



PO Box 17 MINTO NSW 2566

MACARTHUR ASTRONOMICAL SOCIETY Minutes MANAGEMENT COMMITTEE MEETING

Held at Durham Green Retirement Village, 153 Menangle Road, Menangle.
Monday 2th Sept 2019 at 7.30pm

Committee Attending: Allan Hobbs(President), Barry Moore (Secretary), Greg Bradford (Committee Member), Phil Kidd (Committee member), Andy Milton (Treasurer), Henry Swierk (Membership Officer).

Apologies: Brendon Waterhouse (Merchandising), John Rombi (Vice President)

1. OPENING OF MINUTES AND APOLOGIES: meeting opened at 7:33pm

2. ADOPTION OF MINUTES for August committee meeting held 5/8/2019 Proposed by Barry Moore seconded by Allan, Passed.

3. BUSINESS ARISING FROM PREVIOUS MINUTES:

none

4. REGULAR BUSINESS

4.1 Treasurer's Report: Barry Moore for Andy Milton

Macastro Financial report and Bank Statement transactions for August 2019.

The Society Bank Account balance as at 31 Aug was \$18275.62

The Society Investment Account \$21000

The society Paypal account was \$100

Cash to be banked \$30 (from sale of an Image)

The Number 2 Account (China) has a residual amount of \$3.64 representing sundry interest payments

Date	Amount	Details	Comment
30/08/2019	36	Direct Credit Elizabeth Arcadi	Student membership
30/08/2019	72	Cash deposit	Oran park and forum donations
23/08/2019	-12	Direct Debit 279234 PAYPAL AUSTRALIA 1006420861186	extra key for mailbox
21/08/2019	20	Direct Credit 106600 Tony Law Donation- for imag	image sale
19/08/2019	-99.46	Direct Debit 279234 PAYPAL AUSTRALIA 1006375800707	flowers for Andy wife funeral
16/08/2019	1840	Direct Credit 101236 Campbelltown Cit E162486	invoice for One Giant Leap
15/08/2019	165	Direct Credit 144630 ROADSHOW FILMS P FN317	refund from Roadshow
7/08/2019	-99	Chq 000722 presented	new paypal machine
31/07/2019	525	Direct Credit 048767 BDCU cuttawayhill	invoice for One Giant Leap

There are is an outstanding payment to be made:

- One giant leap \$4500 for July 21 event - invoice has been received

There a number of receipts due to Macastro:

Australian Botanic Gardens - \$1000 new invoice template created and sent 6th Aug 6/8/2019.

Action Allan to edit and then send of Invoice to ABG

Andy will now resume the treasurers role after his operation.

Report proposed by Barry Moore for Andy, seconded by Allan

4.2 Membership: Henry Swierk

1 new member since last report. Elizabeth Arcardi (Student)
Membership at the end of Aug: 134 members in total including 6 Hon. 3 Assoc.

4.2.1 New 20 year badge. Has been Ordered.

4.2.2 We do not have a formal policy on members data (email, address etc) –
Action: Committee has declared that membership officer will only send the minimum details to a requesting officer (e.g. schools asking for WWCC). All committee members have full access if needed to the data. A normal member can request a member's phone number or email address **only** if needed for a good reason.

4.2.3 The committee had a Discussion on the changeover of committee members names on public internet sites (e.g. Wikipedia). We need to keep a full list of where the changes are needed.

Moved by Henry Seconded by Alan Passed

4.3 Merchandise: (reported by email from Brendon Waterhouse)

Total Monetary transactions by Merchandising. – Note sales/donations from One Giant Leap not reported fully (one cup and six pens at least though – some sale items are in treasurers receipt book)

Action: Barry, Brendan and Andy to confer and seek the full details.

