

PRO 
Green EXPO
Colorado Convention Center

Denver, CO | February 5 – 8

**Basic Woody Plant Identification for
Certification**

Basic Woody Plant Identification for Certification ProGreen Expo

Dr. James E. Klett - Colorado State University Department of Horticulture and
Landscape Architecture- jim.Klett@colostate.edu

Eric Hammond- Colorado State University Extension Adams County-
ehammond@adcogov.org

Amy Lentz- Colorado State University Extension Weld County-
alentz@weldgov.com



COLORADO STATE UNIVERSITY
EXTENSION

Deciduous Trees: Whorled leaf arrangement

Catalpa speciosa

Western or Northern Catalpa

- 1) Leaves – whorled or opposite, simple, heart-shaped, large
- 2) Flowers – white, showy panicle, June
- 3) Fruit – capsule, 8-20” long, persistent, goes from green to brown
- 4) Fall Foliage – poor yellow-green to brown, often fall before turning
- 5) Cultural Requirements – will withstand dry or alkaline soils and hot, dry environments, sun or part shade
- 6) Winter ID – large, whorled sunken leaf scar, no terminal bud, fruit
- 7) Elevation up to 6,000’

**Deciduous Trees: Alternate leaf
arrangement, simple leaves**



Quercus macrocarpa

Bur Oak, Mossy Cup Oak

- 1) Leaves – alternate, simple, rounded lobes, fiddle shaped
- 2) Flowers – catkins
- 3) Fruit – solitary nut with fringed green cap almost covering acorn
- 4) Fall Foliage – dull yellow-green to yellow-brown
- 5) Cultural Requirements – adaptable to various soils even dry clay, full sun, tolerates urban conditions.
- 6) Winter ID – Ridges on new growth, stout stem, galls on stems, cluster bud
- 7) Elevation to 7,000'

Quercus robur

English Oak

- 1) Leaves – alternate, simple, rounded lobes with ear lobes at base, short petiole, persistent
- 2) Flowers – catkins
- 3) Fruit – acorn, long and narrow
- 4) Fall Foliage – brown, persistent
- 5) Cultural Requirements – well-drained soil, pH tolerant, full sun
- 6) Winter ID – persistent leaves, long acorns, pointed clustered buds
- 7) Elevation to 6,000’
- 8) Cultivars include ‘Royal Prince’, ‘Fastigiata’, ‘Crimson Spire’

Quercus rubra –

Red Oak

- 1) Leaves – alternate, simple, sharp pointed lobes
- 2) Twigs- smooth and reddish brown
- 3) Flowers – catkins
- 4) Fruit – acorn, two years to mature
- 5) Fall Foliage – russet to bright red, sometimes just yellow-brown
- 6) Cultural Requirements – prefers well-drained slightly acid soil, full sun, withstands pollution
- 7) Winter ID – pointed cluster buds, smooth reddish brown twigs
- 8) Elevation to 6,000’

Celtis occidentalis

Common Hackberry

- 1) Leaves – alternate, simple, pointed, “lopsided”, often infested with unsightly nipple galls
- 2) Twigs- small downy twigs branch frequently, branches and trunk have wart like projections
- 3) Flowers – April-May, not showy
- 4) Fruit – Fleshy drupe on ½” stem, green to red to dark purple, birds like them
- 5) Fall Foliage – yellow/golden
- 6) Cultural Requirements – adaptable to urban sites, drought tolerant, full sun
- 7) Winter ID – buds, downy twigs
- 8) Elevation to 7,000’

Cercis canadensis

Eastern Redbud

- 1) Leaves – alternate, simple
- 2) Flowers – ½” long, 4-8 together, rosy-pink, March-April, often damaged by late frosts
- 3) Fruit – legume, 2-3” long, green to brown, persistent
- 4) Fall Foliage – yellow-green to yellow
- 5) Cultural Requirements – adaptable to alkaline soils and higher pH, full sun or light shade, will suffer dramatically with too much or too little water
- 6) Winter ID – zig-zag stem, superposed buds, persistent pod fruit
- 7) Elevation to 5,500’

Tilia americana–

American Linden

- 1) Leaves – alternate, simple, heart shaped
- 2) Flowers – yellow-white, fragrant, favored by bees, June-July
- 3) Fruit – round nutlet with 2-3” light green bract
- 4) Fall Foliage – yellowish
- 5) Cultural Requirements – tolerant of alkaline clay soils
- 6) Winter ID – yellowish-brown “teardrop” buds, fruit and bract may persist, Large, open growth habit when mature
- 7) Elevation to 6500’
- 8) *Tilia americana* ‘Redmond’ – darker leaves, larger bract, maroon red teardrop buds and twigs in winter, pyramidal growth habit.

