

Objectives

Botanists often start the process of identifying a plant by figuring out what family it belongs to. Although a plant family may contain a great variety of plants – small or large, living in a wide range of habitats, having various flower colors – all of them will have certain characteristics in common. The purpose of this lab is to familiarize you with a few families of flowering plants and the characteristics that define them. As you'll see, most of the important identifying characteristics relate to flowers and other reproductive structures. By the time you complete this lab, you should be able to recognize the following families:

- **Grass family** (Poaceae)
- **Lily Family** (Liliaceae)
- **Mint family** (Lamiaceae)
- **Sunflower family** (Asteraceae)
- **Rose family** (Rosaceae)
- **Snapdragon family** (Scrophulariaceae)

You should also be able to recognize the plant characteristics and terms listed below. See the next page for pictures.

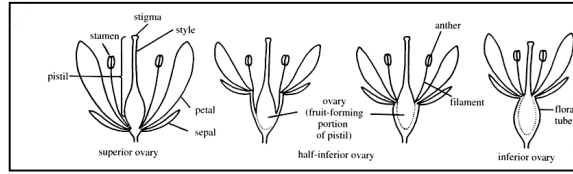
- **Alternate vs. opposite leaves.** See illustration on next page.
- **Flower parts: calyx, sepals, corolla, petals.** The petals are the showy parts around the flower. The corolla is the whole set of petals; the corolla may consist of a tube or of separate, individual petals. The calyx is the outer, usually green, leafy part around the flower. It consists of sepals, which may be fused together or separate.
- **Female parts: ovary, style, stigma.** The ovary is the part of the flower where the female gametophytes develop. After fertilization, ovaries often grow into large fruits as the other flower parts such as petals fall off.
- **Superior vs. inferior ovary.** If the petals are attached below the ovary, it's called a superior ovary; if the petals are attached above the ovary, it's called an inferior ovary.
- **Male parts: stamen & anther.** The anther is the tip where the pollen is produced; the stamen includes the anther and the filament (stalk) to which it is attached. The number of stamens is an important flower characteristic; so is the way the stamens are arranged on the flower.
- **Monocots vs. dicots.** In an earlier lab, you saw that monocots have parallel veins and fibrous root systems. In this lab, you'll also notice that monocots have their flower parts (petals, stamens, etc.) in multiples of three, while dicots have multiples of 4 or 5.

On the lab exam, you may see examples of these plants and be asked to name the family or the characteristics listed above.

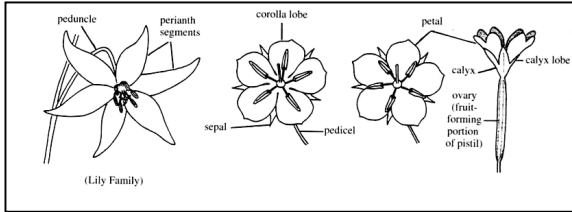
There are hundreds of plant families in California; this lab will only introduce you to a few. Part of the point of this lab is that you'll learn the characteristics of some common plant families; a more important goal is for you to learn to look more closely at plants.

Visual Glossary

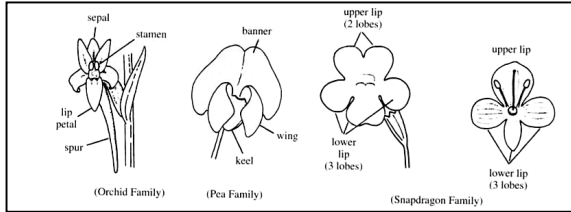
These illustrations show some plant characteristics that are used in identifying plant families.



