

Some knotty problems in communicating wind energy

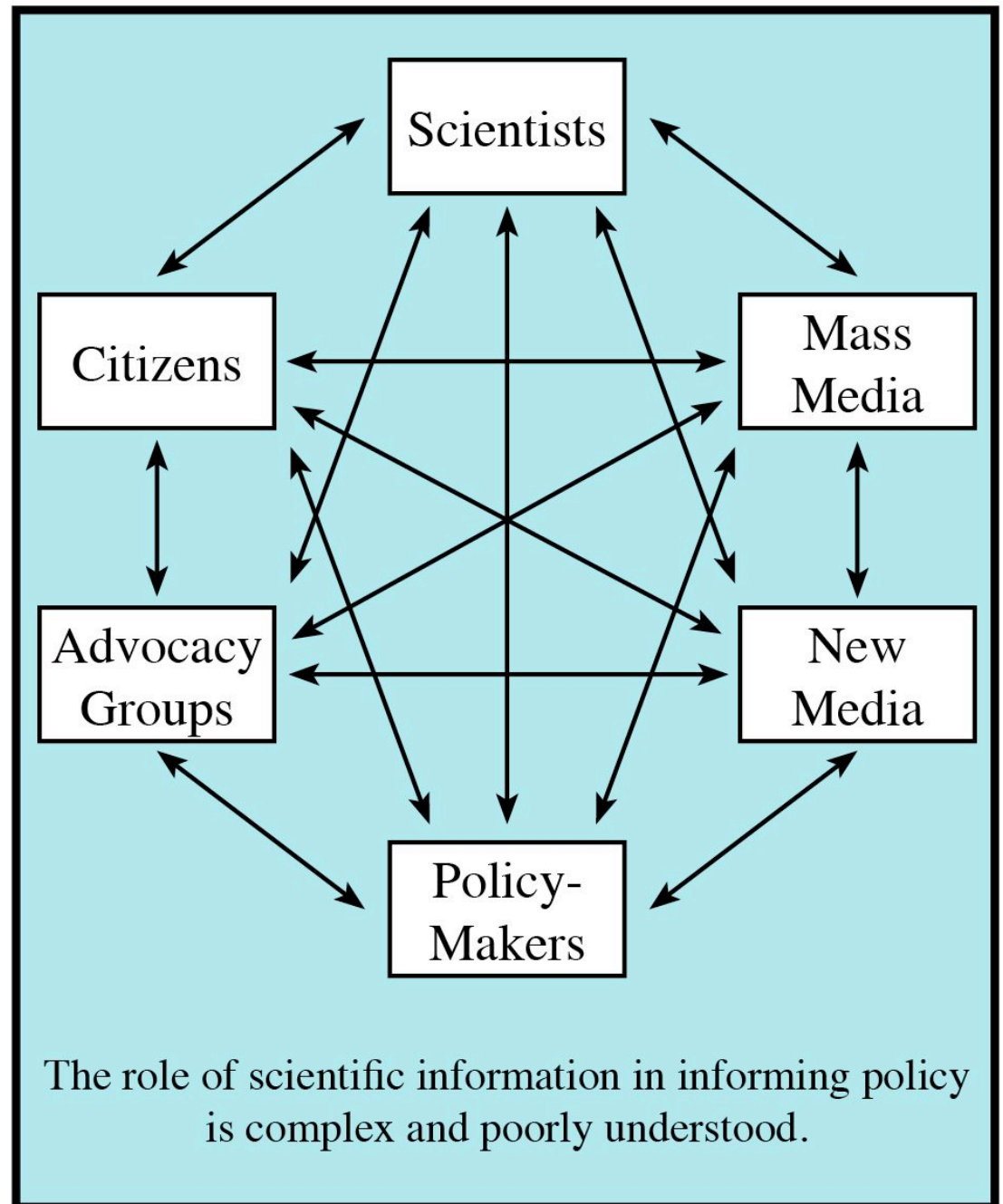
Jean Goodwin

Professor, English/Speech Communication

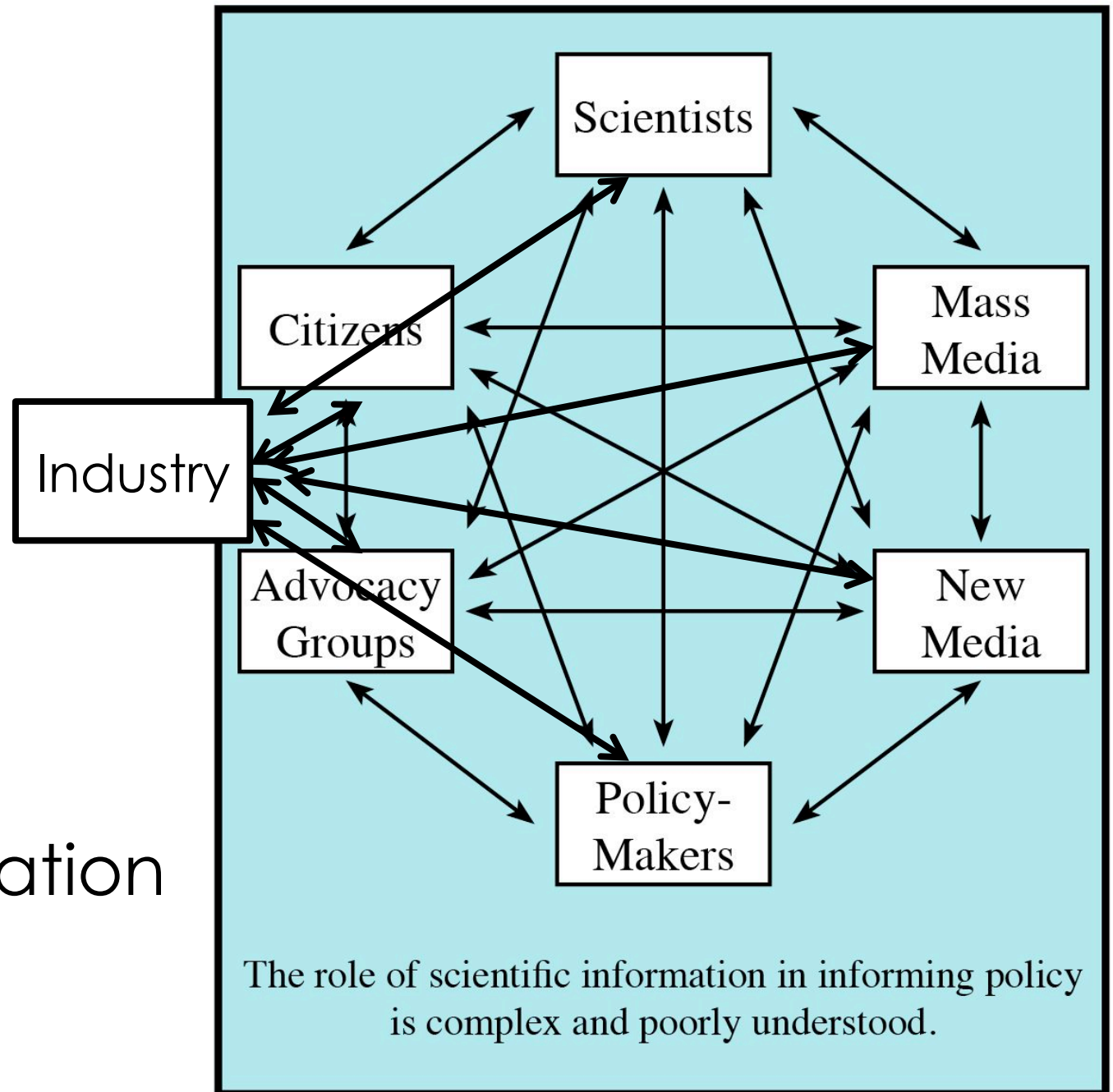


The Science Communication Project @ISU

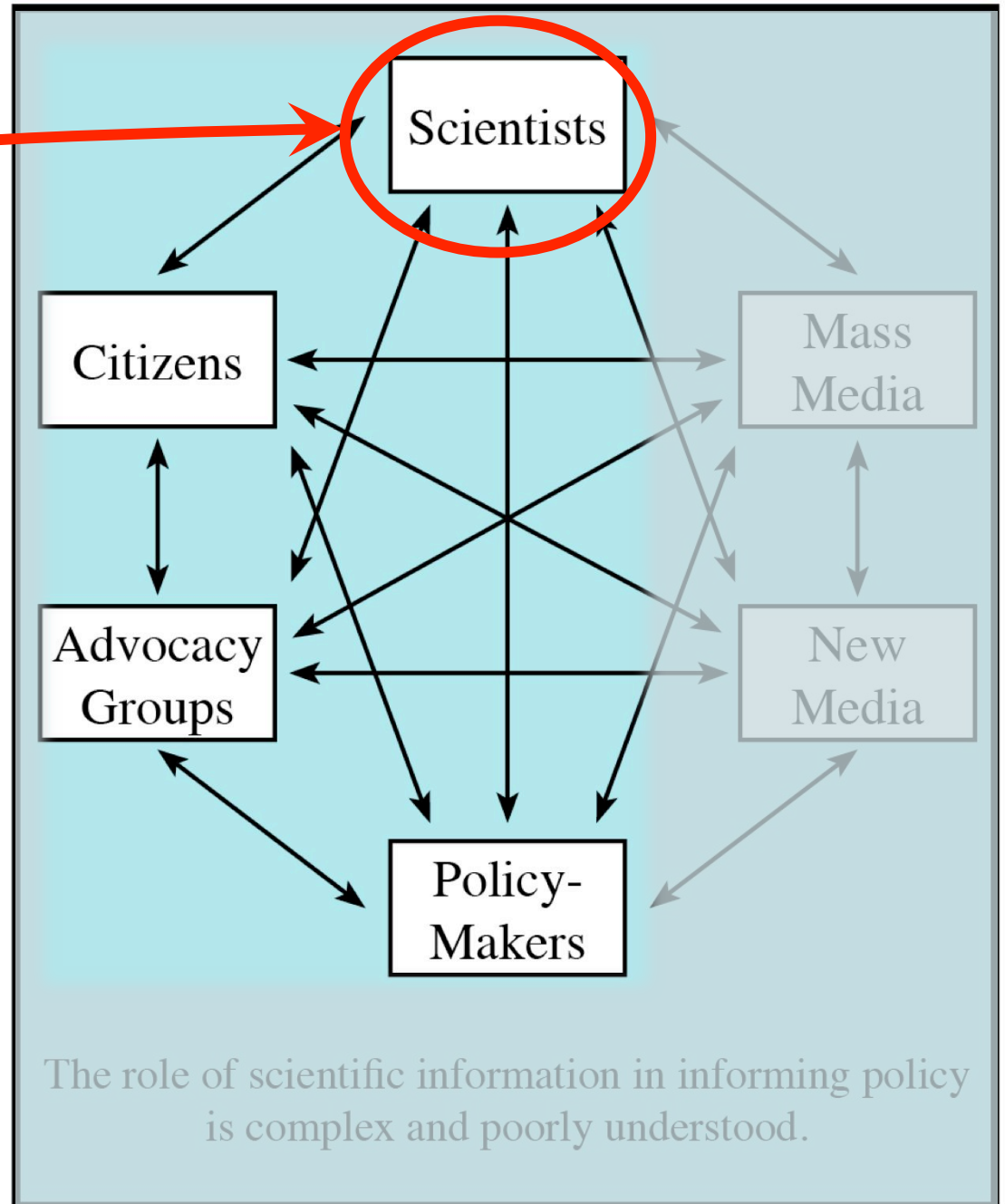
Science
communication
is a
system



Science
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system



me



The two rules of communication:

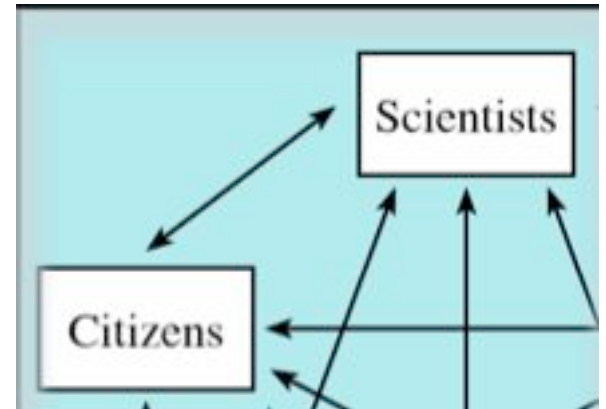
The two rules of communication:

1. Understand your audience.

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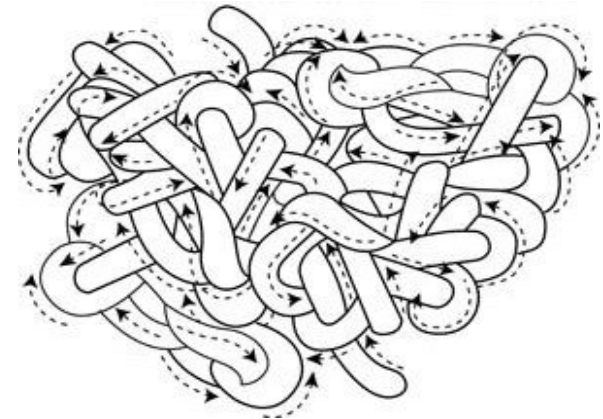
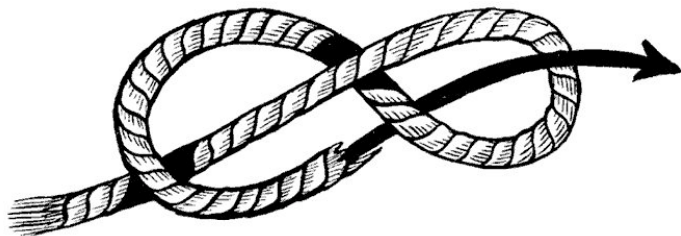
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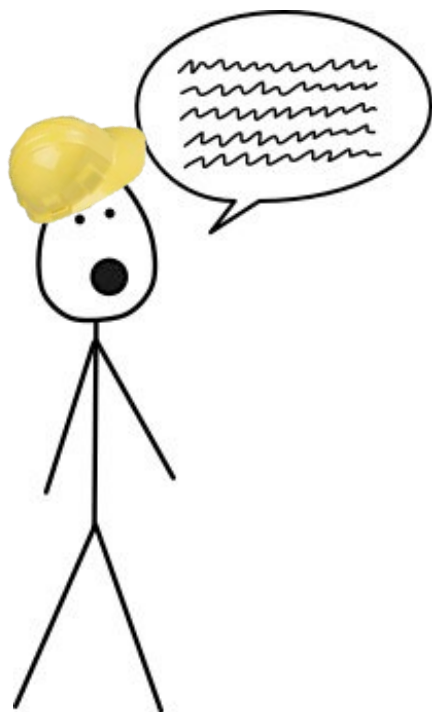


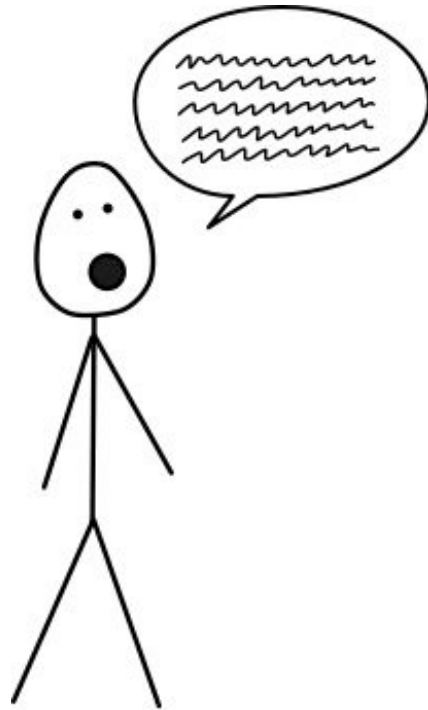
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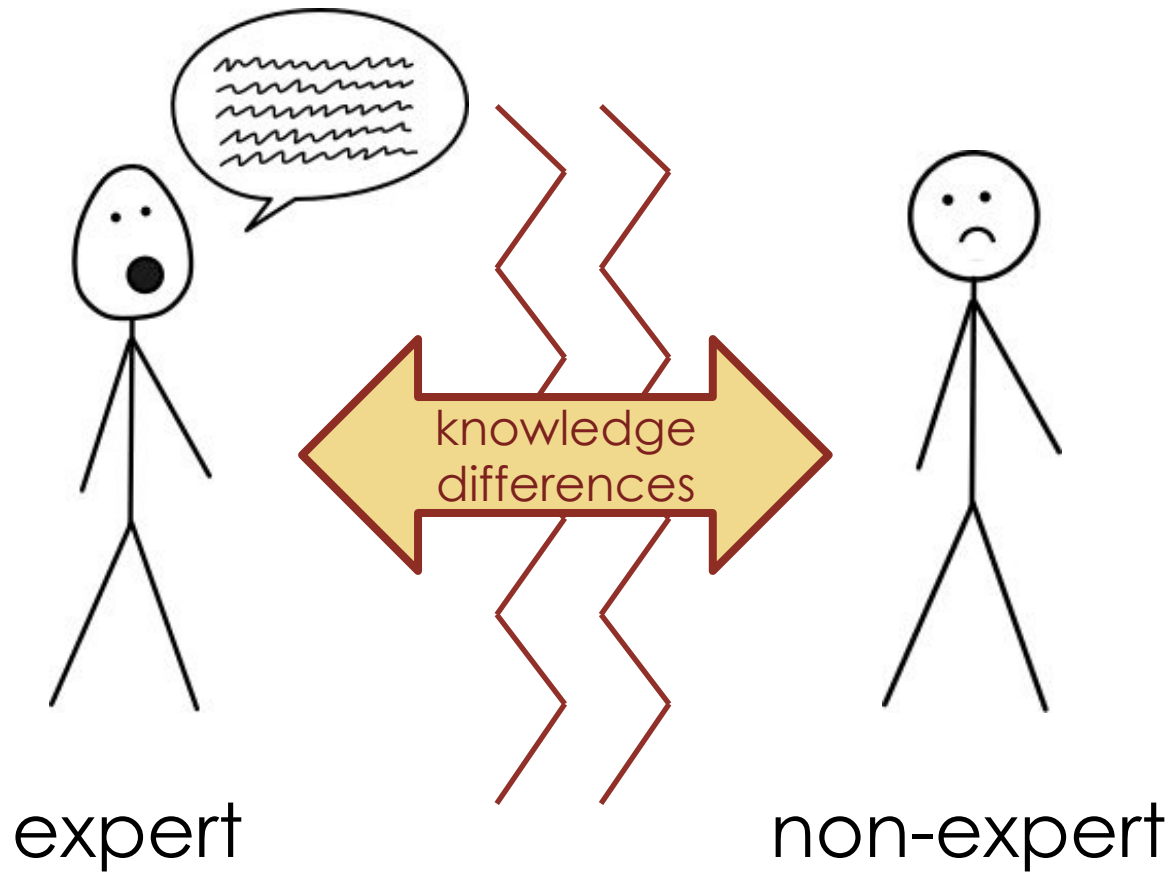


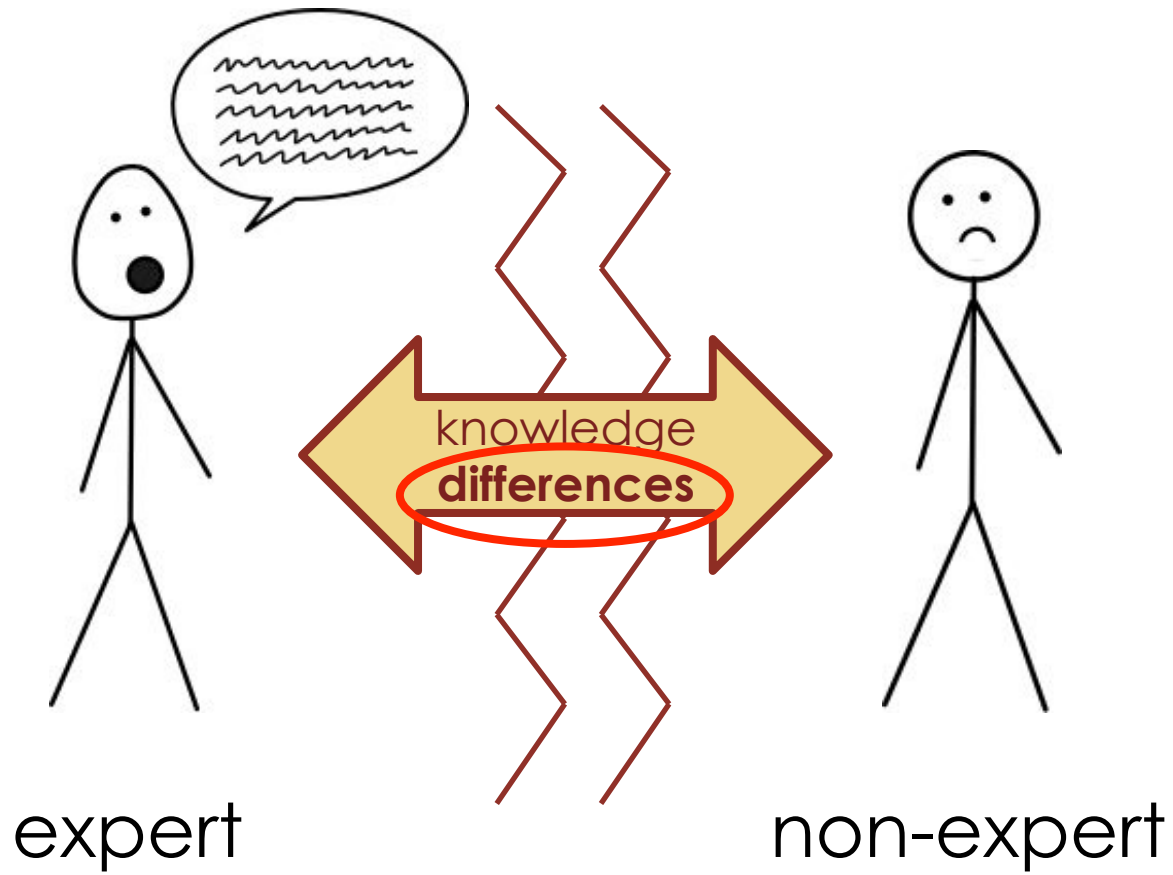


expert



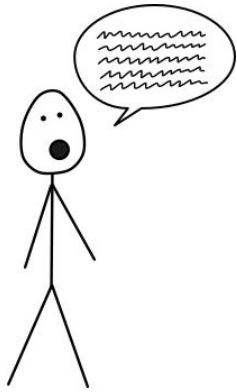
non-expert
(lay person)





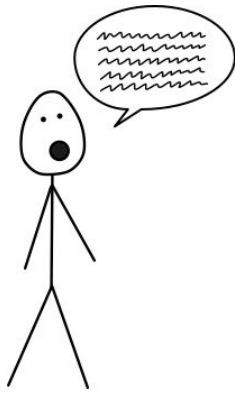


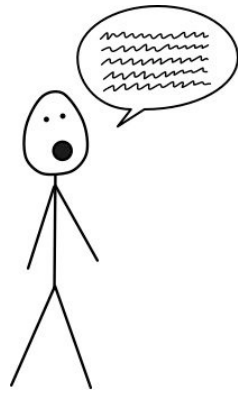
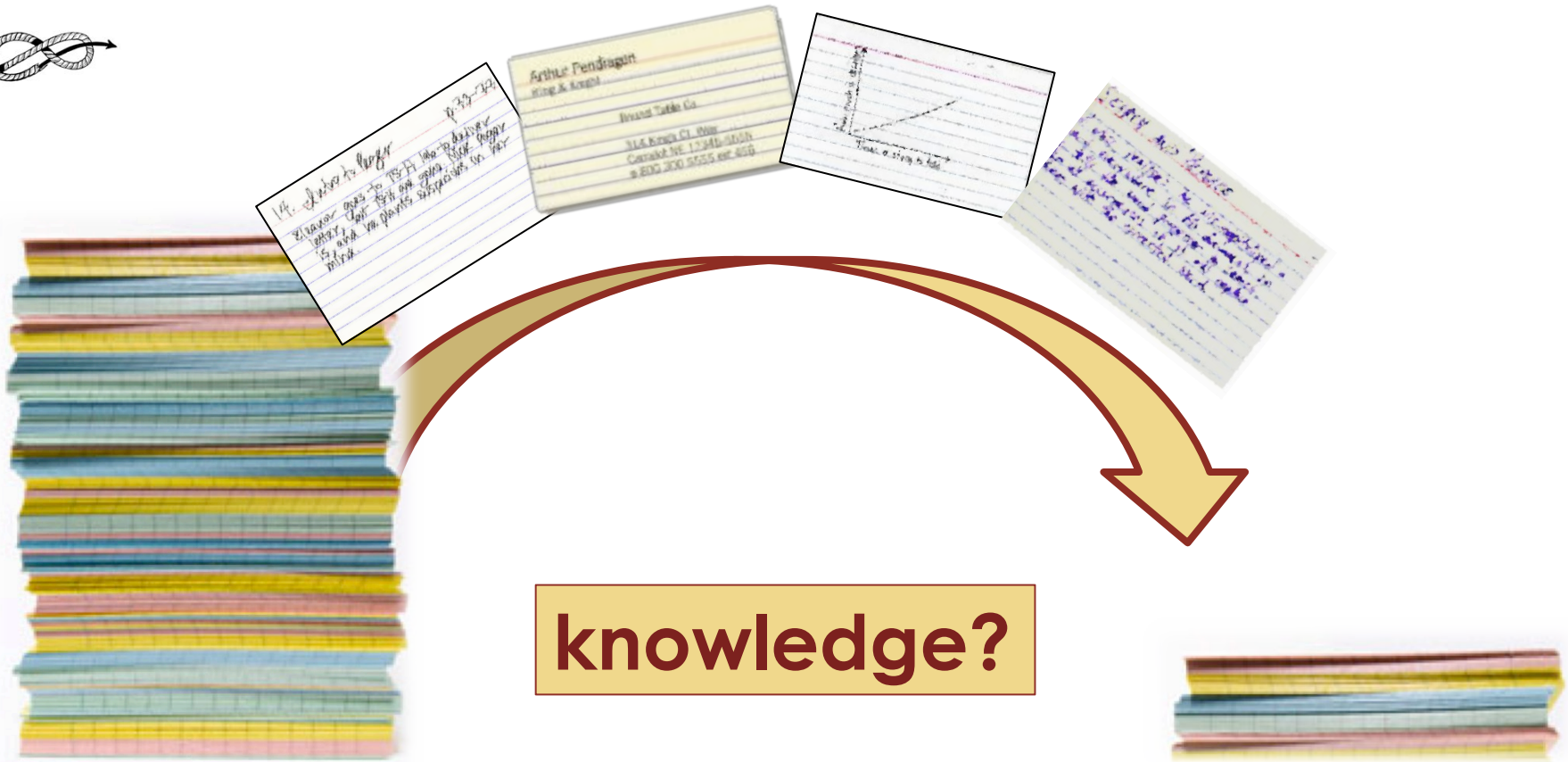
knowledge?

