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The following lessons were created by **Jennifer Jaeger**, a teacher participating in a National Endowment for the Humanities Summer Institute for Teachers entitled Touch the Past: Archaeology of the Upper Mississippi River Region.

Changing Uses of Santa Cruz's Land

Adapted from Project WILD: Color Me a Watershed

Grade Level: 5th

Subjects: Science and History

Objectives:

1. Students will interpret maps to observe the changing relationship between humans and the San Lorenzo watershed.
2. Students will understand that population growth and settlement causes changes in land use.
3. Students will observe how land use can affect the amount of run-off.

Standards: Science 5.3.4, 5.3.5, History 5.1.3, 5.3.1

Duration: 1 class period

Materials:

1. Aerial photographs of the San Lorenzo River
2. Copies of maps A, B, and C
3. Colored pencils
4. Runoff Percentages

Background:

This lesson is designed to give students an opportunity to synthesize a variety of concepts that have been presented in a unit on water and watersheds and apply these concepts to a real world context. Through the course of this unit, students have developed a strong background in river dynamics (and associated vocabulary), along with understanding of sources of pollution within a watershed, and they will utilize this information to learn about the effects of changing land use in their watershed.

Setting the Stage:

Students will begin by comparing and contrasting aerial photographs from Santa Cruz in the 1940s and the 2010. After taking a minute to look at the pictures, students will partner up and create a T chart of similarities and differences between the two photographs.

Procedure:

1. Students will be divided into three groups. One group will receive map A (Santa Cruz 1700), one group will receive map B (Santa Cruz 1860) and the final group will receive map C (Santa Cruz 2010).
2. The class will designate a different color for each land area and each student will color their map using the same color scheme.
3. When students have finished coloring, they will briefly meet in their map groups to discuss the uses for the land in their map.
4. Students will then be assigned to work in groups of three with each map type represented. In these small groups students will compare how land use has changed over time by answering these questions:
    a. What changes do you notice between Map A and Map C?
    b. Which map has the highest percentage of residential land? Why do you think this is the case?
    c. What are some causes for changes in land use?
    d. What do you think some of the effects of these changes in land use could be?
5. The teacher will then show students the document "Runoff Percentage" and lead a discussion about the implications of run off based on different types of land use.

Closure:

Students will write a paragraph summarizing the changing land use in Santa Cruz and the effect on runoff in the watershed.

Evaluation:

Students will be evaluated based on their participation in both small and large group discussions, as well as their final summary.

Links/Extension:

Students could take a walking tour to the nearby bluff overlooking the San Lorenzo floodplain. From this vantage point it is be possible to discuss and observe changes in land use over time (as well as observe the changing route of the river due to human influence).
This lesson may also serve as a catalyst for an action project, such as building a rain garden.

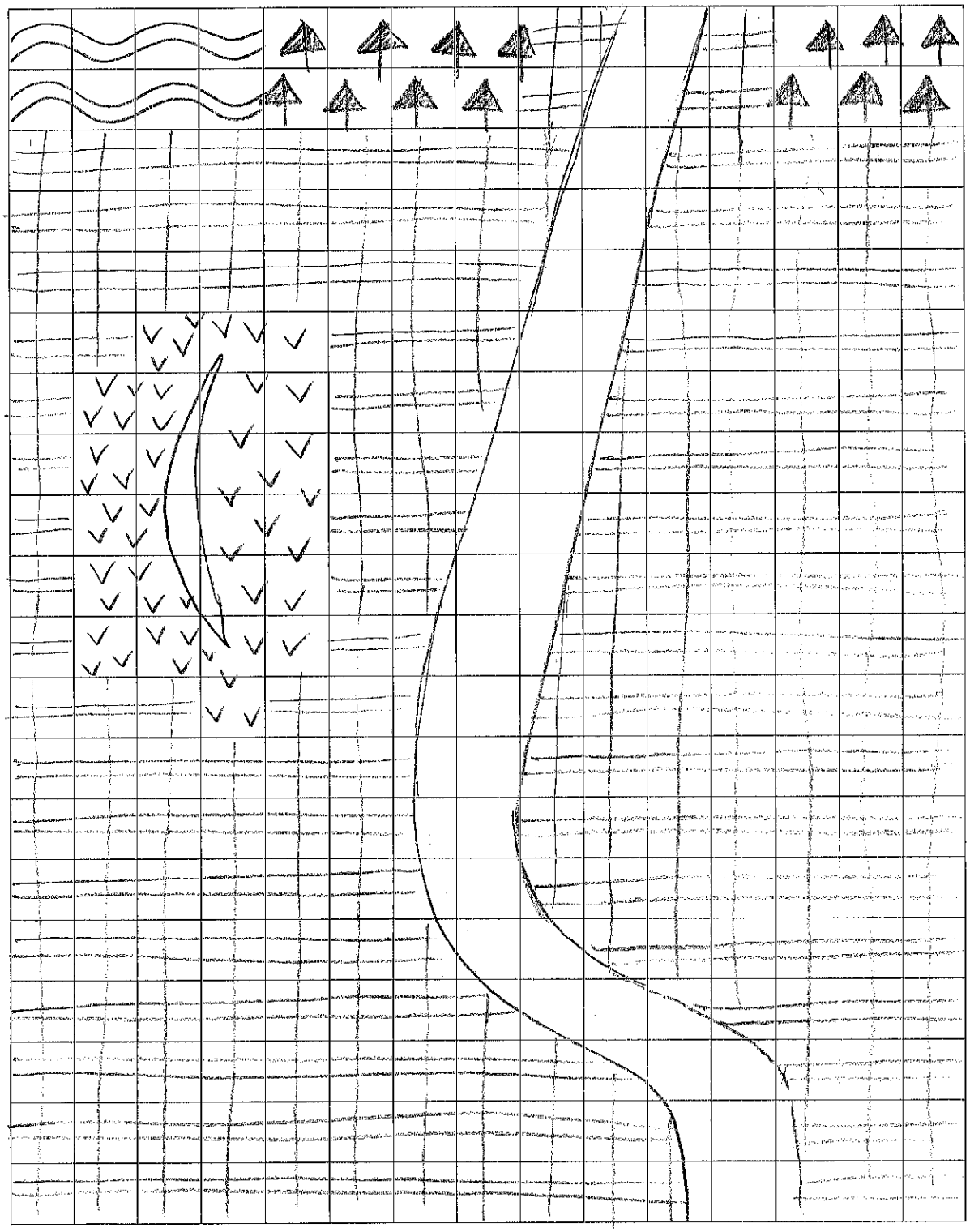
References:

Preliminary Report San Lorenzo River Watershed Planning Process, 1976, pp. 49-56.
Project WILD: Color Me A Watershed
The History of Floods on the San Lorenzo River in the City of Santa Cruz
by Daniel McMahon

Runoff Percentages

Forest **20% runoff**
Grassland **10% runoff**
Wetland **5% runoff**
Residential **90% runoff**
Agriculture **30% runoff**

Santa Cruz 2010



wetlands

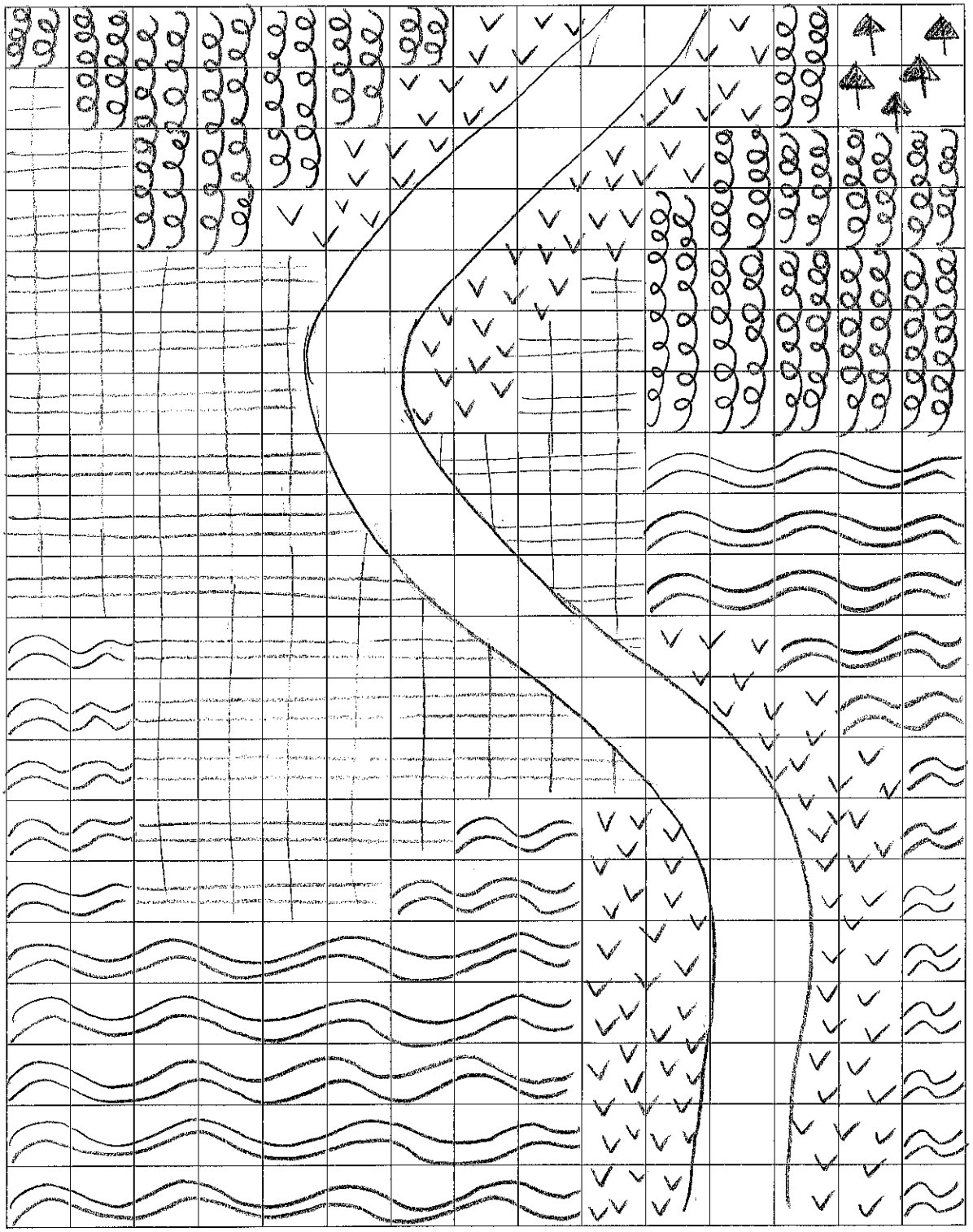
grassland

forest

residental

agriculture

Santa Cruz 1860



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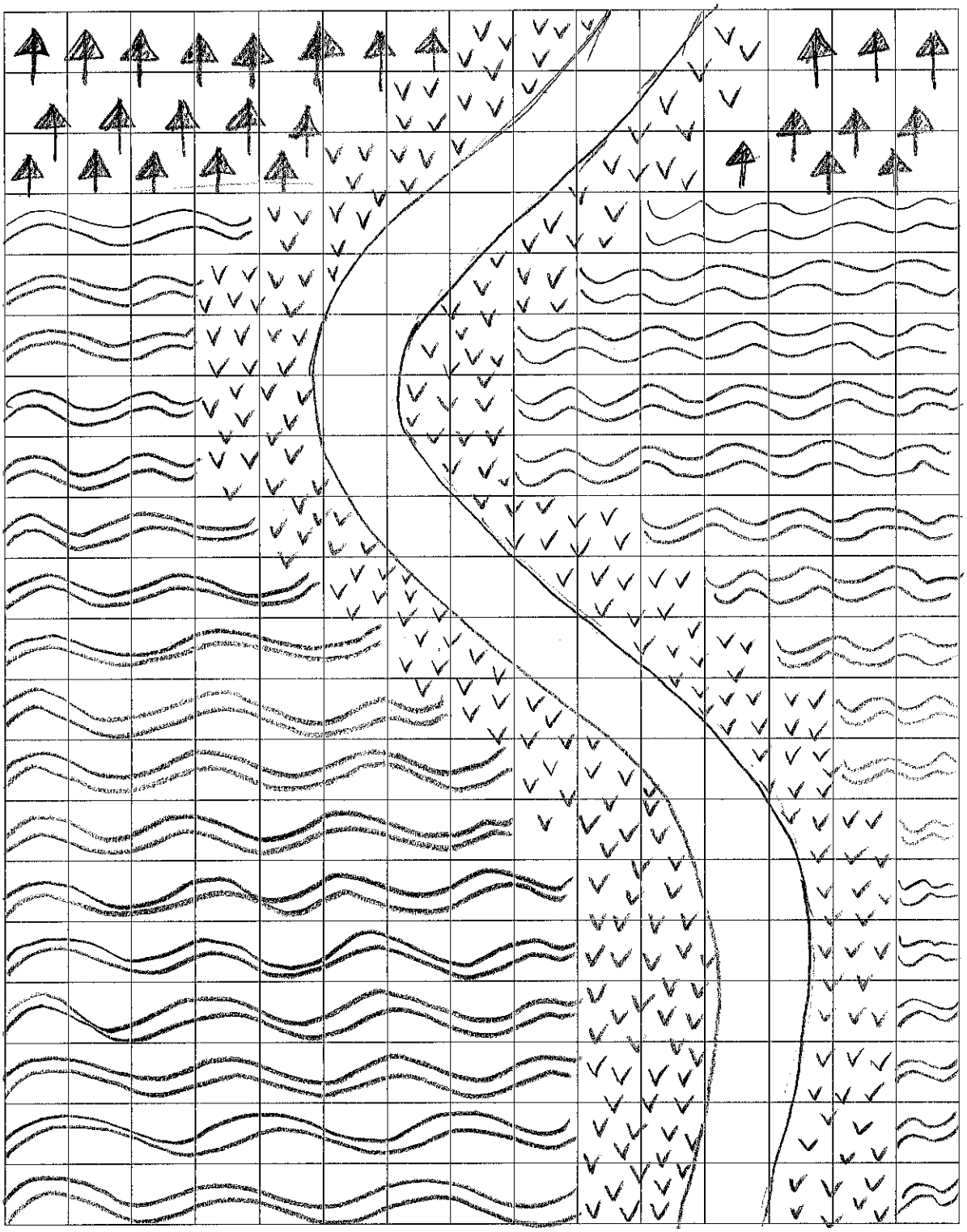
Santa Cruz 1700



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