Initial Cash Balance April 2018	\$96.00
Cash Allotted from Sales or Donations into COH	\$27.90
Cash awaiting Allotment	\$30.00
Total Cash Held by Merchandiser	\$153.90
Total cash till - Cash On Hand – (COH)	\$123.90

1 - 50 Year Event entries

a) Donations - \$6.50 from OGL event (reported by Tony, money with Tony?)

b) Poster sales I have entered these as donations but only dated the 21st July 2019 for ease of tracking.

Committee reports that 7 sales of \$30 and 2 sales of \$10 in posters, Two or three posters left over at present.

2 - Quote for Order with out of stock items has been placed. - 12 Caps, 4 Beanies, - please wait for further information of cost and payment.

3 - Astro 2020.Spreadsheet has been edited for pending stock. Email has been sent to gain this years costings ready for the up-coming forum.

4 - Speaker gift. Dr Lee Spitler (Mac Uni + AAO), kindly gave back the gifts at the end of the forum, mentioning he has received plenty prior. I offered any other merchandise item, however he again did not take anything.

Report moved by Barry , seconded by Andy

4.4 Forum Speakers

Action: Please NOTE all forums and Public outreach is by GOLD coin Donation – do not use the words Free from now on in ANY publicity Including facebook and website.

- **However Business arising..**

Roger (website officer) pointed out in an email that this may jeopardise our free lecture room at UWS. Allan contact committee by email to retract above 'action point' and stated we should use the words **"Free – Gold coin donation appreciated"**

This month: 16th Sep 2019 Marnie Ogg - "The effects of Light Pollution on Astronomy & the Environment"

Next Month 21st Oct 2019

Prof. Geraint Lewis (USYD) Cosmology

Full list of future presenters is listed below

18th Nov 2019	Dr Brad Tucker (ANU)
9th Dec 2019	Fifth Annual Students Night
Early 2020	Dr Jessie Christiansen TES - NASA
18 May 2020	Dr Luke Barnes

4.5 General Business

4.5.1 The Dudley Chesham redevelopment -- on going

4.5.2 "What we do" or "About Us" - Allan Hobbs - pamphlets - on going

4.5.3 Andy to create a Members attendance record at observing nights and also Public outreach night. On going

4.5.4 Request for "Services & Support document Form". Greg has sent a copy editable PDF to all committee members for discussion - committee agreed to use this from now on (version 4 to be approved with times of start and end to be added to form).

Barry has created a new invoice template with ALL the details required. Needs to be filled out when a booking requiring a payment is made. (see end of this document however some adjustments will be removed as these details already covered by Services & Support document Form).

4.6 Regular Viewing

4.6.1 Stargard - 24 Aug - 11 telescopes and a good night

Future dates. 21 Sep, 19 Oct, 21 Nov, 21 Dec.

4.6.2 **The Forest** 30/31 Aug + 1 Sep 5 telescopes and Macarthur Photographic Society joined us - very dewy but clear sky.

Future dates. 27/28/29 Sep, 25/26/27 Oct, 29/30 Nov + 1 Dec, 27/28/29 Dec.

4.7 **Public Outreach** - current dates that are set for 2019. See website Calendar for confirmation close to date

7th **Sept Sat** - Public Stargazing #3 at the Domes

5th **Oct Sat** - Public Stargazing #4 at the Domes (Sunset at 7.30pm later start needed)

4.7.1 Sun July 21 Afternoon 12:56pm, Apollo 11 to STEM and the Next Giant Leap

Apollo Event Survey Results is appended with this document.

Actions:

Committee has carefully read the survey and found that there is considerable valuable information that will be adopted at future events. Some comments in the survey are understandable and a bit petty, others will be adopted. Some points that can be reiterated

- Limit events to 250 people max in future
- Only have one or two MAS **approved** photographers at events
- Don't run events over lunch to avoid having to provide catering
- Handbills (flyers) are not effective
- Two many raffle prizes and need clear instructions on how the raffle is to run
- A lot of work for a few people, more commitment needed from **all** members or it just won't go ahead.
- Without the hard work of the key organisers to obtain sponsors the event would have been a financial loss.

