



# 2<sup>nd</sup> Grade: Water Use in Pioneer Days

## Suggested Time of Year

The main theme of this lesson is water conservation, but it also ties into immigration and Ellis Island. Students graph information and use a Venn diagram to compare and contrast water consumers of today with a fictional woman who lived about 100 years ago.

## Basic Concept

This lesson introduces water conservation. Students study Mrs. Tuttle, a fictional historical figure, who lived in Monterey in 1896 and compare their water use to hers. They learn that there is the same amount of water on Earth today as there was in the past and will be in the future.

## Contents

- Lesson Plan
- Preparation Checklist
- Student Graphing Worksheet
- Water Use List (for graph)

## Lesson Plan

### Organizational Considerations

#### Classroom Time: 50 minutes

- 3 minute introduction
- 20 minute instruction and “trunk” activity
- 25 minute graphing/Venn diagram activity
- 5 conservation message and close

#### Pre-class Set-up

See the Preparation Checklist (at the end of the Lesson Plan) at least a week in advance. Set up the overhead projector with the transparency, and position the easel near the group reading area. Mrs. Tuttle enters in “character” wearing a pioneer style costume.

#### Classroom Organization

Whole class presentation, then working individually on graphs, followed by whole class close.

#### Required Student Skills

Students need to be able to follow simple instructions, be familiar with simple graphing, and know how to use a Venn diagram (all appropriate activities for the age and curriculum).

### Major Objectives

#### Learning Statement

Students will learn how some of the water practices of the past may have conserved water better than some of today’s practices. They will learn what they can do in their every day activities to conserve water.

#### Behavioral Statement

The lesson objectives will be met if the students can perform the graphing activity, participate in producing a Venn diagram, and state that they are using more water today per activity than Mrs. Tuttle.

#### Child Development Statement

Children in second grade are usually 7 or 8 years old, which means they can be in Piaget’s Pre-operational stage or Concrete Operations stage. However by the second grade we can assume most children in the San Ramon Valley are capable of graphing with numbers up to 30. Logic and logical operations are not as important because the activity asks students to compare water use rather than make moral judgments about water use. Many of the students will be able to go further in terms of point of view.

### Vocabulary

**Dowsing Rod:** a “Y” shaped branch made from a weeping willow tree (which always grow near water because they need a lot of it) and used by “dowsers” to locate underground water.

**Conservation:** the act of protecting something from loss or waste

**Immigration:** the act of coming to a new country in order to live there

### Delivery of Instruction

#### 1. Warm-up

**“Good morning students. My name is Mrs. Tuttle and I live on Main Street in Monterey, California, in the year 1896. Those were the good ‘ol days.**

**“How many of you young un’s have been to Monterey? Oh, quite a lot of you! I see children of this century are quite the travelers. The Monterey of my century and the Monterey you visit today are quite different. But wait, I’m getting ahead of myself.**

**“Originally my family came from Ireland. In the 1850’s Ireland’s only crop was the potato. A plant disease turned all the potatoes black so nobody had anything to eat and many Irish people starved to death. The Irish started immigrating to the United States in search of food, jobs, and a better way of life.”** Define immigration if necessary.

**“Actually, my family went through Ellis Island in about 1880. We settled in Chicago and there I met my future husband, Mr. Tuttle. He was a country boy and wanted to start his own farm, so we moved out west to Monterey, California, and that is how I ended up in Monterey in 1896.”**

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✓ *When asking students to raise their hands say, “I’m looking for students who can raise their hand quietly and wait to speak until I call on you.”*

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#### 3. Teacher-directed instruction

SHOW LOG TO STUDENTS.

**“Of course, Mr. Tuttle came to Monterey long before I did because he had to get us all set up. The first thing we needed, of course, was the cabin. So he built us a quaint little cabin, and this log is from that very cabin.**

**“To build a log cabin, a person would cut down many of the trees on their land to make a space. Then they would lay down one log and smear adobe on it like frosting a cake. Adobe is dirt with clay, sand, and straw in it. Adobe helped to keep the logs together and made it so the cabin was less drafty and cold. The cabin got nice and cozy when we had a fire in it.**

**“Let’s see, what else do we have here? OH, lookit this!”**

SHOW PICTURE OF OUTHOUSE.