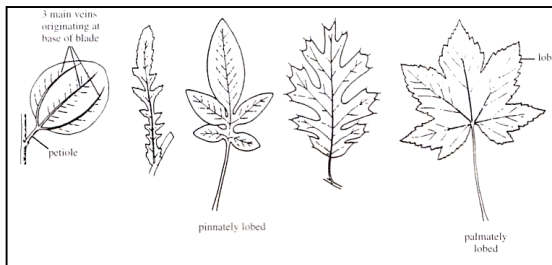
ovary position



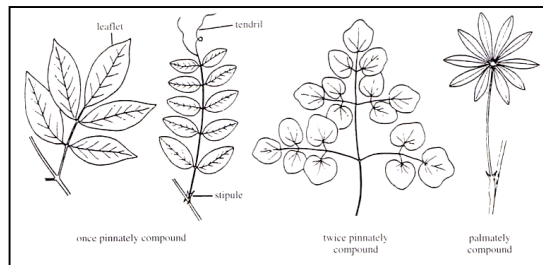
regular corolla



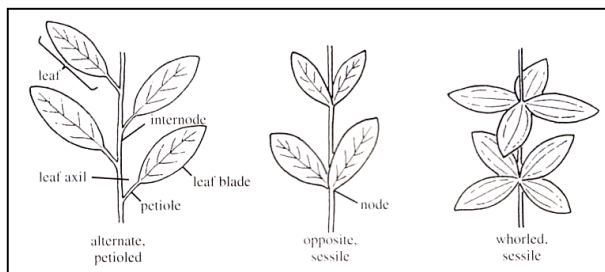
irregular corolla



simple leaves



compound leaves



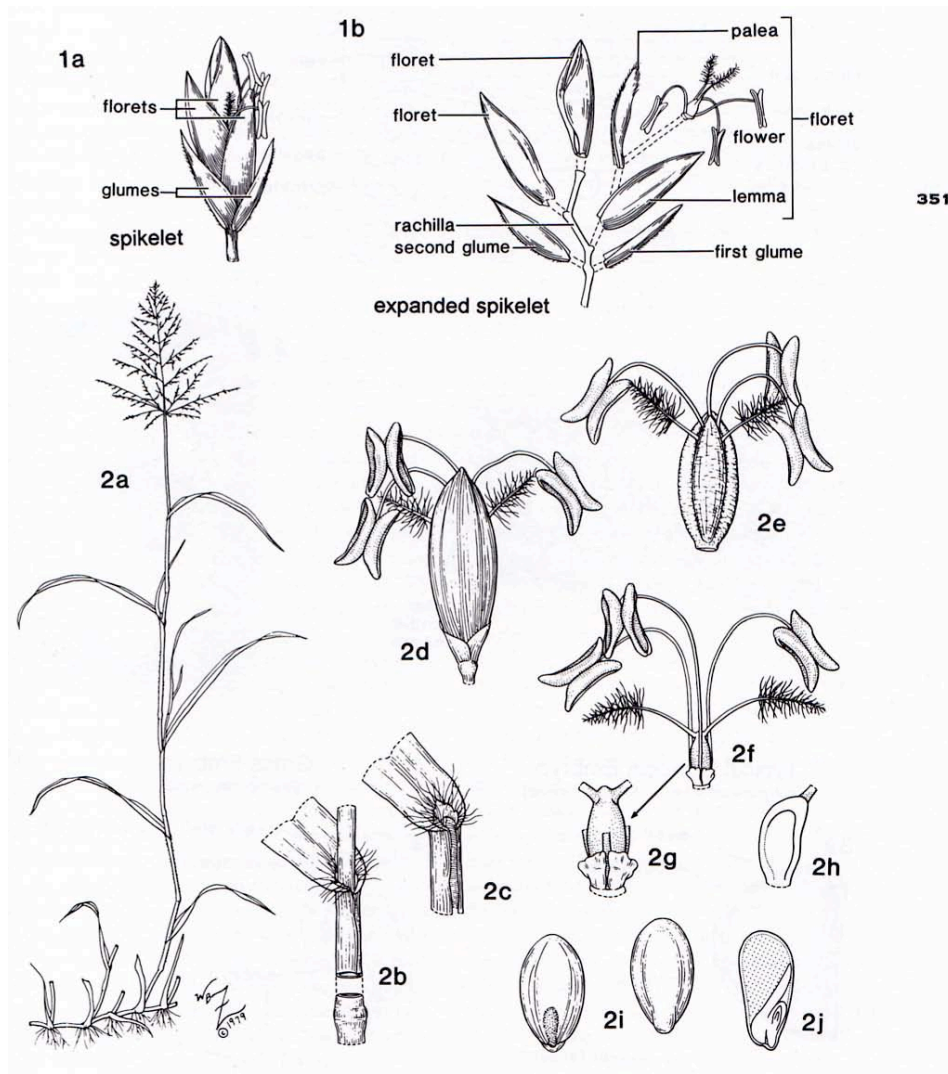
leaf arrangement

Grass family: Poaceae

Grasses are flowering plants! Their flowers are usually small and green, and pollinated by wind. Although the flowers are tiny, they contain the same parts as other flowers. Grasses are monocots.