The committee formally thanked the excellent hard work of all members involved and particularly Tony Law and Greg Bradford

Mike Nichols as and Robert Bee have co authored an article for OGLA – see appended document item at end of minutes.

4.7.2 Mentoring. St Benedict's (Junior High School) and Picton High School

Report from Phil Kidd 1/9/2019

St Benedicts College

The organizing teacher was unable to provide student numbers or topics until late of Friday 30 August. Three students opted to do topics, Two from Year 7 (one of these with special needs) and one from Year 9. Ric Forster, Darryl Salmon and Elizabeth Arcadi were prepared to mentor these students, but all were concerned with the age of the students and the limited time to complete topics.

On Monday 2 September, I was contacted and informed that it seemed doubtful that the Year 9 student would participate, leaving only two Year 7 students. The teacher and I reached an agreement that the projects should be postponed until next year.

Picton High School

Three students elected to participate – one Year 8 and two Year 12. The Year 12 students would not be able to attend the initial meeting and presentation. Tony Law and Phil Kidd were prepared to mentor the Year 12 students. The Year 8 student selected the moons of Jupiter, but the mentor was unable to proceed with the topic. As at 3 September, Mark Brackenbury was negotiating with the teacher at Picton High School regarding these projects.

Recommendations:

1. When the MAS observing schedule is established for 2020, dates also be scheduled for mentoring, including dates for initial presentations and students numbers and topics confirmed.
2. Expressions of interest for mentors be established early in 2020 for first half year and second half year sessions.

Report 1/9/2019 Dear Committee Members,

As of today, we have the following actions:

Schools presently using our speaker service for engagements with students at school are Bringelly Primary, Elizabeth Macarthur High and the Macarthur Anglican School. The presenters are Robert Bee and John Rombi.

You will recall that last month we had to decline two requests from high schools.

The recent action by Roger Powell of adjusting the enquiry email address on our website is an improvement. I have received an inquiry by this means.

Regards, Mike Nicholas

Allan has been in contact with Local State member for grant money. Grant money could be used to recompense mentors for their time. A sub committee is to be formed to look into this.

General discussion was made about the problems of providing mentors to mentor just two students for several weeks. A lot of time is spent with a student to obtain photos or data that cuts into the member's personal time.

There is also a limited observational window (clear skies, weekend nights no moon etc) that also prevents the mentor mentee doing any observation. The club needs to find out what Mentors we have and what time they can offer before the club commits to running Mentor program next year.

4.8 Members' Trips

4.8.1 JPL July 2021 *On Going*

4.9 Fundraising

4.9.1 Members have been asked to consider donations of their Bottles and Cans at recycling depots – three month duration in total.

4.10 Website, Facebook –

Tony suggested that we meet with Chris and Roger to formalise what's required for the new website.

4.11 Publicity and Secretary report by Barry Moore

4.11.1 Publicity for the next forum Sept 16th and Public Outreach Sept 7th have been sent to Advertiser and Chronicle.

4.11.2 Secretary will forward minutes as soon as they are approved by committee to Roger (webmaster) for member's perusal. Ongoing item

4.11.3 Mail box has been checked each week – nothing to report – 2nd key is with Andy

4.11.4 Attendance – August Forum

as per sign-on book: 33 members, 6 Non-members; total 39

4.12 Correspondence

Received. emails

- Invoice from one Giant Leap
- From Mike Nicholas re mentoring

Emails regarding the dropping of the Newsletter for discussion – requested by Allan.

From Alan, Members Notices

Newsletters

Members are advised that our monthly newsletter has been discontinued for the foreseeable future.

For details of all our scheduled activities - both for members and for the public - please bookmark this web page. Our regular activities are also posted on our Facebook group page, which is the best place for members to check for any late changes to events or postponements due to weather.

From Tony,

How and why has this been decided without being discussed by the committee?

