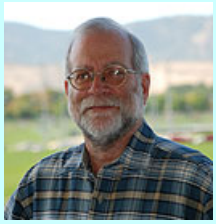
Meet Extension Agent Tom Hooten



Tom is the Montezuma County Extension Director, Agriculture, and 4-H Agent, and has been with CSUE or the research center for 15 years. He earned a BS in Horticulture from University of Connecticut and Masters in Plant Science from Utah State University.

As the ag agent, he develops and conducts county and region wide non-credit educational programs that emphasize best management practices in the areas of home horticulture, small acreage management, and production agriculture, as well as alternative crops, and agriculture marketing. Currently, Tom is busy managing Master Gardener classes and teaching "How Plants Grow" for Archuleta, La Plata, Montezuma, and Delores Counties. Tom spends time at the Southwestern Colorado Research Center in demonstrations and research projects; for example, he hosts a pruning workshop at the orchard for approximately 70 participants. In 2011, there was a plum crop for the first time, and approximate 700 people attended a U-Pick day at the orchard harvesting 17,500 pounds of fruit.

Tom is also the 4-H agent for Montezuma County. Not only does he support the traditional 4-H programs, but he is also very active in his work with K-12 enrichment. Last year, he provided a weekly STEM club at the local middle school. His latest project is collaborating among the Ute Mountain Ute community, United Launch Alliance, an engineering firm in Denver that specializes in space work, and CSU, to provide the middle school Ute Mountain Ute youth an opportunity to build a satellite to launch into space. In the entire United States, there is only one other group of middle school students in a school in Florida engaged in a similar project. Needless to say, Tom is a blast!

STEM Connections

Colorado State University Extension

Connecting Science, Technology, Engineering, and Math concepts to our everyday lives.

Spring is almost here!

Botany: How do plants know when it is time to grow after a long, hard winter?

http://ridgwaycolorado.com/business-listings/dining/

The Gunnison and Utah prairie dogs **hibernate** during the winter, but when do they end their winter **dormancy**? Organisms, including bacteria, fungi, plants and animals, possess **circadian rhythm**, an internal clock that resets every 24 hours with primarily sunlight clues. You may have experienced your circadian rhythm. On the weekend, do you wake up about the same time every day and get sleepy about the same time every evening?

The snow is still on the ground, but about the same time every year, birds return to your back year and get to the business of finding a mate and raising their chicks. How do birds know when it is time to return to their summer homes? We can see annual cycles all around us, and while we many not realize it, we also have annual cycles. What clues do you think organisms use to resent their annual clocks?

To look a bit more at what sets an annual cycle, we are going to use plants as our test subjects. In science, we always change one **variable** at a time. That way, when we notice a difference, we know that it is because of that one change. If we were to change two or three variables at a time, then we wouldn't know which element specifically had the greatest result.

Before you start your experiment, think about what clues organisms have to reset their annual clocks. What conditions or elements do you think are used? Record those on your paper.

EXPLORE IT - DESIGN IT - DO IT

We are going to test increasing temperatures and sunlight as 2 of the clues organisms use. It would be terrific if you have additional ideas and design additional treatments to test for those variables!

- Put a piece of masking tape on each of the 12 pots.
- On 4 of the pots, label the masking tape "Light." These plants will go into the closet with the 24 hours of light. Place a garbage bag down to protect the floor and set the plants on top of it. Place the thermometer in the center of the 4 plants. Turn on the light.
- On 4 of the pots, label the masking tape "Temperature." Place a garbage bag down to protect the table; place the heating pad still wrapped inside the towel and garbage bag on top of that. Place the 4 pots on top of the heating pad. Place the thermometer in the center of these 4 plants. Turn on the heating pad to the lowest setting.
- On 4 of the pots, label the masking tape "Control." These plants need to go 12" away from the heating pad on the same table. Place a garbage bag down to protect the table and set the plants on top of it. Why do we use a "Control?" Place the thermometer in the center of these 4 plants.
- On your paper (data sheet), record the date, temperature, hours of light (closet = 24 hours, and the Temp and Control plants would be the hours of daylight (you can find online at: http://aa.usno.navy.mil/data/docs/Dur_OneYear.php)
- Under notes, do you see any part of the seedling in the soil?
- Water the plants regularly to keep the soil moist. Make sure that each plant receives exactly the same amount of water (i.e. ¼ cup of water).
- After two weeks, which of the plants has grown the most? Which has grown the least? Can you think of additional variables to test? What do you think tells plants it is time to wake up after a long winter?

Age Appropriate:
4th—HS grades

Time Required:
2—4 weeks

Materials:
- 12 small plant pots
- potting soil
- 24 seeds
- CFL (100 watt equivalent)
- lamp
- extension cord/power strip
- dark space (e.g. closet)
- heating pad and towel
- plastic garbage bags
- paper and pencil
- masking tape
- 3 thermometers

The Set-up:
- Ask your parent if you can do this experiment
- Clear out an area in a closet, leaving plenty of room for 4 of your plants
- Set the lamp with the 100 watt CFL in the closet
- Plug the lamp into the extension cord; plug the extension cord into an outlet
- Wrap the heating pad in a towel and place both inside garbage bag
- Put potting soil into the pots, and plant 2 seeds according to the directions in each pot

The Clean-up:
- Unplug the extension cord from the wall socket, and unplug the lamp, electrical timer and extension cord
- Remove plants and garbage bags, put everything away, and return the items you moved for your experiment.

Power Words
- **circadian rhythm**: a daily cycle of activity observed in many living organisms
- **dormancy**: a life cycle when growth and development are temporarily stopped to help an organism conserve energy
- **hibernate**: pass the winter in a dormant state
- **variable**: element, feature, or factor that is liable to vary or change

Date	Light			Temperature			Control		
	Temp	Light	Notes	Temp	Light	Notes	Temp	Light	Notes