Inquiry Research Report #21
Investigating Extra-solar Planets

Formulate a Question, Pursue Evidence, and Justify Your Conclusion

Your task is to design an answerable research question, propose a plan to pursue evidence, collect data using heavens-above (or another suitable source pre-approved by your lab instructor), and create an evidence-based conclusion about some motion or position of the Sun in the sky that you have not completed before.

Research report:

Specific research question:

Is mass of an extra-solar planet correlated to the mass the star that it orbits?

Step-by-step procedure to collect evidence:

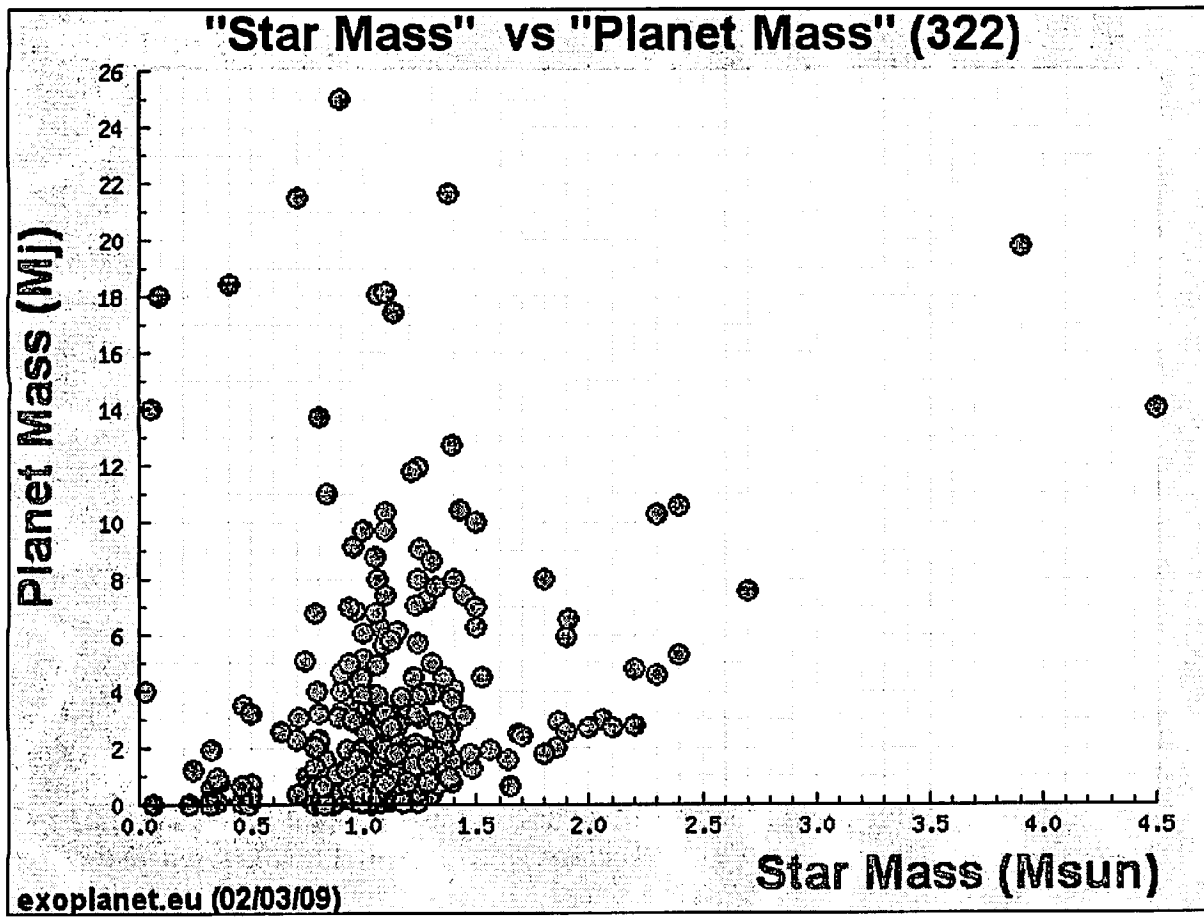
Using the Extrasolar Planets Encyclopedia at http://exoplanet.eu/catalog-all.php
1. Make measurements of the masses of all known extra-solar planets and the masses of the stars that these planets orbit.
2. Plot the masses of each of the extra solar planets against the mass of the stars they orbit. This means the *y*-axis is extra-solar planet mass in terms of Jupiter's mass and *x*-axis is the mass of the stars that extra-solar planets orbit in terms of the Sun's mass.

Data table and/or results

See next page.

Evidence-based conclusion statement:

Only stars that have a mass very similar to the mass of the Sun have planets orbiting them.


