







Which telescope should I buy?



Note that these are the views of our volunteers, and we have not tested each of these models. However they are all reputable brands when bought from a reputable, specialist distributor, not chain stores, department or grocery stores. Please do your own research to satisfy yourself that these are the right choices. Astronomy Ireland is affiliated with Astroshop.eu – if you are buying from them please use the links included in the table below, or by browsing to https://www.astroshop.eu/?affiliate_id=astronomyireland

Although magnification isn't everything, to get an idea of the magnification it is the *focal length* of the telescope that is important. You can calculate the magnification by taking the focal length of the telescope and dividing it by the focal length of the eyepiece. Most telescopes below come with a 25mm eyepiece. Therefore to get a comparative magnification take the focal length of the telescope and divide by 25. You can find the focal length in the specifications for the telescope on the website.

You can get an idea below. This table shows the magnification assuming only a standard 25mm lens. It also includes an *approximation* of how large the moon is in the eyepiece, assuming you have a standard 25mm eyepiece *and* a 2x Barlow lens. It is not meant to be an exact replica of what you will see as the exact view depends on the eyepiece type and other factors, but does give an indication of the view with different focal lengths.

Focal Length of Telescope	Magnification with 25mm eyepiece	Approximation of the moon (with 2x Barlow lens)
300mm	12x	
400mm	16x	
500mm	20x	
650mm	26x	



Focal Length of Telescope	Magnification with 25mm eyepiece	Approximation of the moon (with 2x Barlow lens)
700mm	28x	
750mm	30x	
900mm	36x	
1000mm	40x	
1250mm	50x	
1300mm	52x	

For casual observing in low-budget ranges this is an acceptable metric to use. However at the higher end, especially for astrophotography, the magnification is not everything, and there are other factors to consider. The best bet if this is your budget and interest would be to contact the stockist.

The following list is intended for you to find the category that suits you and shows a potential list of scope models that fit in this category.

- Simple setup (for children to do by themselves, or adults who do not want to learn the more complex setup routine): see page 4. These are all Dobsonian mount telescopes, which is a simple mounting system easy to set up.



- Complex setup (you have some technical/mechanical ability and can learn from YouTube videos. These scopes may need to be polar aligned or there may be computerised setup required. Dobsonian (aka Dobson or DOB) mounts are simple to set up. Equatorial (aka EQ) mounts are more complex. Computerised “go-to” scopes need a setup process via a combination of manual pointing the scope at bright star(s) and using the handheld controller): see page 5
- Astrophotography: These tend to the higher end price brackets. Aperture (the “width” of the scope) and the relationship to the focal length becomes far more important. Best bet here is to speak with the dealer.

The things you want to see in the scope will also be affected by the budget:

- For the moon alone, the lower budget (<€100) is acceptable. Jupiter’s moons will also be visible, but Saturn’s rings or Mars details will not.
- For planets the middle budgets (€100-€300) will be better. The bigger the magnification the better the view. At this range Saturn’s rings will be visible. At the higher end (up to €500) Mars should show some surface detail under good seeing conditions.
- For larger, brighter deep space objects the middle-high budgets will be required.
- For serious photography of planetary or deep space viewing the high budget scopes will be required (€1000+)

OTHER NOTES:

Check what is included in the accessories list. It is best to have:

- At least 2 eyepieces, ≈25mm and ≈10mm. In most cases the eyepieces you get with the scopes are of only OK quality. Enough to start with. In some cases to get a better range of magnification you may wish to add eyepieces, or replace eyepieces with better quality ones (generally only for the more expensive scopes that can take advantage of more expensive eyepieces). Go for Super Wide Angle (SWA) or Ultra Wide Angle (UWA) depending on budget. Expect to pay €50 to €70.
- 2x Barlow lens. These multiply the magnification without changing the width of the part of the eyepiece you look through (eye relief). Smaller eyepieces have a narrower aperture so they are harder to get your head aligned over to see through them properly. The Barlow lens removes that restriction but gives you better magnification. Go for a 2x Barlow, which doubles the magnification. You should expect to spend around €40-€50 on a decent 2x.

If it doesn’t come with these then you should consider adding these to your purchase if possible. If not then go for the best scope you can afford, you can always add eyepieces later if needed.

I often get asked about filters, personally I don’t see for visual observing that they add much value, except for solar filters.

Other accessories include:

- Dew shield. This is a cover that slips over the end of your scope to prevent moisture from fogging up the scope. Not suitable for all scope types. In this list, primarily useful for the Maksutov telescopes. Each brand has its own shield, check with the stockist to ensure you get the right one.
- Tracking Motor. Some equatorial mounts can have tracking motors added to them. These counteract the earth’s rotation (when the tripod is properly aligned) and allows the object being viewed to stay in the eyepiece. Different mounts have different motors, so talk to the stockist first. The most common are for the EQ-2 and EQ-3 mounts.
- Sun or Solar filter. These block nearly all the sun’s light, making it possible to view sunspots on the surface of the sun, and cost around €30 to €50 depending on the scope. Expensive filters show the sun as a “fireball”, using hydrogen-alpha or prominence filters, but these are in the thousands of euros.