Tilia cordata –

Littleleaf Linden

- 1) Leaves – alternate, simple, smaller, heart-shaped
- 2) Flowers – yellow-white, fragrant, favored by bees, June-July
- 3) Fruit – round nutlet with 2-3” light green bract
- 4) Fall Foliage –gold
- 5) Cultural Requirements – tolerant of alkaline clay soils
- 6) Winter ID – yellowish-brown “teardrop” buds, fruit and bract may persist, pyramidal growth habit
- 7) Elevation to 6,000’
- 8) Cultivars include ‘Greenspire’, ‘Chancellor’, ‘Glenleven’

Pyrus calleryana

Callery Pear

- 1) Leaves – alternate, simple and glossy
- 2) Flowers – white, April, showy
- 3) Fruit – tan/green pome July into winter
- 4) Fall Foliage – variable red-orange-yellow, can be spectacular, held late
- 5) Cultural Requirements – adaptable, prefers full sun and well-drained soil
- 6) Winter ID – persistent fruit, hairy scaly bud
- 7) Elevation to 6,000’
- 8) Cultivars include: ‘Chanticleer’, ‘Redspire’, ‘Aristocrat’

Populus deltoides

Cottonwood

- 1) Leaves – alternate, simple, triangle-shape, glabrous, shiny
- 2) Flowers –catkin
- 3) Fruit – capsule with cotton, June
- 4) Fall Foliage – golden yellow
- 5) Cultural Requirements – for moist sites.
- 6) Winter ID – stout, yellow/brown twig, large, resinous buds.
- 7) Elevation to 8000’
- 8) Cultivars include: Siouxland, Nor’easter, Geronimo

Populus tremuloides

Quaking Aspen

- 1) Leaves – alternate, simple, ovate, blue/green, flat petiole
- 2) Flowers – catkins; male=reddish, female=white, cottony. March
- 3) Fruit – capsule, June/July
- 4) Fall Foliage – yellow/gold, sometimes reddish
- 5) Cultural Requirements – best for high elevations
- 6) Winter ID – light gray/white bark, pointed chestnut brown buds, poplar twig gall.
- 7) Elevation to 9500'

**Deciduous Trees:
Alternate leaf arrangement,
compound leaves**

Gleditsia triacanthos inermis

Thornless Common Honeylocust

- 1) Leaves – alternate, pinnately or sometimes bipinnately compound
- 2) Flowers – Greenish-yellow raceme, May/June, not showy
- 3) Fruit – reddish-brown pod, 8-18”, can persist into winter
- 4) Fall Foliage – yellow to yellow-green, early
- 5) Cultural Requirements – more drought tolerant, adaptable, full sun
- 6) Winter ID – Fruit, zigzag greenish-tan twigs, buds hidden under swollen nodes
- 7) Elevation to 7,500’
- 8) Cultivars include: ‘Shademaster’, ‘Skyline’, ‘Sunburst’, etc.

Gymnocladus dioica

Kentucky Coffeetree

- 1) Leaves – alternate, bipinnately compound, to 36” long & 24” wide
- 2) Flowers – greenish-white panicles, May-June, not showy
- 3) Fruit – reddish-brown to brownish black leathery pod, 5-10” long, October, persistent on female trees
- 4) Fall foliage - yellow
- 5) Cultural Requirements - full sun, adaptable to soil and moisture conditions, tolerates some pollution, drought tolerant
- 6) Winter ID – no terminal bud, large leaf scar with small buds above, very stout stem, pink pith color, fruit
- 7) Elevation to 7,500’

