

Instrument Ranges

Timbral Characteristics

Dynamic Curves

Additional Comments

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The chart is organized into columns for each instrument. The first column shows the instrument's range with notes and dynamic markings. The second column describes timbral characteristics with terms like 'Weak, but soft + mellow' or 'Bright + clear'. The third column shows dynamic curves with graphs and terms like 'flutes', 'oboes', 'clarinets', 'bassoons', 'trumpets', 'trombones', and 'tubas'. The bottom section shows the instrument's range in a different format, often with a graph of dynamics.

Piccolo
 - More agile than flute
 - Faster articulations
 - Dynamic curve similar to flute but with exaggerated contrast
 - Solo piccolo in mid-low registers - valuable voice
 - High piano (p) - still shines through orchestral tutti

Flute
 - Agile
 - 2+ = Increased mass, not volume
 - Fast articulations - Double, triple-flutter tonguing
 - Rapid scales - Wide leaps
 - Intonation good except from G6 upwards
 - Also at this register, 2 flutes produce obvious beats which are more obvious with 4th-5th flutes, less so with 3rd-6th - Easily masked below C5 (above mid C)

Oboe
 - Agile
 - Vibrato - standard element
 - Expressive
 - Trills - ornaments sound clear
 - Precise staccatos - All trills-tremolos possible (trills wider than perfect 4th are awkward)
 - Rapid scales - than perfect 4th are awkward
 - Smooth legato - even with wide leaps
 - Double, triple tonguing - Flutter tonguing rare but possible

English Horn
 - As agile as oboe
 - More delicate and slightly quieter than oboe
 - Precise attack
 - Pointed staccatos
 - Rich in upper partials

Clarinet
 - 'E' - very shrill without much chalumeau
 - Agile
 - All major + minor 2nd trills possible
 - Smooth legato (tricky ones listed opposite)
 - Tremolos - good
 - No problem crossing breaks from B4-B4
 - Staccato not as pointed as double reeds, so should be compensated for when used with oboes and/or bassoons
 - Dynamic range greater than other woodwinds - all dynamics are available in all registers (attacks can be almost inaudible)

Bass Clarinet
 - Agile - almost as much as clarinet
 - Fluid
 - Useful ensemble voice - gives clarity to cellos + d. basses
 - Solo - distinguished + strikingly individual tone

Bassoon
 - Often doubles string melodies in unison, or in 8va below
 - Agile - except lowest 5th and above G4
 - Rapid tonguing - single usual, but double + triple also possible - Wide leaps
 - Rapid load or low passages need lots of breath
 - Excellent as solo voice in upper range
 - Divide tricky rapid passages below F2 between 2 bassoons

Double Bassoon
 - Expressive
 - Well-focused
 - Slightly less agile than bassoon, so make parts simpler
 - Good bass to p-pp brass or woodwind ensemble
 - Ready and growly
 - Adds unobtrusive pitch centre to low double basses
 - Often doubles double basses in unison and doubles cello in 8va below

Horn Stopped notes Soft-Delicate, Loud-Onmibus bit!
 - Not very agile - leaps over 1 8ve should be used sparingly
 - Tonguing is less incisive than other brasses, but pro players can perform double, triple and flutter tonguing
 - Trills: 11: up-commaest most useful type. Most whole step
 - In 11ths above written B4, above mid C, are possible
 - 11: Valve 1st are minor 2nds throughout whole range
 - High notes lack accuracy/security, more so in soft passages

Trumpet
 - Very agile - rapid passages, wide leaps
 - Rapid tonguing easy - double, triple or flutter
 - Trills: All major + minor 2nds possible
 - Tremolos: minor 3rds are hard to play fast, but possible if both pitches require little or no change of fingering
 - Slurs: All possible, but bigger than 1 8ve ascending and bigger than 6th descending are difficult

Tenor Trombone
 - Glissandi
 - Responsive and flexible
 - Legato tonguing used frequently
 - Agile from B3 upwards (less so below that)
 - Rapid tonguing easy - double, triple or flutter
 - Good balance with orchestra in any voicing
 - Chords in open or close voicing - good - fast-moving passages
 - Unison or 8ve doubling - good
 - Sustained chords good, but not for too long above mf

Bass Trombone
 - Darker, more somber tone
 - Must secure lower range + pedal tones
 - Requires more breathing spaces in music passages
 - Glissandi

Tuba
 - Agile
 - Rapid tonguing - double, triple or flutter
 - Requires lots of air, especially in lower register + st. mf
 - Always use ledger lines for lower notes
 - Uniform expressiveness throughout range
 - Usually used as bass line, or doubles bass line 8ve lower
 - Solo: Mellow + smooth

Timpani
 - Ranges: The best tone is in the centre of each drum's range
 - Each drum's lower range = Dull + thumpy, Upper = Hard + pingy
 - Can be muffled with cloth
 - Struck dead centre = Darker, more ominous - less ring
 - Soft sticks = Warm, more resonant
 - Hard sticks = Louder + greater clarity
 - Glissandi

