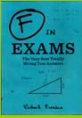


Give the names of two gases that might contribute to global warming.

1. Bottom gas
2. Cow burps





More science from
Richard Benson


Name an environmental side effect of burning fossil fuels.

Fire


Give three ways to reduce heat loss in your home.

1. Thermal underwear
2. Move to Hawaii
3. Close the door



The Math-Science Partnership Project Day-3, Wednesday



Schedule:

1- Discussion of the overnight homework		
2- Jupiter's moons- Gordon		Morning Break
3 - The Notre Dame Library Special Vernier Collection		Lunch
4 - From the kits - developing Vernier extension #2		
5 - Developing a Vernier measurement extension		Kent's GI notebooks
continued		Afternoon Break
6 - Presenting our SIP extension (white-board reporting out...)		
7 - Completing one-page report (preliminary version)		

What's your Story?.....

Galileo and the moons of Jupiter

Galileo did not invent the telescope – but as soon as he heard about its invention, he made his own, and improved on the original models until he had a telescope that magnified 20 times,

Here is one of his telescopes that magnified a factor of 14 that he used to look at the planet Jupiter in 1610



What did Galileo see???

He already believed in the Copernican system of the sun at the center of the solar system, with the planets (the wandering stars) revolving around it.

And all the rest of the stars were a long way away and fixed in the heavens....

Here is what he saw looking at Jupiter.....

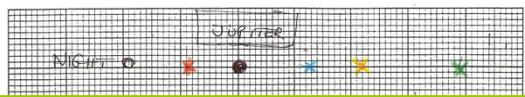


Observing Jupiter Night 0

-2 -1 1 2



Here is my reproduction of his drawing....



Data from Night-0

Note that he draws the 4 bright "stars" as stars –
- which SHOULD NOT MOVE...

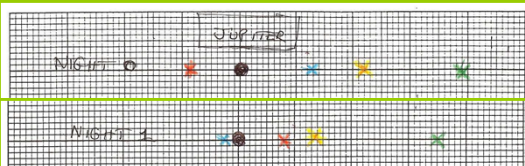
I have colored in the "stars" as red, blue, orange
and green – just to distinguish them

What did Galileo do next????

In the daytime, he went to church....



The next night.....



Data from Night-1

Did the 4 bright "stars" MOVE...???

YES!

I have colored in the "stars" as red, blue, orange
and green – just to distinguish them – Galileo
had to guess which was which!!!

What did Galileo do next????

In the daytime, he went to church....

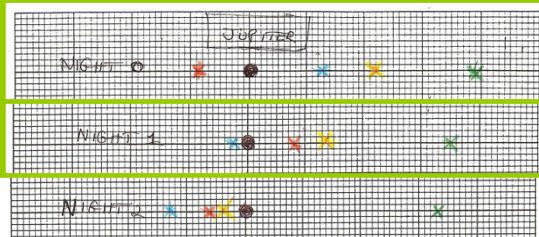


Can we predict

where the 4 stars

will be tonight????

Try it out on your graph paper.....



What did Galileo do next????

In the daytime, he went to church....

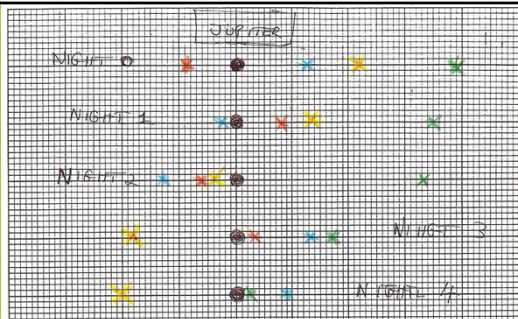


Can we predict

where the 4 stars

will be tonight????

Try it out on your graph paper.....



Here are more two nights --- only three "moons on night 4 -- where did the other one go?

Are you starting to see some patterns??

What did Galileo do next????

In the daytime, he went to church....