**“Does anyone here even know what this is a picture of?”** (Call on a few.)

**“This is called an outhouse. I was a bit shy about writing to Mr. Tuttle and asking him if he had built a proper outhouse for me. But finally I did and he just wrote back and said, ‘Of course I built you an outhouse.’**

**“Does anyone here know what an outhouse is for?”** (Take some guesses.)

**“An outhouse is a hole dug into the ground and then a little house is built around it. It’s away from the log cabin, thus the name ‘outhouse.’ In it there is a little bench with a round hole cut into it. You could sit there and do your business. You have something in your bathrooms someone told me about last week. It’s called a...”** (act a little confused; if they can’t get it say, ‘I think it starts with a T...’) **“Yes that’s it, a toilet! Now a toilet uses water. It’s called a...a...flush? Well we don’t have those in the outhouse. We just went in the hole.”** (It is very important to say this last part because you will refer to it when making the water usage chart).

**“Now, let’s see what else we have in here.”**

BRING OUT THE SEARS AND ROEBUCK CATALOG.

**“In those days we didn’t have any malls or stores to go to. There was one place we shopped, and that was the Sears and Robuck catalog.”** (Open catalog, show different pages and point out the many diverse items.) **“We would order the items and get them through the mail. If we were lucky items would arrive in about 4 months, but it usually took about 6 months.**

**“Every year we would get a new Sears and Roebuck Catalog. Do you know what we did with the old catalogs?”** (Take some guesses). **“We put the old catalog right into the outhouse and we would use it for...oh you have a name for it these days.”** (Act like you can’t remember. If they don’t say ‘Toilet paper,’ say, ‘I think it begins with a T’. Call on kids; they will know it is called toilet paper.)

**“That’s right, it’s called toilet paper. Whenever we went to the outhouse, we would just tear off one sheet in the catalog.”** (The kids will be making lots of faces.) **“Of course it was probably not as soft as that toilet paper you use today but it worked okay.”**

BRING OUT THE DOWSING ROD.

**“It’s Mr. Tuttle’s dowsing rod. Any of you know what this is used for?”** (Call on about three students.) **“A dowsing rod is made from a weeping willow tree branch. Weeping willows need lots of water so they always grow near a stream or a lake. You hold it like this...”**

(hold the two curved ends with the straight branch out in front of you) **“and walk all over the land you are trying to find water on.”**

**“You just held it out, and when it found water it would point to the spot on the ground where the water was. Right on that spot is where you would build your well. But you had to have the gift—which of course Mr. Tuttle did. Mr. Tuttle helped most of our neighbors find the water on their property so they could build their wells.”**

TAKE OUT THE WOODEN BUCKET.

**“Now I need a volunteer for a brief moment. Here, take this pail and go over to the faucet and pretend to fill it up. That bucket holds one gallon. That’s how we measure water, in gallons. Now run back here with the water. This is what we called running water.**

**“Now, last time I visited a class a very nice young man showed me one of these.”**

TAKE OUT THE PLASTIC JUG

**“It’s made out of this stuff you all use today. Oh what’s the name? It starts with a P.”**  
(Someone will say plastic.) **“That’s it! Plastic! This plastic jug also holds a gallon of water. So that is something we both do the same—measure water in gallons.”**  
(This is important because the graph uses plastic jugs.)

BRING OUT THE WASHBOARD.

**“Of course we needed to use the bucket in order to bring water to the house. in pioneer days, the day the women folk most disliked was washing day. It took us a whole day to do the wash and we didn’t have that many clothes. Now today I wore my good skirt because I was coming to meet all of you. I have one other dress, three aprons and two blouses.**

**“We did the wash one day a week. And although none of us women folk liked wash day, it was something we had to do.”** Demonstrate how the washboard was used.

**“Talking about washing--water was so precious to us, it was a matter of life or death. We were very careful with it, maybe even a bit more than you all are today. As a matter of fact, you all can help me find out something. Let’s write down some ways that we use water.”**

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✓ *Use an easel whiteboard or large paper pad on an easel so you can move it if necessary for the children to see it during the graphing activity. Put the list of water use amounts in your pocket.*

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Draw a chart like the one below which eventually will include several common daily activities. Discuss average daily water use, contrasting usage in Mrs. Tuttle’s time and in the present.

