Ranunculaceae  
**Buttercup Family**
Herbaceous perennials (rarely annuals, shrubs, or lianas), leaves compound or dissected (rarely simple in some herbs); *leaves sheathing* (at least at the very base)

Flowers bisexual (unisexual in *Thalictrum*), usually actinomorphic, but zygomorphic in *Aconitum* (monkshood) and *Delphinium* (larkspur), hypogynous

Perianth distinct, either with one whorl of 4–∞ *petaloid sepals* (the corolla is considered absent) or with CA (4)–5–(∞) and CO (4)–5–(∞)

Stamens distinct, usually ∞

Gynoecium (1–)5–∞ *simple pistils*, each pistil unilocular with marginal placentation (i.e., each is a carpel)

Fruit achenes, less commonly follicles, rarely a berry

**“BASAL EUDICOT”**

Magnoliaceae  
**Magnolia Family**
Shrubs or trees, deciduous or evergreen, leaves simple, entire, stipulate, *stipules caducous leaving a circular scar*.

Flowers bisexual, actinomorphic, hypogynous

Perianth distinct, usually not clearly differentiated into sepals and petals (= tepals), outer whorl usually 3 (sometimes of a different texture than the inner whorls), inner whorl 6–∞

Stamens distinct, ∞, spirally arranged; often flattened (especially the outer ones) *with indistinct filaments*

Gynoecium few to usually ∞ simple pistils (i.e., each a carpel), these partially fused along an *elongated, often woody, axis*

Fruits on an elongated, usually woody receptacle and an aggregation of woody follicles, samaras, or berries

**MAGNOLIID**

Berberidaceae  
**Barberry Family**
Herbaceous or woody perennials; leaves simple to compound; *wood usually colored yellow*

Flowers usually bisexual, actinomorphic, hypogynous

Perianth distinct, usually 3-merous [unusual in Eudicots]; *sepals* (4 or) 6, *often petaloid* (sometimes caducous); *petals in two whorls, the outer of (4 or) 6, the inner* [probably petal-like staminodes] of (4 or) 6 that may be showy, reduced to scales, or lacking; perianth parts typically all alike and referred to as *tepals*

Stamens distinct, (4)–6–(∞), *the anthers opening by flaps that open from the base* (a few with longitudinal winged slits)

Gynoecium of 1 pistil with 1 locule, placentation marginal or basal

Fruit usually a berry

**“BASAL EUDICOT”**

Nymphaeaceae  
**Waterlily Family**
Plants aquatic, perennial herbs, leaves large, simple, typically *peltate or cordate, floating*

Flowers large, solitary, bisexual, actinomorphic, hypogynous to epigynous

Perianth distinct, usually not clearly differentiated into sepals and petals (= tepals), outer whorl 3–∞, inner 3–∞

Stamens distinct, ∞, spirally arranged, *filaments flattened and often petaloid*, especially the outer ones

Gynoecium carpels united into 1 pistil with few to ∞ locules

Fruit a spongy berry

**“BASAL ANGIOSPERM”**

Papaveraceae  
**Poppy Family**
(Papaveraceae, Fumariaceae)

Papaveraceae subfamily Papaveroideae
Herbaceous annuals or perennials; leaves *alternate, deeply divided or dissected; sap opaque*

Flowers actinomorphic, bisexual, hypogynous, solitary

Perianth distinct, *CA 2 or 3 caducous; CO 4 or 6 (8), petals often wrinkled* (because they were wadded-up in bud)

Stamens distinct, ∞

Gynoecium of 1 pistil, 1 locule, 2 to several parietal placentae, placenta*e* often intrusive

Fruit a capsule

**“BASAL EUDICOT”**

Papaveraceae subfamily Fumarioideae
(Fumariaceae, Fumitory Family)
Herbaceous perennials (a few annuals); *leaves deeply dissected to divided or compound; sap watery.*

Flowers *zygomorphic, bisexual, hypogynous*

Perianth distinct; *CA 2 minute, caducous or not; CO 4 petals in 2 dissimilar sets of 2, the outer 2 with a basal spur or sac; the inner 2 connivent or connate at the tip*

Stamens *6, usually diadelphous* in 2 sets of 3, fused or somewhat fused in each set

Gynoecium 1 pistil, usually 1 locule with 2 parietal placentae

Fruit a capsule

**“BASAL EUDICOT”**
**Equisetaceae**

Scouring Rush or Horsetail Family

Usually rhizomatous, erect, surface often *longitudinally ridged*, rough from silica deposits

*Leaves at nodal joints in whorls*, scale–like and forming a tubular sheath; branches, when present, whorled at nodes; stems hollow except at nodes

*Sporangia borne in terminal, sessile or stalked strobili, eusporangiate*

Some species have dimorphic stems where the spore-producing and sterile stems are different

**Polypodiaceae**

Polypody Family

Herbaceous, creeping from short to long scaly rhizomes; *petioles with 3 vascular bundles*, leaves simple, entire to pinnatifid or pinnatisect (rarely once, twice, or several times pinnately compound), glabrous to pubescent to scaly, leaf veins free or anastomozing, areoles sometimes with free included veinlets

*Sporangia organized into round (commonly), oblong, or elongate sori, (sometimes sporangia covering large areas), leptosporangiate*

**Indusium absent**

**Pinaceae**

Pine Family

Shrubs or trees; leaves alternate or in fascicles on short shoots, simple and linear to needle-like

Plants monoecious

Pollen cones small and ephemeral

Ovulate cones small to large and more or less woody, consisting of ovuliferous scales and *bracts spirally arranged* around a woody axis; *bract free from ovuliferous scale; ovules inverted*

