Second Division 3 Open Meeting

Gormally et al. scientific literacy skills (small groups revised these)

Jeane Pope’s group (rephrased and reorganized the skills)

1. Understand methods of inquiry that lead to scientific knowledge
2. Identify a valid scientific argument (e.g., recognizing when scientific evidence supports a hypothesis)
3. Conduct an effective search for scientifically valid information (e.g., evaluate the validity of sources (e.g., websites, peer reviewed journals) and distinguish between types of sources)
4. Evaluate the use and misuse of scientific and statistical information (e.g., distinguish the appropriate use of science and math to make societal or personal decisions)
5. Understand how scientists design experiments to collect data and test hypotheses, and how methods influence conclusions
6. Distinguish between causation and correlation
7. Organize, analyze, and interpret quantitative data and scientific information
8. Effectively create and interpret visual displays of quantitative information
9. Solve problems using quantitative skills
10. Understand and interpret basic statistics
11. Justify inferences, predictions, and conclusions based on quantitative data

Brian Wright’s group (commented on the skills)

I) Understand methods of inquiry that lead to scientific knowledge

1) Identify a valid scientific argument (e.g., recognizing when scientific evidence supports a hypothesis)

**Our group highlighted the importance in the student recognizing the process in which a question becomes a hypothesis and then relating that hypothesis to conclusions, etc.**

**Somewhat simplifying this process so a non-science student can determine relationships between an argument/question and a hypotheses, and then conclusion.**

2) Conduct an effective literature search (e.g., evaluate the validity of sources (e.g., websites, peer reviewed journals) and distinguish between types of sources)

3) Evaluate the use and misuse of scientific information (e.g., recognize a valid scientific course of action, distinguish the appropriate use of science to make societal decisions)

4) Understand elements of research design and how they impact scientific findings/conclusions (e.g., identify strengths and weaknesses in research related to bias, sample size, randomization, experimental control)

II) Organize, analyze, and interpret quantitative data and scientific information

5&6) Decide on the appropriateness of a graph and be able to read and interpret graphical representations of data.

**Our group essentially agreed upon #’s 5 & 6 being written as one. We also felt that there is a certain level or ability of creating graphs that might be expected in order to fully understand how to interpret graphical representations.**

**An example would be if a student was presented with a data set and four separate ways the data was graphed, could they select the most “true” representation of that data in graphical form.**

7) Solve problems using quantitative skills, including probability and statistics (e.g., calculate means, probabilities, percentages, frequencies)

8) Understand and interpret basic statistics (e.g., interpret error bars, understand the need for statistics)

**We had some discussion in regards to creating one statement from #’s 7 and 8.**

**Also we thought that even though it might be difficult to cover as much “statistics” as we would like, it is important for the non-science major to grasp the significance of “statistics” in science.**

9) Justify inferences, predictions, and conclusions based on quantitative data

Bridget Gourley’s group (some of their comments are already in the meeting notes)

Distinguishing the types of questions that can or cannot be answered by science. Creating testable hypotheses.

This group liked the overarching goals (i.e., Understand methods of inquiry that lead to scientific knowledge; Organize, analyze, and interpret quantitative data and scientific information). But also recognizing that sometimes we use *qualitative* data as well.

How do the various disciplines use terms such as *model, theory, and hypothesis*?

Does lab matter? Understand how good is the data from the experience of getting your own data.

**How could this be addressed/implemented in DePauw’s SM curriculum?** Any attempt to come up with a long list of skills just gets too long. Various models of accomplishing this: at least two courses in the natural science

or one really general one and then one more specific one as another option.

**Catalog 2008**

Group 1: Natural Sciences and Mathematics: two courses, one of which must be a laboratory science course. These courses shall consider ways in which humans attain knowledge of the natural world.

**vs. current catalog:**

**Science and Mathematics:** Two course credits in the behavioral, computational, mathematical, and natural sciences. These courses explore the physical, mechanical, and quantitative working of numbers, matter, and life. Through observation, experimentation, and scientific and mathematical reasoning, they seek to comprehend the world and model its operations.