The Greenhouse Murders

BACKGROUND

Wyatt Grizzly is a well known floral producer in a small town located in the heart of Oregon. On Friday, his truck was found in the driveway of his greenhouse with the engine still running. In the trailer, which was hitched to the truck, Wyatt's body was found. The neighbor, Shelby Lane, did not recall hearing the truck return nor did she recall hearing any other noises out of the ordinary. In addition, there was no blood on Wyatt's clothing or in the truck/trailer, but plenty of other materials. As a part of his farm, Wyatt runs the largest floral market west of the Mississippi and he does business with several individuals in the area. The town's sheriff begrudgingly had to call in a crime scene investigator from Portland to assist with the investigation.

While collecting evidence, the investigator went through Wyatt's business receipts and discovered that several of his colleagues owed him a sizable amount of money. Dustin Smith had recently purchased a large bouquet of flower #1 for his 20th anniversary. Duke Cyrus, who had also not paid his invoice, recently had Wyatt ship in a large order of flower #2 to the local funeral home. Another large invoice was for Austin Garrett, who had received a large shipment of flower #3 from Wyatt's company for his new home's landscaping. He had paid half of his invoice but upon further questioning of the market's manager, the investigator discovered Garret had words with Wyatt about the remaining balance of his bill. The last unpaid invoice on Wyatt's desk was for an order of flower #4 that Becky Jones had sent to her secretary for Administrative Professionals Day.

Once the body was removed from the trailer, the investigator found several flowers in the top left pocket of the victim's work shirt. The flowers were photographed and catalogued as evidence. Unfortunately, due to a computer glitch, investigators were only left with a general description and no pictures. The descriptions and samples of the four suspect flowers were quickly rushed to local extension center where your assistance in identification is needed. With your expertise in horticulture, the crime scene investigator and extension service are hoping to implicate a suspect in the murder.

CHALLENGE: Who murdered Wyatt Grizzly?

MATERIALS:
Flowers
Hand Lenses
Forceps
Razors Blades or Scalpels
Metric Ruler
Small Dissecting Pan
Lab Notebook

PRE-LAB:

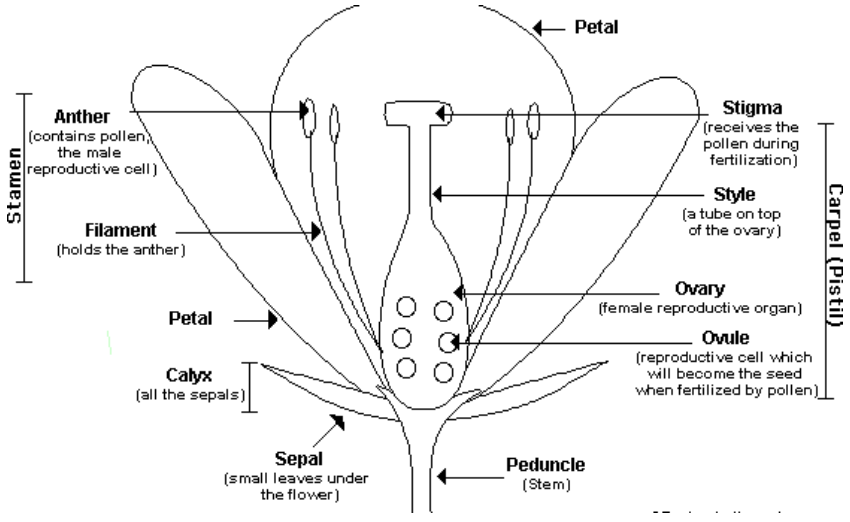
1. Review the parts of a flower.
2. Review the functions of each of the flower parts.
3. Read the flower dissection procedure and using your flower diagram, locate all of the parts you will be identifying on your diagram.
4. List those parts in your notebook and describe the function of each of those parts in your notebook.

FLOWER DISSECTION PROCEDURE:

1. Use the "Flower Identification Key" provided to guide your quest to find Wyatt Grizzly's murderer.
2. Determine identification of each of the flower samples and record their names in your notebook.
3. Remove the sepals, count them and set them aside. Draw the remaining part of the flower in your notebook and label the next parts you are to dissect.
4. If the sepals are fused into the calyx tube, slit the tube and try to remove it in as few pieces as possible. Count the number of lobes at the open end of the tube.
5. Continue with the petals – repeating step #3 carefully. If the stamens are fused to the petals, remove them TOGETHER.
6. Remove and count the stamens. HINT: Sometimes counting the anthers is the easiest way but remember that most anthers are made of two distinct halves.
7. Draw and label in your notebook the remaining parts that are not dissected.
8. Obtain the Evidence Card with the "flower description" from the instructor and use your findings to determine its identity.