Ovuliferous scales with two ovules on the upper surface

Seeds usually *winged* except in a few (e.g., the nut pines)

Important genera: *Abies* (fir), *Larix* (larch), *Pinus* (pine), *Picea* (spruce), *Pseudotsuga* (Douglas-fir), and *Tsuga* (hemlock)

**Cupressaceae** (including *Taxodiaceae*)

Cypress Family

Shrubs or trees; leaves variously arranged, simple, *usually scale-like but often awl-shaped, or linear*, wood and foliage typically *aromatic*

Plants monoecious or dioecious

Pollen cones small

Ovulate cones woody (but cones becoming fleshy and berry-like in *Juniperus*); *ovuliferous scales fused to subtending bract nearly the length of the scale; 2−∞ ovules per scale, erect and scales often opposite*

**Fabaceae (Leguminosae)**

Legume Family

Herbs, shrubs and trees, usually with alternate, stipulate, compound leaves

*Flowers* actinomorphic to usually *zygomorphic*, bisexual, hypogynous

*Perianth* CA 5 basally connate sepals; CO 5 or "4" (3 free + 2 fused) distinct petals

*Stamens* either 10 connate in 1 (monadelphous) or 2 (diadelphous) sets (and then usually 9 + 1) or 10−∞ and distinct

*Gynoecium* 1 simple pistil (= carpel) with marginal placentaion

*Fruit* a *legume =* from a simple pistil and splitting along 2 sutures

**Fabaceae continued**

Subfamilies (Families):

**Mimosoideae** (Mimosaceae)

leaves *bipinnate*; flowers regular and often in dense clusters; petals valvate, distinct or connate, valvate and *very reduced*; stamens 10−∞, distinct, showy

**Caesalpinioideae** (Caesalpiniaceae)

leaves pinnate to bipinnate; flowers *imbricate, zygomorphic* (occasionally actinomorphic); petals *distinct*, imbricate with the *upper inserted inside the others*; stamens ≤10, *usually distinct*

**Papilionoideae** (Fabaceae)

leaves simple, pinnate, or palmate but *never bipinnate*; flowers imbricate, zygomorphic (papilionaceous); petals imbricate, *lower 2 fused into a keel, upper petal outside the others*; stamens 10, *monadelphous or diadelphous* (9 + 1)
**Saxifragaceae**

**Saxifrage Family**

Herbaceous perennials, leaves alternate or more commonly basal, with *palmate venation* (a few pinnate), usually simple; *plants often scapose*

**Flowers** bisexual, actinomorphic, hypogynous to epigynous (ovary often half-inferior), with a *hypanthium* (usu. short)

**Perianth** hypanthium technically present but typically very short; CA (4–) 5, free or connate; CO (4–) 5, *clawed*, many species with *dissected petals*

**Stamens** (4) 5 or 10, equal to or twice the number of petals

**Gynoecium** of 2 (–5) connate carpels that are usually *fused basally with distinct upper ovaries*, styles and stigmas (together forming *beaks*); locules 2 (–5) with parietal or axile placentation (marginal in the upper free portion of ovary)

**Fruit** a capsule (or a cluster of follicles)

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**Euphorbiaceae**

**Spurge Family**

Habit various (herbaceous, woody, succulent, annual or perennial), usually with alternate, simple, stipulate leaves; *plants with milky or colored sap*

**Flowers** hypogynous, *unisexual* (monoecious or dioecious), often aggregated into a flower-like structure called a *cyathium* (an involucre of modified leaves); styles usually 3, these usually bifid or divided

**Perianth** CA 0 or (3)–5–(6), distinct or slightly connate; CO typically 5 but often absent

**Fruit** usually a schizocarp

**Euphorbia-type** flowers: ♂ and ♀ flowers in a *cyathium*; glands on *cyathium* often with petaloid appendages; perianth lacking or of reduced sepals; ♂ flowers consist of a single stamen; ♀ flowers have 1 pistil with 3 locules on an elongating pedicel ("gynophore")

**Non-Euphorbia-type** flowers: ♂ and ♀ flowers well separated on the plant; perianth none or of (3)–5–(6) sepals and 0 or 5 petals; ♂ flowers usually with (1)5–10(=) stamens; ♀ flowers have 1 pistil with 3 locules

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**Lamiaceae (Labiatae)**

**Mint Family**

Herbaceous to woody plants with *square stems* and *decussate*, usually simple leaves; *plants usually aromatic*, *trichomes multicellular*, glandular trichomes often present. As recognized here, includes some woody genera formerly in Verbenaceae.

**Flowers** bisexual (or polygamous), zygomorphic, hypogynous; *inflorescence often verticillate* but technically with an indeterminate main axis and *cymose* lateral axes (a thryse)

**Perianth** CA 5, strongly fused; CO 5 (rarely appearing 4-lobed), strongly fused and forming a *bilabiate* corolla of various shapes

**Stamens** 2 or 4, *epipetalous*; usually *didynamous if 4, exserted* (often) or *not*

**Gynoecium** 1 pistil usually with a *4-lobed ovary*, 2 locules with 1 basal-axile ovule in each of four apparent locules, *style almost always gynobasic, 2-branched at apex*

**Fruit** schizocarp of 4 nutlets or rarely a berry

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**Apiaceae (Umbelliferae)**

**Carrot Family**

Perennial, *aromatic*, herbaceous (a few lianas, shrubs, and trees); leaves alternate or basal, *sheathing, blades deeply dissected or compound; internodes often hollow; usually estipulate*

