There are 3 main kinds of simple fruits...

- **Berry**: All parts of pericarp are fleshy/pulpy except for exocarp (skin)
  - This grape is a berry.

- A pepo is a berry with a thick, inseparable rind.

- A hesperidium is a berry with a leathery, separable rind.
**Drupe (stone fruit):** Usually one-seeded with a stony endocarp, fleshy mesocarp, and a thin and skin-like exocarp.

**Pome:** develops from flower with inferior ovary and compound pistil. Receptacle / floral tube becomes major fleshy part of the fruit.

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**Dry fruits: dehiscent vs. indehiscent.**
- Dehiscent fruits split open at maturity
- Indehiscent fruits do not split open at maturity

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**Fruit and Seed dispersal**
- Fruits protect seeds during development and sometimes aid in their dispersal
- Fleshy fruits or seeds are adapted to animal dispersal
- Dry fruits can be adapted to air or water dispersal, animal dispersal, or to release the seeds at maturity
- Seeds themselves often have their own dispersal-adapted morphology, and adaptations for survival and germination

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**Fruit adaptations that enhance seed dispersal:** Red berries are animal dispersed, while dandelion fruits are wind-dispersed (right).
Dandelion fruit dispersal via wind

Some fruits, such as these burrs, hitch a ride on the fur of animals

The seeds of many plants have elaiosomes—fleshy attachments which attract ants. Ants carry the seeds back to their nests, eat the elaiosome, and often discard the seed. (One example is our native wild ginger, Asarum caudatum)

Don’t forget: many plants also reproduce asexually. Two examples: the maternity plant (Kalanchoe, left), aspen (Populus) groves (right)

Seed adaptations for survival and germination

- Many seeds exhibit dormancy, a temporary condition of low metabolism and no growth or development. Some seeds can survive like this for decades or more. What are the potential benefits of dormancy?

- Dormancy in some seeds is simply broken by favorable environmental conditions, but others only germinate after specific cues

- What would you expect the cues to be for seeds living in deserts, fire-prone habitats (such as California chaparral), or at high latitudes? How about for seeds borne in berries eaten by mammals?
The four steps of seed germination: 1. imbibition of water, 2. enzyme digestion of stored food, 3. embryo begins growth and radicle is pushed through the seed coat, and 4. shoot tip grows toward soil surface. Germination of a barley seed is shown below.
Figure 38.7 The development of a dicot plant embryo