Simple setup telescopes

This category of scope is for children to do by themselves, or adults who do not want to learn the more complex setup routines.

Most important in this category is a stable mount that is not heavy or cumbersome, and is easy to set up.

Within each budget category the telescopes are listed in order of magnification (lowest magnification first).

Prices may vary, these are estimates given below. To find them you can go to https://www.astrosop.eu/telescopes?affiliate_id=astronomyireland and search for the name shown.

Note that this author has personal experience with a Sky-Watcher N100 scope which is very good quality and can be operated by the 7-year old in question (who is now 11 and still uses the scope).

Budget	Model	Type
<€100	Sky-Watcher N 76/300 Heritage Dobsonian 300mm focal length Comes with: 25mm, 10mm eyepieces Recommended to add: 2x Barlow	Dobsonian
	Celestron Dobson telescope N 76/300 FirstScope DOB 300mm focal length Comes with: 25mm and 10mm eyepieces Recommended to add: 15mm eyepiece; 2x Barlow	Dobsonian
	Omegon Dobson telescope N 76/300 DOB 300mm focal length Comes with: 20mm, 12.5mm, 6mm, 4mm eyepieces; 2x Barlow Recommended to add: Nothing	Dobsonian
€100-€200	Celestron Dobson telescope N 76/300 Cometron FirstScope 300mm focal length Comes with: 20mm, 10mm eyepieces (better quality) Recommended to add: 15mm eyepiece, 2x Barlow	Dobsonian
	National Geographic N 76/350 compact Dobsonian 350mm focal length Comes with: 20mm, 6mm eyepieces; 2x Barlow; Compass Recommended to add: Nothing	Dobsonian
	Sky-Watcher N100/400 Heritage DOB 400mm focal length Comes with: 25mm, 10mm eyepieces; 2x Barlow Recommended to add: Nothing	Dobsonian
	National Geographic N114/500 compact Dobsonian 500mm focal length Comes with: 20mm, 6mm eyepieces; 2x Barlow; Moon filter Recommended to add: Nothing	Dobsonian



Budget	Model	Type
€200-€300	Note: In this category onwards the scopes are getting a bit bigger and bulkier. For children check the weight & size against what you feel the child is capable of handling.	
	Omegon Dobson telescope N 102/640 DOB 640mm focal length Comes with: 20mm, 6mm eyepieces; 3x Barlow Recommended to add: 2x Barlow	Dobsonian
	Bresser Dobson telescope N 130/650 Messier DOB 650mm focal length Comes with: 25mm, 9mm eyepieces; Moon filter; Compass; Solar filter Recommended to add: 2x Barlow	Dobsonian
	Sky-Watcher Dobson telescope N 130/650 Heritage FlexTube* DOB 650mm focal length Comes with: 25mm, 10mm eyepiece Recommended to add: 2x Barlow	Dobsonian
€300-€400	Sky-Watcher Dobson telescope N 150/750 Heritage FlexTube* DOB 750mm focal length Comes with: 25mm, 10mm eyepiece Recommended to add: 2x Barlow	Dobsonian
	Bresser Dobson telescope N 150/750 Messier DOB 750mm focal length Comes with: 25mm, 9mm eyepieces; Moon filter Recommended to add: 2x Barlow	Dobsonian
	Omegon Dobson telescope MightyMak 90 Titania** 1000mm focal length Comes with: 25mm eyepiece Recommended to add: 15mm eyepiece; 2x Barlow	Dobsonian

* Sky-Watcher FlexTube scopes extend out (see videos on the astroshop.eu website), so they are a small bit more complex for young ones to set up by themselves. They can be affected by ambient light as well unless positioned correctly. But you get more telescope for your euro because there is less to the tube.

** At this focal length you will find you need to manually move the scope fairly frequently to track the object you are looking at. This will be frustrating for younger users, or indeed for casual adult users. You may be better looking at scopes in the next section if patience isn't your virtue!



More complex setup telescopes

This category of scope is for older teenagers or adults who are willing to learn through YouTube videos and practice how to set up these scopes, or for children if the adult is willing to help them set it up.

- Dobsonian (aka Dobson or DOB) mounts are simple to set up.
- Equatorial (aka EQ) mounts are more complex and need to be set to the correct latitude and be polar aligned. If this doesn't daunt you then you want to go with the types that have the slow motion controls otherwise they will be difficult to use.
- Alt-azimuth mounts are also simple but are difficult to use and generally quite finicky. Simple travel scopes would be all I'd use this type of mounting for. Generally I recommend sticking with the Dobsonian mounting system if the Equatorial mounting system seems too complex.
- Tracking scopes use a motor drive to counteract the earth's rotation and keep the object being observed in sight.
- Computerised "GoTo" scopes need a setup process via a combination of manual pointing the scope at bright star(s) and using the handheld controller. But they take away the need for constant manual adjustments to track the object you are looking at, and can guide you direct to the objects you want to see.

This author has personal experience with a Sky-Watcher N 150 Heritage FlexTube Virtuoso scope which is very good quality, and far quicker and easier to set up than my large 8 inch Celestron scope. The GoTo software takes some practice with to get right.