**Flowers** small, bisexual, actinomorphic, epigynous; *inflorescence a simple or compound umbel* often subtended (either the entire umbel and/or the secondary umbels) by an involucre of bracteoles

**Perianth** CA 5, distinct, often very *small and essentially absent*; CO 5, distinct (but arising from a nectary disk)

**Stamens** 5, alternate the petals, inserted on a nectary disk

**Gynoecium** 1 pistil with 2 locules; 1 (really 2, but one aborts) apical-axile ovule per locule; styles 2 often basally swollen forming a *stylodium*

**Fruit** a schizocarp of 2 mericarps attached to a carpophore and the fruit often ribbed and/or ornamented, fruit with oil ducts visible on the surface or in cross section

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**Solanaceae**

**Potato or Nightshade Family**

Usually herbaceous, annuals or perennials with alternate, estipulate leaves. *Leaves in the inflorescence often appear in pairs on the same side of the stem.*

**Flowers** usually bisexual, actinomorphic, hypogynous

**Perianth** CA 5, connate (sometimes only basally), sometimes becoming accrescent; CO 5, connate, *plicate*

**Stamens** usually 5, *epipetalous*, sometimes *connivent* by the anthers, occasionally opening by terminal pores, often attached to a membranous projection of the corolla

**Gynoecium** 1 pistil, usually with 2 locules and axile placentation, the *placenta often swollen*, 1 style and stigma

**Fruit** a berry or capsule

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**Polemoniaceae**

**Phlox Family**

Usually herbaceous with alternate or less commonly opposite, leaves; leaves simple, divided or compound; often foul-smelling

**Flowers** usually bisexual actinomorphic, hypogynous

**Perianth** CA 5, connate, lobes usually green with *hyaline margins*, calyx tube typically *hyaline between sepals*; CO 5, connate, often with a *slender tube* and salverform

**Stamens** 5, *epipetalous*, often inserted at *different levels on the corolla tube* when salverform

**Gynoecium** 1 pistil with 3 *locules*, axile placentation, and a single style with 3 *style branches*

**Fruit** capsule

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**ASTERID (LAMIID)**
**Plantaginaceae**

**Snapdragon Family**

(Includes much of traditional Scrophulariaceae)

Usually herbaceous perennials, leaves alternate or opposite, simple, usu. entire; autotrophic (unlike the segregated Orobancaceae, which are hemiparasites or parasites).

**Flowers** bisexual, usually zygomorphic, hypogynous (actinomorphic in *Plantago* and a few others)

**Perianth** CA (4) 5, usually connate; CO (4) 5, connate, *bilabiata*, and tending to have 2 upper lobes and 3 lower lobes

**Stamens** *epipetalous*; (2 or) 4 and *didynamous*, but sometimes including a 5th sterile stamen (a *staminode*).

**Gynoecium** 1 pistil with 2 locules (1 in a few members of *Plantago*) and axile placentation; stigma entire or 2-lobed

**Fruit** usually a septicidal capsule

**Asteraceae**

**Sunflower or Composite Family**

Habit and leaves extremely variable

**Flower** bisexual or, in ray flowers, pistillate or sterile; actinomorphic (disk flowers) and syngymorphic (ray and ligulate flowers); epigynous; *flowers in a head* (*capitulum*) surrounded by phyllaries.

One tribe (Lactuceae) has milky sap.

**Perianth** CA highly modified into a *pappus* or absent; CO 5, connate, actinomorphic and/or syngymorphic.

**Stamens** 5, *epipetalous*, fused by anthers around style

**Gynoecium** 1 pistil, style 2-lobed

**Fruit** cypsela ("achene")

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**Brassicaceae** (Cruciferae)

**Mustard Family**

Herbs and shrubs, leaves alternate, simple to dissected; plants often smell of mustard-oils (glucosinolates)

**Flowers** usually bisexual, actinomorphic, hypogynous.

**Perianth** CA 4, distinct; CO 4, distinct.

**Stamens** 6, almost always *tetradynamous* (4 long + 2 short).

**Gynoecium** 1 pistil with 2 locules with *parietal placentation*.

**Fruit** a specialized capsule, called a *silique* when > 3 times longer than broad or a *silicle* when < 3 times longer than broad; valves splitting leaving the *replum* attached to the receptacle and spanned by a septum.

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**Ericaceae**

**Heather Family**

(including Empetraceae, Monotropaceae, & Pyrolaceae)

Shrubs, sometimes low to the ground (rarely trees or herbs), evergreen or deciduous, often in acidic soils; leaves alternate, simple, estipulate, *often leathery*. Includes some achlorophyllous parasites.

**Flowers** usually bisexual, usually actinomorphic, hypogynous (epigynous in tribe Vaccineae).

**Perianth** CA (4)–5, connate; CO (4)–5, connate, *often urceolate*.

**Stamens** anthers inverted at maturity, distinct, equal to or twice the number of petals, typically *free from the corolla* [unusual in Asterids] (basally epipetalous in a few); typically *dehisce by* "apical" pores or slits and sometimes with 2 appendages; often with modifications; pollen in large tetrads.

**Gynoecium** 1 pistil, usually with 5 (2–10) locules, axile placentation, style 1, undivided.

**Fruit** capsule, berry or drupe

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**Salicaceae**

**Willow Family**

*Shrubs or trees*, leaves alternate, simple, stipulate with deciduous stipules; dioecious.

**Flowers** unisexual, *essentially actinomorphic without an evident perianth*; flowers in *catkins* (aments), often each flower subtended by a small bract (called a scale).

**Perianth** uniseriate, CA 1–2 (3) modified into enlarged basal glands (*Salix* – willows) or a small cup-shaped disk (*Populus* – cottonwoods).

