

What does a scientist do?

(a lot of writing)

- ◆ Think up questions to answer
- ◆ Figure out how to answer those questions
- ◆ Do experiments to try and answer those questions
- ◆ Observe the experiments and get the results
- ◆ Figure out what those results mean
- ◆ Tell everyone else about the results.

I need to think up a question to answer

Must be:

- ✓ Answerable,
- ✓ do-able in my lifetime,
- ✓ not too expensive (depending on who is paying), and
- ✓ something I think I know how to do.

Which of these would be a good question?

?? Why are there plants?

?? Why are flowers different colors?

?? Which attract more bees, red roses or yellow roses?

For which I do a lot of:

- Writing down ideas
- Reading what others have done that could help
- Writing (emails) to other scientists to help refine the question.

I need to figure out how to answer my question

- ✓ What equipment will I need?
- ✓ How many other scientists or helpers will I need?
- ✓ Will anyone give me the money or equipment I will need?

For which I do a lot of:

- Writing down ideas
- Reading what others have done to get ideas and see how their experiments succeeded (or failed!)
- Writing (emails) to other scientists to help refine the question.
- Writing grant proposals to ask the government for money and equipment to do the experiment

Observe the experiments and write down the results

- Writing *clearly*
- Writing *neatly*
- Writing *completely*
- Writing *accurately*.

Which of these shows good writing for results?

Wow that time, lots came to the first one, not as many to the last.

Wednesday: 10 more bees coming to the darker red flower than the first yellow flower, but not as many as yesterday. Maybe the 2nd red flower is more -- --

October 14 2009, 2.23pm:
18.3°C, bright sun, wind calm.
All flowers fully open, <2 days old
15-minute observing interval

Flower A (dark red): 23 bee visits
Flower B (light red): 14 bee visits
Flower C (dark golden yellow): 13 bee visits
Flower D (yellow/white): 2 bee visits

Notes: what I saw yesterday seems to be continuing with more visits to Fl. A, even though sunny today as compared to cloudy yesterday.

Figure out what those results mean

- Did you answer what you tried to answer?
(this could be “no”)
- Did you end up answering a different question?
- Did you come up with more questions for more research?

Reading, Thinking, Writing, Reading, Thinking, and Writing.
Repeat.

[This is a **LOT** of what scientists do every day!]

Lab Notes

24 October 2009

- Dr. Honey saw in 2004 that bees liked darker-colored roses no matter what the color. That's similar to what I saw. Then in 2008 Dr. Honey said that it wasn't a big effect, just a little one (only a few bees difference, not twice as many like I saw).
- Dr. Pinecone observed way back in 1988 that bees liked sweeter-smelling roses.
⇒Uh oh, I didn't smell my roses. ⇐
- Dr. Wood's team said in 2006 that red roses smelled sweeter than yellow roses.

Looks like what I saw was consistent with these earlier studies: my darker roses “won” for each color, and difference between light/dark was bigger than between red/yellow for each hue (lightness/darkness).

More questions: can I make them all smell the same so it's not smell that is maybe the cause rather the color like I was trying to figure out? *How the heck do you keep bees from smelling the roses???*

Tell everyone else about the results.

Non-Fiction Science Writing:

- ◆ **What, how, why, and who cares?**
- ◆ **Clear and careful**
 - ◆ (but can be a little funny, too).
- ◆ **Do not exaggerate**
 - ◆ (do not say you saved the world, when all you did was figure out how many bees liked red roses)

*“Red Roses **do** mean “love” for American HoneyBees”*

Dr. S. Wood and the 4th Grade Bear Creek Investigative Team

Summary: Over the course of four months in the spring of 2009, we conducted controlled observations of the American Honey Bee to investigate this species' color preference in rose visitations. We determined that between colors, red is preferred by a significant margin over the yellow shades, and that within colors, the darker hues are preferred also by a significant margin. These results are consistent with prior findings of Honey (2004) and Wood et al (2006), and suggest further research regarding the context of Pinecone (1998)'s findings regarding a red rose's “sweet sweet smell”.

Figures, Pictures, and Graphs

“A Picture tells a Thousand Words”

(ok, but are those words going to be helpful???
or just horribly confusing?)

Illustration #1:
Dark Red roses
were the best.