Cheers, Tony

Hi John

Following on from our conversation last night. Email communication is the only way to get to all members. Sending messages out one at a time becomes very messy and people switch off. A newsletter with all the salient facts from the last month and the next few months is essential!

Cheers Tony

From: Greg

Sent: Tuesday, 20 August 2019 10:43 AM

To: John, Barry, Phil, Andy, Allan

Subject: Re: Newsletter

Hi John,

Given the fact that not all members are on Facebook and the fragile nature of our website, it would be a good move to keep issuing it.

The information has to be written somewhere, so why not a common document that could be pasted/emailed easily ?

Cheers, Greg

----- Original Message -----

From: John
To: Greg, Henry, Barry, Phil, andy
Sent: 12/08/2019 2:34:25 PM
Subject: Newsletter
Dear CM's,

Allan & I have been having a discussion about The MAS monthly newsletter.
We would like your opinion on whether to continue this task each month.
Please let me know as soon as practicable.
Cheers, John.

Basic MAS Newsletter in Word - Just insert images and notes!
Sent by Tony.

NOTE emails edited to remove actual email addresses (BM)

Sent.

- email to Members re cash a can
- email to Members re help with public Outreach night and attendance at Next Forum

5. NEW BUSINESS

5.1 Continuation of the Monthly newsletter – for discussion (see emails above in correspondence)

Actions.

1. Members will be asked to see if a newsletter editor can be found at the next Forum and in the next month.
2. It was discussed that the Macastro Facebook needs a “sticky” link that directs members to the calendar and /or what’s on page of our website.

6. NEXT COMMITTEE MEETING:

7.30pm Tues October 8th 2019 at Allan Hobbs, Durham Green Retirement Village, 153 Menangle Road, Menangle.

(Note this was changed to Mon October 7th BM)

7. CLOSE OF MEETING 21:57

Typed by Secretary, Barry Moore on 2/9/19, edited 9/9/19 and 15/9/2019

Approved by Allan Hobbs Date 7 October 2019

Apollo Event Survey Results - Summary

The (Very) Good....

This document summarises and combines results from two surveys - one for members and one for non-members.

- *Very good survey response rate - 53% of members attending, 49% of non-members attending. Approx 28% of the total attendance.*
- **96% of respondents rated the event as Excellent or Very Good.**
- *Pricing of the event was considered appropriate by 61% of respondents. 6% considered it too expensive, (including 11% of the members responding) while 33% overall would have been prepared to pay more.*
- *The vast majority - 85% - thought the length of the event was "About Right", 15% said it was too long.*
- *Morning Sessions (Panel, short films & The Dish) were rated Excellent or Very Good by 81% of all respondents*
- *Afternoon Speaker Sessions were rated Excellent or Very Good by 83% of all respondents*
- *Selection of positive comments*
 - *Brilliant*
 - *Can't improve on perfection*
 - *Speakers very engaging*
 - *Excellent program*
 - *Engrossed the whole day.*

The Bad.....

- *Food service provided by Ingleburn Lions was less well received. Only 24% of respondents rated it as Excellent or Very Good, 28% rated it as Good 23% rated it as Fair or Poor. 26% did not buy food. Respondents appreciated that this service was provided by volunteers, but several comments were made about poor food selection, poor vegetarian options, lack of healthy options, but mostly, slow service and long queues.*
- *Selection of negative comments received about the following issues:*
 - *Poor audio*
 - *Photographers were annoying*
 - *Talks were not technical enough*
 - *Not enough volunteers*
 - *Cold in the theatre*
 - *Couldn't easily swap between talks - not synchronised.*
 - *Did not like having to choose between speakers*
 - *Not enough food vendors*
 - *No coffee van*
 - *No concession pricing*
 - *MC management of Q & A*
 - *Event felt rushed*

- No coffee at the lunch break
- Did not like the seating area for lunch
- Car park was “like the surface of the moon”

And the Utterly Ridiculous....

