

**Multiple Choice**

1. How large is the Milky Way Galaxy?

- A. It is the largest galaxy ever observed.
- B. It takes up over half of the known universe.
- C. It cannot be measured or compared.
- D. It is very small when compared to the universe

2. Which of the following correctly ranks astronomical objects by size, starting with the smallest?

- A. Earth, sun, solar system, galaxy, universe
- B. Sun, solar system, Earth, universe, galaxy
- C. Universe, galaxy, solar system, Earth, sun
- D. Solar system, Earth, sun, universe, galaxy

3. Which of the following best compares the amount of empty space in the universe to the amount of space galaxies occupy? Galaxies...

- A. take up about half of the space.
- B. take up most of the room in space.
- C. are less than half but more than a fourth of space.
- D. take up an extremely small amount of space.

4. Compared to our galaxy, how big is our solar system? The solar system is...

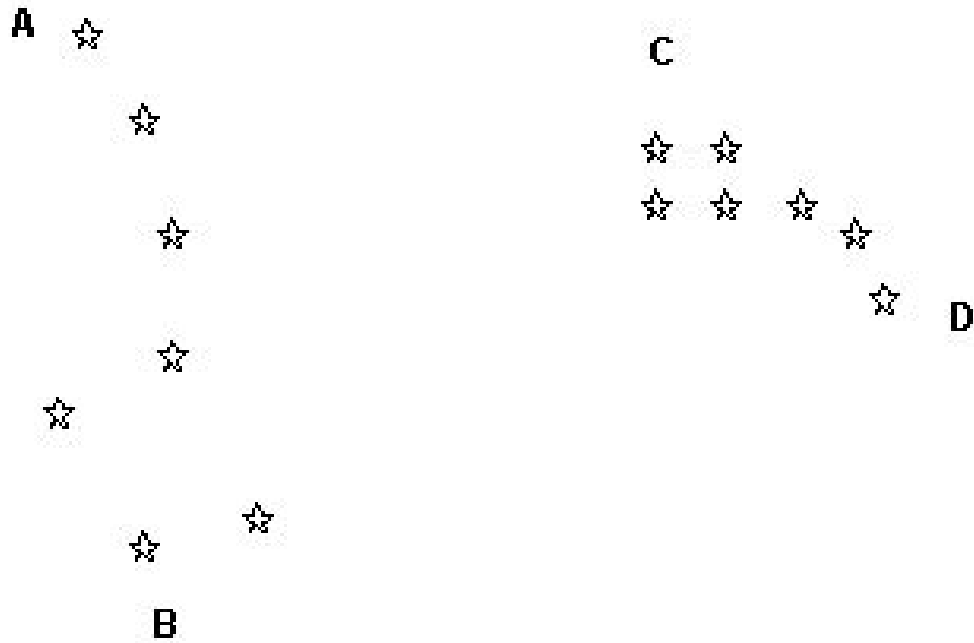
- A. extremely tiny.
- B. about one-tenth of the galaxy.
- C. about one-third of the galaxy.
- D. over half of the galaxy.

5. Our nearest star neighbor in space, Alpha Centauri, is four light years from Earth. Why will it be difficult to visit?

- A. It is very bright and hot.
- B. We are not sure exactly where it is.
- C. There may be no planets near it.
- D. It is very far away.

6. What are galaxies made of?
- A. moons and planets
  - B. two stars orbiting each other
  - C. about one hundred stars
  - D. many millions of stars
7. Why are distances in space often measured in light years?
- A. The light year is a commonly used unit of measure.
  - B. Distances in space are so great that a large unit is needed.
  - C. Scientists always use metric units like light years.
  - D. Light years are easy to measure and understand.
8. Early astronomers thought that galaxies were single stars. Why was this mistake easy to make?
- A. Galaxies are so far away that they look like a single star.
  - B. Galaxies are made of stars that you can only see one at a time.
  - C. Light from galaxies collects into a single beam.
  - D. Earth is small and galaxies are much larger.
9. What do the stars in a constellation have in common? The same...
- A. brightness
  - B. distance from Earth
  - C. size
  - D. general direction from Earth
10. Which stars do we always see during the year? Stars...
- A. on the horizon
  - B. over the North Pole
  - C. in the larger constellations
  - D. inside other galaxies

Use these constellations to answer the next two questions.



11. Which constellation is located between star “A” and “B”?

- A. Pegasus
- B. Cassiopeia
- C. Big Dipper
- D. Orion

12. What star is “D”?

- A. Antares
- B. Betelgeuse
- C. Polaris (North Star)
- D. Sirius (Dog Star)

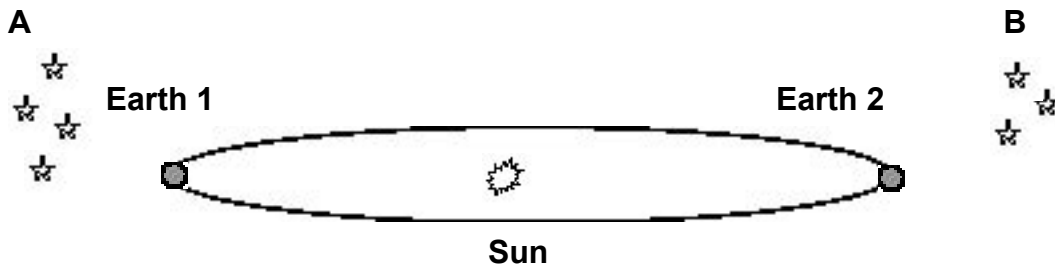
13. How were constellations originally named and identified?