**Deciduous Trees:
Opposite leaf arrangement,
simple leaves**

Acer x freemanii 'Autumn Blaze' –
Freeman Autumn Blaze maple

- 1) Leaves – opposite, simple, 5-lobed, moderate sinuses
- 2) Flowers – greenish-yellow to red, March, not showy
- 3) Fruit – Double samara, May-June
- 4) Fall Foliage – red, red/orange
- 5) Cultural Requirements – Transplants well, tolerates variety of soils but prefers slightly acidic and moist soil, often gets chlorosis in alkaline soils.
- 6) Winter ID – Cluster flower buds, usually red in color. Silver/gray bark
- 7) Elevation to 6,000'

**Deciduous Trees:
Opposite leaf arrangement,
compound leaves**

Aesculus glabra

Ohio Buckeye

- 1) Leaves – opposite, palmately compound, usually 5 leaflets
- 2) Flowers – showy greenish-yellow panicles, May
- 3) Fruit – light brown capsule with prickly cover, usually containing one seed (“buckeye”)
- 4) Fall Foliage – yellow to orangish
- 5) Cultural Requirements – prefers moist, well-drained, slightly acid soil, full sun or part shade, develops leaf scorch and drops leaves in hot, dry conditions
- 6) Winter ID – large, scaly terminal bud, fruit
- 7) Elevation to 6,000’

Acer negundo

Boxelder

- 1) Leaves – opposite, pinnately compound, usually 3-5 leaflets, yellow-green color
- 2) Twig: waxy; green color in summer with white bloom
- 3) Flowers –greenish-yellow pendulous racemes, May
- 4) Fruit – two-winged samara, pendulous chains
- 5) Fall Foliage – yellow/tan
- 6) Cultural Requirements – Fast-growing, weak-wooded
- 7) Winter ID – purple waxy twig, leaf scar encircles twig
- 8) Elevation to 6,000'

Fraxinus americana

White Ash

- 1) Leaves – opposite, pinnately compound
- 2) Flowers – green to purple panicle, April, before leaves, not ornamentally important
- 3) Fruit – samara (female trees) in fall, can persist into winter
- 4) Fall Foliage – yellow to deep purple and maroon, earlier
- 5) Cultural Requirements – pH adaptable, full sun
- 6) Winter ID – stout stem, bud set down into leaf scar
- 7) Elevation to 6,000' Cultivars include: 'Autumn Purple', 'Autumn Blaze', 'Autumn Applause'
- 8) Emerald ash borer in Boulder County as of December 2017

Fraxinus pennsylvanica

Green Ash

- 1) Leaves – opposite, pinnately compound
- 2) Flowers – green to purple panicle, April, before leaves, not ornamentally important
- 3) Fruit – samara (female trees), can persist
- 4) Fall Foliage – yellow
- 5) Cultural Requirements – very adaptable once established, full sun, susceptible to borers
- 6) Winter ID – stout stem, dark brown scaly buds, leaf scar with bud set on top, fruit
- 7) Elevation to 7,500’
- 8) Cultivars include: ‘Patmore’, Marshall Seedless’, ‘Summit’ and ‘Cimmaron’
- 9) Emerald ash borer in Boulder County as of December 2017

Quiz through Quizizz

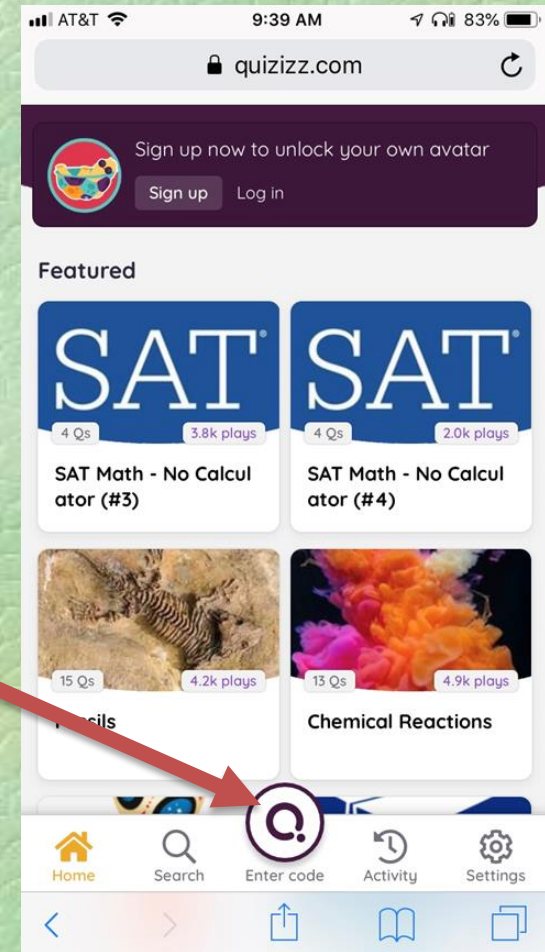
If you want to Play go to:

<https://quizizz.com/join>

Click Here

Enter Code:

Turn your volume down



Answers:

Question 1

🕒 30 seconds



Q. What plant does this leaf belong to?

Hint: This plant has an alternate leaf arrangement and cluster terminal buds. It is a large shade tree.

— answer choices —

- Quercus macrocarpa*
- Quercus rubra*

- Quercus robur*
- Cercis canadensis*

Answers:

Question 2

🕒 30 seconds



Q. What plant do these leaves belong to?

This plant is a smaller ornamental tree with alternate leaf arrangement non-clustered buds.

— answer choices —

Populus deltoides

Pyrus calleryana

Celtis occidentalis

Crataegus crus-galli inermis

Answers:

Question 3

🕒 30 seconds

Q. Which of these leaf scars below belongs to *Fraxinus pennsylvanica* (green ash)?

— answer choices —



**Conifers: Leaves scale or
awl-like**

**Conifers: Needles in
bundles, woody cones**

Pinus edulis

Pinyon Pine

- 1) Leaves - borne 2 or 3 together; shorter, resinous. Light green color
- 2) Size and Growth Habit - 15-25' tall and 15-20' wide. Open, irregular 'shrubby' appearance.
- 3) Fruit – Cones, resinous, rose shaped. Females produce large pinon seed, edible
- 4) Comments - slow growing, round headed pine. Very drought tolerant. Colorado native.
- 5) Winter ID – Cone, needles sometimes swollen with insect gall, resinous buds, breaks between needles where male flowers located.
- 6) Elevation to 7,500'

Pinus nigra

Austrian Pine

- 1) Leaves - In pairs, persisting 4-8 years, stiff, 5-6” long. Dark green color which holds into winter
- 2) Size and Growth Habit - 40-50’ tall and 25-30’ wide. Pyramidal to oval dense with age.
- 3) Fruit – Cone, 2-3 together or single, 2-3” long, no spines at end of scales
- 4) Comments - fast growing. Adaptable to Rocky Mountain region.
- 5) Winter ID – needles darker green than ponderosa pine, whitish buds, grayish bark
- 6) Elevation to 7,500’

Pinus ponderosa

Ponderosa Pine or Western Yellow Pine

- 1) Leaves - in threes, or sometimes twos, remaining about 3 years, 5-10" long and curved. Medium green color which turns yellow green in fall and winter
- 2) Size and Growth Habit - 50-60' tall and 20-25' wide. Younger trees are more narrow, pyramidal in growth, and older trees more open, rounded in habit, often void of lower branches.
- 3) Fruit – Cone, 3" long, prickle on end of scale
- 4) Comments - Valuable forest tree. CO Native.
- 5) Winter ID – yellowish needle color, soft and long needles, cone, reddish brown buds and cinnamon colored bark
- 6) Elevation to 9,000'

Conifers: Singular needles

Picea pungens

Colorado Spruce

- 1) Leaves – radially spaced around stem, stout, sharp point, about 0.75” - 1” long. Variable dull green to bluish or silvery white color.
- 2) Size and Growth Habit - 70-80’ tall and 30-35’ wide. Pyramidal horizontal branching, becoming more open as matures.
- 3) Fruit: Cone, 2-4” length, papery scales with resin
- 4) Comments - Prefers rich, moist soil in sunlight. Many clones selected for foliage color and growth habit. Susceptible to Ips beetle. Native.
- 5) Winter ID – single bristly needles, rose shaped bud, papery cones.
- 6) Elevation to 9,500’

