

Dichotomous From Top To Bottomous



Can you use a dichotomous plant key?

A dichotomous plant key is an important tool used by biologists to identify plants. When you use a dichotomous key, you must answer a series of questions about the characteristics of the plant you are trying to identify. Some of the questions are easy to answer, but some knowledge of plant biology or special vocabulary is helpful.

During this activity, you will learn how to use a dichotomous plant key and some of the terms necessary to identify plants. Click on one of the Mystery Plant icons (below) to begin.

Hints: Click on unfamiliar terms for a brief explanation. Click on the square in front of a term to select it or fill in the blank. You can use the arrows (top right) to help with navigation.



Mystery Plant A



Simple leaves are singular, only one segment between the stem of the leaf and the tip of the leaf blade.



A compound leaf is made up of completely separate segments called leaflets.



Mystery Plant A



Alternate leaves are not directly across from each other along the stem.



Opposite leaves are directly across from each other along the stem.



Mystery Plant A



Serrated leaves have jagged “teeth” directed forward towards the tip of the leaf.



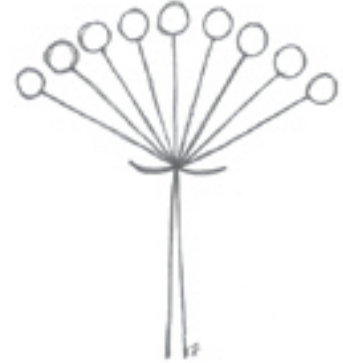
The margins, or edges, of an entire leaf are smooth and without teeth or lobes.



Mystery Plant A



A spike is an inflorescence with sessile flowers (flowers having no stalk of any kind) on a long axis (stem or branch) with the newest flowers at the apex (top).



An umbel is a convex or flat-topped inflorescence, where all the flowers arise from one central point.



Mystery Plant A



STEP 1

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaves.

- simple
- compound

Mystery Plant A



STEP 2

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaves.

- alternate
- opposite



Mystery Plant A



Please, try again.

This plant has long, narrow leaves. However, none of the leaves of this mystery plant are compound.



A compound leaf is made up of completely separate segments called leaflets.

Mystery Plant A



STEP 3

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

The leaf margins of this plant are _____.

- serrated
- entire

Mystery Plant A



Please, try again.

This mystery plant does not have opposite leaves.



Opposite leaves are directly across from each other along the stem.

Mystery Plant A



STEP 4

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

The inflorescence or flower cluster of this plant is _____.

- spike-like
- umbel-shaped

Mystery Plant A



Please, try again.

This mystery plant does not have serrated leaves.



A serrated leaf has jagged “teeth” directed forward towards the tip of the leaf.

Mystery Plant A



Paintbrush

Mystery Plant A is called paintbrush, a native plant in Golden Gate National Parks.

Castilleja latifolia (Indian paintbrush)

Castilleja wightii (coast paintbrush)

Figwort Family (Scrophulariaceae)

Castilleja plants are named for a Spanish botanist, Domingo Castillejo. They are usually shrubby, one to two feet high, sticky and hairy. The leaves are linear to lanceolate and the flowers appear to be clustered in spike-shaped stalks. They are usually variations of yellow or red.

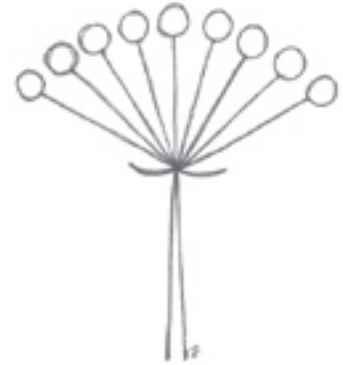


Mystery Plant A



Please, try again.

This mystery plant does not have an umbel-shaped inflorescence.



An umbel is a convex or flat-topped inflorescence, where all the flowers arise from one central point.

Mystery Plant B



Simple leaves are singular, only one segment between the stem of the leaf and the tip of the leaf blade.



A compound leaf is made up of completely separate segments called leaflets.



Mystery Plant B



Pinnately compound leaves are compound leaflets on opposite sides of a long axis.



Palmately compound leaves are vaguely hand-shaped because all leaflets radiate out from a central point.