**Stamens** (1) 2 – ∞, distinct.

**Gynoecium** 1 pistil with 1 locale and a few parietal placenta and many ovules.

**Fruit** a capsule containing many comose seeds.

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**Caryophyllaceae**

**Pink or Carnation Family**

Herbaceous, *leaves opposite*, simple, estipulate or stipulate; the nodes are often swollen.

**Flowers** bisexual or unisexual, actinomorphic, hypogynous.

**Perianth** CA 5, distinct or connate; CO 5, distinct or fused, petals often bilobed, usually clawed. True petals lacking, the “petals” are really modified stamens.

**Stamens** 5 or 10.

**Gynoecium** 1 pistil, 1 locale, styles 2–5 (typically 3 or 5), *free-central placentation*.

**Fruit** capsule (infrequently an achene)
Cactaceae

Small to large stem-succulents sometimes large enough to be shrubs or trees; leaves very reduced or absent, when present usually quickly deciduous

**Flower** bisexual, actinomorphic, *epigynous*

**Perianth tepals** \( \approx \), spirally arranged, distinct, the outer sepaloid, the inner petaloid

**Stamens** \( \approx \), distinct, basally adnate to innermost tepals

**Gynoecium** 1 pistil, 1 locule, parietal placentation, many seeds, style with 2-\( \approx \) stigma lobes

**Fruit** berry (rarely a fleshy capsule, or indehiscent spiny bur)

Terms: *areole* = a short shoot with leaves modified to a collection of spines (and also *glochids* in *Opuntia* and *Cylindropuntia*)

Caryophyllid

Fagaceae

Shrubs or trees; leaves alternate, stipulate but stipules usually quickly deciduous

**Flowers** epigynous, *unisexual in catkins*; plants monoecious

**Perianth, Androecium, and Gynoecium**

Perianth reduced and inconspicuous, usually of 6 segments. *Staminate catkins with many flowers*, each with 4-\( \approx \) stamens. *Pistillate catkins with 1–3 flowers*, each with 1 pistil, 3–7 styles and 1 locule at maturity (all but one abort), and subtended by an involucre of bracts or a scaly cupule

**Fruit** nut

Rosid (Fabid)

Betulaceae

Shrubs and trees. Leaves alternate, simple, serrate (usually doubly so), stipulate. Bark often with *lenticels*.

**Flowers** unisexual in *catkins*; plants monoecious; *epigynous* (but perianth parts not or very rarely visible)

**Perianth and Gynoecium**

Perianth reduced or absent (0 or 4). Stamine catkins with many flowers, each subtending 3 flowers, each usually with 4 stamens. Pistillate catkins with many flowers, each subtended with *firm to woody bracts* subtending 2–3 pistils, each pistil usually with 2 styles and 1–2 locules

**Fruit** achene, nut, or samara

Rosid (Fabid)

Commelinaceae

Herbaceous; leaves alternate, *sheathing, nodes swollen*; often *succulent*; plants surfaces usually with 3-(rarely 4-)celled, glandular microhairs

**Flowers** bisexual, actinomorphic to more infrequently zygomorphic, hypogynous, subtended by a folded *spathe*

**Perianth and Gynoecium**

Perianth CA 3, *greenish*, distinct or connate; CO 3, *colorful*, usually distinct

Stamens 6, often with *hairy filaments*, often (1–)3 stamens are reduced to staminodes with modified anthers

Gynoecium 1 pistil, 1 stigma, 3 locules, axile placentation

**Fruit** capsule

Rosid (Fabid)

Juncaceae

Herbaceous, *grass-like*; usually in mesic, aquatic or semiaquatic sites; leaves usually basal or in lower portion of the stem, linear, 3-ranked, with *open or closed sheaths*

**Flowers** bisexual, actinomorphic, hypogynous

**Perianth** scale-like; CA 3, distinct; CO 3, distinct; *like a miniature lily flower*, *prophyllate* (flower subtended by 2 bracteoles) or not

Stamens 3 or 6

Gynoecium 1 pistil with 3 styles, the ovary either with 1 locule and 3 parietal placentae or with 3 locules and axile placentation

**Fruit** capsule; seeds with or without tails on 1 or 2 ends

Monocot

Cyperaceae

Herbs (usually *grass-like*), leaves 3-ranked, linear, sheathing with *closed sheaths*, stems usually triangular in cross section

**Flowers** bisexual or unisexual, very reduced, actinomorphic, hypogynous, subtended by a bract; flowers arranged into *spikelets*

Bisexual: perianth of bristles, scales, hairs, or absent; stamens 3; gynoecium of 1 pistil with 1 locule and 2–3 styles

Unisexual: *staminate flowers without a perianth*, stamens 3; *pistillate flowers* with a perianth (a *perigynium*) that closely envelops the gynoecium of 1 pistil with 1 locule and 2–3 styles. Spikelets may be all of one sex or may be gynaecandrous (♀ above ♂) or androgynous (♂ above ♀)

**Fruit** achene

Monocot
Poaceae (Gramineae) Grass Family

Herbaceous (a few woody like bamboo), leaves linear, entire, 2-ranked, sheaths open or closed

Flowers highly reduced and aggregated into spikelets. Spikelets usually bisexual, sometimes unisexual or. A spikelet consists of the following:

2 outer (lower) bracts (glumes) 1–∞ florets each consisting of the following:

2 bracts (lemma and palea) a perianth reduced to 2(3) microscopic lodicules
3 stamens
1 pistil with 2 styles and 2 plumose stigmas

Fruit a caryopsis

Terms: auricle, awn, collar, floret, glume, lemma, ligule, lodicule, palea, rachilla, spikelet

MONOCOT

Ephedraceae Mormon-tea or Joint-Fir Family

Mostly shrubs (rarely vines), spreading by rhizomes and having jointed stems. Leaves opposite or whorled, simple and scale-like, often quickly deciduous.