Well-known members: wheat, corn, rice, and just plain grass!

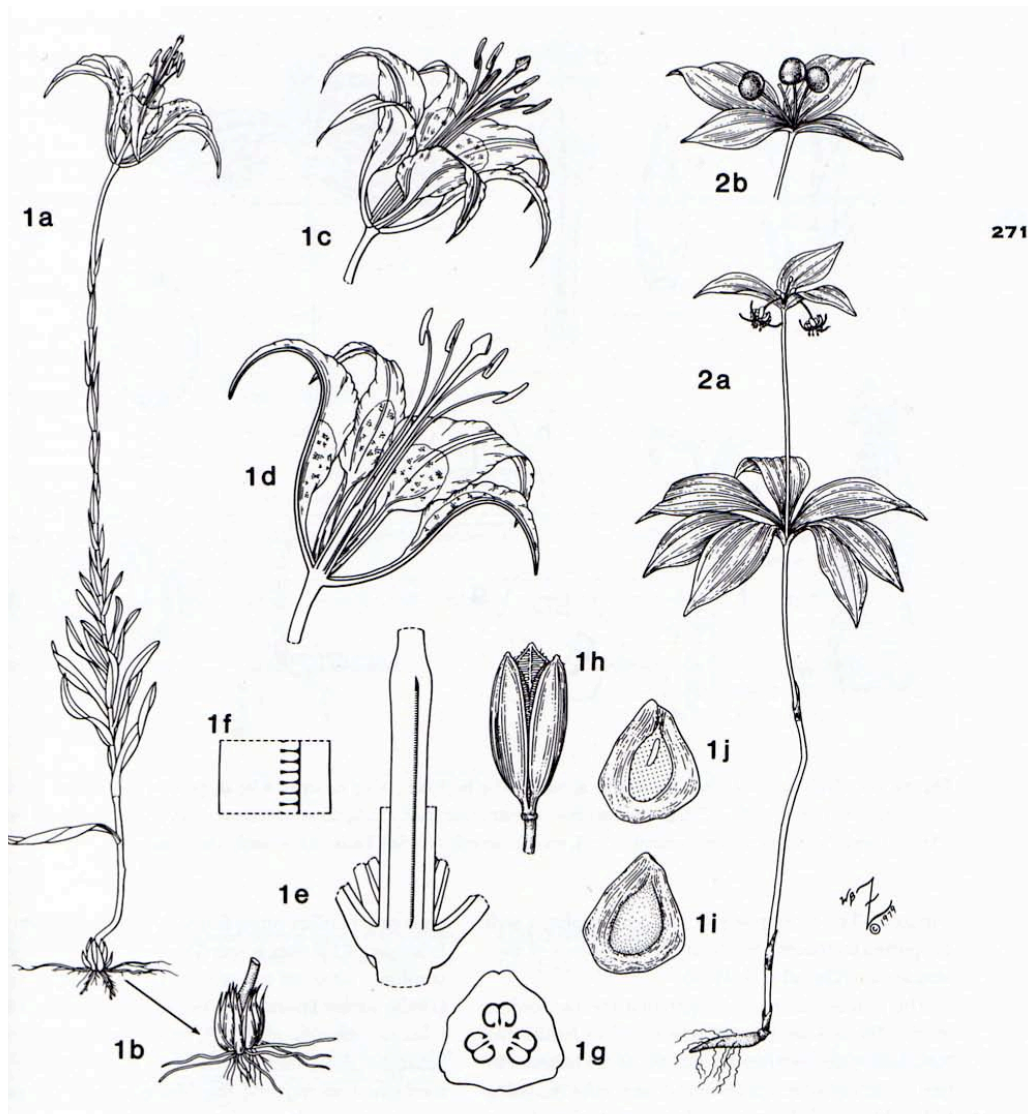
- No petals or sepals; flower enclosed between two greenish bracts.
- Simple leaves with parallel veins. Leaves arise from a sheath that surrounds the stem.
- Round, hollow stems with solid nodes.
- Stamens: 1 – 3 (monocots generally have flower parts in multiples of 3, while dicots have multiples of 4 or 5).