Abies concolor

White Fir, Concolor Fir

- 1) Leaves - curve outward and upward, 1.5-2.5" long, flattened, glaucous on both sides. Bluish or grayish green color with pale blue bands on the underside
- 2) Size and Growth Habit – 30-40', Pyramidal to open as matures, branches to ground.
- 3) Fruit – Cones, stalked, cylindrical, pale green before maturity or often with purplish bloom. Sit upright on stem. Scales fall off in Fall, only stalk remains.
- 4) Winter ID- flat blue-green soft to touch needles, curve upward. Small resinous bud. Gray, smooth bark, may become scaly as matures.
- 5) Elevation to 9000'

Deciduous Shrubs 8 ft or Taller



Amelanchier spp.

Serviceberry

- 1) Leaves - alternate, simple
- 2) Buds - terminal present, 5-7 scales, sharp pointed
- 3) Flowers - smaller flowers (3/4" diameter), May, white racemes
- 4) Fruit - bluish purple, juicy, edible, birds like them
- 5) Fall foliage color - excellent yellow to apricot-orange to dull, deep dusty red, variable
- 6) Cultural requirements – full sun to part shade, adaptable to various soils, moderately drought tolerant
- 7) Winter ID – sharp pointed elongated buds
- 8) Elevation to 8,000'

Syringa vulgaris

Common Lilac

- 1) Leaves – opposite, simple, heart-shaped
- 2) Flowers – 4-8” long panicles, fragrant, May
- 3) Fruit – capsule, not ornamental, can persist through winter
- 4) Fall Foliage – yellow/green, not important
- 5) Cultural Requirements – very adaptable to wide range of soils and easy to transplant, many cultivars, best in full sun
- 6) Winter ID – larger twin terminal buds, persistent fruit
- 7) Elevation to 8,000’

Viburnum lantana

Wayfaringtree Viburnum

- 1) Leaves - opposite, simple, dark green, with veins deeply set
- 2) Flowers – creamy white, mid May to late summer, clusters about 3-5” in diameter
- 3) Fruit - drupe, green to red to black in color, mid to late summer
- 4) Buds - flower and vegetative separate and naked (not scaly)
- 5) Stem - younger stems are gray/brown, pubescent
- 6) Cultivars include ‘Mohican’
- 7) Winter ID – stems with fuzzy new growth, naked vegetative buds, bulbous naked flower buds, persistent leaves
- 8) Elevation to 8,000’

Viburnum trilobum 'Compactum'

Compact American Cranberrybush Viburnum

1. Leaves opposite three long pointed lobes; petiole grooved with dome-shaped glands
2. Flowers—sparse large white, flat-topped clusters
3. Fruit—sparse red drupes 1/3” long in September; stay on bush until February;
4. Buds—wide, greenish red-brown, glossy with two fused scales
5. Fall Foliage—yellow to reddish-purple
6. Cultural Requirements—needs well-drained, moist soil, not very drought tolerant, sun to part shade; eriophyid mites
7. Winter ID - twigs grayish brown, glossy; buds reddish-brown, glossy
8. Elevation to 7,000'

Ligustrum vulgare 'Cheyenne'

Cheyenne Privet

- 1) Leaves – opposite, simple
- 2) Buds – very small, rounded
- 3) Flowers – white panicles, June
- 4) Fruit – lustrous black, berry-like drupe, September, persistent into winter
- 5) Fall Foliage – holds leaves late
- 6) Cultural Requirements – very adaptable to wide range of soils, sun or partial shade
- 7) Winter ID – Opposite buds, persistent fruit
- 8) Elevation to approx 7500'

Forsythia x intermedia

Forsythia

- 1) Leaves – opposite; darker green on top, lighter green on bottom;
- 2) Buds – opposite; clustered flower buds in leaf axils, long and pointed
- 3) Flowers – brilliant yellow, generally blooms in March and April and lasts 2-3 weeks
- 4) Fruit – small brown capsule (not significant)
- 5) Fall Foliage – yellowish color and persists
- 6) Cultural Requirements – tolerant, adaptable to many soils, can be planted in part shade, but full sun best for flowers; many cultivars
- 7) Winter ID – squarish stems with prominent lenticels; chambered pith; some species may have hollow pith, cluster type flower buds
- 8) Elevation to 7,500'

