



How and Why of Learning Science

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Chai and Why?

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Parents bring us into the world...



Will we go to school, learn science, graduate?

We grow...



Will we go to school, learn science, graduate?

Go to School...



Will we learn science, graduate?

Perhaps we aim to be...



Or...



Asking some questions

- ◆ Is your parents' SES predictive of your chances of completing school, of graduating?
- ◆ Is it predictive of your chances of learning science?
- ◆ Is this fair? Is it a 'scientific' question?
- ◆ Do you know its answer already?
- ◆ How do you know? How will you find out?
- ◆ What might be some causal factors mediating SES and science achievement?

Why must we learn science?

Do you like to learn science?

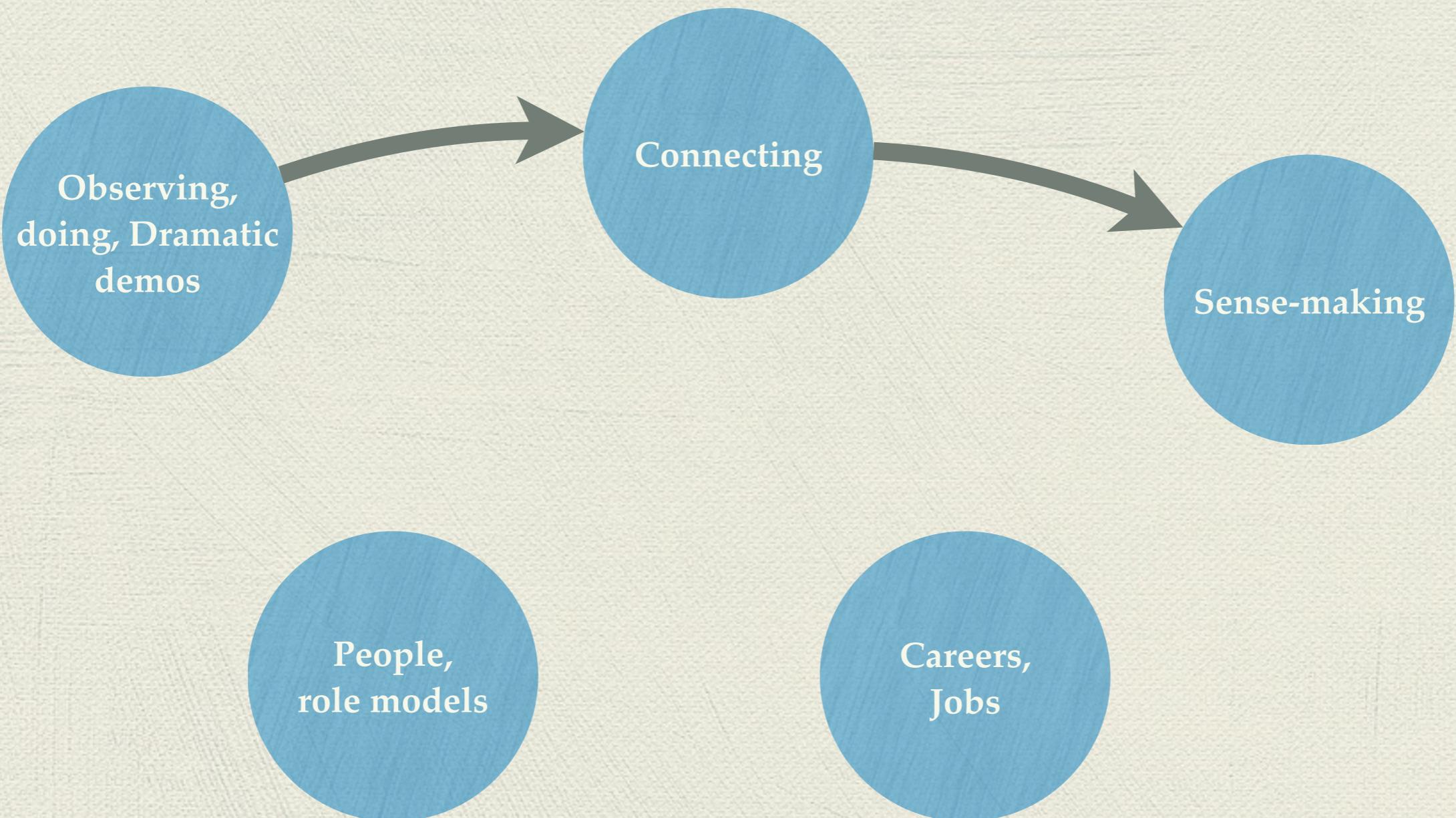
- ◆ Your most memorable experiences of learning science
 - What have you liked?
 - What have you disliked?

What I have liked in science

What I have disliked in science

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Why they liked or disliked science



National Science Day 2015



Discovery of
Raman effect --
February 28, 1928

Sir C.V. Raman (1888-1970)

- ◆ Why did Raman do Science?

Why is the sky blue?

The best way to answer a question is to ask another...

- ◆ Why are the stars not visible in day time?
- ◆ Why does the sky appear blue in sunlight, but not in moonlight?
- ◆ Why does the sky looks bluest when there are a few clouds in it?
- ◆ What is a cloud? Why is it floating in the air?

C. V. Raman, Why the sky is blue, Vikram A Sarabhai Community Science Centre, December 22, 1968

Why is the sky blue?

- ◆ The reduction of the yellow in the spectrum is responsible for the blue of the sky.
- ◆ 25-30 bright - coloured silk blouse pieces, to verify the proposition that all brilliant colours require the suppression of yellow
- ◆ Why is the yellow reduced by the atmosphere?

C. V. Raman, Why the sky is blue, Vikram A Sarabhai Community Science Centre, December 22, 1968

Why is the sky blue?

“Scattering of light by the molecules of the atmosphere.”....
(But) the spirit of science is not finding short and quick answers. The spirit of science is to delve deeper... and deeper. Don't be satisfied with the short and ready quick answers... look around and think and ask all sorts of questions... this is the spirit of science.

C. V. Raman, Why the sky is blue, Vikram A Sarabhai Community Science Centre, December 22, 1968

Why Ramu does not ask questions

- ◆ We are afraid our classmates will laugh
- ◆ The culture of the school (and home) discourages questions
- ◆ Only teachers are allowed to ask questions
- ◆ We are lazy and unmotivated
- ◆ Girls - additional factors

K. P. Madhu, Why Ramu does not ask questions, Science Reporter, Feb 2015, 22-25.

Never fear - Google it

- ◆ Can we see air?

Inquiry in the classroom

- ◆ What is that?
- ◆ Why do trees have flowers?
- ◆ Why do trees want to attract insects?
- ◆ Why don't we hear the sun burning?

Google it! Lake Wobegon Effect

- ◆ "Well, that's the news from Lake Wobegon, where all the women are strong, all the men are good looking, and all the children are above average."
— Garrison Keillor on the Radio show **A Prairie Home Companion**

... in a survey of a million high school students, only 2 percent stated that they were below average in their leadership ability

... subjects were asked about their competence as drivers in relation to a group of drivers... a majority... regarded themselves as more skillful and less risky than the average driver in each group...

... 94 percent of college professors thought they do above average work.

Google it! Confirmation bias

... the tendency to search for, interpret, or recall information in a way that confirms one's beliefs or hypotheses.

Image Sources

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Thank you!

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