Lily family: Liliaceae

Lilies are monocots, with parallel-veined leaves and flower parts in multiples of 3.

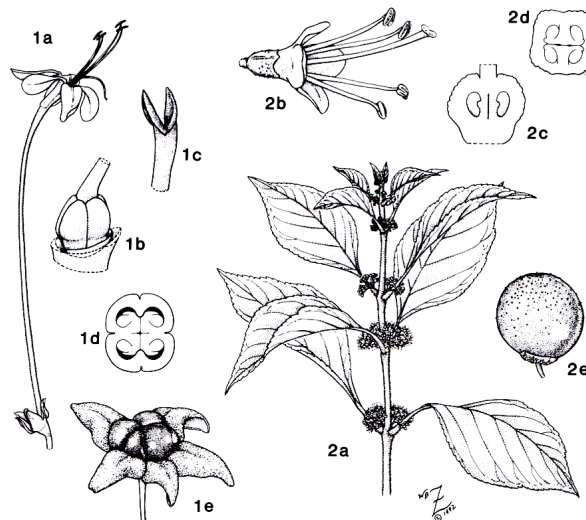
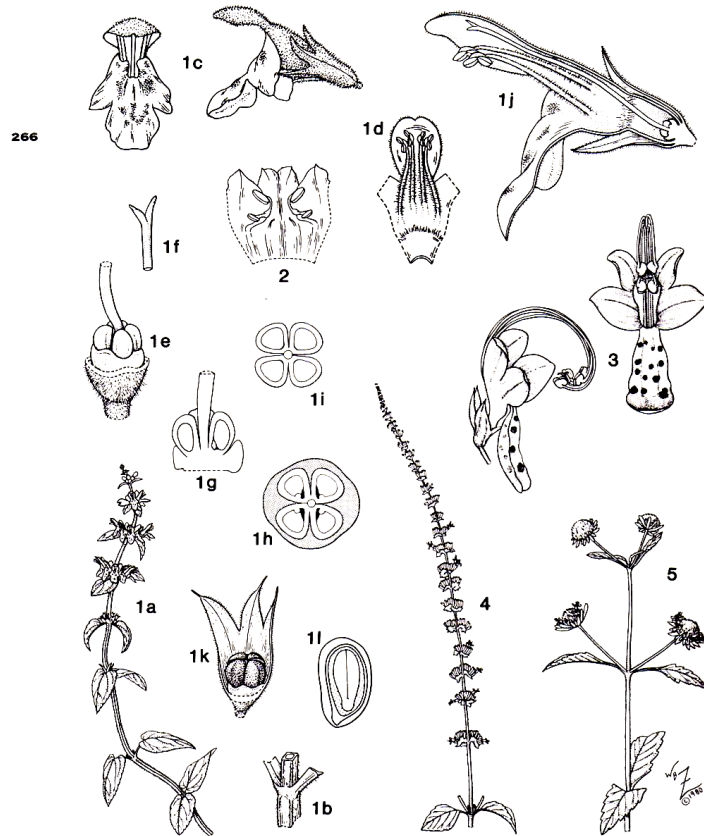
- Flowers usually have three sepals and three petals (monocots generally have flower parts in multiples of 3, while dicots have multiples of 4 or 5). Petals and sepals may look similar; petals are the inner parts and sepals are the outer ones.
- Regular corolla.
- 1 ovary with three compartments.
- Superior ovary.
- Fruit is a capsule that splits open to reveal the three seed-bearing compartments.
- Stamens: 6.
- Simple leaves with parallel veins.