Mystery Plant B



Lanceolate leaves are lance-shaped; several times longer than wide with the widest part at the base and tapering to a point at the apex.



Oblanceolate leaves are inversely lanceolate; the tapered end attaches to the petiole (or stalk) and the widest end is at the apex of the leaf blade.



Mystery Plant B



A raceme is an inflorescence with pedicelled flowers (flowers having little stalks) on a long axis (stem or branch) with the youngest flowers at the apex (top).



A spike is an inflorescence with sessile flowers (flowers having no stalk of any kind) on a long axis (stem or branch) with the newest flowers at the apex (top).



Mystery Plant B



STEP 1

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaves.

- simple
- compound



Mystery Plant B



Please, try again.

None of the leaves of this mystery plant are simple.



A simple leaf is singular, only one segment between the stem of the leaf and the tip of the leaf blade.

Mystery Plant B



STEP 2

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

The leaves of this plant are _____ compound.

- pinnately
- palmately

Mystery Plant B



Please, try again.

This mystery plant does not have pinnately compound leaves.



Pinnately compound leaves, below, are compound leaflets on opposite sides of a long axis.

Mystery Plant B



STEP 3

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaflets.

- lanceolate
- oblanceolate



Mystery Plant B



Please, try again.

This mystery plant does not have lanceolate leaflets.



A lanceolate leaf is lance-shaped; several times longer than wide with the widest part at the base and tapering to a point at the apex.

Mystery Plant B



STEP 4

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

The inflorescence (flower cluster) of this plant is in a _____.

- raceme
- spike



Mystery Plant B



Silver Leaf Lupine

Mystery Plant B is called silver leaf lupine or white-leaf bush lupine, a native plant in Golden Gate National Parks.

Lupinus albifrons

Pea Family (*Leguminosea*)

This small shrub is a deciduous perennial plant with a woody, trunk-like base. It is prostrate (low growing) and mat forming. The leaves are gray-green and the wandering branches form large, circular patches on rocky banks and grassland areas. All lupines have palmately compound leaves divided into 7-10 leaflets with each leaflet being oblanceolate. The leaves of silver leaf lupine are covered with white or silvery hairs. From March through July, numerous flowering stalks bear blue-purple raceme flowers.



Mystery Plant B



Please, try again.

This mystery plant does not have a spike.



A spike is an inflorescence with sessile flowers (flowers having no stalk of any kind) on a long axis (stem or branch) with the newest flowers at the apex (top).

Mystery Plant C



Simple leaves are singular, only one segment between the stem of the leaf and the tip of the leaf blade.



A compound leaf is made up of completely separate segments called leaflets.



Mystery Plant C



Palmate veins of a leaf radiate from a central point so that the pattern is vaguely hand-shaped.



Parallel veins on a leaf run parallel from tip to tip along the leaf, typical of grasses and grass-like leaves.



Mystery Plant C



A rhizome is a thickened stem that looks like a root and grows horizontally along the ground just at or beneath the surface.



A j-root is a root with a j- or u-shaped kink, usually from bending during transplanting.



Mystery Plant C



STEP 1

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaves.

- simple
- compound

Mystery Plant C



STEP 2

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant's leaves have _____ veins.

- palmate**
- parallel**



Mystery Plant C



Please, try again.

This mystery plant does not have compound leaves.



A compound leaf is made up of completely separate segments called leaflets.

Mystery Plant C



Please, try again.

This mystery plant's leaves do not have palmate veins.



Palmate veins radiate from a central point so that the pattern is vaguely hand-shaped.

Mystery Plant C



STEP 3

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has a _____.

- rhizome
- j-root



Mystery Plant C



Douglas Iris

Mystery Plant C is called Douglas iris, a native plant in Golden Gate National Recreation Area.

Iris douglasiana

Iris Family (Iridaceae)

Douglas iris has a vibrant purple flower and dark green leaves that sprout from its rhizome. The leaves are an important source of rope and basket-making fiber for several northern California tribes. The Coast Miwok used this plant to make a tea that induced vomiting.



Mystery Plant C



Please, try again.

This mystery plant leaves does not have a visible j-root.

A j-root is a root with a j- or u-shaped kink, usually from bending during transplanting.