Physocarpus opulifolius

Ninebark

- 1) Leaves – alternate, with 3-5 pointed lobes; species has dark green leaves with lighter green undersides
- 2) Buds – many loose scales; leaf scars raised
- 3) Flowers – small (1/2” long) flowers in clusters; bloom late spring to early summer; flowers white, cream, pinkish, yellowish
- 4) Fruit – Small pointed follicles borne in dense clusters, initially red and later turning a bright reddish brown
- 5) Fall Foliage – depends on cultivar; can be purple or yellow
- 6) Cultural Requirements – very cold hardy; tolerant of most soil types, many cultivars available with various flower and leaf colors
- 7) Winter ID –on older twigs the bark splits and exfoliates in long strips; twigs slender and red-brown in color
- 8) Elevation to 8,500’

Small Shrubs
(up to 8 feet tall at maturity)



Berberis thunbergii

Japanese Barberry

- 1) Size – 3-5' high and wide
- 2) Leaves – alternate, simple, borne in clusters
- 3) Flowers – yellow, April-May
- 4) Fruit – red berry, October, persistent
- 5) Fall Foliage – orange to reddish purple
- 6) Stem – single spine on mature twigs
- 7) Cultural Requirements – easy to transplant, adaptable, full sun, tolerates drier, urban conditions. Many cultivars.
- 8) Winter ID – stem with single spine, persistent fruit
- 9) Elevation to 7,500'

Euonymus alatus 'Compactus'

Compact Winged Euonymus

- 1) Size – 6-8' high and wide
- 2) Leaves – opposite, simple, brilliant red in Fall
- 3) Flowers – Not important
- 4) Buds – greenish brown, scaly
- 5) Fruit - Sparse
- 6) Cultural Requirements – Adaptable to soil pH, full sun or part shade, easy to transplant, not tolerant of too wet or too dry soils; best left un-sheared
- 7) Winter ID – Stems with wing-like projections, often not pronounced; scaly buds
- 8) Elevation to 6,500'

Ribes alpinum

Alpine Currant

- 1) Size – 3-6' high and wide
- 2) Leaves – Alternate, simple
- 3) Flowers – Greenish-yellow racemes, not showy, early
- 4) Fruit – Rarely develops
- 5) Fall Foliage – Yellow
- 6) Cultural Requirements – Adaptable to a variety of soils, full sun to shade. Often used as a sheared hedge.
- 7) Winter ID – Whitish-tan pointed buds, ridged stems split between nodes
- 8) Elevation to 8,500'

Caryopteris x clandonensis

Bluebeard or Blue Mist Spirea

- 1) Size – 4' high, 3' wide
- 2) Leaves – opposite, simple
- 3) Flowers – bright blue cymes July-August on new growth. Some cultivars dark purple. Attracts bees.
- 4) Fruit – capsule, provides winter texture
- 5) Fall Foliage – no change
- 6) Cultural Requirements – easy to transplant, prefers well-drained loose drier soil, full sun to part shade, prune in late winter/early spring.
- 7) Winter ID – persistent fruit that is fragrant when crushed
- 8) Elevation to 6,500'

Rhus trilobata

Skunkbush Sumac

- 1) Leaves - alternate, trifoliate
- 2) Medium size - generally between 4-6 feet in height
- 3) Flowers - green to yellow in April and May, before leaves
- 4) Fruit - red, hairy drupes in summer
- 5) Fall foliage color - yellow-orange-scarlet
- 6) Cultural requirements – vigorous grower and good xeriscape plant for higher pH soils
- 7) Winter ID – brown-yellow scaly buds
- 8) Elevation to 8,000'