Mint family: Lamiaceae

Well-known members: mint, lavender, sage, rosemary, basil, stinging nettles. Members of the mint family usually have a distinctive minty or herbal smell.

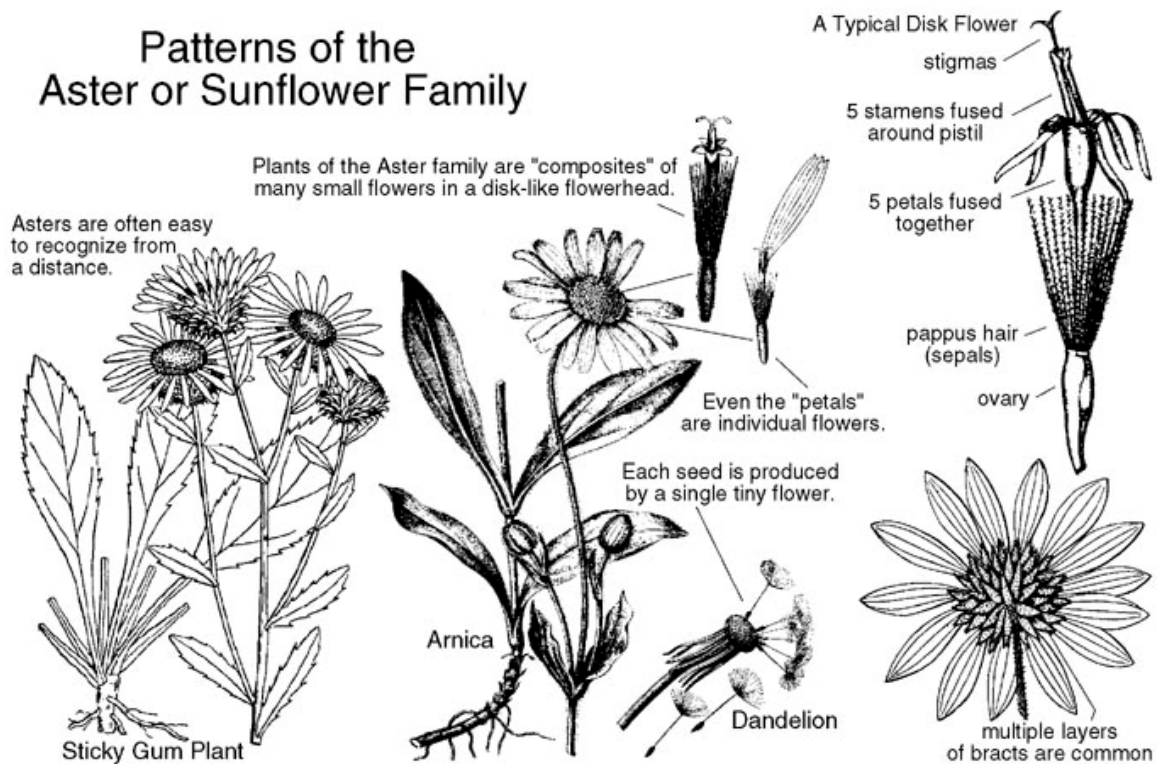
- Petals fused into a tubular corolla, usually irregular (bilaterally symmetrical) with distinct upper and lower lips. Sepals also fused into a tubular calyx with 5 lobes.
- Stamens usually 4; sometimes 2.
- Ovary superior.
- Inflorescence often a whorl.
- Leaves usually simple but may be pinnately lobed (like a feather). Opposite & decussate (each successive pair of leaves sticks out at a 90° angle to the pairs above and below).
- Stems often square (unless they're woody).
- Often aromatic.