Harp
 - Harmonics: 1st hand-up to 7 octaves harmonics (over a 5th partial, right hand only 1 harmonic. Must be all 7, or 8 per hand)
 - 7th strings: 7 pedals for each pitch class. Only 1, 2, or 3 tuning per string
 - All 7s affected by changing 1 push down pedal, except the lower 2 strings which have to be tuned manually
 - Allow approximately 0.5-1 second per pedal change, which can be done while playing as long as that pitch is not playing
 - Only the left hand can reach lowest 8ve - 7th strings resonate more than chords of 8ve notes per hand are possible - natural 8 or sharp 8 strings
 - Thumb-3 fingers used. So favour large intervals between upper pitches, and avoid large intervals between lower pitches
 - Average hand span interval of 10th from thumb - ring finger
 - Tremolos: Fast and loud tremolos possible, using 2 strings tuned to same note
 - Binaural: Delicate trilling tremolos + ppp - pp only - less clear articulation
 - Glissandi: 1 hand, 2 hand, up down or bow, single notes or chord gliss.
 - Can change the tuning in mid gliss - Sans Ensembles. Dampens notes-day stacc.
 - Very rich table. Great! Most played note ascending!

Violin
 - Most agile, responsive + versatile of strings
 - Solo: Bow over the fingerboard
 - Col Legno: Tap string with wood or bow-hard, clattery sound (ord. = Blow through body of the bow)
 - Ponticello or Sul Ponticello: Bow near bridge
 - Multiple stops: i) Double. Adjacent strings, all dynamics, can sustain, easy to play
 - ii) Triple. Only mf/ff
 - iii) Quadruple. Only f/ff

Viola
 - Good for doubling melodic lines at 8ve or in unison with violin
 - Can be used as an inner voice
 - Can reinforce + double cello, acting as a small cello
 - Good used as the only bass part - solid, but heavy foundation
 - Usually drives, not multiple stops, for 2, 3, or 4 pitches (but it can play multiple stops - same limitations of multiple stops as violin)
 - Excellent used in an accompaniment - rhythmic figurations, or harmonic structure

Cello
 - Multiple stops - Avoid wide tremolos
 - Solo: Commanding upper register; also good in mid and lower lines
 - i) Double: Adjacent strings, all dynamics, can sustain, good in mid and lower lines
 - easy to play. Avoid 2nds + 8ves unless 1 string is open
 - ii) Triple: Best at f/ff At mf = less clear articulation
 - iii) Quadruple: Best at f/ff At mf = less clear articulation
 - iv) Quintuple: Best at f/ff At mf = less clear articulation
 - v) Sextuple: Best at f/ff At mf = less clear articulation
 - vi) Septuple: Best at f/ff At mf = less clear articulation
 - vii) Octuple: Best at f/ff At mf = less clear articulation
 - viii) Nonuple: Best at f/ff At mf = less clear articulation
 - ix) Decuple: Best at f/ff At mf = less clear articulation
 - x) Undecuple: Best at f/ff At mf = less clear articulation
 - xi) Dodecuple: Best at f/ff At mf = less clear articulation
 - xii) Tridecuple: Best at f/ff At mf = less clear articulation
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 - xxix) Septingentuple: Best at f/ff At mf = less clear articulation
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 - xxxi) Octingentuple: Best at f/ff At mf = less clear articulation
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 - xl) Milingentiduplex: Best at f/ff At mf = less clear articulation

Double Bass
 - Good at p-pp. They can provide the only solo player that to be skillful necessary to play a complex tonal structure!
 - Natural Harmonics: Easy + good. They can provide an alternative to other string section lines because they are in the middle of the string section range.

Bibliography

-Adler, Samuel
The Study of Orchestration
3rd ed. New York: Norton, 2002.

-Berlioz, Hector
Treatise on Instrumentation
Enl. and rev. Richard Strauss. Tran. Theodore Front.
New York: Dover, 1991.

-Blatter, Alfred
Instrumentation and Orchestration
2nd ed. New York, Schirmer Books, 1997.

-Forsyth, Cecil
Orchestration
2nd ed. New York: Dover, 1982.

-Jacob, Gordon
Orchestral Technique
3rd. ed. London and New York: Oxford University Press, 1982.

-Kennan, Kent and Grantham, Donald
Technique of Orchestration
6th ed. New Jersey: Prentice Hall, 2002.

-Rimsky-Korsakov, Nikolai
Principles of Orchestration
Ed. Maximilian Steinberg. Trans. Edward Agate.
New York: Dover, 1964.

-Piston, Walter
Orchestration
London: Victor Gollancz Ltd, 1955.

-Ray, Don B.
Orchestration Handbook
Milwaukee: Hal Leonard Corporation, 2000.