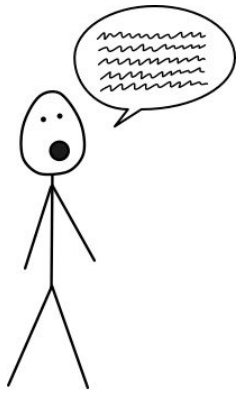
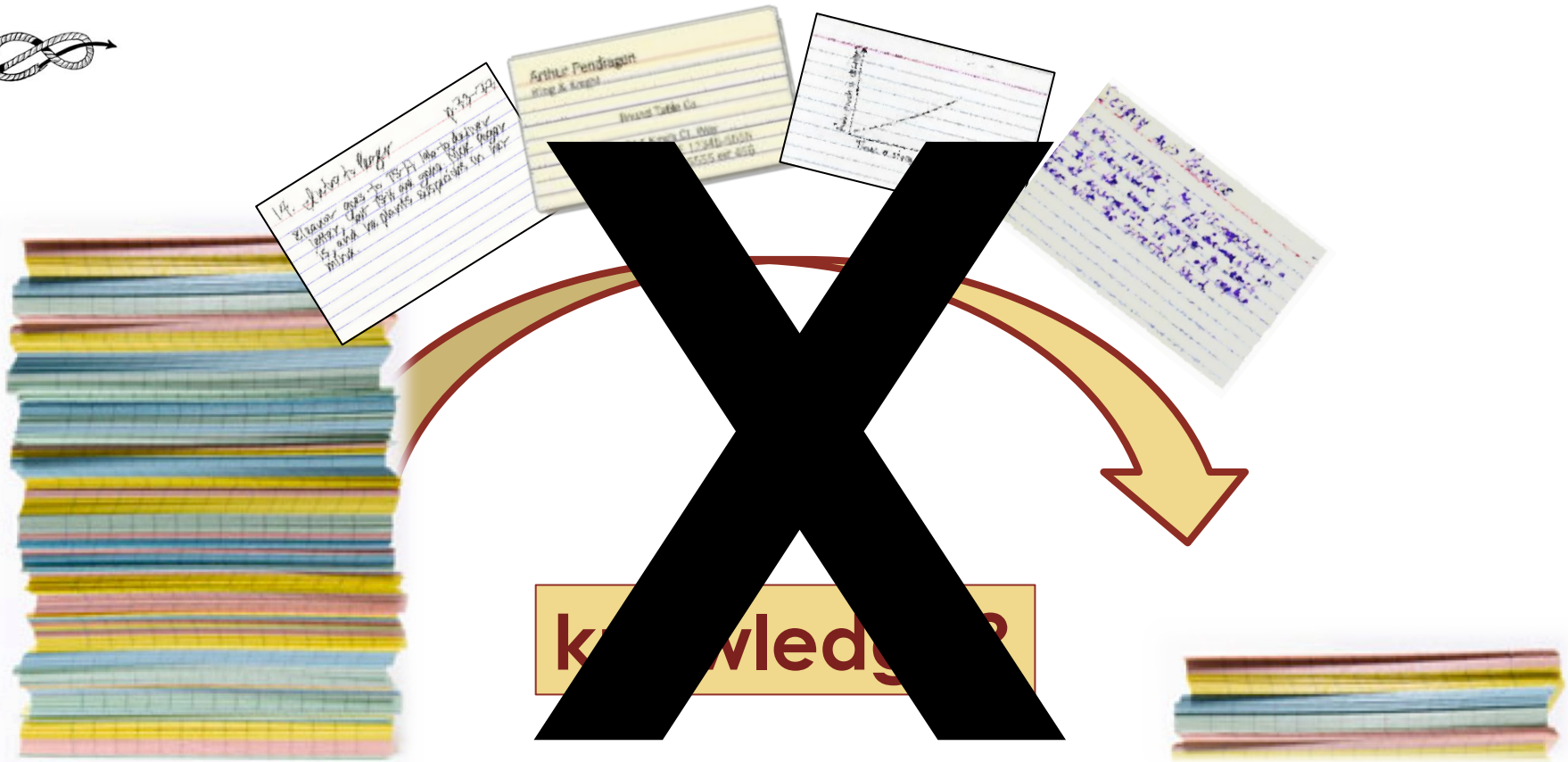




knowledge?

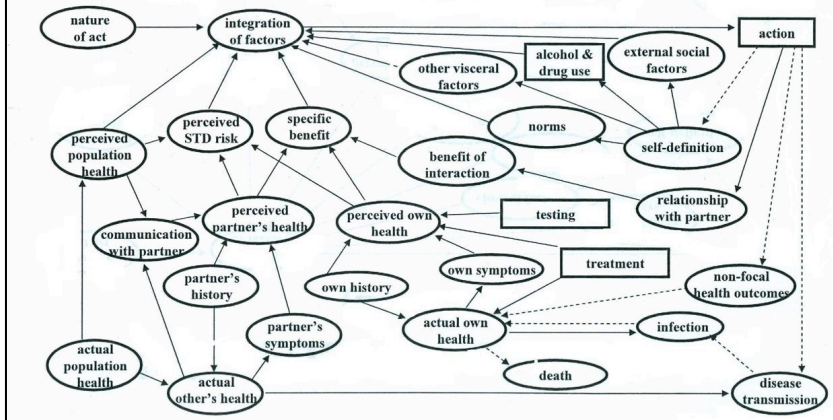




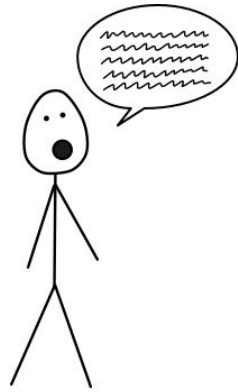




expert mental model



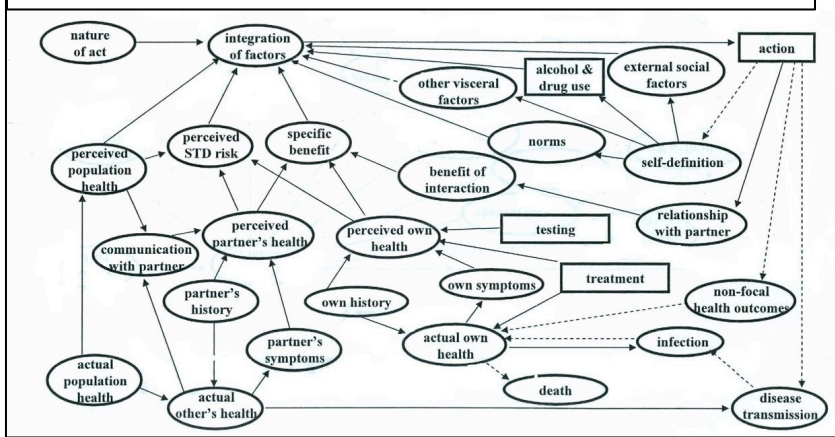
knowledge!



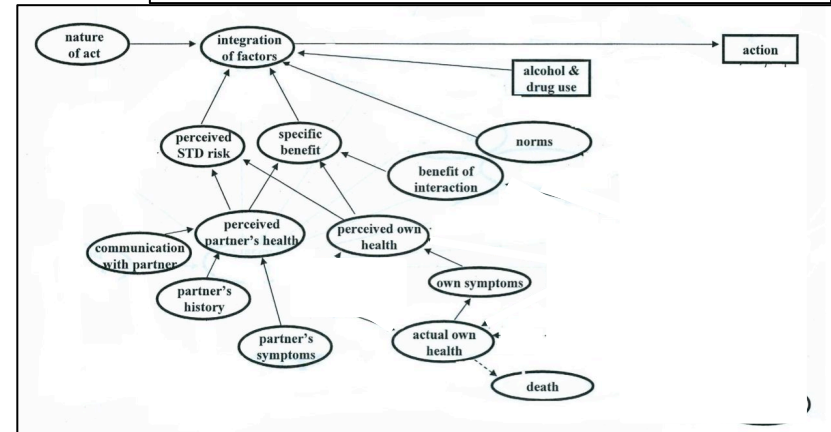
Prof. Lulu Rodriguez



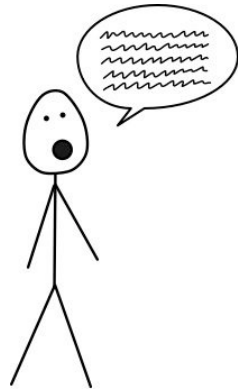
expert mental model



lay mental model

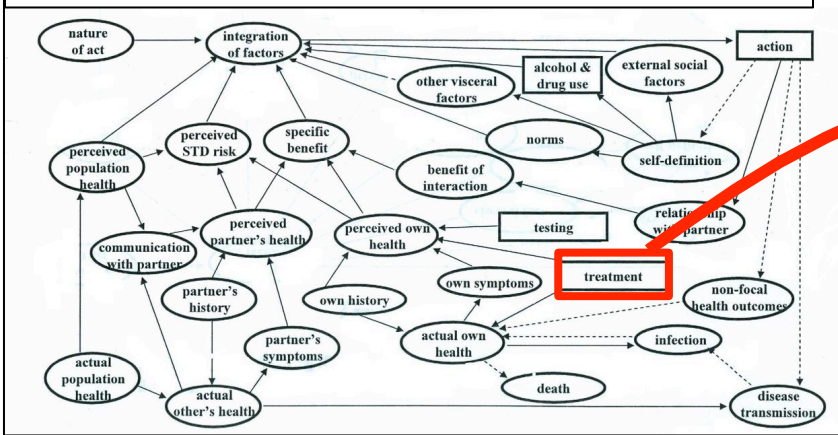


knowledge!

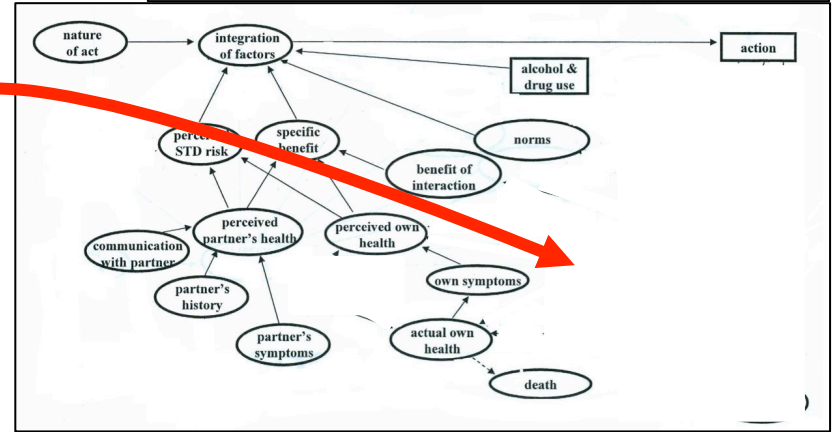




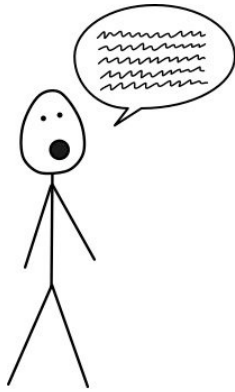
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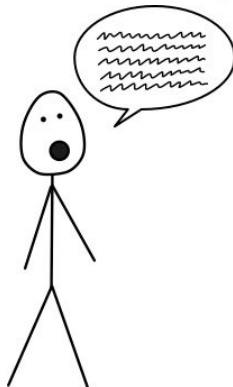
Site selection, optimisation and energy production



Andrew Clifton, Katherine Dykes
National Wind Technology Center

Webinar for Iowa State University, October 12 2012

NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.





