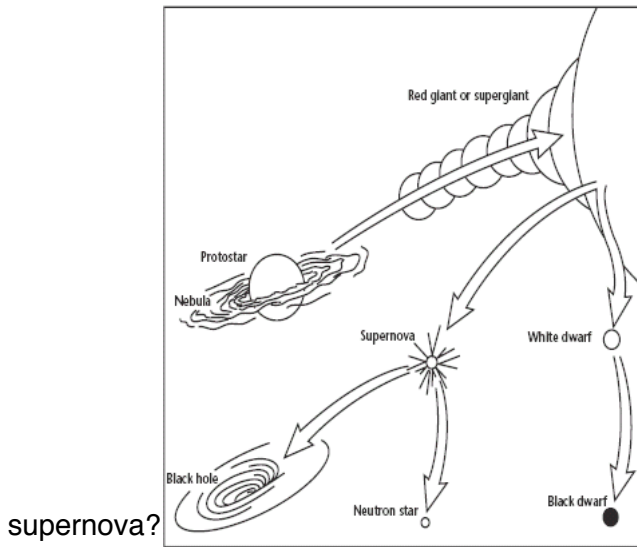


All stars begin their lives as parts of

- A nebulas.
- B black holes.
- C pulsars.
- D double stars.

- 30 What determines whether a star becomes a white dwarf or a

Lives of Stars



- A its color
B its diameter
C its mass
D its temperature
- 31 A light-year is
- A 365 days.
B the distance light travels in a year.
C the distance from Earth to Proxima Centauri.
D the amount of light the sun produces in a year.
- 32 The center of our galaxy is 25,000 lightyears away from Earth. Using this information, select the statement below that is true.
- A Light travels at 25,000 kilometers per year.
B Our galaxy is 50,000 light-years in diameter.
C It takes 25 years for light from the center of the galaxy to reach Earth.
D It would take 25,000 years to reach the center of our galaxy traveling at the speed of light.
- 33 Why do scientists use the speed of light to describe distances between stars?
- A Light waves can be detected only from distant sources.
B Telescopes can detect light-years more easily than kilometers.
C The speed of light is more easily measured than the speed of sound.
D Distances between some objects in the universe are too large to use kilometers.

34 A trip to Proxima Centauri at the speed of light would take 4.2 years. What is the distance from Earth to Proxima Centauri?

- A 4.2 million million miles
- B 4,200,000 miles
- C 4,200,000 kilometers
- D 4.2 light-years

35 One astronomical unit (AU) is defined as the distance of Earth from the sun, or 149,598,000 kilometers. The table shows the average distance from the sun, in AU, and the average orbital speed of the nine planets in our solar system. How much farther from the sun is Pluto than Earth (in AU)?

Planet Distance from the Sun and Orbital Speed		
Planet	Average Distance From the Sun (AU)	Average Orbital Speed (km/s)
Mercury	0.4	48.0
Venus	0.7	35.0
Earth	1.0	30.0
Mars	1.5	24.0
Jupiter	5.2	13.0
Saturn	9.6	10.0
Uranus	19.0	7.0
Neptune	30.0	5.1
Pluto	39.0	4.7

- A 4.2 AU
- B 8.6 AU
- C 18 AU
- D 38 AU

- 36 The largest asteroid is called Ceres. It orbits the sun at a distance of about 2.7 AU. Where is Ceres orbit located?

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Uranus	19.0	7.0
Neptune	30.0	5.1
Pluto	39.0	4.7

- A between the orbits of Earth and Mars, but closer to Earth
 B between the orbits of Earth and Mars, but closer to Mars
 C between the orbits of Mars and Jupiter, but closer to Mars
 D between the orbits of Mars and Jupiter, but closer to Jupiter

- 37 How does a star differ from a planet?

- A A star has a fixed orbit.
 B A star is self-luminous.
 C A star revolves about the sun.
 D A star shines by reflected light.

- 38 Which of the following makes a star visible?

- A emission of light
 B reflection of light
 C absorption of light
 D scattering of light

- 39 Milton observes Saturn through a telescope. What does he see?

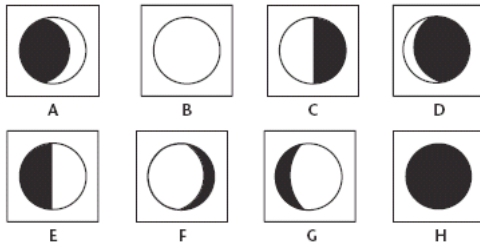
- A light absorbed by Saturn
 B light emitted by Saturn
 C light reflected by Saturn
 D light transmitted by Saturn

40 What produces light in a star?

- A combustion
- B fluorescent minerals
- C nuclear fusion
- D reflection of light from planets

41 What causes the moon to change its appearance as shown in the

The Phases of the Moon



diagram?

- A Different amounts of the moons surface emit light.
- B Different amounts of the moons surface reflect light.
- C Half of the moons surface emits light, but different amounts of this half are visible from Earth.
- D Half of the moons surface reflects light, but different amounts of this half are visible from Earth.