Note that this list is not exhaustive, there are many other options. Please do your own research to satisfy yourself that you are buying the correct model for your needs.

Budget	Model	Type
<€100	Levenhuk Telescope AC 70/400 Skyline Travel* AZ 400mm focal length Comes with: 20mm, 10mm eyepieces, 3x Barlow	Alt-Az
€100-€200	Celestron Telescope AC 50/360 TravelScope* AZ 360mm focal length Comes with: 20mm, 8mm eyepieces	Alt-Az
	Levenhuk Telescope AC 80/400 Blitz 80s PLUS EQ 400mm focal length Comes with: 25mm, 6mm eyepieces; Dew shield Recommended to add: 12.5mm eyepiece	Equatorial
€200-€300	Omegon Telescope N 114/500 EQ-1 500mm focal length Comes with: 25mm, 10mm eyepieces; 2x Barlow Recommended to add: Nothing	Equatorial
	Sky-Watcher Telescope N 114/1000 SkyHawk EQ-1 1000mm focal length Comes with: 25mm, 10mm eyepieces; 2x Barlow Recommended to add: Nothing	Equatorial
	Sky-Watcher Telescope N 130/900 Explorer EQ-2 90mm focal length Comes with: 25mm, 10mm eyepieces; 2x Barlow Recommended to add: Nothing <i>This scope has a better mount than the EQ-1 scopes.</i>	Equatorial



Budget	Model	Type
€300-€400	Bresser Telescope N 130/650 EQ3 Spica 650mm focal length Comes with: 20mm, 4mm eyepieces; 3x Barlow; Smartphone camera adapter Recommended to add: 12.5mm eyepiece; Motor (optional)	Equatorial
	Sky-Watcher Dobson telescope N 114/500 Heritage Virtuoso DOB 500mm focal length Comes with: 25mm, 10mm eyepieces Recommended to add: 2x Barlow	Tracking Dobsonian
	Sky-Watcher Dobson telescope MC 90/1250 Heritage Virtuoso DOB 1250mm focal length Comes with: 25mm, 10mm eyepieces Recommended to add: 2x Barlow	Tracking Dobsonian
	Sky-Watcher Maksutov telescope MC 102/1300 Starquest EQ 1300mm focal length Comes with: 25mm, 10mm eyepieces Recommended to add: 2x Barlow	Equatorial
	Omegon Telescope N 150/750 EQ-3 750mm focal length Comes with: 25mm, 6.5mm eyepieces; 2x Barlow Recommended to add: Nothing <i>This scope has a high quality mount giving extra stability and good quality Plössl eyepieces.</i>	Equatorial
	Sky-Watcher Telescope N 114/500 SkyHawk 1145P AZ-Go2 500mm focal length Comes with: 25mm, 10mm eyepieces Recommended to add: 2x Barlow	GoTo Wifi**
	National Geographic Telescope AC 70/350 GoTo 350mm focal length Comes with: 20mm, 10mm, 4mm eyepieces; Compass Recommended to add: Nothing	GoTo



Budget	Model	Type
€400-€600	Celestron Telescope N 130/650 Astromaster EQ-MD 650mm focal length Comes with: 20mm, 10mm eyepieces; Tracking Motor Recommended to add: 15mm eyepiece; 2x Barlow	Tracking Equatorial
	Sky-Watcher Maksutov telescope MC 102/1300 SkyMax EQ-2 1300mm focal length Comes with: 25mm, 10mm eyepieces; Dew shield Recommended to add: 2x Barlow; Motor (optional)	Equatorial
	Sky-Watcher Maksutov telescope MC 102/1300 SkyMax BD AZ-S GoTo 1300mm focal length Comes with: 25mm, 10mm eyepieces; 2x Barlow Recommended to add: Nothing	GoTo
	Sky-Watcher Dobson telescope N 150/750 Heritage FlexTube Virtuoso GTi 750mm focal length (but 50% more light gathering than above scopes) Comes with: 25mm, 10mm eyepieces Recommended to add: 2x Barlow	GoTo Wifi**
	Levenhuk Telescope N 203/800 Blitz 203 PLUS EQ 800mm focal length (but double the light gathering than above scopes) Comes with: 25mm, 6,5mm eyepieces; Moon and Sun filters Recommended to add: 2x Barlow; Motor (optional)	Equatorial
	Celestron Telescope AC 102/660 StarSense Explorer DX 102 AZ 660mm focal length Comes with: 25mm, 10mm eyepieces Recommended to add: 15mm eyepiece; 2x Barlow	GoTo PushTo***

* This scope is a highly portable scope on a small tripod. Good for both basic astronomy and regular terrestrial observing. Not suitable for dimmer objects such as nebula or faint planets. You might have trouble adding a high-quality Barlow lens as the weight may cause instability.

** This uses an app on your smartphone to connect to the telescope and control it.

*** This is an interesting guidance system that allows you to dock your smartphone then the app will guide you to the objects you want to view. When you have the scope in the correct position the bullseye on the app turns green. The author hasn't seen this in operation but it sounds easy to use.