CANS OF JAM²

issue 15, Bastille Day, July 2012

TO THE SKY AND BEYOND!

OR NOT.

CANS OF JAM²

From the editors

That is it : another school year is finished!
But before everyone goes on holiday, here is the latest issue of *cans of jam²*, to read on the beach or wherever you go...
This issue should have been called 'to the sky and beyond', and should have contained numerous articles about the last experiment of the year with the two groups of *première* pupils : making rockets out of plastic bottles and sending them in the air with a secret fuel (clue : one of the components is vinegar); unfortunately, not one rocket left the ground, so no articles were written... But we will try again, and this time, we will succeed, hopefully!
Still, some of the rockets were nice, as you can see on the cover, and it nearly did not rain ...
We wish you a very pleasant summer, and great holidays to those of you who have got some!

Willy B. and Didier G.

News from Space in brief

by Jean C.C.

On the 2nd of May, the European Space Agency announced its future mission. This mission is called "Jupiter Icy Moons Explorer", the operation's name is "Juice", and the estimated date for contact is around 2030. That promises us a lot of very beautiful pictures of the biggest planet of the solar system and of its satellites.

Obviously, we must be patient, it will only be in 2022 that an Ariane 5 rocket will launch the Juice spacecraft from Kuru in French Guiana. Then, it will take eight years to cover the 800 million km up to Jupiter.

But around Jupiter there are 60 satellites, and Juice is going to see one in particular : Europe, a ball of ice the size of our moon. Why? To see if this satellite could be inhabited. Indeed, below the ice there is an ocean...

CANS OF JAM²

The destiny of our galaxy, the Milky Way

by Julien D.

In four billion years, our galaxy will collide with one of its nearest neighbours, Andromeda.

Andromeda today

The astronomers of NASA can now be sure of that thanks to the analysis of many information from the Hubble Space Telescope. By deducing from those measures the speed and direction of Andromeda, they put a stop to nearly a century of speculation. The first cataclysmic collision is not expected before 4 billion years.

Andromeda in 2 bn years

By then, man will probably have disappeared from the surface of the Earth.

Andromeda in 3.75bn years

The collision between the two giants would anyway not necessarily be fatal. When the two giants collide, the hundreds of billions of stars in them, separated from each other by millions of kilometers, should not destroy each other. The greatest risk would actually be to see our star, and the Earth, thrown out of the galaxy by the colossal forces of gravity.

Andromeda in 5.1 bn years

It is more probable that the Earth will stay quietly in the new galaxy that will result from this collision. Indeed, the two spirals will eventually merge into one large elliptical galaxy between 1 and 2 billion years after the initial collision.

CANS OF JAM²

The destiny of our galaxy, the Milky Way, *continued*

by Julien D.

For now, Andromeda, also known as M31, is located 2.5 million light years from our galaxy. We can see it in the sky as a tiny dot like a star.

When moving closer to us at a speed of 400,000 km / h, it will become at least as bright as the Milky Way in about 2 billion years.

Andromeda in 7 bn years

the collision, first phase

the collision, second phase

Readers' e-mails (translated and corrected by the editors)

Dear colleagues,

As I am leaving the academy of Amiens for the academy of Versailles, I want first to thank you for your regular production of the always interesting *cans of jam²*, and second, to ask you to send them to my colleague Pierre Daussin who will put them on the academic site from now on.

I wish you very good holidays,

Sincerely,

Christiane, from Amiens (60) but soon from Versailles (78)

Thank you Madam for your support, and all our best wishes in your new life...

the editors

CANS OF JAM²

Readers' e-mails, *continued*

7x31+4x30+28,25=365,25
(21+12)x(25+3)+(5-4)²x2=926
7x(5x4x2+1)=287
3,5x10x5x2+5+2:(3-2)²=357

However, I did not find a solution for the numbers 45 - 36.2 - 30 - 10. I hope you will give it in the next issue!
I also hope that you are well. You must look forward to the holidays. See you (hopefully) soon.

Guillaume, from Faverges 74

Well, as expected, Guillaume, you have been the most thorough in our mathematical challenge, and you seem to have had fun doing complicated things! Since your answers are all correct, they will be the magazine's solutions, even if there were more simple ways... Here is what Jean proposed for the last one :
 30x10= 300   300+36.2=336.2   336.2x45=15129   √(15129)=123
A trifle vicious, though, we have to admit...

the editors

To all the poor physics teachers who have used the old, tired VHS tape on the comparative sizes in the universe...
http://htwins.net/scale2/
Long live the internet!
Scientific greetings!

Florence, from Sweden

Now, this site is really incredibly well done; and as we gave the information to some of the physics teachers in the school, here are some of their reactions.

the editors

Thank you for this video, it's great ! can you find it in Spanish now please ? See you soon.

Yolande (teacher of physics and chemistry in Spanish), from Beauvais (60)

Excellent !
Congratulations [Florence] for this high-quality find!

Gérald, from Saint-Léger (60)