8T Weekly Assignment #6: Streams Name: ___________________________

1. **3-2-1:** Think about today's activity on stream processes and write down the following based on the outcomes of your group and the presentations by other groups.

3 things that I learned about streams	**2** questions that I have about streams	**1** new idea or connection that I made

2. The Next Generation Science Standards emphasize the use of 8 science and engineering practices listed at the beginning of the write up for this streams activity on p.81. Choose two of these practices and reflect on how it was used in this activity.

Science Practice	When it was used in this Activity	How it enhanced the science experience

3. In preparation for next week's NGSS activity, please read the article *California's Next Nightmare* (on the pink handout provided) – as you read, fill out the attached reading slip.

NGSS Science Practices

A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. (NRC, 2012)

1. Asking Questions and Defining Problems

Science begins with a question about a phenomenon, such as “Why is the sky blue?” or “What causes cancer?,” and seeks to develop theories that can provide explanatory answers to such questions. A basic practice of the scientist is formulating empirically answerable questions about phenomena, establishing what is already known, and determining what questions have yet to be satisfactorily answered.

2. Developing and Using Models

Science often involves the construction and use of a wide variety of models and simulations to help develop explanations about natural phenomena. Models make it possible to go beyond observables and imagine a world not yet seen. Models enable predictions of the form “if … then … therefore” to be made in order to test hypothetical explanations.

3. Planning and Carrying Out Investigations

Scientific investigation may be conducted in the field or the laboratory. A major practice of scientists is planning and carrying out a systematic investigation, which requires the identification of what is to be recorded and, if applicable, what are to be treated as dependent and independent variables (control of variables). Observations and data collected from such work are used to test existing theories and explanations or to revise and develop new ones.

4. Analyzing and Interpreting Data

Scientific investigations produce data that must be analyzed in order to derive meaning. Because data usually do not speak for themselves, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Sources of error are identified and the degree of certainty calculated. Modern technology makes the collection of large data sets much easier, thus providing many secondary sources for analysis.

5. Using Mathematics and Computational Thinking

In science, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks, such as constructing simulations, statistically analyzing data, and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable predictions of the behavior of physical systems, along with the testing of such predictions. Moreover, statistical techniques are invaluable for assessing the significance of patterns or correlations.

6. Constructing Explanations

The goal of science is the construction of theories that can provide explanatory accounts of features of the world. A theory becomes accepted when it has been shown to be superior to other explanations in the breadth of phenomena it accounts for and in its explanatory coherence and parsimony. Scientific explanations are explicit applications of theory to a specific situation or phenomenon, perhaps with the intermediary of a theory-based model for the system under study. The goal for students is to construct logically coherent explanations of phenomena that incorporate their current understanding of science, or a model that represents it, and are consistent with the available evidence.

7. Engaging in Argument from Evidence

In science, reasoning and argument are essential for identifying the strengths and weaknesses of a line of reasoning and for finding the best explanation for a natural phenomenon. Scientists must defend their explanations, formulate evidence based on a solid foundation of data, examine their own understanding in light of the evidence and comments offered by others, and collaborate with peers in searching for the best explanation for the phenomenon being investigated.

8. Obtaining, Evaluating, and Communicating Information

Science cannot advance if scientists are unable to communicate their findings clearly and persuasively or to learn about the findings of others. A major practice of science is thus the communication of ideas and the results of inquiry—orally, in writing, with the use of tables, diagrams, graphs, and equations, and by engaging in extended discussions with scientific peers. Science requires the ability to derive meaning from scientific texts (such as papers, the Internet, symposia, and lectures), to evaluate the scientific validity of the information thus acquired, and to integrate that information.

California's Next Nightmare

New York Times – July 1, 2011

Sacramento Flooding (paragraph 3)

Two location factors related to the flood-prone nature of Sacramento	

Two events that could cause a *megaflood*	

Consequences of a megaflood for Sacto	Consequences beyond Sacramento

Chance of a Megaflood (paragraph 5)

Is a Sacto megaflood possible?	What evidence is given?

The New York Times

July 1, 2011

California’s Next Nightmare

By ALEX PRUD’HOMME

People tend to underestimate the power of floods: six inches of fast-moving water can knock you down;
¶ 1 two feet of water can float most cars away. Floods kill an average of 127 Americans a year — more than tornadoes or hurricanes — and cause more than $2 billion of property damage annually, according to the National Oceanic and Atmospheric Association.

This spring, the nation was riveted by images of blown levees and submerged towns in the Midwest along the Mississippi River. But an even more threatening situation looms in California, especially around the San Francisco Bay Delta. The delta is the link between two-thirds of the state’s fresh-water supply — which originates in the Sierra Nevada and the rivers of the north — and two-thirds of the state’s
¶ 2 population, which resides in the south. Starting in the 1870s, farmers began building 1,100 miles of levees around the delta to control floodwaters and create farmland out of tule marshes. Today many of those levees are old, decrepit and leaking. Jeffrey Mount, a geologist at the University of California, Davis, predicts that there is a 64 percent chance of a catastrophic levee failure in the delta in the next 50 years.

Scientists consider Sacramento — which sits at the confluence of the Sacramento and American Rivers and near the delta — the most flood-prone city in the nation. Experts warn that there are two events that could destroy the levees and set off a megaflood. One is an earthquake; the second is a violent Pacific superstorm, like the one called the Pineapple Express, which sweeps water off the ocean around Hawaii and dumps it on the mainland with firehose intensity while
¶ 3 battering the coast with high wind and waves. A megaflood would not arrive as gradual seepage; it would be a rapid submerging of hundreds of square miles. Salt water would be sucked from the bay (in what is known as the big gulp) and impelled into the delta, contaminating drinking supplies for 25 million people, destroying some of the nation’s most productive farmland, washing away buildings, highways, gas lines and railroads and causing landslides. A flood in the delta could sink downtown Sacramento under as much as 20 feet of water, as well as cripple California (the eighth-largest economy in the world), hobble the nation and disrupt global trade.

Robert Bea, professor of engineering at the University of California, Berkeley, warns: “In terms of damage, deaths and long-term cost, a rupture in the delta levees would be far more destructive than what happened in Hurricane Katrina. This is a ticking bomb.”

¶ 4

Sacramento has flooded many times, most infamously in 1862, when a 45-day rain turned the Sacramento and San Joaquin Valleys into vast inland seas. Gov. Leland Stanford attended his inauguration by rowboat, and the state capital was temporarily moved to San Francisco. It was the largest deluge in state history, though geologic records indicate that six other powerful
¶ 5 storms swamped the region before then. The chance of a megaflood inundating Sacramento again is not only plausible, predicts the U.S. Geological Survey, but “perhaps inevitable.”

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Article available at: <http://www.nytimes.com/2011/07/03/magazine/sacramento-levees-pose-risk-to-california-and-the-country.html?_r=0>