Wind turbines convert momentum to energy

- **3 blades on a rotating shaft**

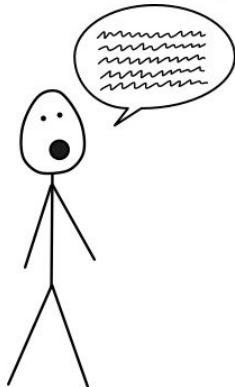
- Wind over the blades generates lift
- which turns the shaft
- to power the generator.
- Controls yaw the turbine into the wind

- **Power in the wind;**

$$Power = \frac{1}{2} \rho A C_p V_\infty^3$$

$$C_{P_{max}} \cong 0.59$$

50 m radius = 7,853 m²
Winds of 10 m/s, at sea level
Power = 2.84 MW (1,500-3,000 homes)





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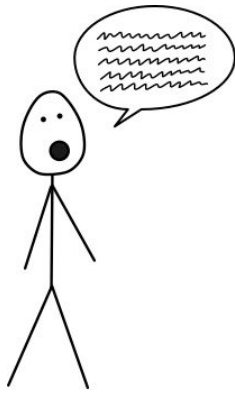
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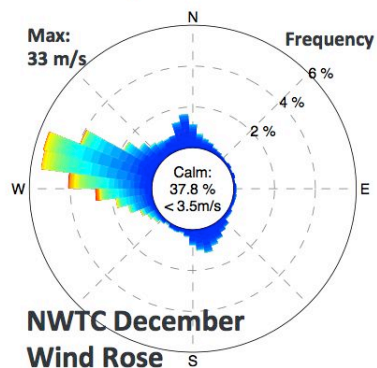
Power = 2.84 MW (1,500-3,000 homes)





Prospecting using temporary towers

- Quantify the wind resource at hub height
 - Annual distribution
 - Seasonal cycle
 - Diurnal cycle



NRG #40C
Anemometer \$290



NRG #200P Wind
vane. \$215

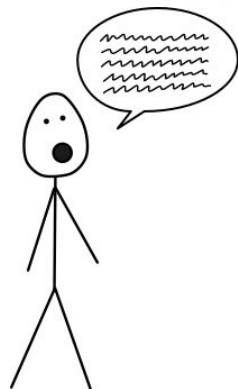


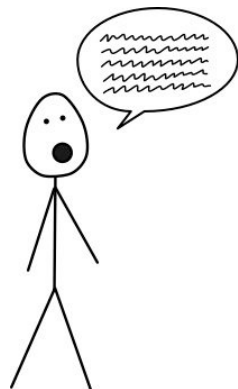
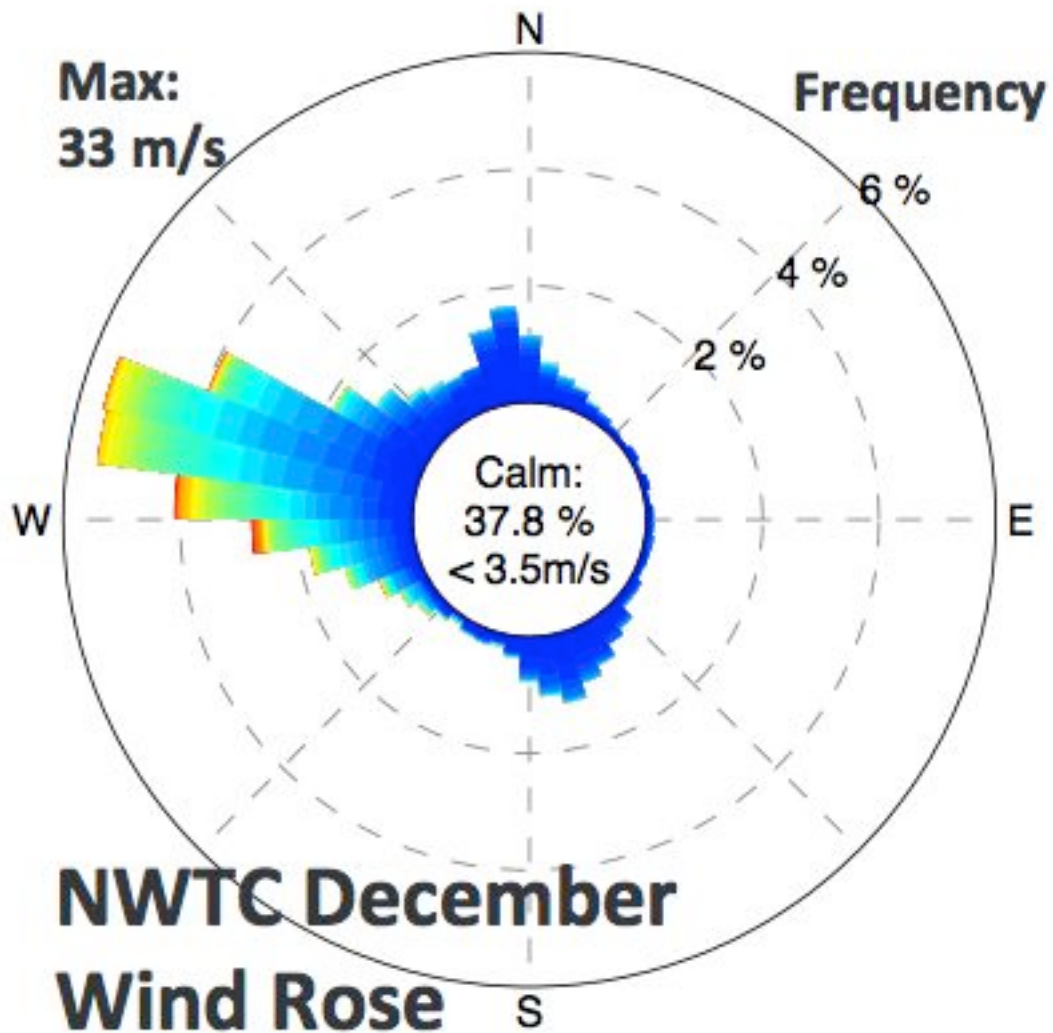
NRG #110S
temperature sensor
\$205

60m, Ice-rated tower
from NRG; \$18,430
(shipping included!)

Instrument images from
www.nrgsystems.com

Michael Brower. *Wind Resource Assessment: A Practical Guide to Developing a Wind Project*. Wiley, 2012. DOI: 10.1002/9781118249864.







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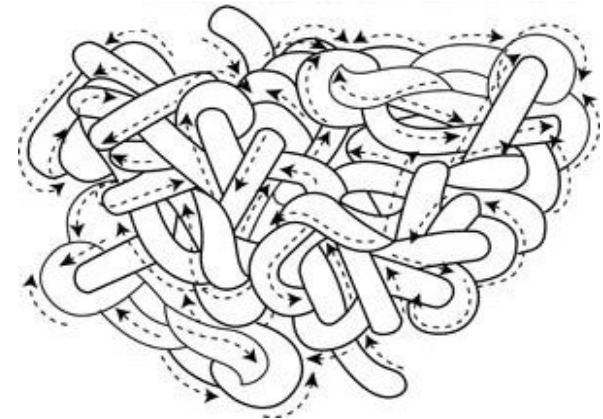
Explain what it means.

Explain why it matters.

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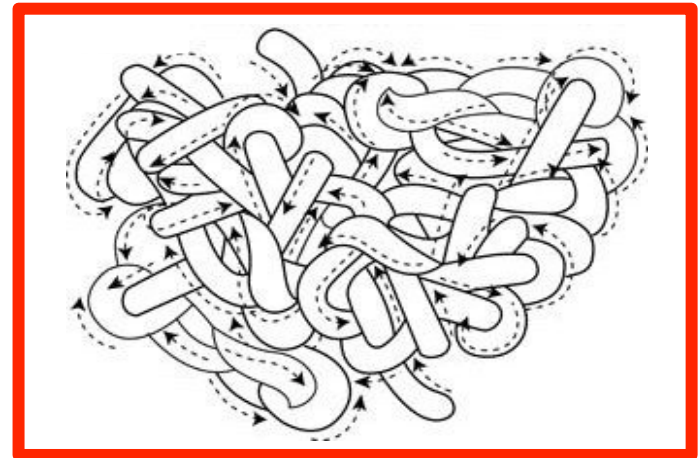
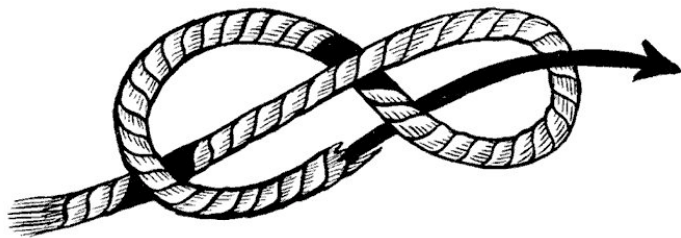
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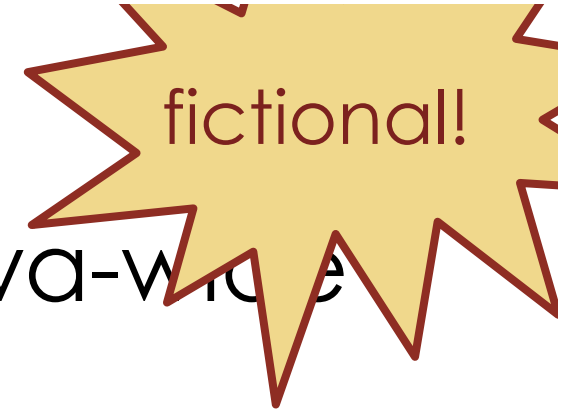
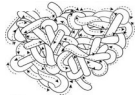
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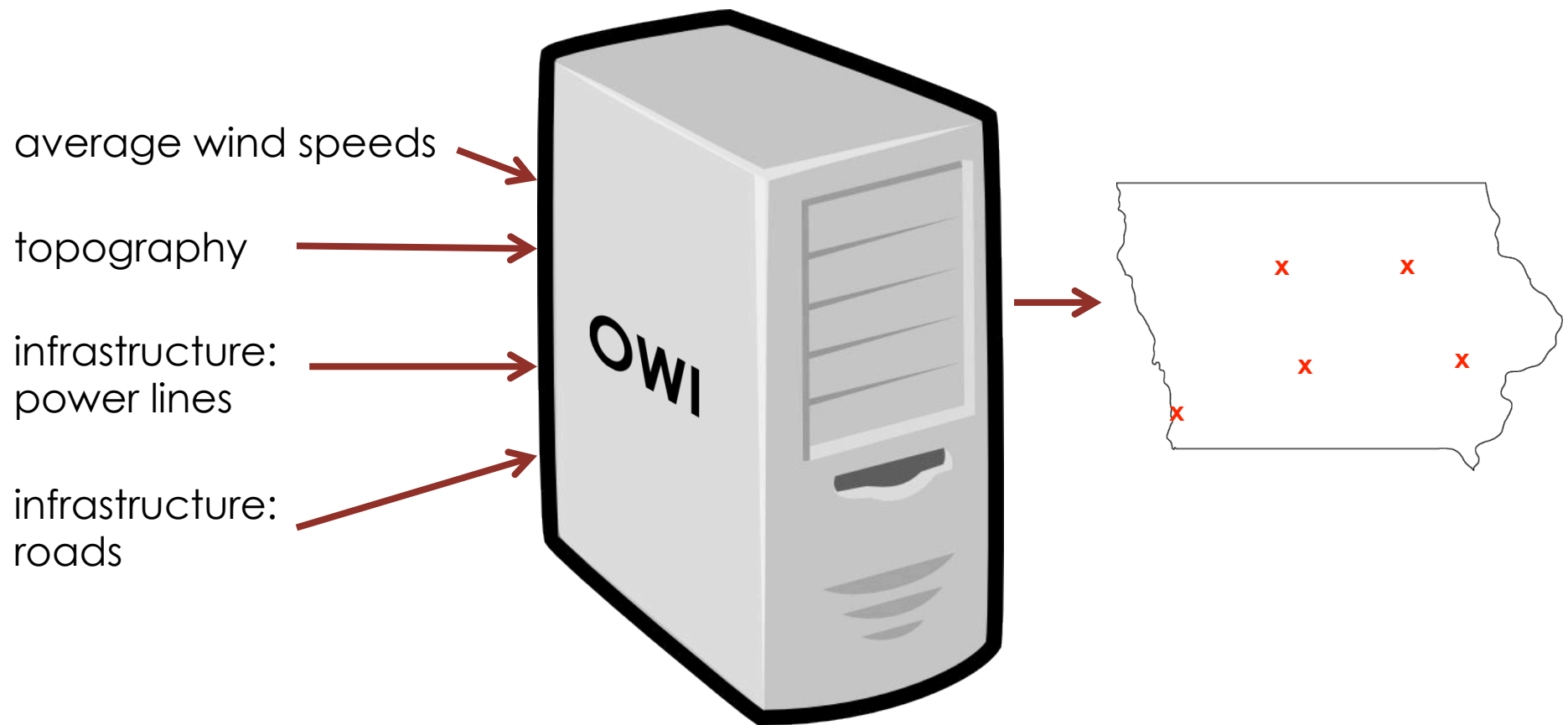
Optimizing Windfarms Iowa-wide