Plants dioecious. Pollen and ovules borne in flower-like structures arranged in a strobilus of opposite or whorled bracts. Bracts subtending each “flower”, “flowers” at the apex of the strobilus, the lower bracts sterile.

Pollen strobili with stamen-like structures (stalk) with 2–10 microsporangia. Ovulate strobili with 1–3 “flowers”. Seeds encased in a fused pair of bracts.

Has double fertilization, like the angiosperms!

GYMNOSPERM

Onagraceae Evening-Primrose Family

Usually herbaceous annuals or perennials, leaves simple and usually alternate or basal, but rarely opposite

Flowers bisexual, actinomorphic (usually), and epiprigynous

Perianth hypanthium present and usually obvious (but may be so short as to be inconspicuous in a few genera); CA 4–5 (rarely 2 or 5); CO 4–5 (rarely 2 or 5)

Stamens (2, 4) 8 (10)

Gynoecium of 1 pistil with 4 locules; stigmas unbranched or more commonly branched with 4 lobes

Fruit usually a capsule

ROSID (FABID)

Crassulaceae Stone Crop Family

Perennials (usually) with succulent stems and simple leaves that are succulent or fleshy

Flowers bisexual, actinomorphic, hypogynous

Perianth CA 4–5 distinct; CO 4–5 distinct or basally connate, a short hypanthium may be visible

Stamens equal or twice the number of petals (4, 5, 8, or 10); free or basally adnate to corolla (often when twice the number of the petals the opposite stamens are adnate to the petals); distinct to slightly connate at base

Gynoecium 4–5 distinct simple pistils, (i.e., each a carpel) usually the same number as the petals

Fruit a cluster of follicles

BASAL ROSID

Rosaceae Rose Family

Herbs, shrubs, or trees, usually with alternate, simple or compound, stipulate leaves that are serrate

Flowers actinomorphic, bisexual, perigynous or epipergynous

Perianth hypanthium present (occasionally very short and hard to observe); CA 5, partially connate, often alternating with epicalyx lobes; CO 5 (0, 3–10), distinct, clawed, around the rim of the cup-like hypanthium

Stamens 10–∞, rarely fewer than twice the number of petals

Gynoecium variable, pistils 1–∞; when 1, pistil compound, when 2–∞, the pistils each a carpel (simple pistils)

Fruit variable: drupe, achene, follicle, pome, or an aggregate of achenes, drupelets, or follicles, some with fleshy tissues derived from the receptacle (accessory fruit) or hypanthium (pome and hip)

ROSID (FABID)

Hydrangeaceae Hydrangea Family

Woody shrubs (or trees), leaves opposite with pinnate veins

Flowers bisexual, actinomorphic, half to fully epigynous, rarely hypogynous

Perianth forming a short or nearly obsolete hypanthium [unusual in Asterids]; CA 4–5 connate; CO 4–5 attached to hypanthium rim [unusual in Asterids]

Stamens twice the number of petals or more [unusual in Asterids]

Gynoecium 1 pistil, half to fully inferior; (2–) 3–5 (–12) locules with axile placentation or 1 locule with parietal placentation

Fruit a capsule

ASTERID (BASAL)
Geraniaceae  Geranium Family
Usually herbaceous, annuals or perennials; leaves pinnately or palmately compound or lobed, usually stipulate, herbage usu. aromatic and with glandular hairs
Flowers actinomorphic, bisexual, hypogynous
Perianth CA 5 distinct or basally connate; CO 5 distinct
Stamens usually 5 or 10 (15), somewhat fused at the base
Gynoecium 1 pistil, usually 5-lobed and with 5 locules, axile placentation, elongated style with 5 distinct stigmas
Fruit schizocarp splitting into mericarps

Boraginaceae  Borage Family
Herbs or shrubs; leaves alternate, simple and ± entire; foliage very often hirsute with swollen-based hairs (with important exceptions)
Flowers bisexual, actinomorphic (rarely zygomorphic), hypogynous; inflorescence usually a scorpioid cyme
Perianth CA 5 distinct or connate, sometimes fused in groups; CO 5 connate, frequently with scales or appendages (fornices) at mouth of corolla tube
Stamens 5, epipetalous
Gynoecium 1 pistil, with usu. 2 locules, axile placentation, style with 2 branches or stigma lobes (rarely unlobed), gynobasic or from summit of ovary. Each locule divided into 2 lobes and thus the ovary appears to have 4 locules and is 4-lobed.
Fruit usually a schizocarp dehiscing into 4 one-seeded nutlets

Campanulaceae  Bellflower/Lobelia Family
(includes Lobeliaceae)
Usually herbaceous, often with milky sap; leaves alternate, simple
Flowers bisexual, actinomorphic or zygomorphic, epigynous or partly epigynous (ovary inferior or half-inferior)
Perianth CA usually 5, distinct or basally connate; CO usually 5, connate, actinomorphic or zygomorphic
Stamens 5, alternate with CO, distinct, connivent or connate by filaments (monadelphous), free or adnate to base of corolla; in some the anthers are connate around the style (see segregate families below)
Gynoecium 2–5 (10) locules and axile placentation or 1 locule and parietal placentation; style 1, entire or 2–5–lobed
Fruit capsule or berry
Campanulaceae sensu stricto: flowers actinomorphic, stamens distinct
Lobeliaceae: flowers zygomorphic, anthers connate in a tube around style

