

Some Questions on Beginning Astronomy

Question:

I came across your website whilst trying to find out more about astronomy. My 12 year old daughter is fascinated with astronomy having watched Stargazing and read a couple of books. I wanted to try going out on some clear nights this winter to look at stars and planets and wanted to get some top tips about how to set about it (binoculars, telescopes and star charts/ apps). I wonder if you have some advice or could point me to a good local retailer. Having seen your website I am interested in the talks that you have coming up and wanted to know if I can just turn up and pay the entrance fee or if I need to let someone know in advance. Would my daughter be able to attend too or are they adult only?

Reply:

It's good to hear that your daughter is showing an interest in astronomy – and the winter is an ideal time to start observing and learning about the night sky.

Many of the winter constellations are bright and easy to identify and they are home to an abundance of interesting objects that you need only binoculars to discover. Added to this, the Milky Way is dramatic at this time of year. I would suggest starting by learning to recognise some of the main winter constellations and the most prominent stars in them. You'll soon get to know these. With the advent of Spring, the winter stars will slip out of sight in the West and, in the East, 'new' constellations will rise for you to explore. As the year turns, these will be followed by the stars of summer, then autumn, until the winter stars return to dominate the evening sky.

To start with, I'd strongly advise you and your daughter to consider joining the excellent *Society for Popular Astronomy*. In fact, I'd make the very informative SPA website www.popastro.com your next port of call; here you'll find answers to many of the questions that beginning astronomers ask. The SPA is for people of all ages and levels of knowledge and experience and it's very well attuned to the needs of beginners and young people.

Here's a selection of resources to help you find your way around the sky and locate some of the interesting objects on show.

Stellarium Free planetarium program from www.stellarium.org. Shows you the appearance of the night sky for any date and any location: constellations, where to find the Moon and planets among the stars, deep sky objects, etc

There are many astronomy apps for iPhone and Android. Here are some, in no particular order, that I've used and can recommend:

Starlight

StarTracker

SkyView (not the free version – still inexpensive)

Sky Survey

Sky Safari (£2.29 for the cheapest version).

The above apps all show you on screen what you are looking at when you point your device at the sky. Some are more intuitive than others; some have more detail than you might at first require. Since all are free or inexpensive, I suggest you give them a go and see which you prefer.

SkyWeek Plus Useful app from *Sky and Telescope* - tells you what's up and what to look out for each week, with notes.

For meteor showers, try the *Meteor Shower Calendar* app. If you want to look out for the ISS and artificial satellites, try *ISS Spotter* – though *SkyView* (among others) shows the ISS and other satellites as well. And don't forget the Moon – it's a prime target for amateur telescopes - try *Moon Globe* and *Moonrise Pro*. Also try *Double Stars*, an app that gives you details of interesting multiple stars and tells you where to find them.

It's sometimes handy to have a book rather than a screen to refer to. *The Monthly Sky Guide* by Ridpath and Tirion is a nicely produced, informative guide to the sky for each month of the year. The monthly astronomy mags on sale in WH Smith, etc all have excellent star maps for each month showing the constellations, the current positions of the planets and movements of the Moon.

Turn Left at Orion by Consolmagno and Davis is a well-known and popular guide for tracking down night sky objects that you can see in modest amateur telescopes. Both these introductory books are obtainable from Amazon.

Binoculars, Telescopes, etc

There is some expert advice on the SPA website about choosing equipment when starting out in astronomy. It's a big topic and it's well-introduced there, so I'll just add a few further observations.

Binoculars in the 7x50 or 10x50 range are great for sweeping the constellations and for wide-field views of the Milky Way, especially if you can find a really dark sky. They are also an excellent choice for looking at extensive star-clusters such as the Pleiades and Hyades. They are good for locating some of the brighter 'deep sky objects' shown on the star charts and they'll show you the four brightest satellites of Jupiter and some large-scale features of the Moon's surface. You'll see more if you hold them steady, which isn't easy to do. If you put them on a steady tripod or stand, you'll see a lot more.

That said, ordinary binoculars (there are some giant ones out there but the good ones carry giant prices) are not a substitute for a telescope. They won't allow you to explore, for example, the craters and mountain ranges of the Moon in any detail or give you a chance of glimpsing detail on any of the planets. And, while they're perfect for wide-field views, they won't let you home in on most of the exciting deep sky objects out there - things like the Trapezium at the heart of the Orion Nebula, the Ring Nebula, colourful double stars like Albireo, and countless others. For this you need something bigger. This is because the power of a binocular or telescope to reveal faint objects and to show fine detail beyond the reach of the unaided eye depends on the size of its 'eye' – the diameter of its main lens or mirror. To put it very crudely, most binoculars are small compared with most astronomical telescopes and are consequently less 'powerful'. But please read the advice on the SPA website around this. The ins and outs of 'magnification', for example, are often misunderstood and there's not room to go into detail here.