Optimizing Windfarms lowa-wide

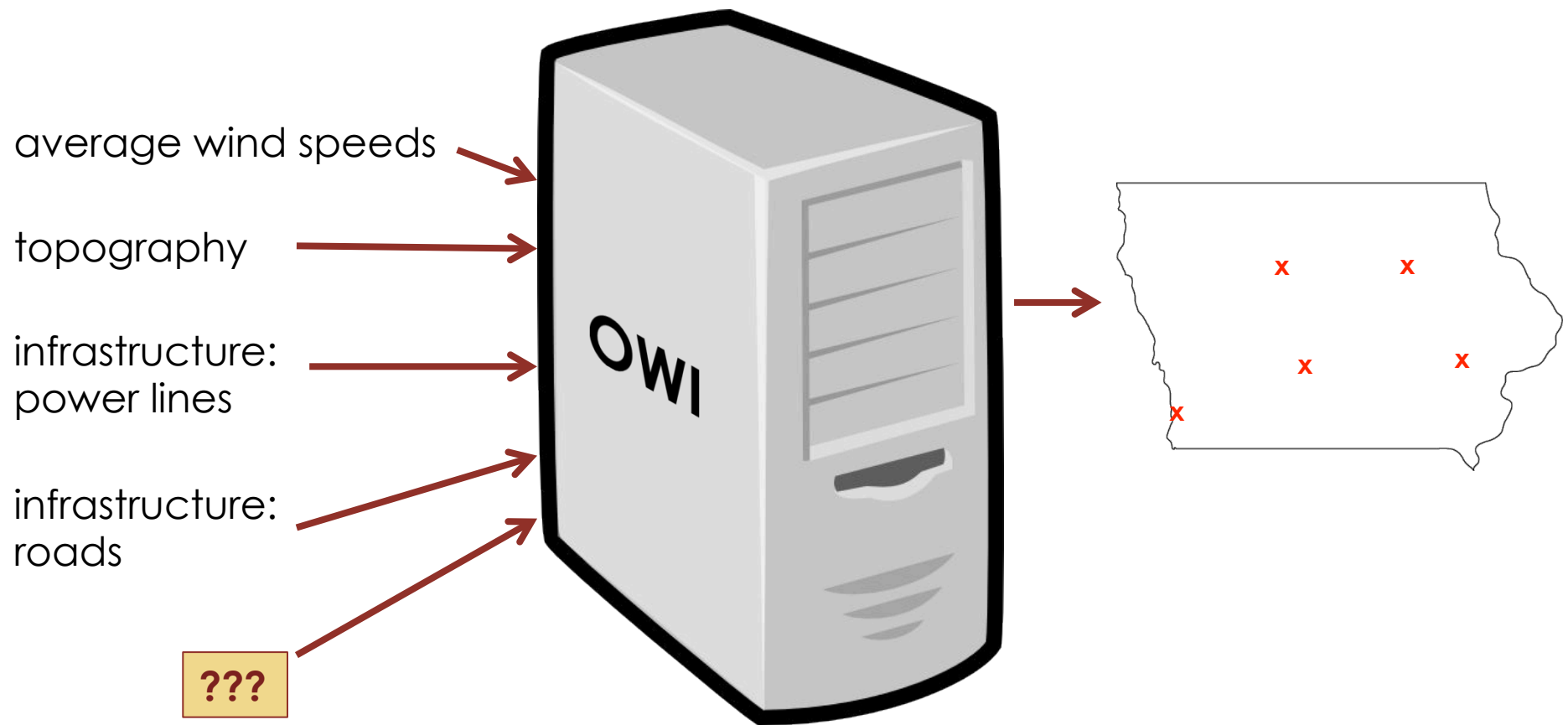


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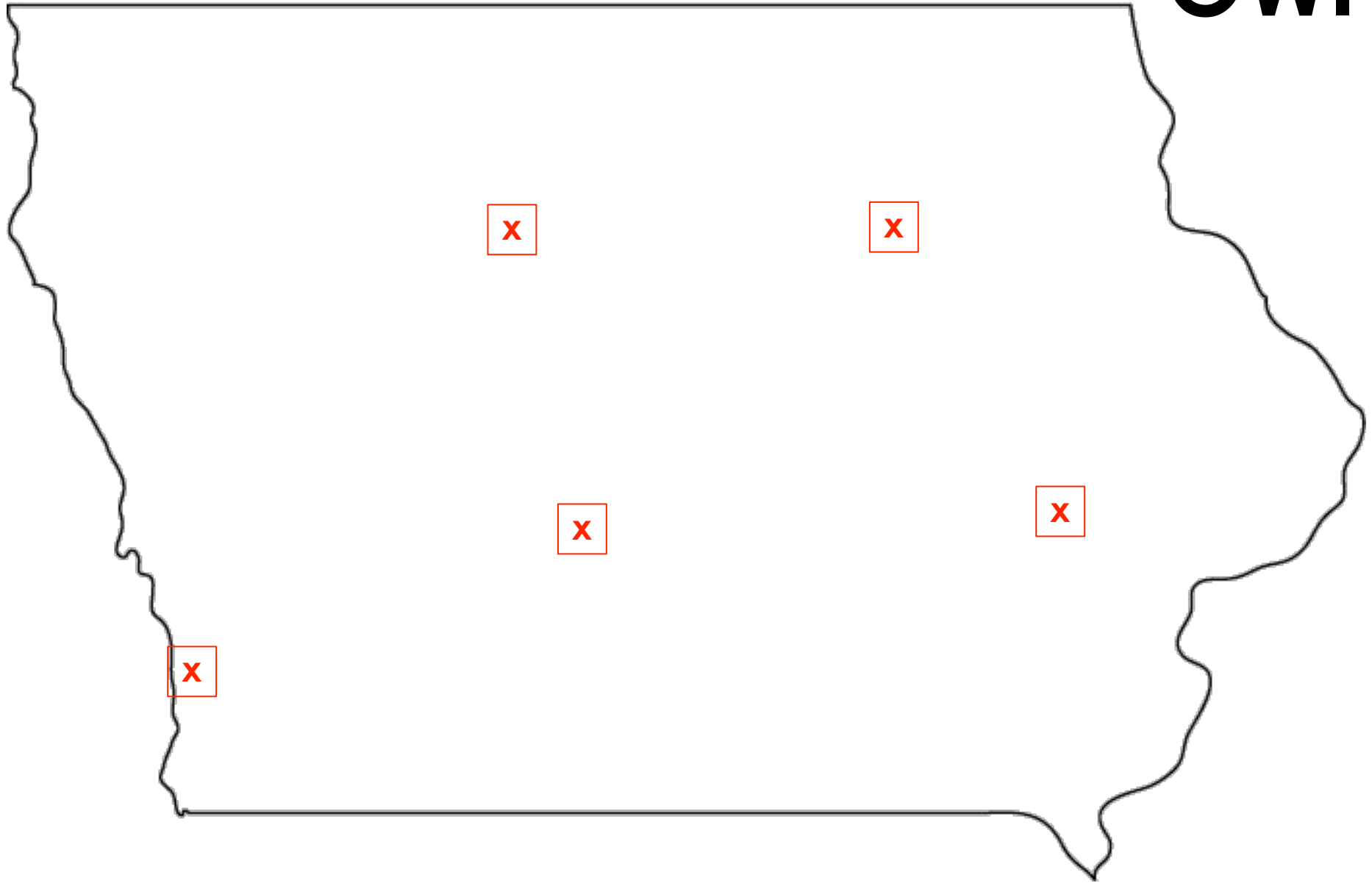


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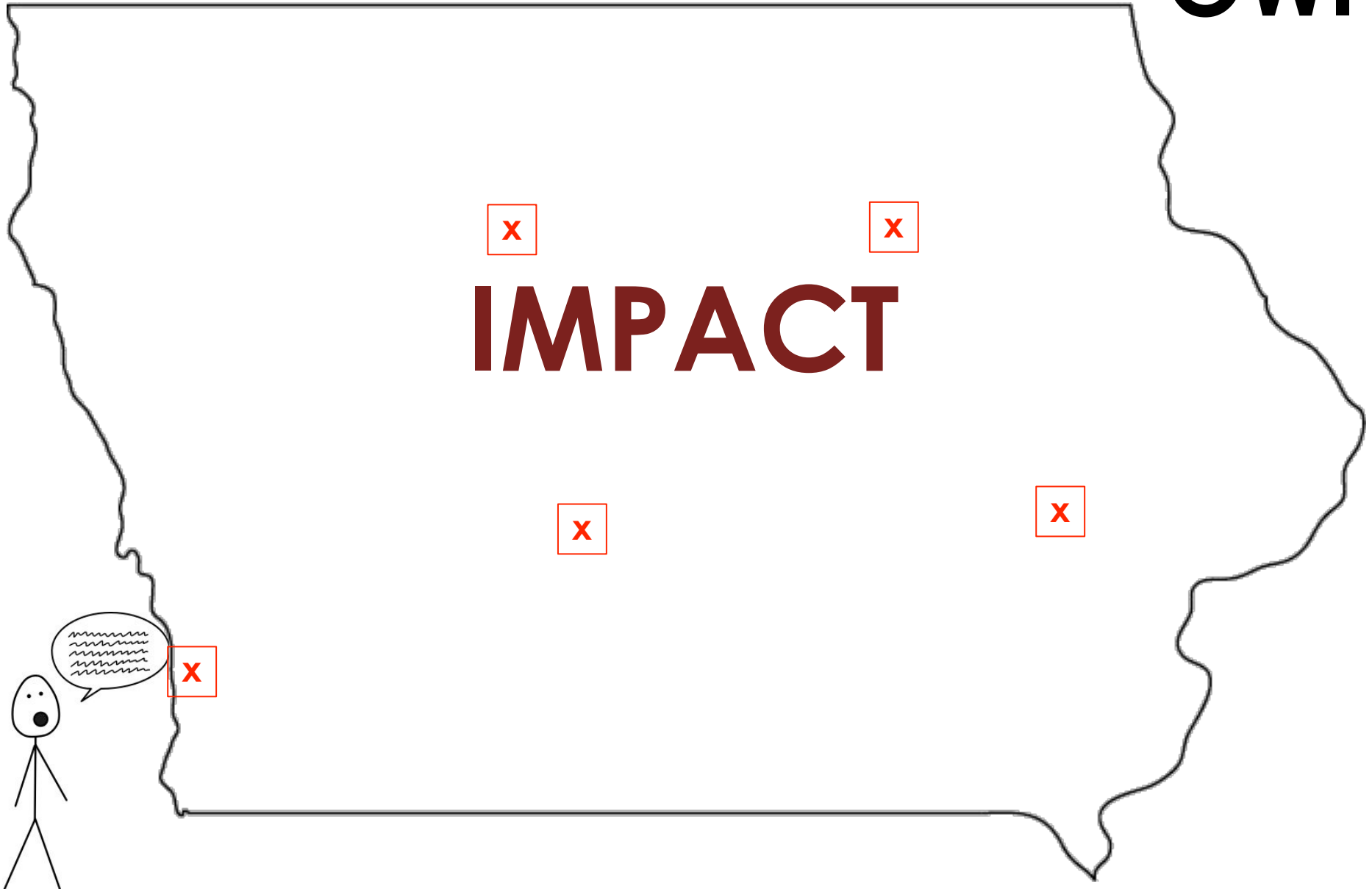


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IMPACT

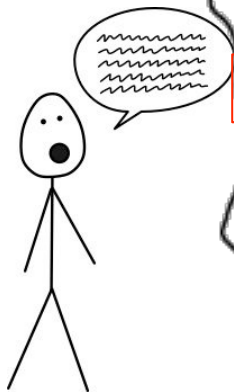
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X