42 Four of Jupiters satellites can be seen from Earth using a telescope. What makes these satellites visible?

- A light emitted by the satellites
- B light emitted by Earth and reflected by the satellites
- C light emitted by Jupiter and reflected by the satellites
- D light emitted by the sun and reflected by the satellites

43 About how many times will the moon cycle through all of its phases in the time it takes Earth to make one revolution around the sun?

- A 1
- B 6
- C 8
- D 12

44 One complete revolution of Earth around the sun takes about

- A one rotation.
- B one season.
- C one year.
- D one eclipse.

45 What do all of the inner planets have in common?

- A They have the same period of revolution.
- B They have the same period of rotation.
- C They have the same diameter.
- D They are small and have rocky surfaces.

46 A total lunar eclipse occurs when

- A Earth blocks sunlight from reaching the moon.
- B the moon blocks sunlight from reaching Earth.
- C the moon passes partly into the umbra of Earth's shadow.
- D Earth's shadow allows a view of the sun's corona.

47 For a solar eclipse to occur,

- A the sun must be directly between Earth and the moon.
- B the moon must be directly between Earth and the sun.
- C the moon must be directly behind Earth.
- D Earth must be directly between the sun and the moon.

48 How is an object as small as the moon able to block out an object as large as the sun?

- A The moon absorbs light from the sun very well.
- B The moon is larger than scientists think it is.
- C The moon is not what causes a total solar eclipse.
- D The moon is much closer to Earth than the sun.

- 49 What generalization can you make from the chart regarding the period of revolution of planets as you move farther from the sun?

The Inner Planets				
Planet	Diameter (km)	Period of Rotation (Earth days)	Average Distance from the Sun (km)	Period of Revolution (Earth years)
Mercury	4,878	59	58,000,000	0.24
Venus	12,104	243	108,000,000	0.62
Earth	12,756	1	150,000,000	1.0
Mars	6,794	1.03	228,000,000	1.9

- A The closer a planet is to the sun, the longer its period of revolution.
B The farther a planet is from the sun, the longer its period of revolution.
C The longer the period of rotation, the longer the period of revolution.
D Distance from the sun has no effect on the period of revolution.
- 50 The period of revolution of Mars is to the period of revolution of Earth as the diameter of Mercury is to the diameter of which planet?

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Mars	6,794	1.03	228,000,000	1.9

- A Jupiter
B Pluto
C Earth
D Neptune
- 51 The asteroid belt is located
- A between Earth and Mars.
B between Mars and Jupiter.
C between Jupiter and Saturn.
D between Saturn and Uranus.
- 52 Scientists believe that the moon has been hit by numerous meteoroids because they can see that it has many

- A maria.
- B rocks.
- C valleys.
- D craters.

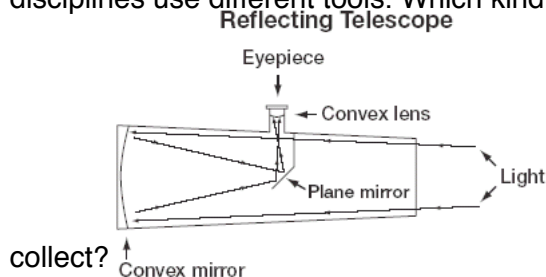
53 In a heliocentric system,

- A all of the planets revolve around the sun.
- B the sun revolves around Earth.
- C Earth is the center of the universe.
- D the sun appears to move backward among the planets.

54 Which is the smallest of the nine planets in the solar system?

- A Mercury
- B Venus
- C Neptune
- D Pluto

55 All scientists seek to discover information about the natural world, though scientists in different disciplines use different tools. Which kind of observations do scientists use the tool shown to



- A those using the sense of sight
- B those using the sense of smell
- C those using the sense of touch
- D those using the sense of hearing

56 What do scientists do to ensure that their investigations can be repeated and obtain the same results?

- A They write everything in code.
- B They keep their results secret.
- C They keep accurate and detailed records.
- D They publish their hypotheses on the Internet.

- 57 Scientists who study the solar system usually cannot perform controlled experiments. What do they use to test their hypotheses?
- A conclusions
 - B constants
 - C observations
 - D variables
- 58 The density of planets and other large objects is measured in kg/m^3 instead of g/cm^3 . The moon has an average density of $3,350 \text{ kg}/\text{m}^3$. Space probes have brought back samples of rocks from the moon. A 10-cm cube of moon rock has a volume of 0.001 m^3 . What would you expect the mass of this cube to be?
- A 3.35 kg
 - B 33.5 kg
 - C 3,350 kg
 - D 3,350,000 kg
- 59 The planet Mercury travels 2,874 km in one minute. What is Mercurys average speed in km/s? (Remember that $d = vt$)
- A 2,874 km/s
 - B 479.0 km/s
 - C 287.4 km/s
 - D 47.90 km/s
- 60 Many of the small satellites in the solar system have irregular shapes. Saturns moon Calypso is one of these. It can be approximated by a rectangular prism with length 15 km, width 8 km, and height 8 km. What is the approximate volume of Calypso?
- A 64km^3
 - B 120km^3
 - C 960km^3
 - D $1,200\text{km}^3$