Lesson Plan for Using Google Trends to Demystify Climate Change Data

Teaching goals: • Help students read and analyze time-series graphs • Explain and identify the differences in patterns and scales in data • Link these concepts to climate change science	Homework / papers to be collected: • Introductory homework assignment that asks them to play with Google Trends on their own.
Learning objectives: At the end of the lesson student will be able to: • Describe time-series graphs • Interpret several types of patterns and scales • Explain climate graphs • Recognize that the current warming is unexpected given the previous pattern	Other considerations: • Although this lesson starts a bit silly, it builds such that it be placed in a unit about global environmental and/or climate change • See article in The Science Teacher for details on the standards this activity addresses
Equipment / supplies needed: • Lesson Plan • Pens/Pencils • Computer and projector, if available • Lesson Worksheet (6 page worksheet which includes 6 graphs and 16 questions) • There is also a PowerPoint of the figures to use in your classroom.	Homework to be assigned: • Finish the worksheet if not finished in class.

Time allotted:	Lesson activities for the instructor and the students:
5 minutes	Log onto Google Trends and play with it for a couple minutes with the class so the students can get the idea of how it works. You might consider assigning a homework assignment to familiarize them with the site. Explain the differences between the results with annual patterns (ex. Saw) and the ones without patterns (ex. Twilight) to introduce terminology. Terminology: Phase/anti-phase (ex. pool and swimming vs superbowl and memorial day) Various types of cycles (ex. annual/diurnal/monthly/etc) Trend- Here used to refer to a long-term increasing or decreasing slope (low-frequency signal) Pattern- here used to refer to approximately repeated sequences in the data
5-10 minutes	Break students into groups of 2-4 students to work on the worksheet together. Once everyone has gotten to the stopping point, debrief the beginning of the worksheet. Ask the students what they guessed and give them the correct answers. *Teacher's Key : A= groundhog, B= full moon, C= swimming (blue) and skiing (red), D= Romeo (blue) and Juliet (red).* Discuss what guesses your students had. Were they right or close to right? What was the rationale for their choices? Make sure they understood that A and B were annual and near monthly. Also note that graph C is in anti-phase and the lines in graph D are in phase. Examples of time series data include: temperature, EKG (heart monitor), streamflow, brainwaves, bird song, etc.
15-20 minutes	Let students finish the worksheet.
Remaining Time	Debrief and if time, discuss the global change questions at the end.