X

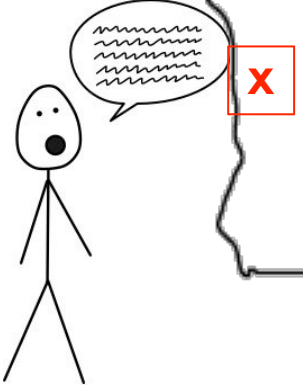
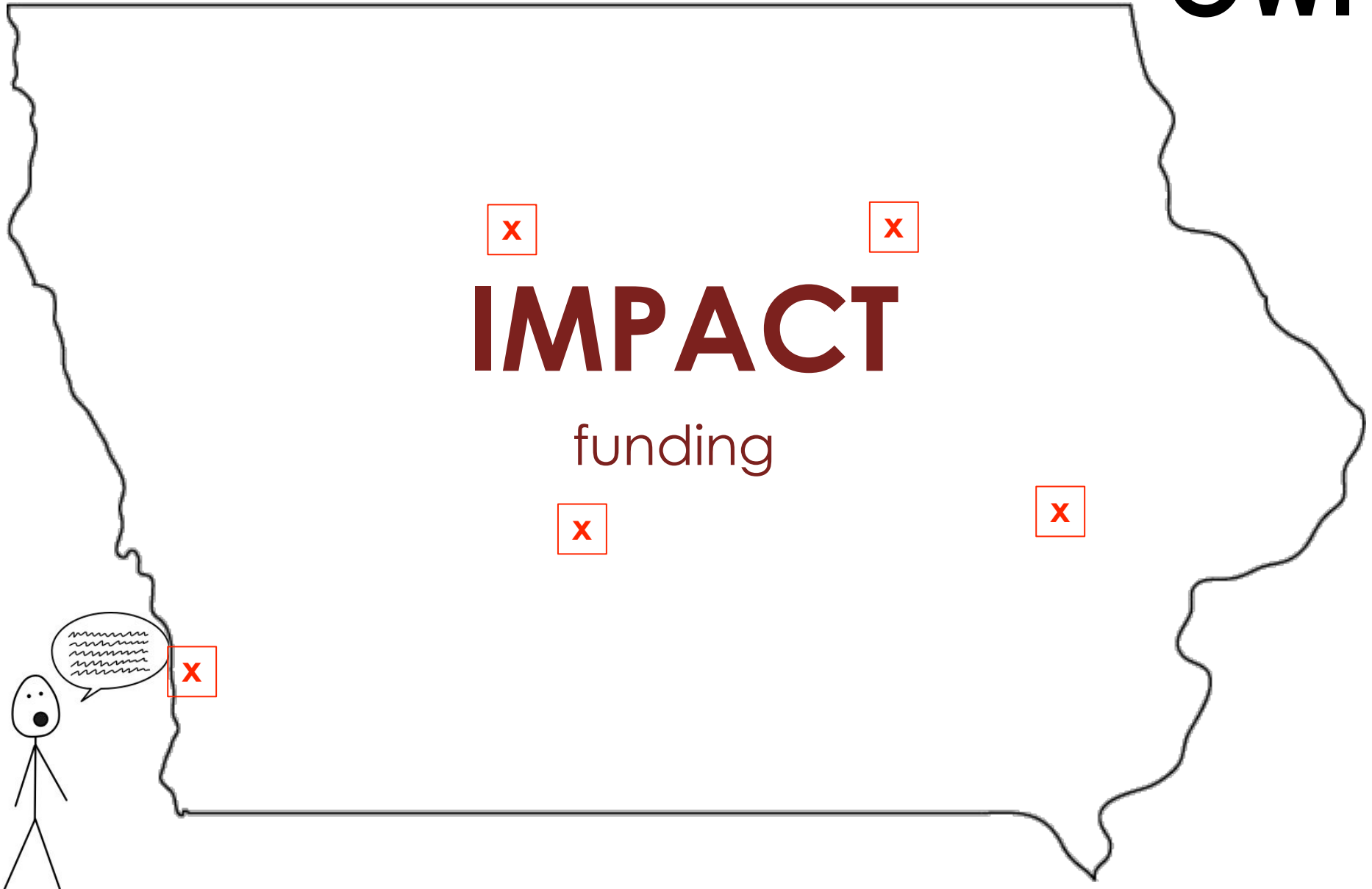
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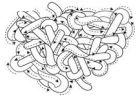
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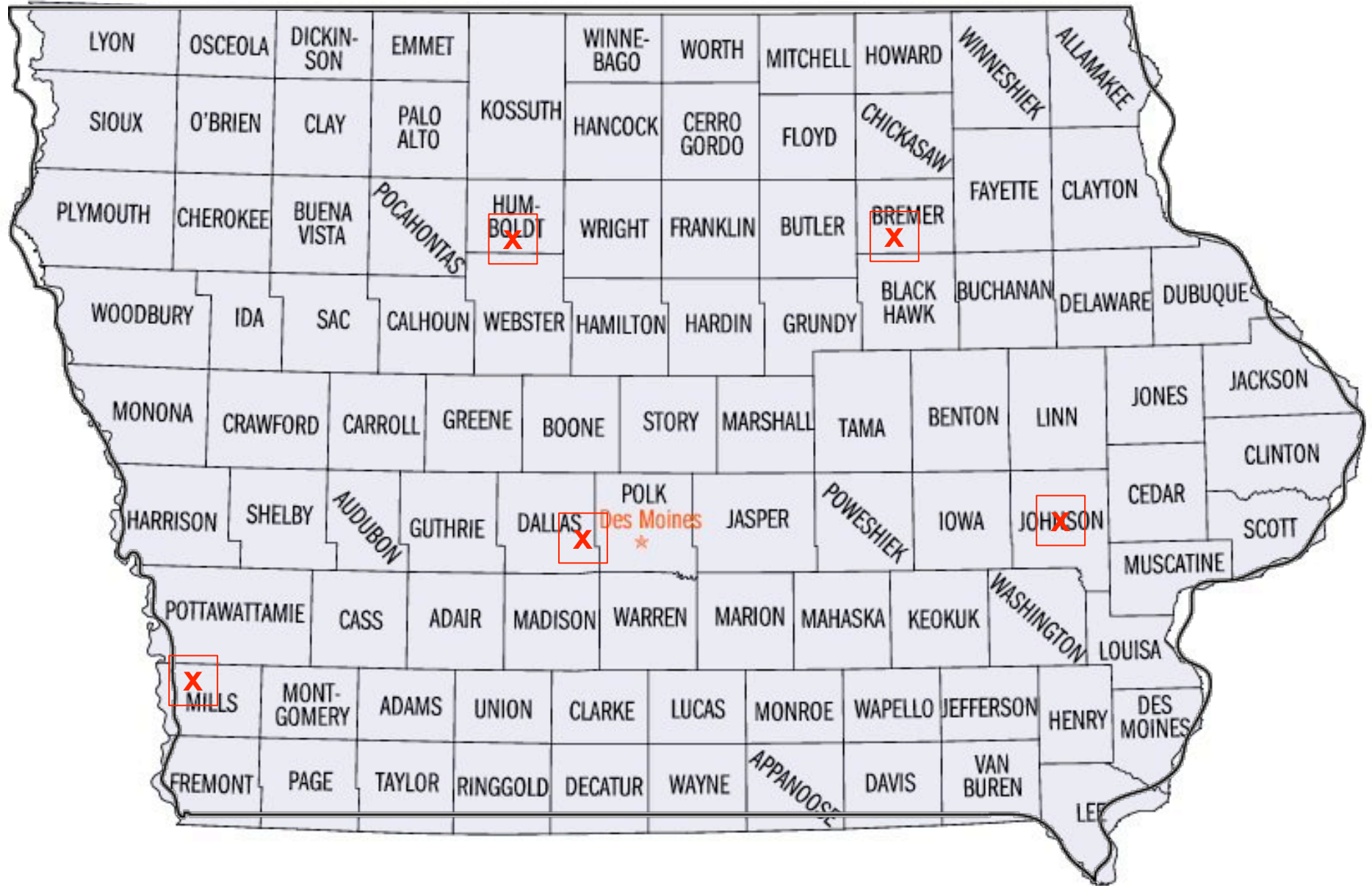


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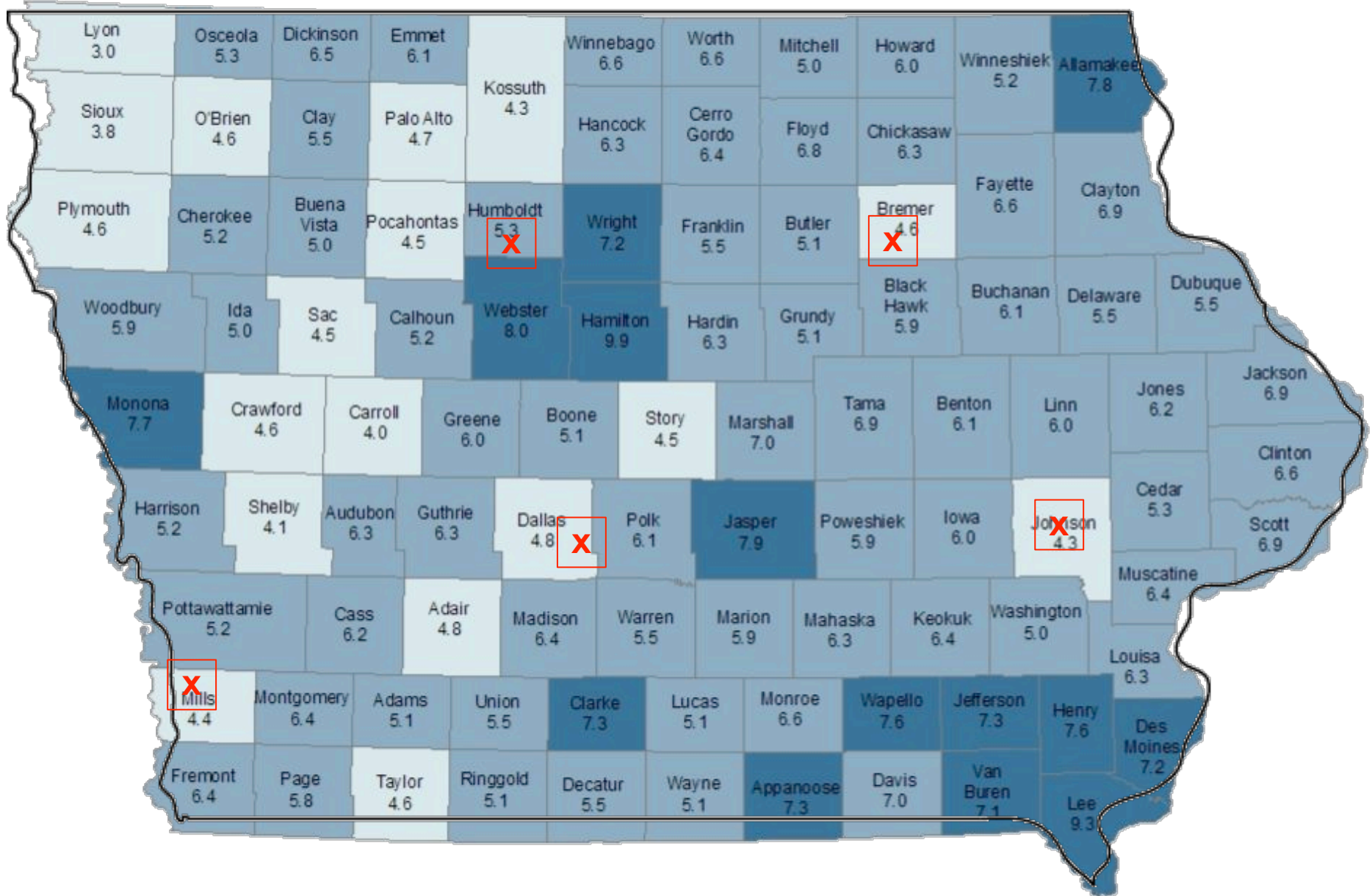