Sunflower family: Asteraceae

Well-known members: sunflowers, dandelions, many others. This family is very distinctive, because what appears at first to be a single flower turns out to be a flower head containing numerous tiny flowers attached to a disk-like base.

- Flowers arranged on disk-like base.
- Flowers often come in two types: disk flowers with very small corollas filling most of the disk, and ray flowers around the edge having much larger corollas.
- Stamens 5, but tiny and hard to count.
- Leaves and overall plant form extremely variable.
- Ovary inferior; one ovule per ovary.

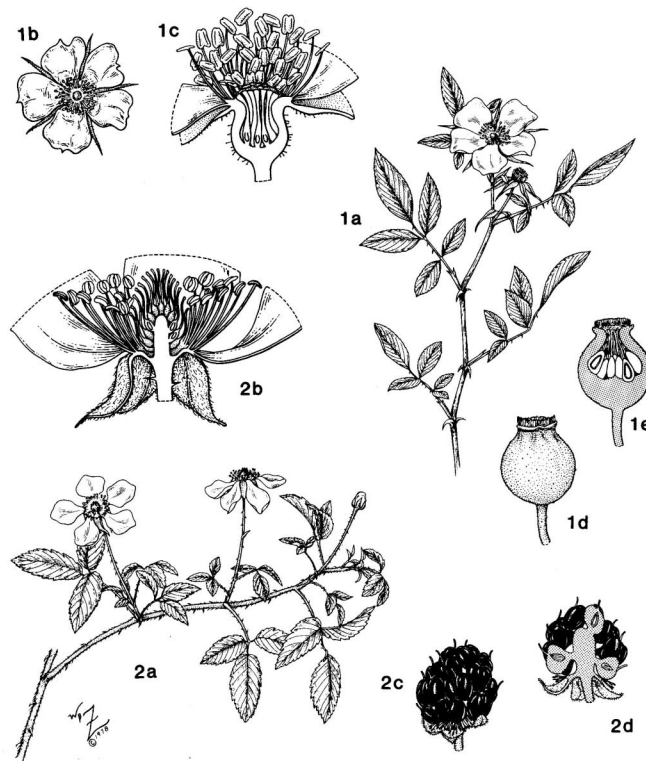


Rose family

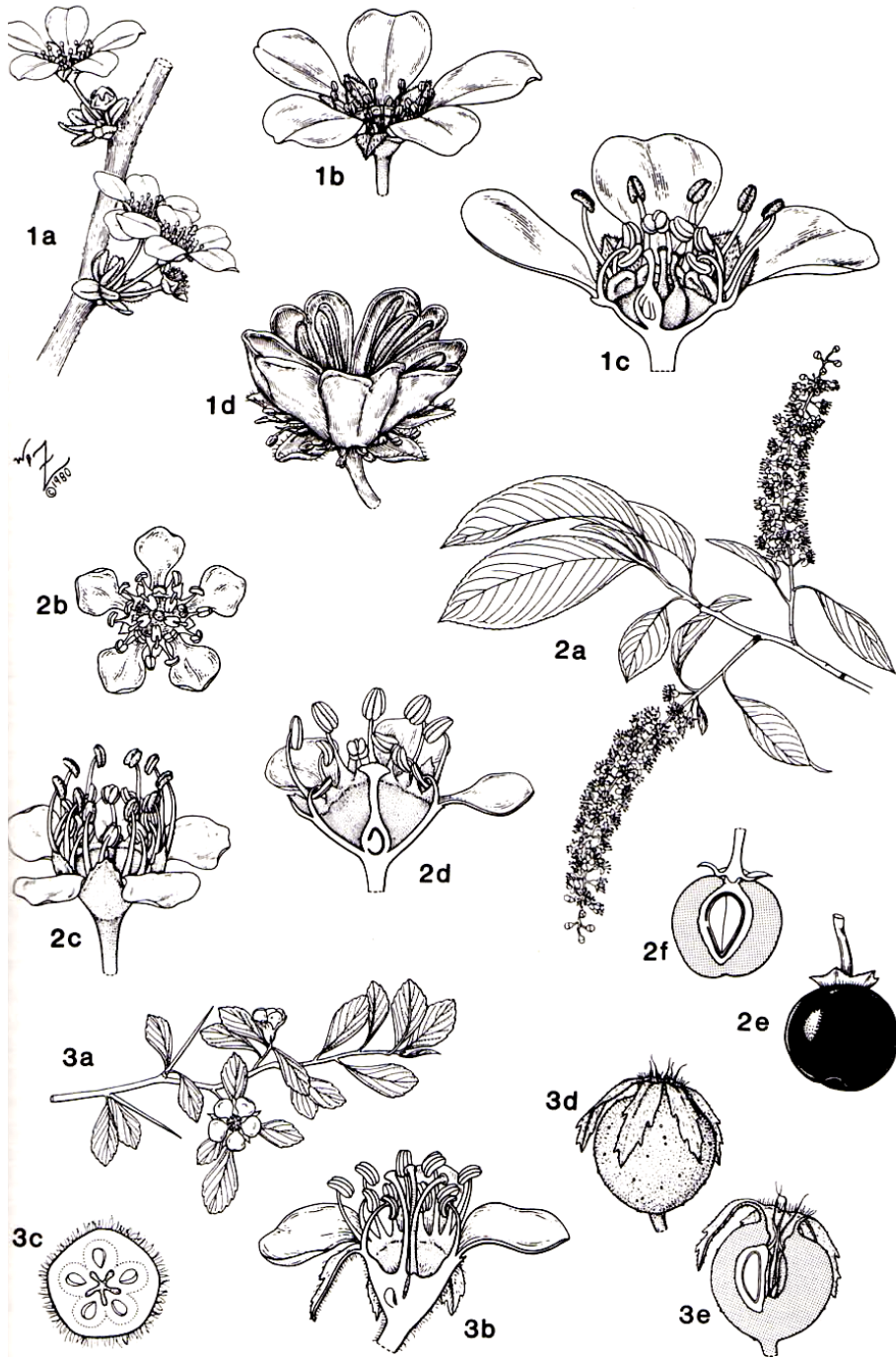
Well-known members: roses, strawberries, blackberries, the genus *Prunus* (including plums, almonds, peaches, etc.), apples, and numerous California native herbs and shrubs.

- Corolla regular (radially symmetrical). 5 petals, not joined together. (Cultivated roses are mutants, bred to have extra whorls of petals. Wild roses have 5.)
- Flower has a cuplike base.
- Calyx with 5 sepals, joined at the base.
- Stamens numerous (more than you want to count), in several whorls.
- Leaves often pinnately compound.
- Ovary can be superior (plums or almonds) or inferior (apples or rose hips).
- Fruit variable.
- Leaves alternate; can be simple or compound.

The rose family is very large, and includes many plants that don't look like roses. However, if you look closely at the flowers, you can see a family resemblance. In particular, notice the large number of stamens, the cup-shaped base of the flower, and the fact that all the petals are separate (not joined together in a tube as in some other families).