Hydrophyllaceae  Waterleaf Family
(= Boraginaceae subfamily Hydrophyllodeae)
Usually herbaceous, annuals or perennials, leaves alternate (more rarely opposite) and usually dissected or compound; herbage often rough-hairy or with glandular hairs. (Sometimes included in a broader Boraginaceae)
Flowers bisexual, actinomorphic, hypogynous; inflorescence usually a scorpioid cyme or flowers solitary
Perianth CA 5 distinct or basally connate; CO 5, connate
Stamens 5, epipetalous, often with a pair of scales where the filament joins the corolla, stamens often exserted
Gynoecium 1 pistil with 1 locule and parietal placentaion (rarely with 2 locules and axile placentation); style with 1 (2) style branches; ovary not 4-lobed (as in Boraginaceae)
Fruit many-seeded capsule

Caprifoliaceae  Honeysuckle Family
Herbs, shrubs, and woody vines; leaves opposite and simple
Flowers bisexual, zygomorphic (sometimes barely so), half to fully epigynous
Perianth CA (4) 5, connate; CO (4) 5 connate, bilateral and often bilabiate with 2 upper lobes and 3 lower or 4 upper and 1 lower
Stamens (4) 5, epipetalous
Gynoecium 1 pistil usually with an elongated style; 2–5 locules and axile or apical placentaion or with 1 locule and 1–few parietal or apical ovules; stigma capitate
Fruit a berry, drupe, capsule, or achene

Apocynaceae  Milkweed Family
(includes Asclepiadaceae)
Usually herbaceous but also woody vines, stem-succulents, or trees; usually with milky sap; leaves opposite (rarely whorled or alternate), simple, entire
Flowers bisexual, actinomorphic, hypogynous
Perianth CA 5, connate or nearly distinct; CO 5, connate (often highly modified with 5 reflexed lobes and 5 erect lobes comprising a hood and horn [together the corona] in Asclepiadaceae sensu stricto)
Stamens 5, epipetalous or fused to gynoecium.
Gynoecium 2 carpels connate by their styles or stigmas, apical part of style expanded and highly modified. In taxa with pollinia, the Androecium and Gynoecium are fused into a single structure with the 5 stamens adnate to the gynoecium (= the gynostegium)
Fruit a pair of follicles
Terms: corpusculum, translator, pollinium, horn, hood, corona
Malvaceae

Mallow Family

Mostly herbaceous perennials and shrubs, leaves simple, alternate, usually palmate, usu. with stellate or peltate hairs, stipulate, these often prominent.

Flowers bisexual, actinomorphic, hypogynous

Perianth CA 5, usually fused, often with an epicalyx; CO 5, distinct but may be adnate to filament tube

Stamens ∞, monadelphous in a tube around the style

Gynoecium 1 pistil, 5–∞ locules, style branches as many as locules, axile placentation

Fruit usually a schizocarp but often a capsule

ROSID (MALVID)

Amaranthaceae

Amaranth/Goosefoot Family

(includes Chenopodiaceae)

Herbs and shrubs; often halophytic; leaves alternate, often farinose or glaucous, bract-like in some, usually somewhat succulent

Flowers small, usually bisexual (some unisexual), actinomorphic, hypogynous, associated with fleshy to papery bracts

Perianth uniseriate, usually reduced, herbaceous and green, papery (greenish) or otherwise colored, of (2)–5 distinct or basally connate segments, surrounding the fruit

Stamens (3)–5, distinct, opposite the sepals, distinct (or fused at the very base)

Gynoecium 1 pistil, 1 locule, 1 basal ovule, carpels 2 or 3 as stigmas are (1) 2 or 3

Fruit achene or utricle, often surrounded by adnate or adherent calyx or bracts; seed with spirally coiled embryo

CARYOPHYLLID

Polygonaceae

Buckwheat Family

Herbs to shrubs, stems with swollen nodes and usually stipulate with fused stipules (ocrea), less frequently estipulate (e.g., the large genus Erigonum)

Flowers usually bisexual, actinomorphic, hypogynous

Perianth either biseriate with 2 whorls of 3 each or uniseriate with 1 whorl of 5 (6) segments; perianth parts distinct or basally connate, typically all petaloid

Stamens 3, (5), 6, or (9), distinct

Gynoecium 1 pistil, 1 locule, 2–3 styles, 1 basal ovule

Fruit lenticular or trigonous achene, sometimes associated with enlarged (fleshy or dry) perianth parts

CARYOPHYLLID

Montiaceae

Purslane Family

Herbs, leaves simple, entire, spirally arranged, estipulate, commonly succulent

Flowers bisexual, actinomorphic, hypogynous

Perianth sepaloids 2 (3–9), distinct; petaloids (4)–5–(19), usually distinct (sometimes basally connate). The 2 “sepals” originated as bracts, therefore, the “petals” are actually petaloid sepals

Stamens opposite petaloids, equal the number of petaloids (infrequently ∞), distinct (rarely adnate to the base of the petaloids)

Gynoecium 1 pistil, 1 locule with 2–∞ basal or free-central ovules; styles 2–9 or 1 and lobed

Fruit usually a 2–3 valved capsule

Portulacaceae s.s.: leaves alternate or rarely opposite, often stipulate; ovary half-inferior; fruit a circumsessile capsule, the cap falling with the dry perianth remains

CARYOPHYLLID

Iridaceae

Iris Family

Herbs (a few shrubs) from rhizomes, bulbs, or corms; leaves equitant, basal or alternate