CONCLUSIONS:

9. Using the evidence and evidence card, write a one paragraph summary of your findings for the Oregon State Police.



http://www.battaly.com/science/flowerlab_no.htm

Flower Identification Key

1. The "flower" is actually a tight cluster of many, small flowers (a head or spadix).....go to 2
1. The flowers are single, or loosely associated together (i.e., umbels or cymes).....go to 5
    2. The flowers are surrounded by 4 large, showy bracts.....Cornus
    2. The flowers are not surrounded by 4 large, showy bracts.....3
        3. The flowers form a finger-shaped spadix.....Arisaema
        3. The flowers form a tight disk (a head).....4
            4. All the flowers look the same, although some may be more mature than others.....Taraxacum
            4. There are two distinct types of flowers, the outer ones with a much larger single petal.....Chrysanthemum

5. The flowers lack petals (wind pollination).....6
5. The flowers have petals (animal pollinated).....8
    6. The flowers are perfect, containing both stamens and pistils.....Avena
    6. The flowers are not perfect; each contains either stamens or pistils.....7
        7. The bract of each flower is spiky.....Carya
        7. The bract of each flower is rounded.....Quercus

8. The flowers have 3, 6, or 9 sepals, styles may also be petal-like.....9
8. The flowers have other than 3, 6, or 9 sepals.....16
    9. The flowers have many anthers, and are dicotyledons.....Podophyllum
    9. The flowers have 6 or fewer anthers, and are monocotyeldons.....10
        10. The 6 sepals are dissimilar and may be highly modified.....11
        10. The 6 sepals are nearly identical.....12
            11. The flower is radially symmetrical.....Iris
            11. The flower is bilaterally symmetric.....Epidendrum

12. The flowers are <2 cm long.....Allium
12. The flowers are >2 cm long.....13
    13. The filaments are as thick as the anthers.....Yucca
    13. The filaments are much thinner than the anthers.....14

14. The anthers are <1.5 cm long.....Hemerocallis
14. The anthers are >1.5 cm long.....15
    15. The flower is <10 cm long.....Lilium
    15. The flower is >10 cm long.....Amaryllis

16. The petals are fused together a least in part, to form a corolla tube.....17
16. The petals are completely free from one another.....24
    17. The corolla tube is radially symmetrical.....18
    17. The corolla tube is bilaterally symmetrical.....21
        18. The flowers are imperfect, having only stamens or only pistils.....Cucumis
        18. The flowers are perfect, having both stamens and pistils.....19
            19. The corolla tube has 4 lobes or sections.....Oenothera
            19. The corolla tube has 5 lobes or sections.....20
                20. The corolla tube is hairy.....Nicotlana
                20. The corolla tube has no hairs.....Ipomoes

21. The ovary is positioned below the corolla (inferior).....Lonicera
21. The ovary is positioned above the corolla (superior).....22
    22. There are exactly 5 anthers.....Rhododendron
    22. There are more than 5 anthers enclosed in fused petals (keel).....Pisum
    22. There are 4 anthers.....23
        23. The anthers are free of the corolla tube, and the flower is over 2 cm long.....Antirrhinum
        23. At least 2 of the anthers are attached to the corolla tube, and the flower is less than 1 cm long.....Prunella

24. There are 4 petals……25
24. There are more than 5 petals……26
24. There are 5 petals……28
25. The petals are equal……Brassica
25, The petals are unequal……Pisum

26. The ovary is positioned above the petals (superior)……Liriodendron
26. The ovary is positioned below the petals (inferior)……27
27. There is 1 style……Opuntia
27. There are many styles……Rosa
28. The flowers are imperfect, having only stamens or only pistils……Daucus
28. The flowers are perfect, having both stamens and pistils……29
29. There are 5 stamens……30
29. There are more than 5 stamens……32
30. The ovary is positioned below the petals (inferior)……Daucus
30. The ovary is positioned above the petals (superior)……31
31. The petals are equal……Ascleplas
31. The petals are unequal……Viola

32. The petals are thick and little or no light can pass through……Citrus
32. The petals are thin enough to see through……33
33. There is 1 style……Prunus
33. There are 5 styles……Pyrus
33. There are many styles……34
34. The pedicle is prickly……Rosa
34. The pedicle is not prickly……Ranunculus