Average Water Use Per Day		
	Mrs. Tuttle	Present Day
Brushing Teeth		

**“We were quite good about brushing our teeth. We usually brushed them about twice a week and we kept our teeth until we were about forty. Then we usually got false teeth made out of wood. My teeth are wood. Do you still have your teeth?” (YES!)**

**“We used toothbrushes made of fish bones with little holes drilled through them. Then we pulled animal hair, usually a badger, through the holes. How often do you brush your teeth?” (They will shout out answers. Act surprised.) “No wonder your teeth are so white!”**

**“Well, when I brushed my teeth I just used a little cup, wet my toothbrush, brushed ‘em real good, then rinsed my mouth out with a little water. So, I didn’t use much water. But to make the math easier I’m just gonna write ‘1 gallon’ under ‘Mrs. Tuttle’ on the graph. Now, I went to your water company and they keep all kinds of records on how much water people use. So who wants to guess how much the average person uses when they brush their teeth today?”**

Say, “Higher!” or “Lower!” until the children guess 12. Then write “12 gallons per day.”

Average Water Use Per Day		
	Mrs. Tuttle	Present Day
Brushing Teeth	1 gallon/day	12 gallons/day

NEXT TALK ABOUT BATHING.

**“When it was time to take a bath, Mr. Tuttle would take down the tin bath tub from the wall and put it in the middle of the living room. We would haul 9 gallons of water from the river and pour it into the tin tub. Then we would get 9 more gallons, make a fire, boil the water and then mix it with the water in the tub until we got nice warm water. I was the first one to take a bath, and then the children would each take a turn. We had 8 children! Mr. Tuttle would bathe last because he was the dirtiest. He worked out in the fields 7 days a week.”**

Get input from the students as you fill in the graph, one line at a time. This keeps the children’s attention.

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✓ *As you add categories to the chart, be sure to follow the order on the list in the apron pocket. This matches the order on the student's worksheet. Use a different color for each column, and use the same two colors consistently in the graphing activity that comes next.*

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**“Now let's see who was paying attention. How many gallons of water does Mrs. Tuttle use when flushing the toilet?”** The answers will vary greatly from class to class. Eventually someone will remember that Mrs. Tuttle doesn't use a toilet, so the answer is zero. **“I see you were really paying attention.”**

Finish the chart but do not fill in the totals.

**Average Water Use Per Day**

	<b>Mrs. Tuttle</b>	<b>Present Day</b>
Brushing Teeth	1 gallon/day	12 gallons/day
Bath/Shower	18 gallons/day	30 gallons/day
Flushing Toilet	0 gallons	2 gallons/day (3gal. x 4 times/day)
Washing dishes	2 gallons	12 gallons/load

### **Average Daily Total**

**“Now we are going to do an activity. When I say so, please go to your seats and get out two crayons or colored pencils. Do not use markers. Pick colors that are easy to tell apart like red and blue or orange and green. I will give you a piece of paper. Do not write on the paper until I tell you to.”**

Pass out the graph paper. Go to the front of the room and turn on the overhead projector to show the graph transparency.

#### **4. Modeling/Guided Practice**

Ask the students to hold up their graph paper in one hand and their two crayons in the other. When all hands are up, you are ready to model the first graph line.

**“Write your name anywhere on the top of the paper. Your teacher is going to collect these and grade them so make sure you do your best work. Okay, we will now begin.** With one of your colors, fill in the jug next to where it says Mrs. Tuttle.” Do this as you explain it, and then step back so all students can see. Glance around to see if all students are on task.

**“Now take the other color and where it says ‘Present Day,’ fill in that jug. Okay, who can tell me how much water Mrs. Tuttle uses to brush her teeth?”** Call on kids who have raised a hand. One will say 1 gallon. **“That's right, you just look at the chart we made together and then fill in the graph. So in this case, we fill in the top line of jugs with the color we use for Mrs. Tuttle.”** Do this as you say it.

**“Now, how many gallons of water do people in the present day use to brush their teeth?”**

(12) Color in the jugs one at a time. This is important because you are modeling for the students.