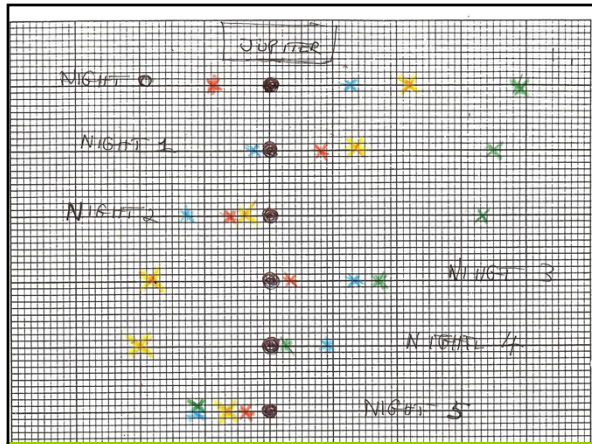


Can we predict

where the 4 stars / moons

will be tonight????

Try it out on your graph paper.....



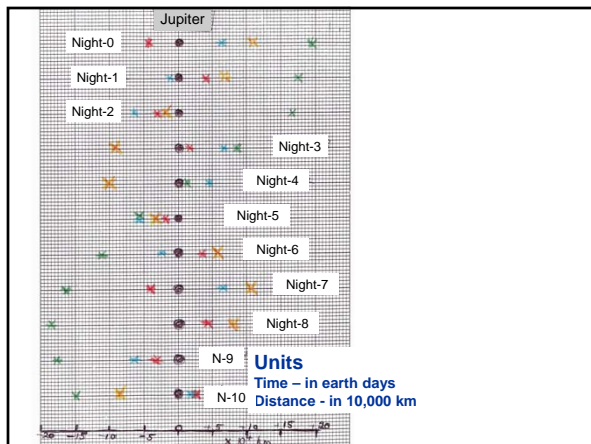
In the daytime, he went to church....



Galileo measured for eleven nights –

Some of the nights were cloudy and he saw nothing

I have changed history just a little so that we can see the positions of all four moons all eleven nights.....

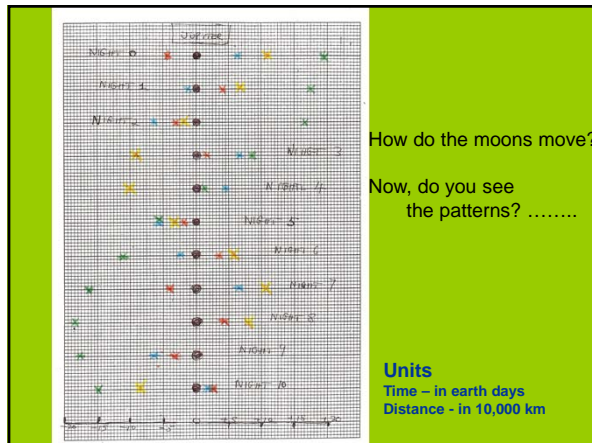


Why did Galileo look at Jupiter?

Why did Galileo repeat his observation?

What question(s) did Galileo ask?

What did Galileo do that helped answer his question(s)?



How do the moons move?

Now, do you see the patterns?

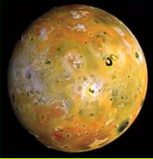
We can use your drawings to construct the orbital motions of the four planets....

Try connecting the positions of each planet from one day to the next day

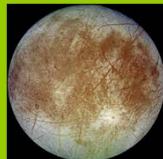
What can you find out about the time for each moon to go around Jupiter?

Or about how far away each moon is from Jupiter?

The **Galilean moons** are the four moons of Jupiter discovered by Galileo Galilei in January 1610. They are the largest of the many moons of Jupiter and derive their names from the lovers of Zeus: Io, Europa, Ganymede and Callisto. They are among the most massive objects in the Solar System outside the Sun and the eight planets, with radii larger than any of the dwarf planets.



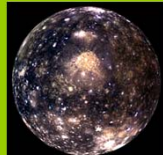
Io
(#1
Red)



Europa
(#2
blue)



Ganymede
(#3
Orange)



Callisto
(#4
green)

Hans Lippershey made the earliest known working telescope in 1608

Galileo's improvements enabled him to see the moons of Jupiter, and also the phases of Venus