Disliked:

“That it was all the way out in Campbelltown” (non member)

Venue:

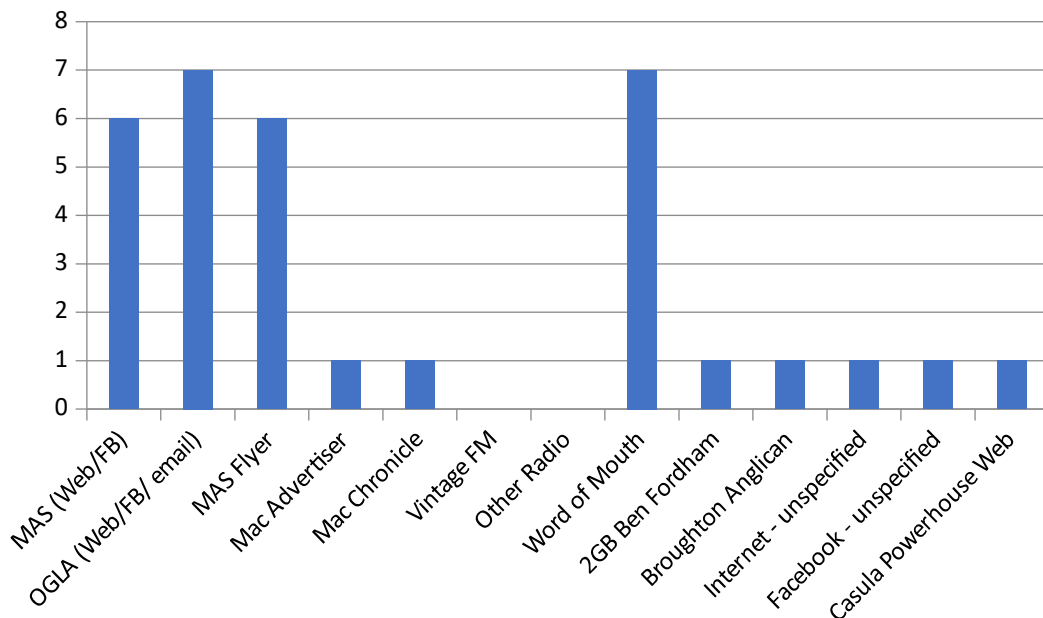
“The theatre is not well designed. People sitting on the left quarter of the room have to look at the screen at an angle. The entrance walkway should be removed and turned into tiered seating. A new entrance needs to be installed on the right side where visibility of the screen is poor. The architects got it wrong!” (non member)

The Dish:

“The Dish being on TV the night before so the screening of The Dish maybe shouldn’t have happened.” (non member)

Advertising Value: Information is far from conclusive...

Where did you hear about the event? Non-members only



Flyers breakdown:

One each from Oran Park Library event, Campbelltown Library event, Campbelltown Winterfest, 3 not specified. It appears Flyers produced 18% of non members attending - approx 27 people if extrapolated to the full non member attendance. Cost/benefit of flyers should therefore be reviewed. Cost of flyers & A4 posters (printing only) \$563.45. Max revenue from that number of tickets - \$560.00. Situation may have been very different if the Public Night in June had not been cancelled due weather.

It should also be noted that Campbelltown Council **failed to publicise our event** on Council and Library Websites as per their own sponsorship agreement.

But there is hope... the best comment:

What an excellent program and line up of speakers you had! The content was relevant to adults AND also to children with a genuine interest in space. I brought along some very young children and they appreciated the event - (most things that include children tend to be dumbed down for their age group; children with a deep

interest don't want things dumbed down). At the same time, the presenters all spoke in everyday language, so there was no technical jargon that prevented people of all ages from understanding. It was also excellent that the presenters encouraged and complimented the children for asking questions and being engaged. There were no children that had immature questions or behaviour - I saw such engaged children! That said, it was a bit disappointing to see so few people attend, given the great line up you had. While you had an agenda, it possibly missed a bit of marketing in how you used words - you have an exciting, event, with amazing speakers.... I felt that you had reached out to and were speaking to the converted eg. your Macarthur society members/One Giant Leap (who did a great job), but you could / should / ought to draw a larger crowd - there are many, many more people that would be genuinely interested and they have missed a great event.

