

EU9.1

Inquire into the motion and characteristics of astronomical bodies in our solar system and the universe.

(h) Compare the composition and physical characteristics of astronomical bodies within the solar system, including the planets, comets, asteroids, and meteors, using appropriate scientific terminology and units (e.g., light years, astronomical units).

- A. Define the distance of an Astronomical Unit (au).
 - B. Determine the speed of light in m/s, km/s and au/h.
 - C. Research the deep space probe Voyager 1. Find the speed of Voyager 1 in both km/h and au/year.
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- 1. Voyager 1 launched from earth on September 5, 1977. Using the information found above, calculate the current distance of Voyager 1 from earth in both au and km.
 - 2. Using Voyager 1's velocity, calculate the shortest time it would take for a deep space probe to reach the planet Jupiter from earth.
 - 3. Calculate the time it would take for the light from the sun to reach Earth, Jupiter and Neptune
 - 4. Determine which star, other than our sun, is closest to earth. Calculate the time it would take the Voyager probe to reach this star.
 - 5. Assuming a flight speed of 800 km/h (and many other hypothetical scenarios), how long would it take a Boeing 777 jet to travel from the earth's orbit to the moon?

Answers:

Define the distance of an Astronomical Unit (au).

149 597 871 kilometers

Determine the speed of light in m/s, km/s and au/h.

299 792 458 m / s

7.208 au / h

299 792 km / s

Research the deep space probe Voyager 1. Find the speed of Voyager 1 in both km/h and au/year.

62,136 km/h

543 192 912 km / a

3.49 au / a

Voyager 1 launched from earth on September 5, 1977. Using the information found above, calculate the current distance of Voyager 1 from earth in both au and km.

129.1 au

20 108 458 409.3 km

Using Voyager 1's velocity, calculate the shortest time it would take for a deep space probe to reach the planet Jupiter from earth.

Velocity = 62,136 km/h

<http://www.universetoday.com/15462/how-far-are-the-planets-from-the-sun/>

Jupiter

Distance = 588 000 000 km

Time = 9463.11 h = 394.30 d = 1.08 a

Calculate the time it would take for the light from the sun to reach Earth, Jupiter and Neptune

Velocity = 299 792 km / s

<http://www.universetoday.com/15462/how-far-are-the-planets-from-the-sun/>

Distances are using average distances

Earth

Distance = 150 000 000 km

Time = 500.35 s = 8.34 min

Jupiter

Distance = 779 000 000 km

Time = 2598.47 s = 43.31 min

Neptune

Distance = 4 500 000 000 km

Time = 15010.41 s = 250.17 min = 4.17 h

Determine which star, other than our sun, is closest to earth. Calculate the time it would take the Voyager probe to reach this star.

Proxima Centauri 4.24 Light years away or 277 600 au

Velocity of 3.49 au / a

Time = 79541.54 years

Assuming a flight speed of 800 km/h (and many other hypothetical scenarios), how long would it take a Boeing 777 jet to travel from the earth's orbit to the moon?

Distance = 384 400 km

Velocity = 800 km / h

Time = 480.5 h

Time = 20.02 days