Mystery Plant D



An elliptic leaf is shaped like an ellipse, with the center part of the leaf blade the widest and the two ends of the blade the same size.



A dissected leaf is separated into many narrow segments; often feathery looking.



Mystery Plant D



Alternate leaves are not directly across from each other along the stem.



Opposite leaves are directly across from each other along the stem.



Mystery Plant D



A panicle is a compound inflorescence with the youngest flowers being at the apex.



A raceme is an inflorescence with pedicelled flowers (the flowers having little stalks) on a long stem or branch. The youngest flowers are at the top.

Mystery Plant D



STEP 1

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaves.

- elliptic
- dissected



Mystery Plant D



Please, try again.

This plant has aromatic, needle-like leaves. However, none of the leaves of this mystery plant are elliptic.



An elliptic leaf is shaped like an ellipse, with the center part of the leaf blade the widest and the two ends of the blade the same size.

Mystery Plant D



STEP 2

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaves.

- alternate
- opposite



Mystery Plant D



STEP 3

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant's inflorescence is a _____.

- panicle
- raceme



Mystery Plant D



Please, try again.

This plant does have leaves that grow in clusters along the stem. However, none of the leaf clusters are opposite.



Opposite leaves are directly across from each other along the stem.

Mystery Plant D



California Sagebrush

Mystery Plant D is called California sagebrush, a native plant in Golden Gate National Recreation Area.

Artemisia californica

Aster Family (Asteraceae)

California sagebrush is an aromatic shrub that grows two to four feet tall. The flower heads are very small but numerous and bloom in summer through early winter. It is thickly branched and has soft, gray-green, needle-like leaves that grow in clusters along the stem. It may lose its leaves under conditions of extreme drought. It is not a true sage and is not even related to the true sages, some of which are commonly used as a cooking herb. True sages belong to the genus *Salvia* and are members of the mint family.



Mystery Plant D



Please, try again.

This plant does have the younger flowers at the top of the inflorescence. However, the inflorescence is not a raceme.



A raceme is an inflorescence with pedicelled flowers (the flowers having little stalks) on a long stem or branch.

Mystery Plant E



Simple leaves are singular, only one segment between the stem of the leaf and the tip of the leaf blade.



A compound leaf is made up of completely separate segments called leaflets.



Mystery Plant E



Trifoliate leaves are compound leaves that consist of three leaflets that arise from the same point.



Pinnate leaves are compound leaves that have one central axis with leaf structures branching off it.



Mystery Plant E



Sessile flowers are attached directly to the stem without a stalk of any kind.



Pedicel flowers are attached to the stem with a stalk.



Mystery Plant E



STEP 1

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaves.

- simple
- compound



Mystery Plant E



Please, try again.

None of the leaves of this mystery plant are simple.



A simple leaf has only one segment between the stem of the leaf and the tip of the leaf blade.



Mystery Plant E



STEP 2

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ leaves.

- trifoliate
- pinnate



Mystery Plant E



STEP 3

Observe the sketch on the left. Fill in the blank by clicking one of the characteristics below:

This plant has _____ flowers.

- sessile
- pedicel



Mystery Plant E



Please, try again.

The flowers bloom singly along the branches between April and June. However, none of the leaves are pinnate.



A pinnate leaf is a compound leaf with several leaflets branching off of the main stem. This diagram is pinnately compound once on the left and twice on the right.

Mystery Plant E



Please, try again.

None of the flowers of this mystery plant are sessile.



A sessile flower is attached directly to the stem without flower stalks.





Mystery Plant E



Scotch Broom

Mystery Plant E is called scotch broom, an exotic plant commonly found in Golden Gate National Recreation Area.

Cytisus scoparius

Legume Family (*Fabaceae*)

Scotch broom, similar to french broom (*Genista monspessulana*), is a perennial shrub that grows 1 to 2 meters high with trifoliate leaves and yellow flowers on a green stem. However, scotch broom is deciduous and usually appears bare because the leaves are very small (6 to 12 mm long). French broom has flowers borne in racemes while Scotch broom has flowers with pedicels. They develop into brownish-black pods, each containing 5-8 seeds. Studies have shown that the hard seed coats can remain viable in the soil for as long as 80 years.