"Star Mass" vs "Planet Mass" (322)
Planet Mass (Mj)
Star Mass (Msun)
exoplanet.eu (02/03/09)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

Inquiry Research Report #22
Observing The Moon

Formulate a Question, Pursue Evidence, and Justify Your Conclusion

Your task is to design an answerable research question, propose a plan to pursue evidence, collect data using Solar System Simulator (or another suitable source pre-approved by your lab instructor), and create an evidence-based conclusion about the orbit or motion of a planet or moon that you have not completed before.

Research report:

1) Specific research question:

Exactly how many days is the Moon's orbital period around the Earth?

2) Step-by-step procedure to collect evidence:

Using the Solar System Simulator at http://space.jpl.nasa.gov// (observe from Sun's vantage point)
1. Beginning Feb.14, 2009, observe the Moon/Earth system every 4 days for 3 months.
2. For each observation, measure the distance between the centers of the Earth and Moon.
3. Making measurements with a *Squigit* ruler, mark down on which side of the Earth the Moon is located, left or right.
4. Record measurements in a table, and plot the data in a graph of Distance vs. Time to determine the orbit period of the Moon around the Earth.

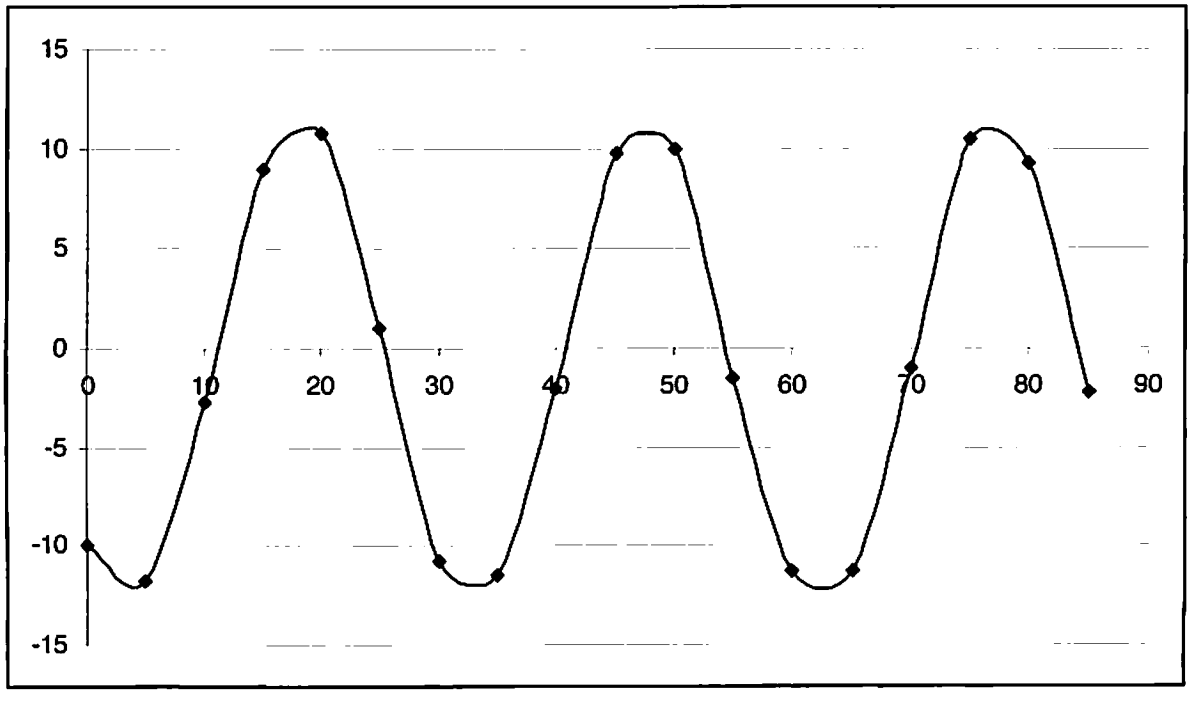
3) Data table and/or results:

See next page.

4) Evidence-based conclusion statement:

Exactly 30 days

Date	Distance	Left/Right
14-Feb	10	L
19-Feb	11.75	L
24-Feb	2.75	L
1-Mar	9	R
6-Mar	10.75	R
11-Mar	1	R
16-Mar	10.75	L
21-Mar	11.5	L
26-Mar	2	L
31-Mar	9.75	R
5-Apr	10	R
10-Apr	1.5	L
15-Apr	11.25	L
20-Apr	11.25	L
25-Apr	1	L
30-Apr	10.5	R
5-May	9.25	R
10-May	2.25	L



Inquiry Research Report #23
Classifying Extra-solar Planets

Formulate a Question, Pursue Evidence, and Justify Your Conclusion

Your task is to design an answerable research question, propose a plan to pursue evidence, collect data using the online extra-solar planets database (or another suitable source pre-approved by your lab instructor), and create an evidence-based conclusion about extra-solar planets that you have not completed before.