Flowers bisexual, usually actinomorphic, epigynous, subtended by a spathe (bract)

Perianth petaloid, distinct or connate (and appearing like a hypanthium); CA usually 3 and petaloid; CO usually 3; CA and CO differentiated or not

Stamens 3, filaments distinct or connate

Gynoecium 1 pistil, 3 locules, style 1 or 3-lobed; stigmas sometimes petaloid

Fruit capsule

MONOCOT

Alismataceae

Water-Plantain Family

Herbaceous, aquatic, perennial with milky sap; unusual monocot in some species have palmate venation; leaves basal, simple, often hastate or sagittate

Flowers bisexual or unisexual (monoecious), actinomorphic, hypogynous

Perianth CA 3, distinct, usually green; CO 3, distinct

Stamens 6–∞, distinct

Gynoecium 6–∞ distinct carpels

Fruit achenes in a cluster

MONOCOT
**Araceae**  
Arum Family  
Perennial herbs, leaves large, unlike most monocots in having *palmate or pinnate venation*, simple, often *mucilaginous*.

**Flowers** minute, unisexual or bisexual, usually actinomorphic, ovary position variable; inflorescence consisting of a fleshy spike (= *spadix*) and a showy subtending bract (= *spathe*).

**Perianth** 0, 4 or 6 tepals, *very reduced*.

**Stamens** 1, 2, 4, or 8, distinct or connate.

**Gynoecium** individual flowers with 1 pistil of (1) 2–3 carpels with 1–3 locules, style 1; ovary typically sunken into axis of spadix.

**Fruit** berry.  

**MONOCOT**

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**Orchidaceae**  
Orchid Family  
Herbaceous perennials with alternate or basal, simple leaves; epiphytic or less frequently terrestrial.

**Flowers** bisexual, *zygomorphic*, epigynous, mostly resupinate.

**Perianth** ornate; CA 3 (2 of the petals fused in some), usually distinct but sometimes connate, usually actinomorphic; CO 3, *zygomorphic* with 2 similar lateral petals and a 3rd median petal forming the *labellum*.

**Stamens** 1 or 2 (3), fused to the gynoecium; pollen in *pollinia*, these attached by "threads" to a *viscidium*, together, this structure called a *pollinarium*; operculum (anther cap) sometimes present.

**Gynoecium** 1 pistil, unilocular, fused to androecium and together forming the *column* (gynostemium or gynostegium); ovary inferior, usually *resupinate* (twisted).

**Fruit** a capsule.  

**MONOCOT**

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**Agavaceae**  
Agave or Yucca Family  
Perennial or monocarpic, *woody to some degree* (some trees), with thickened stems and *fibrous*, often spiny, persistent leaves in whorls or rosettes.

**Flowers** bisexual, actinomorphic, hypogynous or epigynous.

**Perianth** tepals 6, usually *entirely petaloid*, distinct or connate.

**Stamens** 6, distinct, free or adnate to the perianth.

**Gynoecium** 1 pistil with 3; style 1 or stigma sessile.

**Fruit** usually a capsule but sometimes berry-like.  

**MONOCOT**

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**Violaceae**  
Violet Family  
Herbaceous in temperate zones, but some shrubs, vines, and even small trees in the tropics; usually perennial, plants relatively small; leaves simple, stipulate, alternate or basal.

**Flowers** bisexual, *zygomorphic* (less frequently actinomorphic), hypogynous; cleistogamous flowers often present.

**Perianth** distinct; CA 5, CO 5 with *lower-most petal often saccate* or spurred.

**Stamens** 5, often *connivent* or connate; anthers appressed to the ovary.

**Gynoecium** 1 pistil with 1 locule and 3 parietal placentae.

**Fruit** a capsule in temperate species.  

**ROSID (FABID)**

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**Liliaceae**  
Lily Family  
(including Calochortaceae)

Herbs, perennial from a bulb; leaves simple, entire, usu. sheathing, alternate, whorled, or usu. basal; lacking an onion-like odor.

**Flowers** bisexual, actinomorphic (rarely slightly bilateral), *hypogynous*, large; inflorescence a *raceme or solitary* (very rarely an umbel), each flower usually subtended by a bract.

**Perianth** showy, biseriate, of 6 petaloid tepals or of 3 sepals and 3 petals of different texture, *distinct, often with spots, lines, showy glands, or other ornaments*.

**Stamens** 6, distinct.

**Gynoecium** 1 pistil, 3 locules, axile placentation, stigma 1, 3-lobed, or 3.

**Fruit** capsule, loculicidal (*Liliaceae sensu stricto*) or septicidal (traditional Calochortaceae).  

**MONOCOT**

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**Alliaceae**  
Onion Family  
Herbaceous, from a bulb; leaves alternate and usually basal, simple, sheathing, often *grass-like or terete*; plants often *strong-smelling of onion*; from *bulbs*.

**Flowers** bisexual, actinomorphic (rarely bilateral), hypogynous; inflorescence an *umbel* subtended by a bract (spathe); individual flowers not subtended by a bract.

**Perianth** tepals 6, distinct to connate, petaloid, not spotted, when connate, tubular to campanulate.

**Stamens** 6, filaments distinct to connate, sometimes adnate to tepals.

**Gynoecium** 1 pistil, 3 locules, axile placentation, stigma 1, capitate to 3-lobed.

**Fruit** loculicidal capsule.  

**MONOCOT**
### Ruscaceae  Butcher’s Broom Family

*(includes Convallariaceae)*

Herbs (usually) to shrubs and trees; leaves simple, entire, usually alternate and cauline, but often basal.