Mahonia aquifolium

Oregon Grapeholly

- 1) Leaves - alternate, pinnately compound, evergreen, 6-12" long, spine-tipped, lustrous dark green, turns purplish in winter
- 2) Size - 5-6' tall and 3-5' wide
- 3) Flowers - bright yellow, April
- 4) Fruit - blue-black grape-like berry in Aug-Sept
- 5) Avoid hot, dry sites and desiccating winds.
- 6) Cultivar: 'Compactum' - dwarf form with very glossy leaves and bronze winter color, about 24-36" tall
- 7) Winter ID – evergreen spine-tipped leaves, large buds, persistent fruit, often winter-burns
- 8) Elevation to 6,500'

Quiz through Quizizz

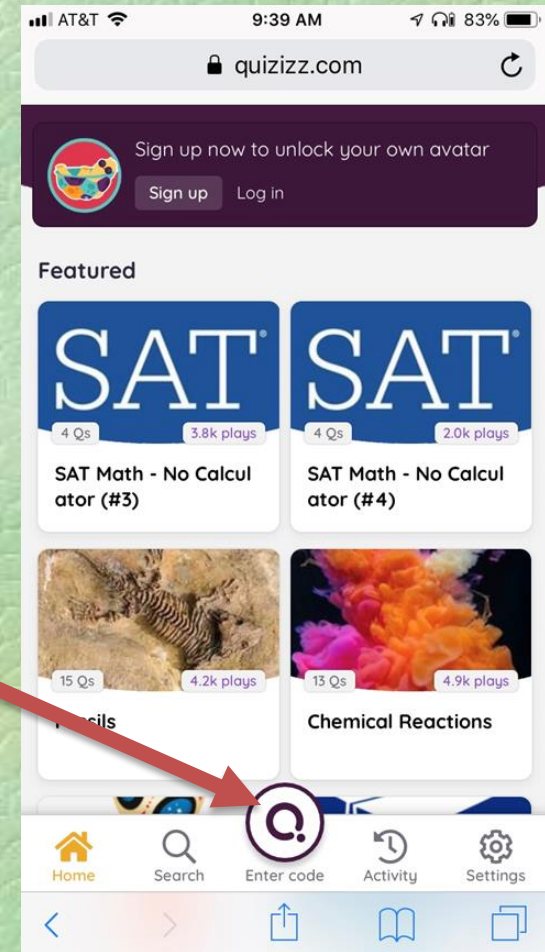
If you want to Play go to:

<https://quizizz.com/join>

Click Here

Enter Code:

Turn your volume down



Answers:

Question 1

🕒 30 seconds

Q. Which family of conifers has needles which are bound in groups know as fascicles?

— answer choices —

Abies

Picea

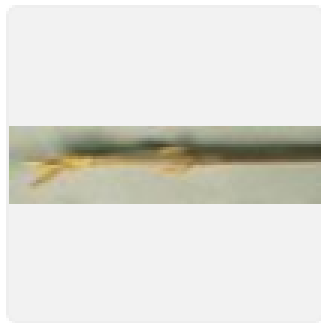
Pinus

Junipers

Answers:

Question 2

🕒 30 seconds



Q. What shrub do these naked buds belong to?

Hint: This is a large shrub with thick textured and semi-evergreen leaves and which has many seasons of interest.

— answer choices —

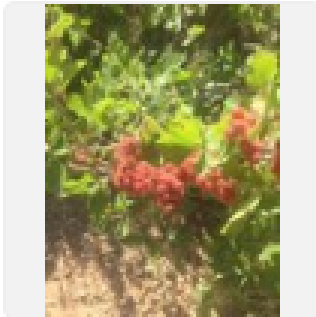
- Syringa vulgaris*
- Viburnum lantana*

- Ligustrum vulgare*
- Forsythia x intermedia*

Answers:

Question 3

🕒 30 seconds



Q. Which shrub does this fruit belong to?

Hint: This is a smaller shrub, it can be grown as a ground cover and which has orange to red fall color.

— answer choices —

Rhus trilobata

Caryopteris x clandonensis

Mahonia aquifolium

Berberis thunbergii

Thank you!

Dr. James E. Klett - Colorado State University Department of Horticulture
and Landscape Architecture- jim.Klett@colostate.edu

Eric Hammond- Colorado State University Extension Adams County-
ehammond@adcogov.org

Amy Lentz- Colorado State University Extension Weld County-
alentz@weldgov.com