Research report:

Specific research question:

Do extra-solar planets with orbital distances similar to that of the Earth-Sun distance also have masses similar to that of Earth's mass? (*In other words, does Earth-distanced correlate to Earth-massed?*)

Step-by-step procedure to collect evidence:

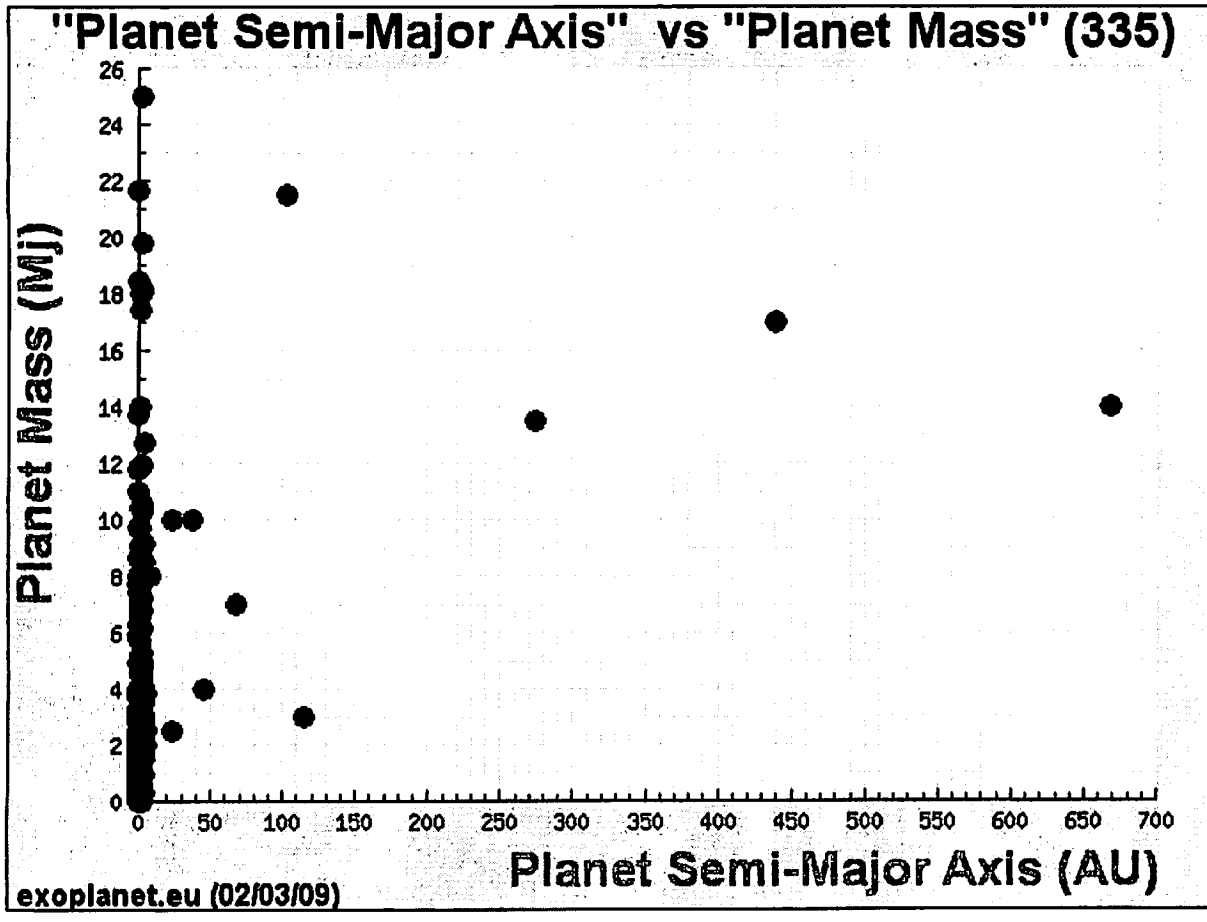
Using the Extrasolar Planets Encyclopedia at http://exoplanet.eu/catalog-all.php
1. Make measurements of the orbital distances and masses of all known extrasolar planets.
2. Plot the masses of each of the extra solar planets against their orbital distance (semi-major axis). This means the *y*-axis is extra-solar planet mass in terms of Jupiter's mass and the *x*-axis is the mass semi-major axis in units of AU.

Data table and/or results

See next page.

Evidence-based conclusion statement:

There appears to be no correlation between a mass and orbital radius for planets with orbital distances similar to that of the Earth.


"Planet Semi-Major Axis" vs "Planet Mass" (335)
Planet Mass (Mj)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
Planet Semi-Major Axis (AU)
exoplanet.eu (02/03/09)