From a non-member

Members rating of previous events:

Previous events, both "Evening with the Stars" and "Space Rocks" were rated as Excellent or Very Good by 94% of the members surveyed who attended the events. The Apollo event compares favourably with 100% of members responding Excellent or Very Good.

Suggested points to think about when planning the next major event....

Definition of Insanity: Doing the same thing over and over again and expecting a different result.

- Consider the number of speakers in the same event. Did we have an option to take only some of OGLA's speakers, or was it an "all or nothing" job lot? Taking only some of the speakers may not have even been thought about this time, but with the benefit of hindsight, fewer speakers could have improved the day by making it less rushed, and increased the length of time available for the selected speakers. (Several comments related)
- MAS needs to be realistic about the number of tickets we expect to sell. If we couldn't get more than 200 for this event, with all the hoopla surrounding the anniversary, what hope have we got! This should surely be regarded as the maximum number we are ever likely to achieve for future planning purposes. Unless we suddenly figure out how and where to better publicise / promote our events. One member commented: "The idea that these events engage the local community is now dead and buried!"
- Try Booking database from this event should be used as basis for direct email campaign for the next event. At least we know they might be interested, and email is free.
- Carefully consider use of multiple lecture theatres in future. Adds complexity, potential for confusion, and increases the number of volunteers needed to run the event. Some people commented that they did not want to have to choose between speakers, one member did not feel that the timings facilitated easy swapping.
- Reconsider provision of food service. The support of the Ingleburn Lions Club truly saved our bacon on this occasion, since we had advertised that there would be food. However, a significant number of respondents (26%) rated the food service as Fair or Poor, and 24% did not use it at all. Food allergy issues & dietary requirements make food service a nightmare these days, and people are just getting very, very fussy.

Since food trucks do not consider relatively small events worth attending, perhaps we should look further at boxed lunch or similar catering as an extra ticketed item - people could purchase ticket only or ticket plus lunch for a higher price. Alternatively, we just save ourselves all the bother, and do not provide food for a similar full day event, simply advertise it as BYO food.

- *There were three specific comments received that the numerous photographers were annoying, particularly during the panel discussion .*
- *It is really not worth trying to sell MAS specific Merchandise at a public event like this. Members have plenty of other opportunities, and the general public is just not interested. Only one mug was sold. Not worth the bother of transporting the stock. (KB personal comment.)*

Preparing Students for a Future Linked to Space. (by Bob Bee and Mike Nicholas)

“I never knew the moon looks like this,” the elderly lady said as she peered in the telescope. How had she lived almost a lifetime and not seen the surface of the moon in a photo, let alone through a telescope? By comparison, today a bright year 12 student aspires to study astronomy, then join the Australian Space Agency.

These are actual events. Our Macarthur astronomy group is helping these people to enjoy and marvel at the night sky. They do show the generational gap, but also a new student-led demand for knowledge of the night sky and we should expect it to grow.

Lay astronomers know how effective astronomy is in making junior students comfortable with physics - they see and ‘touch’ it, then understand it. It warms them to science in the senior school.

“*Astronomy is the gateway to science,*” a motto from the England and Wales school system.

Remarkable changes are occurring in air and space propulsion that will engage us all in the near future, especially the school students of today. In their immediate future:

Hypersonic flight where Sydney to London becomes a 2.5 hour trip. Space craft powered by an ion engine on a six day round trip to land on the Moon to visit a museum constructed at the Apollo 11 landing site of 50 years ago. Test flights of a British hypersonic plane are expected next year. NASA has announced a return to the Moon in 2024 to establish a base there. NASA plans a multi-nation venture. Australia could be a possible partner. MARS is on the agenda for around 2035.