political boundaries



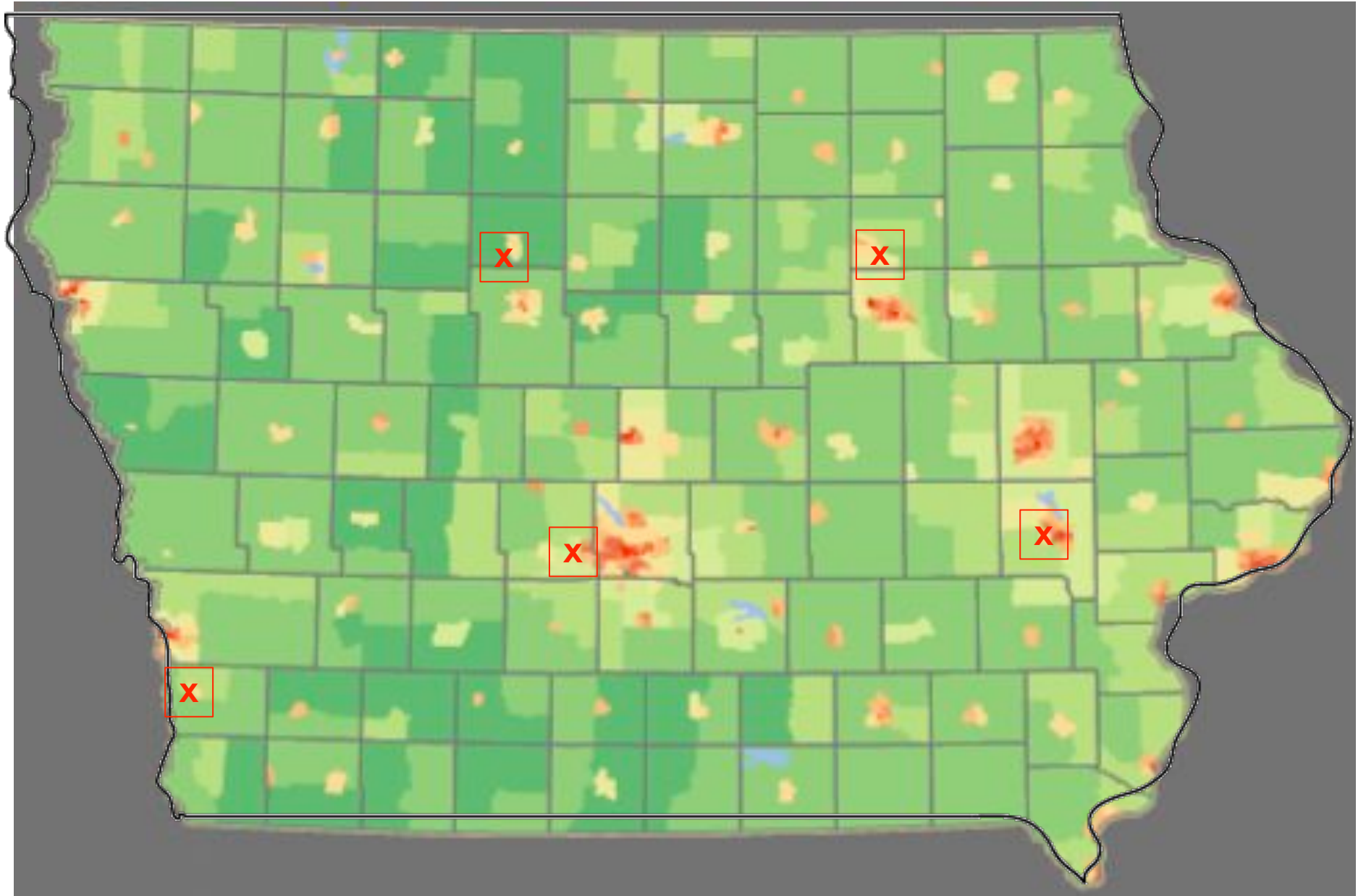


unemployment rates

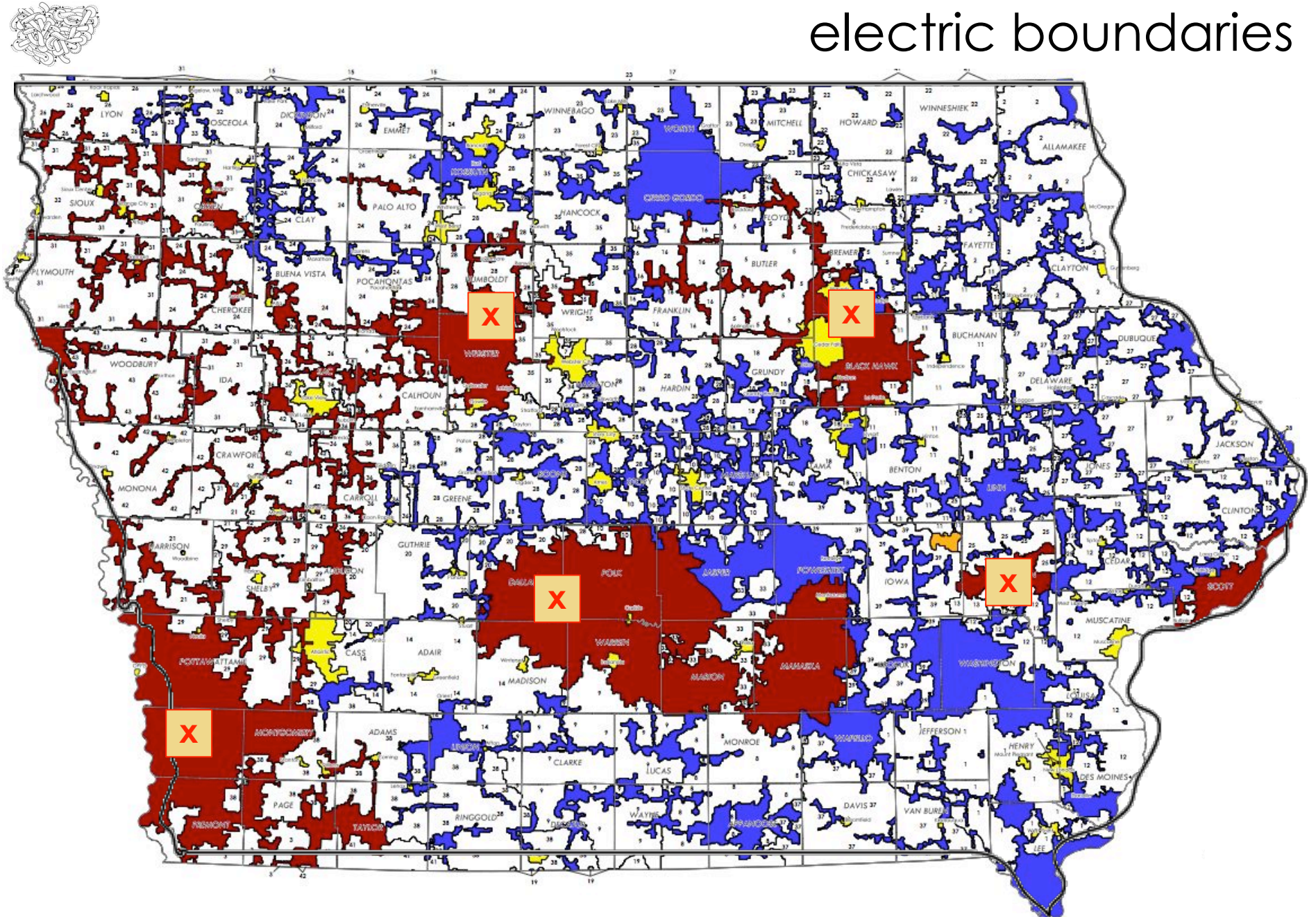


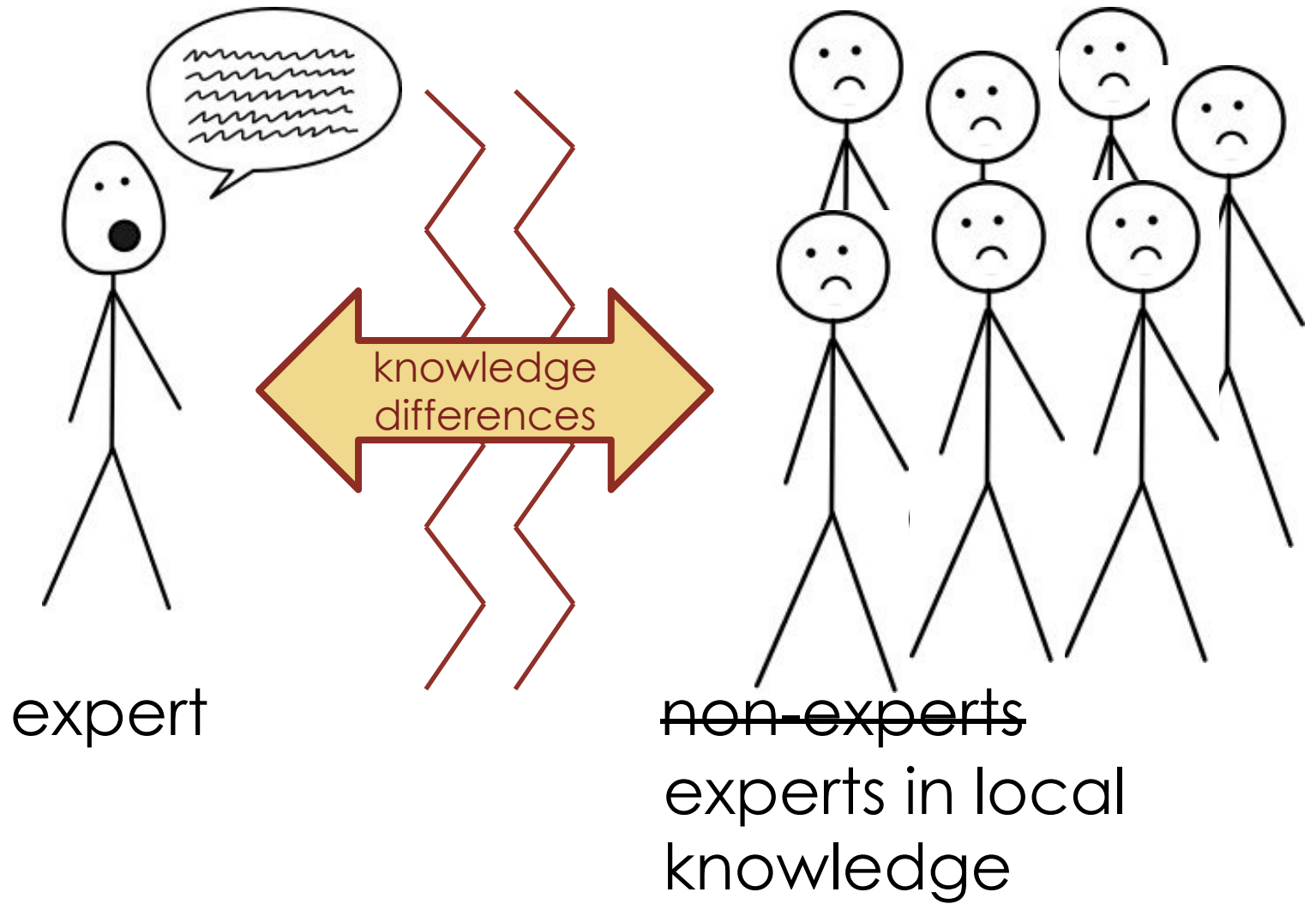


population density



electric boundaries







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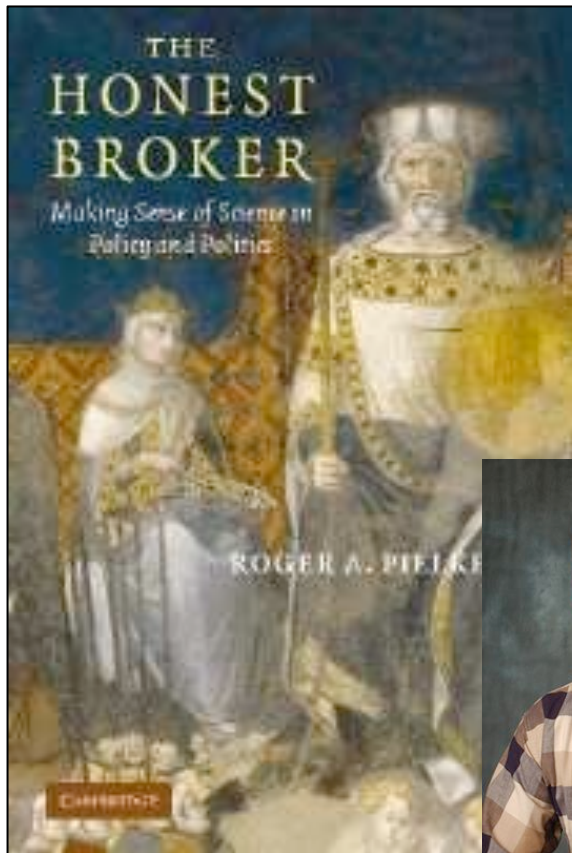
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roles an expert
can play
on a
controversial
issue



Roger Pielke, Jr



1. Question-answerer

- wait for questions
- answer fully & accurately

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2. Advocate

- present best option
- argue for it strongly

3. "Honest Broker"

- increase range of options
- clarify choices and consequences



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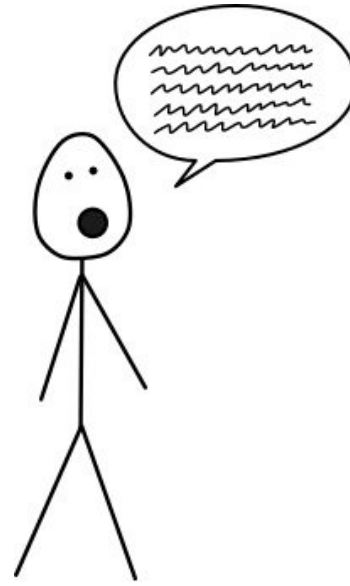
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OWI