- A. as people or animals they may have resembled
- B. mathematically, with numbers and coordinates
- C. in groups of very distant, bright or old stars
- D. by their location from Earth’s horizon

## Constructed Response

1. What are galaxies made of?
2. If you could travel outside the solar system and look back at it, what would you notice about the size of the planets?
3. Draw or describe where Earth is in space. Be sure to include its position in the solar system, galaxy and universe.

Use this diagram to answer the next questions. The Earth is shown in two positions. Two constellations “A” and “B” are shown.



4. Which constellation will people see when Earth is in position 1?
5. Why?
6. How long will it take before they can see the other constellation?
7. What are two ways this diagram is incorrectly scaled?

## Answers:

### Multiple Choice

1. D
2. A
3. D
4. A
5. D
6. D
7. B
8. A
9. D
10. B
11. C
12. C
13. A

### Constructed Response

1. *Many millions of stars*
2. *They are very small*
3. *Earth is the fourth planet from the sun, our sun is in an outer spiral arm of the Milky Way galaxy, the galaxy is in a cluster of galaxies called the Local Group and other groups exist in the far outer reaches of space.*
4. *Constellation A*
5. *The sun's light will block the view of constellation B.*
6. *6 months*
7. *The Earth is too large, the constellations should be much farther away.*

**Title: What is a Light Year?****Activity Description**

Students will calculate the distance light travels in one year.

**Materials**

A calculator

**Time Needed**

20 minutes

**Teacher Background**

It is important to work some practice problems with students before giving them this assignment. Some students will not yet have the math skills needed and will ultimately need to see the answer worked out. Be sure to give students time to figure distances for themselves, some will be able to do it.

**Procedure**

1. Tell students they are going to calculate the distance light travels in one year. To learn how to do that, they will start with some practice problems on the board such as:
  - a. If a car is traveling 60 miles per hour, how far does it travel in 4 hours?
  - b. If a car is traveling 60 miles per hour, how far does it travel in one day?
  - c. If a planet is traveling 100 miles per second, how far does it travel in a minute?
  - d. If a planet is traveling 100 miles per second, how far does it travel in an hour?
  - e. If a planet is traveling 100 miles per second, how far does it travel in a day?
  - f. If a planet is traveling 100 miles per second, how far does it travel in a week?
2. Explain that light travels very rapidly, at 186,000 miles **per second**.
3. Ask students to determine how far light travels in a year. Allow plenty of time for work.
4. Ask the students to show you their answers as they finish. Pick a correct answer and ask the student to go to the board and show the class how he/she found the answer.
5. They should arrive at the answer by the following method:

$186,000 \times 60$  (seconds in a minute)  $\times 60$  (minutes in an hour)  $\times 24$  (hours in a day)  $\times 365$  (days in a year)

Students may calculate days in a week, weeks in a month, and months in a year. They may get slightly different answers doing it this way.

Students may not understand their calculator when the answer is given. It will appear in exponent form because it is too large a number to fit on the screen.

The answer may appear as 5,865,696 E6. This means 5,865,696 times 10 to the 6<sup>th</sup> power (1,000,000) or 5,865,696,000,000 miles in one year.

Another way to say this is that light travels nearly 6 trillion miles in one year. Our nearest star neighbor in space is Alpha Centauri at about 4 light years away. That makes it 24 trillion miles from us.

6. Using a textbook or other source, you might have students calculate distances to other astronomical features.

**Title: Constellation Calendar**

**Activity Description**

Students choose constellations to draw as “art” for a calendar. They will describe three facts about each constellation.

**Materials**

Calendar pages (see below) markers (glow in the dark markers would be fun) resource materials (astronomy books, Internet, encyclopedias)

**Time Needed**

This will vary depending on whether students work in groups or alone. If in groups will take about 60 minutes. Individuals will take 60 minutes of class time plus time at home or the next day.

**Procedure**

1. Print off calendar pages by changing the month and date on the calendar page below then print each page. Hand out calendar pages to students. They can be a full size piece of paper or you can shrink them to half-page size. They will be stapled in the middle.
2. Place students in groups if desired. Four is a good number. Each student would research 3 constellations.
3. Tell students they need to draw the constellation on the “picture” part of the calendar and write three facts in the box. They will get the facts from the resources you provide.
4. Have students share information within their groups to complete each calendar.

**Scoring Guide**

1. *Student researches and draws three constellations.....20 pts*
2. *Student shares information with group..... 5 pts*
3. *Students completes own calendar.....10 pts*
4. *Calendar is neat.....5 pts*
6. *Calendar has three facts for each constellation.....10 pts*



	<b>Constellation Name:</b>
	<b>Facts:</b>

February 2002								
Sun	Mon	Tue	Wed	Thu	Fri	Sat		
27	28	29	30	31	1	2		
3	4	5	6	7	8	9		
10	11	12	13	14	15	16		
17	18	19	20	21	22	23		
24	25	26	27	28	1	2		
3	4	5	6	7	8	9		