To contribute to this progress, activity in the Australian space industry is expected to treble from 10,000 jobs to 30,000 by the year 2030 and from \$1 billion to \$3 billion in revenue. This trebling speed matches the growing space industry among all countries.

To assist teachers in this environment, where they present astronomy-space studies to their students, there are aids available for use. A selection is set out here.

Among the aids are more than 50 amateur astronomy organisations in Australia and local tourist astronomy services such as Alice Springs, Broken Hill and Dubbo. The members enjoy their interest, know its many facets in various ways, and usually like to share it with others.

Maths and English

What captures the young mind more than ‘strange new worlds,’ space exploration and adventure, weird alien species? Some of the greatest science fiction writers of the past (and the present) were also professional scientists and engineers. As they let their imaginations delve into speculative realms of the future, building on their scientific knowledge, they also indulged in highly creative story telling. Science fiction no longer has the ‘pulp fiction’ stigma of the past but is now main stream. When exploring writing at school, the subject of astronomy may inspire creativity whilst informing and building a knowledge of space and the universe in a student. English teachers, using their students’ basic knowledge of science and astronomy, and wishing to encourage creative writing skills, could invite them to imagine ‘what if?’ Build on it, developing plots, societies and characters

to populate their imagined world. It frees them from the restrictive bounds of stories in their real world, allows new elements of un-Earthbound adventure and allows their imaginations to soar.

Space can make maths exciting. Maths for maths sake can soon lose the interest of many young people. What use is it? But show them how the maths can explain, even calculate some realistic and 'cool' space and planetary scenarios will surely engage them. There are calculations they can easily do themselves with hand calculators or simple spreadsheets. Simple equations are available that allow a student to calculate, among other things:

- The escape velocity of a rocket from a planet (such as Earth) or a moon, or a neutron star;
- The mass of a planet, simply by knowing the orbital period and diameter of any one of its moons. Image – using the orbital diameter and period of, say, Ganymede to calculate the mass of the gas giant Jupiter. Or the mass of the Sun from Earth's period and orbital diameter;
- The height of orbit above the Earth of a satellite (or space craft) travelling at a given speed. Or vice versa;
- How far and high an object would travel when thrown (or kicked or fired) from the surface of the Moon, or Mars as compared to on Earth. This is basic Newtonian mechanics using different values for the local gravity but adds a new dimension when imagined on an exotic world. What teenager wouldn't want to know how far he could hit a cricket ball on the Moon?

All the equations for these examples and others are readily available off the internet.

School Incursions.

A realistic planetarium is available to use in a classroom at a modest cost. It comes from Sega Toys. It uses photos of the night sky, whereas light points usually represent the stars. Features of the night sky can be highlighted with a laser pointer. A local lay astronomer might have a role here.

<https://www.segatoys.space/en/public/discs.html>

Some lay astronomers could be invited to show a class, during day school hours the Sun and the Moon from their playground. A solarscope with its special filters makes the Sun with its sunspots and prominences safe to view. A normal telescope views the Moon. This would add realism to a talk given to the class during the same visit.

A night time sky viewing for students and parents by lay astronomers could be held in a school's grounds. This could coincide with the study of the solar system in the classroom. A teacher would be in charge of the night viewing.

An added attraction might be a sausage sizzle provided by the P and C and/or a fee charged for the school's funds. A high school teacher has done this to fund a science excursion to a primary school science week event.

Another option in the classroom has pupils directed by handout to the parents, to visit a prearranged night sky viewing with an astronomy group where the student would achieve certain aims. They might identify the Sea of Tranquility on the moon, certain planets (Saturn is always popular), the Southern Cross, the Andromeda galaxy. The next day in class a discussion would be held to reinforce the learning objectives.