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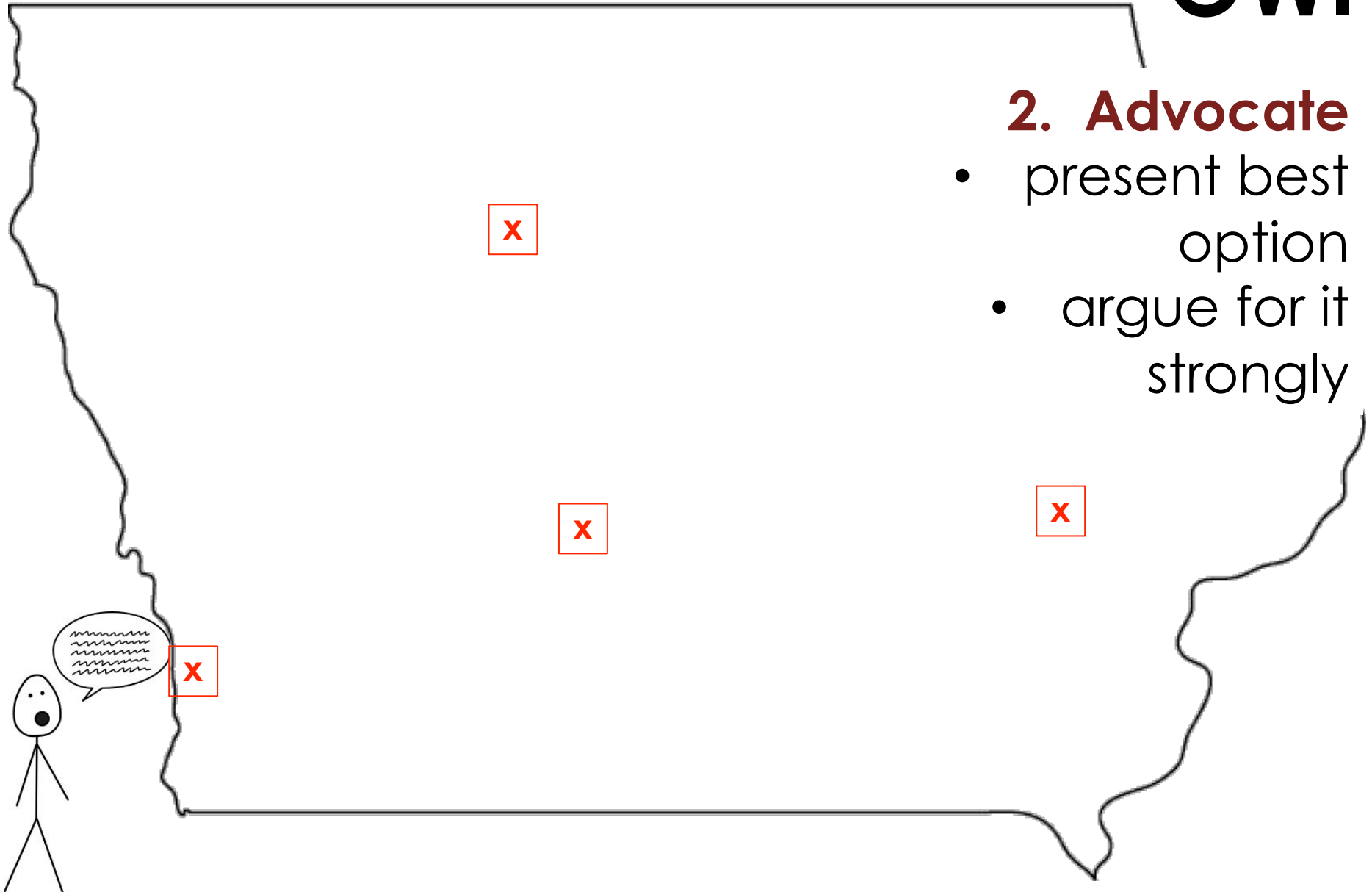




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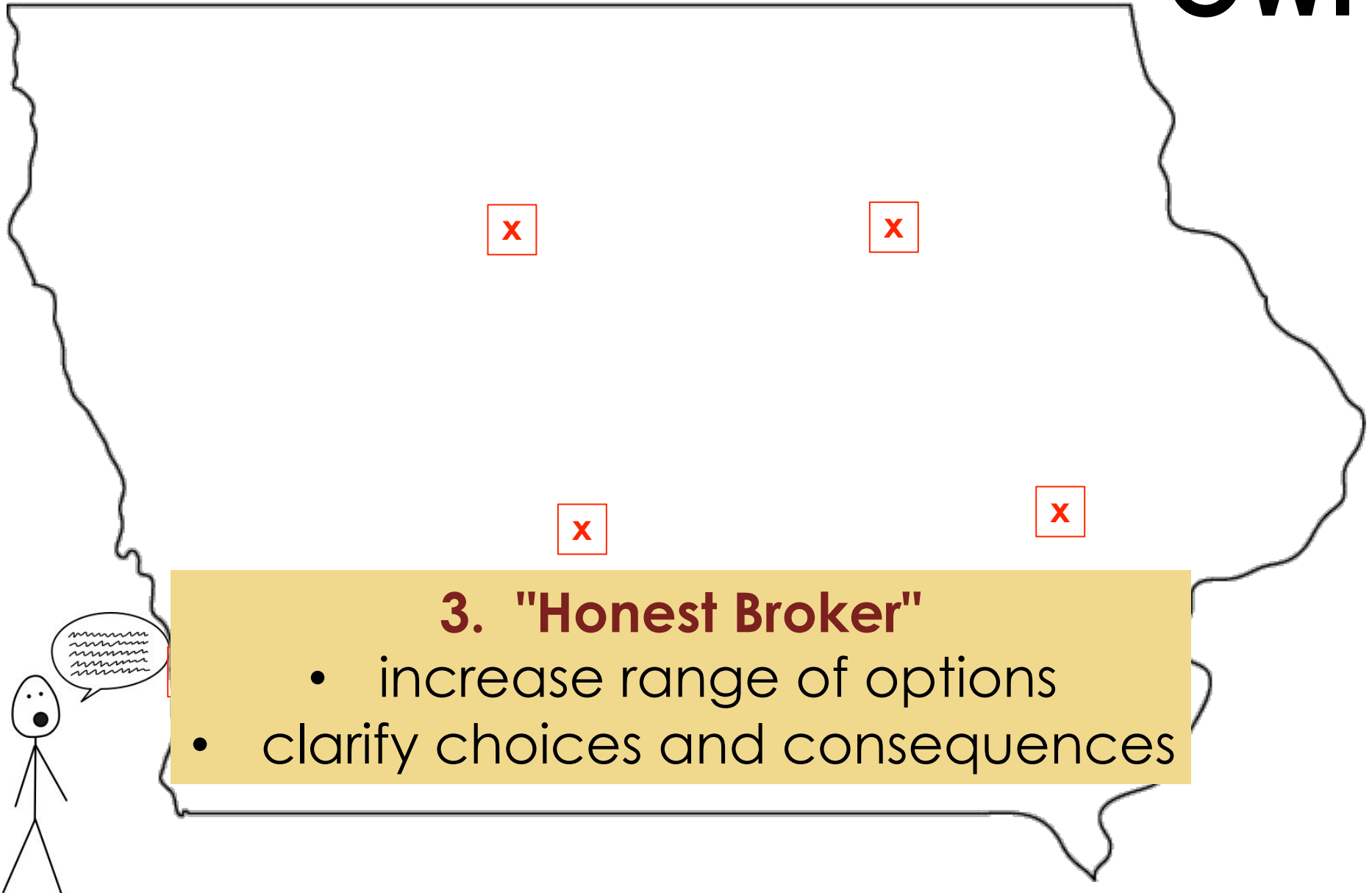
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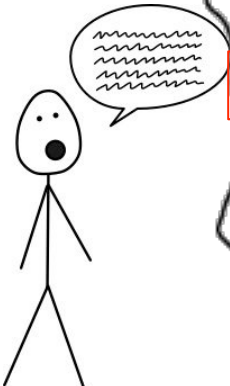


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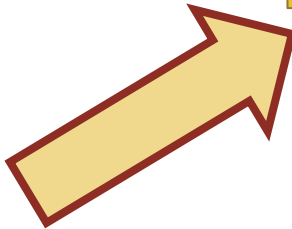




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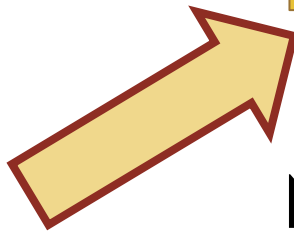




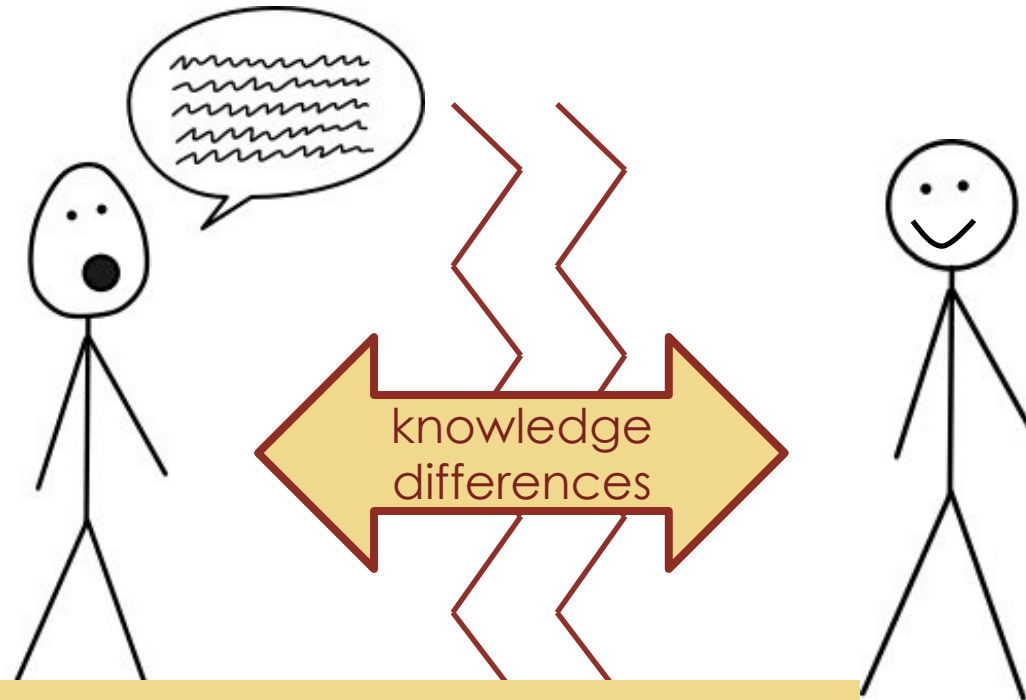
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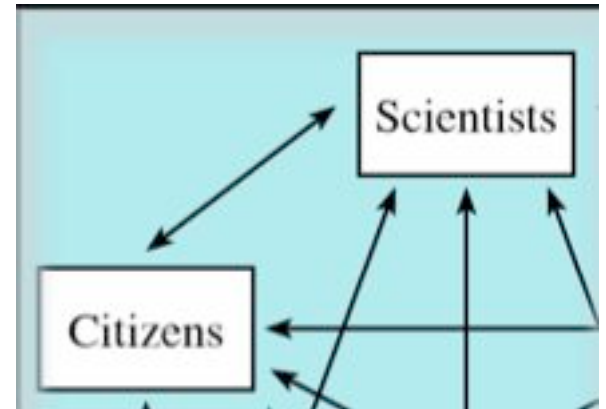


Notice: you may not only have to change your words— you may have to change your science.



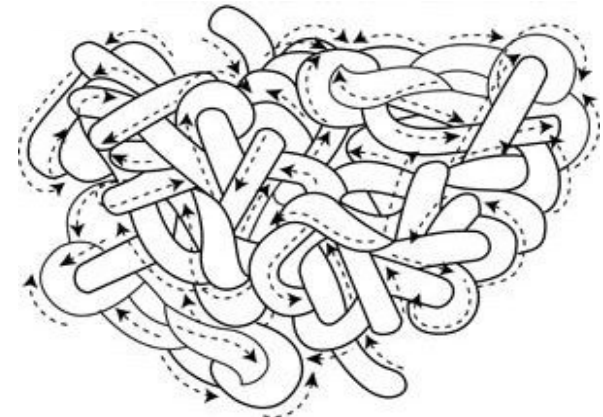
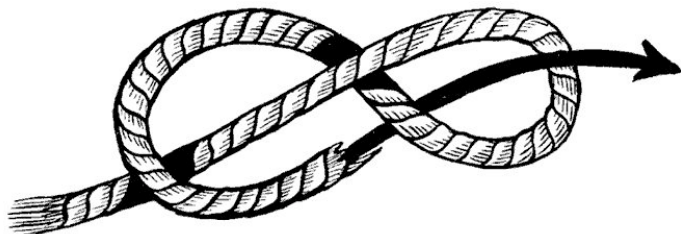
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Thanks!



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