**Flowers** bisexual, actinomorphic, *hypogynous*, small

**Perianth** tepals 6, usually *connate* (sometimes only at the very base or rarely distinct), petaloid, *not spotted*

**Stamens** 6, filaments usually distinct, *often adnate to tepals*

**Gynoecium** 1 pistil, (2) 3 locules with axile placentation, stigma 1, capitate to 3-lobed

**Fruit** usually a *berry* or sometimes 3-angled and nut-like

MONOCOT

### Lycopodiaceae  Club–moss Family

Herbaceous; densely leafy with *1–nerved* leaves; stems *dichotomously branched*

Sporangia borne in axils of fertile leaves, these often aggregated into *cone–like strobili* projected above the often trailing stems; eusporangiate

LYCOPOD

### Grossulariaceae  Gooseberry or Current Family

Woody shrubs, *leaves alternate with palmate venation*, often with glandular hairs

**Flowers** bisexual, actinomorphic, *epigynous*

**Perianth** well developed *hypanthium* present; CA (4)–5, connate; CO (4)–5 attached to hypanthium rim

**Stamens** (4)–5

**Gynoecium** 1 pistil, 1 locule and 2 parietal placentae

**Fruit** *berry*

BASAL ROSID

### Aspleniaceae  Spleenwort Family

Herbaceous, rhizome ascending to nearly erect or creeping, scaly at the apex; petioles with 2 vascular bundles, leaves simple to 4-pinnate, *scaley*, veins free or anastomosing, areoles without free included veinlets, veins reaching the leaf margin or not, vein endings undifferentiated or forming hydathodes

Sporangia in *elongate sori along the veins, the sorus along one side of veins, not crossing leaf veins*, leptosporangiate

*Indusium linear and laterally attached*

MONILOPHYTE

### Dryopteridaceae  Wood Fern Family

Herbaceous, rhizomes creeping, ascending or erect, scaly at the apex; *petioles with numerous vascular bundles in a ring*, leaves 1–5-pinnate or more divided (rarely simple), glabrous to sometimes scaly or glandular, leaf veins free or anastomozing, areoles with or without free included veinlets

Sporangia in ± *round* (usually) *sori*, leptosporangiate

*Indusium superior and peltate or ± lateral and kidney-shaped* (very rarely absent), *not growing along veins if lateral* (crossing veins), if kidney-shaped (or even a little longer), the sorus crosses a leaf vein

MONILOPHYTE

### Pteridaceae  Maidenhair Fern Family

Herbaceous, creeping from short to long scaly rhizomes; petioles with 1–2–several vascular bundles, leaves 1–6-pinnate (rarely simple), glabrous to pubescent, glandular or scaly, leaf veins free or anastomozing, areoles without free included veinlets

Sporangia in *elongate sori along the leaf veins* or in *bands along the leaf margin*, leptosporangiate

*Indusium absent* but the reflexed margin of the leaf often forms a false *indusium*

MONILOPHYTE
Athyriaceae  
Ladyfern Family

Herbaceous, from short- to long-creeping to erect rhizomes, these scaly, sometimes with golden hairs; plants frequently have *trophopods* (thickened petiole base that is starch-filled and persistent upon the rhizome); petioles with 2 vascular bundles, leaves simple to 3-pinnate-pinnatifid, veins free or sometimes anastomosing, the areoles without free included veins, veins usually terminating before the leaf margin, vein endings slightly raised and expanded, or forming hydathodes, or not differentiated

Sporangia in *somewhat elongate, sometimes round sori, on the vein or along one side, single or paired across the vein, then crossing over the vein in a J- or U-shape*, leptosporangiate

*Indusium lateral*

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Cystopteridaceae  
Bladder Fern Family

Herbaceous, from short-to more often long-creeping rhizomes; petiole bases narrow or with *trophopods* (thickened petiole base that is starch-filled and persistent upon the rhizome); petioles with 2 vascular bundles, leaves 2–3-pinnate-pinnatifid, leaf veins free and terminating at the leaf margin, the vein endings not differentiated

Sporangia in *round or slightly elongate sori, these usually on a distinctly raised and hardened receptacle, leptosporangiate*

*Indusium inferior (basal) and curving like a hood around the sorus (indusium lacking in Gymnocarpium)*

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Woodsiaceae  
Cliff Fern Family

Herbaceous, from short-creeping, horizontal to suberect rhizomes; petioles with 2 vascular bundles, leaves 1-pinnate to 2-pinnate-pinnatifid, leaf veins free and terminating before the leaf margin, vein endings expanded and forming hydathodes

Sporangia in *round sori, leptosporangiate*

*Indusium inferior (basal) and composed of a series of scale-like or filamentous segments (rarely sac-like and globose)*

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Verbenaceae  
Verbena Family

Herbaceous to woody plants, often with *square stems*, leaves *decussate* and simple, these nearly always toothed; plants not typically aromatic; *trichomes unicellular*, glandular trichomes often present

*Flowers* bisexual, zygomorphic (a few nearly actinomorphic), hypogynous; *inflorescence racemose*

*Perianth* CA 5, strongly fused; CO 5 (rarely appearing 4-lobed), strongly fused, zygomorphic, usually trumpet-shaped, usually with short lobes

*Stamens* usually 4, *epipetalous*; often didynamous *never exserted*

*Gynoecium* 1 pistil (*unlobed*), 2 locules (but appearing 4 locular) with 1 or 2 ovules per locule, *style terminal, entire or 2-lobed*

*Fruit* schizocarp of 4 nutlets (usually) or drupaceous

*ASTERID (LAMIID)*