School Excursions.

Your local lay astronomers are likely to have scheduled their dark sky viewing nights through the year. They might also have public viewing nights. Contact them to inquire what might be arranged for your students. This could begin with a web search for a local group.

Our Macarthur astronomy group holds four public viewing nights in the winter months. Up to 400 visitors a night attend. We find a sausage sizzle enhances the pleasure of the planets for the young guests.

Mentoring senior school students in astronomy assignments is a very rewarding experience for our astronomy group's members. Some of the students have won science awards and all are enthused by astronomy with its tangible science.

To accomplish mentoring, a menu of projects is compiled by a teacher with the astronomers. From this the students each choose a project that interests them. The three parties work together over several months toward the students producing scientific reports as part of their curriculum work AND making brief presentations on their findings to a meeting of the club members. The teacher manages the students' work, the astronomers lend their astronomy knowledge, guidance and telescopes to the students, and the parents (not the teacher) attend the dark sky viewing nights with their children.

Online Applications.

There is a plethora available to use, but, you are best to stay with these sources: ABC News Services, Royal Museums Greenwich, NASA and Youtube.

The ABC Pocket Guide to the Moon. This is just magic. <https://www.abc.net.au/news/2019-07-16/pocket-guide-to-the-moon/11260558>

Royal Museum Greenwich. Learning resources. They are curriculum-linked learning resources designed to work in the classroom. Search the learning resources by Key Stage, subject and resource type. As well, the Museum offers online FREE teacher training courses compiled by educators.

The NASA (National Aeronautics and Space Administration) Goddard Space Flight Center. Search: StarChild.

StarChild is a learning center for young astronomers ages 5-13 to learn about the solar system, the Milky Way galaxy, and the universe beyond. Use the links above to explore the site's topics.

If you are looking for something a bit more advanced (ages 14+), then head on over to Imagine the Universe!

Wishing you good dark nights sky watching.

The Macarthur Astronomical Society has served the region of Macarthur on the South West of Sydney for more than 20 years. We offer the public and schools an outreach service to enjoy the night like its members do. For inquires and outreach go to www.macaastro.org.au.

[Company Address]
Phone [Phone Number]
Email: [Fax Number]

INVOICE

INVOICE #2019-XX
EVENT DATE: DD/MM/2019
INVOICE SENT DATE DD/MM/2019

Web: <http://www.macaastro.org.au/>

ATTENTION OF:

Account Managers Name
Company Name
Company web address:
Company ABN: NN NNN NNN NNN
Company Phone:

SHIP TO:

Company Representatives Name
Company Name
Email: email@address.au
Company Representatives Mobile:

COMMENTS OR SPECIAL INSTRUCTIONS:

PROVIDE BRIEF DETAILS OF WHAT WE ARE PROVIDING HERE.

EVENT COORDINATOR
P.O. NUMBER
EVENT ON SITE CONTACT
INVOICE SENT BY
MEETING POINT
TERMS

One of our members
n/a or their number
Name of company person
Email or Post
On site or whatever
30 Days

QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
Outreach night	Provide NN hours of telescope viewing on DD/MM/YYYY from HH:MM	\$XXX	\$xxx

Notes:	Invoice is applicable even in bad weather. (delete or change as reqd)		

SUBTOTAL	\$xxx
----------	-------

WE ARE NOT LIABLE FOR GST TAX	0.00
-------------------------------	------

ENTRY TOLLS OR PARKING COSTS	0.00
------------------------------	------

TOTAL DUE	\$xxx
-----------	-------

Make all cheques payable to Macarthur Astronomical Society or Electronic Funds Transfer to...

Account: Macarthur Astronomical Society Inc

Bank BSB: 062340 (Commonwealth Bank Macarthur Square)

Account number : 10029861

If you have any questions concerning this invoice, contact: MemberName at [Phone Number] or [E-mail Address]