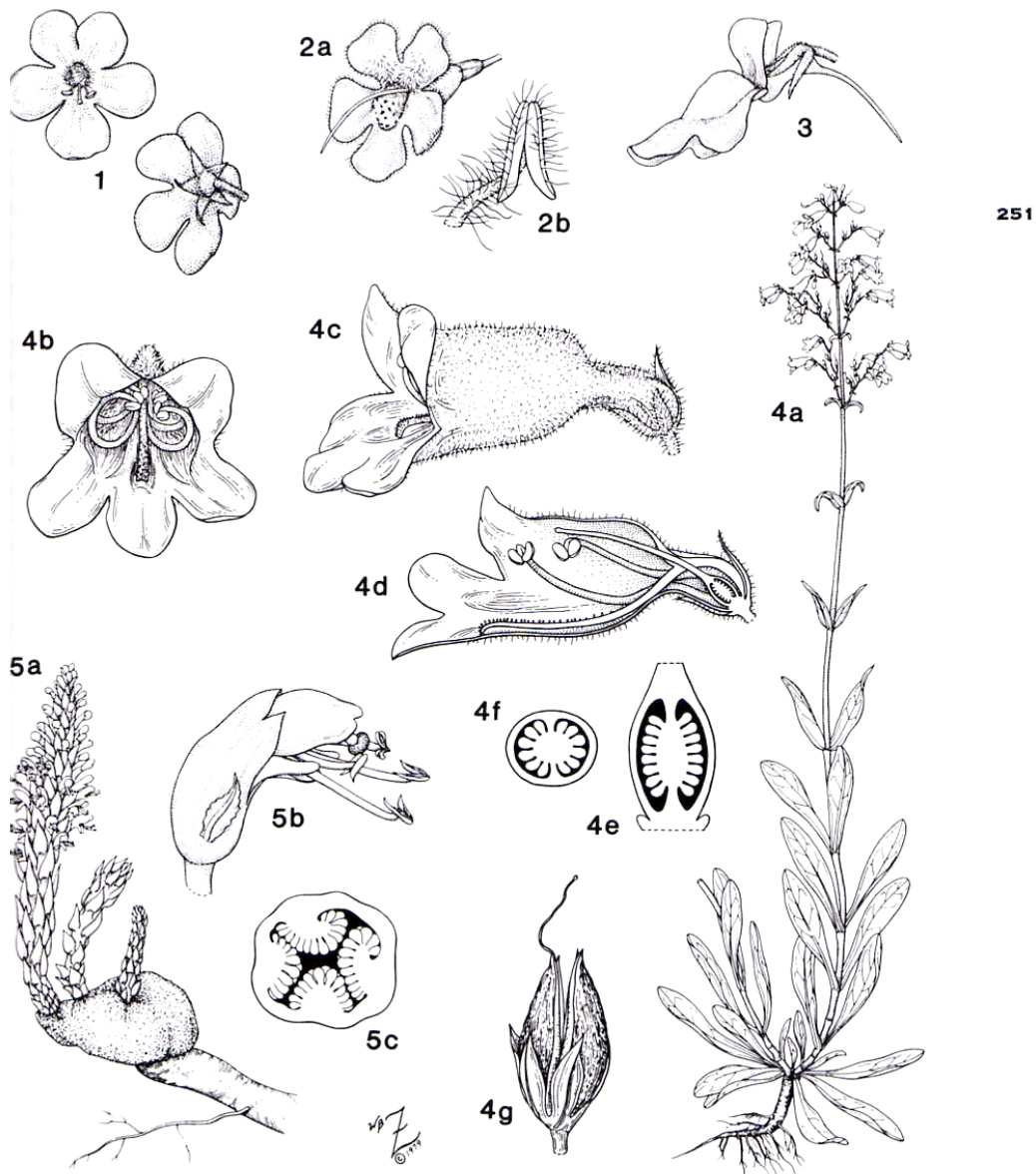
Rose family, continued



Snapdragon family: Scrophulariaceae

Well-known members: snapdragons, penstemons, monkeyflowers.

- Corolla irregular (bilaterally symmetrical). Petals joined into a long tube, with a distinct upper and lower lip. Usually 5 lobes, sometimes 4.
- Stamens: 5, including one extra long stamen that looks different from the others.
- Leaves variable.
- Ovary superior, with one or two compartments.
- Stigma (where the flower receives pollen) typically has two lobes, like small lips.
- Fruit a long capsule with many seeds.



Questions for plant lab 4

On the lab exam, you'll see various plant specimens with questions like the following:

1. What family does this plant belong to? (For this question, you'd be presented with one of the plants from today's lab, or a very similar plant.)
2. Is the ovary on this flower (or fruit) superior or inferior?
3. Is the corolla on this flower regular or irregular?
4. Are these leaves simple or compound?
5. Is this leaf arrangement opposite or alternate?
6. Monocot or dicot?
7. Parallel veins or reticulate?
8. Fibrous root system or tap root system?