Flower Descriptions

Allium- Onion; a plant grown for the edible bulb.
Amaryllis- Amaryllis; a plant grown from a bulb for its showy flowers.
Antirrhinum- Snapdragon; an herbaceous plant grown for its distinctive flowers.
Arisaema- Jack-in-the-pulpit; an herbaceous perennial found in forests.
Ascleplas- Milkweed; a weedy herbaceous plant common along edges of fields.
Avena- Oats; a plant commonly cultivated for the grain.
Brassica- Mustard, broccoli, cauliflower; a large number of cultivated vegetables belong to this genus.
Carya- Hickory; a forest tree that bears edible nuts and is sometimes harvested for its hard wood
Chrysanthemum- Daisy; an herbaceous plant sometimes grown for the flowers, but also a common weed along edges of fields.
Citrus- Orange; a tree most commonly grown for its fruit.
Cornus- Dogwood; a small tree grown as a landscape ornamental.
Cucumis- Cucumber; a vine grown for its fruit
Daucus- Carrot; Queen Anne's Lace; some species are grown for their roots, others are common weeds along edges of fields.
Epidendrum- Orchid; an herbaceous plant grown for its showy flowers
Hemarocallis- Daylilly; an herbaceous plant grown for its showy flowers, most commonly as a landscape ornamental
Ipomoea- Morning-glory; a vine sometimes grown for the showy flowers, but also a common weed along edges of fields.
Iris- Iris; an herbaceous perennial grown for its showy flowers.
Lillum- Lily; an herbaceous plant grown for its showy flowers.
Liriodendron- Yellow-poplar, tulip tree; a tree commonly grown for the wood.
Lonicera- Honeysuckle; a vine sometimes grown for the showy flowers, but also a common weed along edges of fields
Nicotiana- Tobacco, nicotiana; this genus includes both the cultivated tobacco and some ornamental flowers.
Oenothera- Evening-primrose; some species are grown for their flowers, and others are weeds.
Opuntia- Prickly-pear cactus; a succulent grown as an ornamental and for the fruit.
Pisum- Pea; a vine grown for its edible pods and seeds.

Podophyllum- May-apple; an herbaceous perennial found in forests.
Prunella- Heat-all; a plant that commonly grows as a weed
Prunus- Cherry; a tree grown mostly for the fruits or for the flowers.
Pyrus- Pear; a tree grown for its edible fruits.
Quercus- Oak; a tree oftehn harvested for the lumber or planted as a landscape tree.
Ranunculus- Buttercup; an herbaceous plant sometimes grown for the flowers, but also a common weed along edges of fields.
Rhododendron- Rhododendron, azalea; a shrub grown for its showy flowers.
Rosa-Rose; a perennial plant grown for its showy flowers.
Taraxacum- Dandelion; a weed common in most open areans.
Viola- Violet, pansy; this genus contains many garden flowers as well as wild violets.
Yucca-Yucca; a plant that is commonly grown as a landscape ornamental.

Glossary

Anther- The portion of the stamen that contains the pollen.
Bilateral- Symmetrical in only one longitudinal plane, e.g., a human.
Bracts- Specialized leaves that grow immediately below the pedicel of a flower or a cluster of flowers.
Calyx- The sepals collectively, often used to describe the tube formed by fused sepals.
Corolla- The petals collectively, often used to describe the tube formed by fused petals.
Cyme- An inflorescence in which the topmost flower opens first.
Dichotomous- Branching in two directions.
Dicotyledon- A plant with two seed leaves (cotyledons).
Filament- The portion of the stamen that supports the anther.
Fused- Describes flowers parts that have grown together
Head- An inflorescence in which the flowers are tightly clustered, usually into a disk
Imperfect- Describes a unisexual flower, one that lacks either stamens or pistils.
Inferior- Describes an ovary that is positioned below the point of attachment of the petals.
Inflorescence- A group of flowers arising from one stem.
Keel- The lower two fused petals of a legume.
Modified- Describes a flower or flower part that is different from the stereotypical flower; e.g., missing petals, or petals that have an unusual shape.
Monocotyledon- A plant with one seed leaf (cotyledon).
Ovary- The basal portion of the pistil in which the seeds develop, generally swollen in comparison to the style.
Pedicel- The stalk of the flower.
Perfect- Describes a bisexual flower, one that has both stamens and pistils.
Petal- One of the inner whorl of leaf-like structures, usually showy
Pistil- The female organ of a flower, comprised of the ovary, style and stigma.
Raceme- An inflorescence in which the sequence of flower opening begins at the bottom.
Radical- Symmetrical in more than one longitudinal plane, often circular; e.g., daisy
Spadix- A fleshy club-shaped inflorescence of tightly-packed flowers.
Stamen- The male organ of a flower, comprised of the filament and anther
Stigma- The exposed end of the pistil to which the pollen adheres; may be lobed or divided.
Style- The portion of the pistil that supports the stigma, through which the pollen tubes grow.
Superior- Describes an ovary that is positioned above the point of attachment of the petals.
Sepal- A term for each of the parts of the calyx of a flower, enclosing the petals and typically green and leaflike.
Umbel- An inflorescence in which all the pedicels originate from the same point and all the flowers are on the same plane.
Whorl- A group of parts arranged in a circle around one point of the stem or petiole.