Choosing a telescope can be confusing. Again, this is not the place to discuss in any depth the pros and cons of different makes and designs, but a few pointers may help. Here are some questions that it might help you to start with.

How much do I want to spend? Most off-the-shelf scopes come with a couple of eyepieces and some accessories; otherwise you'll need to budget for these. Some designs of scope come with their own mounting; if you buy one that doesn't, you'll need to allow for a suitable mount as well.

Do I want to use the telescope for terrestrial observing as well? If you do, you should probably favour a refractor (lens telescope); other affordable designs work well on the sky but are awkward for things like bird-watching.

How portable do I want it to be? Might I take it on holiday? On an airplane? Where will I keep it? As with many astronomical choices, there's a compromise to be struck: bigger telescopes potentially show you more but are heavy and can be awkward to lug around. You also need somewhere to put it when it's not in use!

If you're new to observing, a good place to start would be a modestly priced general purpose instrument that will, nevertheless, show you a lot of amazing stuff – accompanied by a pair of binoculars. It's a combination that works well. Experienced observers usually develop more specific requirements, but most of those I know also continue to use and enjoy quite simple equipment that they've owned for years. If you or your daughter remains interested in astronomy, there will be plenty of other options to consider later on.

A stable mount is essential or you won't be able to hold any object properly in view – it'll just jiggle around frustratingly in the eyepiece so you never get a proper settled look at it. Many entry-level, off-the-shelf telescopes come already attached to a mount. Some of these mounts are designed, once properly set up, to track the stars, countering their apparent motion across the sky, so that the object you're looking at stays in the field of view. This is helpful, especially when using high powers, and essential for astro-photography through the telescope. However, many of the most popular and cost-effective designs for visual observing are simply moved about by hand. (See below and my *Ask an Astronomer* reply to a question about an 'alt-az' mount)

Very small telescopes with lots of gadgets are generally not good value for money in terms of what they allow you to observe. It's better to focus your spending on the telescope itself and a solid mount than on gadgetry. The 'goto' systems on many small, off-the-shelf telescopes list thousands of objects in their databases, which sounds attractive – but many of these will be invisible in the eyepiece because, under typical skies, the telescope itself is just too small to show them.

So what could you buy? The best value for money you can get in terms of price per inch of aperture is the so-called 'Dobsonian'. This is a 'reflecting' telescope which uses a mirror as the main optical component, not a lens. A quick Google search will tell you more. At today's prices, £275 will buy you, for example, an 8 inch '*Revelation*' Dobsonian. These scopes have decent optics, are soundly made and, in my opinion, are good

value for money. I wouldn't go for anything much bigger than this at this stage because of size and weight – not so much in use as when moving around - but, with this design, I wouldn't go smaller than a 6 inch. The same sort of money from the same dealer would buy you a budget 4 inch refractor. Remembering that, other things being equal, bigger scopes show you more, my own preference would be for the 8 inch Dobsonian (or bigger), but your daughter might well find such a scope awkward to manage when setting up and putting away and might prefer the convenience and appeal of the refractor. Though smaller, it would be neater and more portable and would not need any routine adjustments – either way I doubt she would be disappointed. And, if she is to enjoy using it, it should be something that she likes and is comfortable with.

Guildford Astronomical Society does not endorse any particular brand or dealership. However, having bought from them, I am happy to recommend from personal acquaintance and experience Telescope House (based nr Lingfield) and Ian King Imaging (Paddock Wood) I should point out that Ian is a friend though not a business associate of mine. Both are highly knowledgeable and I have found both to be helpful, honest and straightforward – which is not to imply that others are not! Telescope House, in particular, has a good display of telescopes of different designs and sizes, which would allow you to get a feel for the different options. *I would advise not purchasing anything before doing this.*

You and your daughter would be very welcome indeed to come along to any of our meetings. There is a small entry fee for non-members and if you felt it was for you, you could join the society. Full details of this, location and the topic for each month's talk are shown on the GAS website.

You might also find it useful to take a look at the general, practical tips on observing I gave towards the end of my answer about 'Observing the Draconids' which appears in the Ask an Astronomer column on the GAS website.

I hope this helps – good luck!

John Evans FRAS

GAS Ask an Astronomer