Walk around the room making sure that students are using the correct colors and the correct line of jugs. **“Are there any questions about what we are doing or how to do it? If you need help just raise your hand.”**

**“Okay, now I want you to finish the graph on your own.”**

As the students work, go to the trunk and put everything away while keeping an eye on students who raise their hand for help. If some students finish early, you can tell them to figure out how many total gallons Mrs. Tuttle uses as opposed to today. They can add the numbers or simply count the jugs on the graph. Many students will not finish, but you have to move on

**“By looking at what you have done on the graph so far, can you guess who, on average, uses less water.”** (Mrs. Tuttle) Add the totals to the chart on the board.

**Average Water Use Per Day**

	<b>Mrs. Tuttle</b>	<b>Present Day</b>
Brushing Teeth	1 gallon/day	12 gallons/day
Bath/Shower	18 gallons/day	30 gallons/day
Flushing Toilet	0 gallons	12 gallons/day (3gal. x 4 times/day)
Washing dishes	2 gallons	12 gallons/load

**Average Daily Total**    21 gallons/day    66 gallons/day

**“Oh, by the way, I’m going to ask you a question. Who thinks there is more water on Earth today than there was in 1896? Raise your hand if you think the answer is ‘more.’”**

Write on the board “MORE” with an arrow in front of it and “LESS” with an arrow behind it. Count the number of children who raise their hands and write the number next to “MORE.”

#     **MORE**    **LESS**        #

**“Who thinks there is less water on the Earth today than there was in 1896?”**

Count the number of children who raise their hands and write the number next to “LESS.”

**“Actually it’s exactly the same. There is the same amount of water on the Earth today as long ago. This is important, so remember it.”**

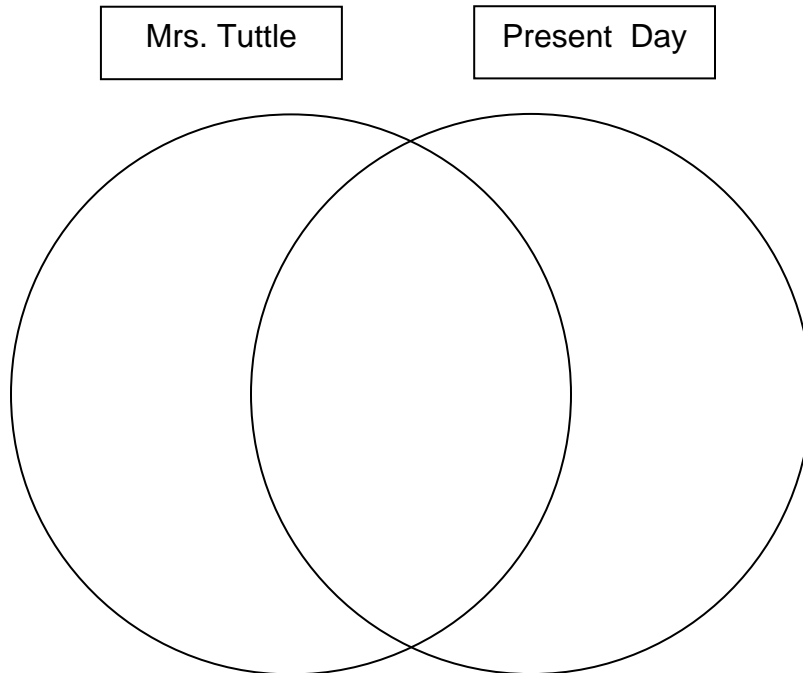
### 5. Practice

The students continue the graphing activity, with the goal of trying to figure out total water usage for Mrs. Tuttle and the present day.



### 6. Assessment and Closure

The Venn diagram is the assessment vehicle. After most of the students are finished, or if only 5 minutes are left, introduce the Venn diagram. Draw the figure below on the board.



Explain that the intersection of the circles we want to list things that Mrs. Tuttle and present day people have in common with respect to water use. Ask students for suggestions. (They need water to survive, brush teeth, go to bathroom, bathe, etc.) Write them on the board. Then, in each outer section write how that activity is performed, stressing differences in how water is used today from the past. (Ex. Center: Go to the bathroom. Mrs. Tuttle: No water. Present Day: 12 gallons a day.) Do a few of these, as time permits.

**“Here is a Big Question! Should we be using more water today if the amount of water on earth is the same as 100 years ago?”**

Write on the board, in big letters: **C O N S E R V A T I O N**

Say the word, “con-ser-va-tion,” and define it.

**“So who is better at conserving water?”** (Mrs. Tuttle.) **“On the back of your graph paper I want you to write down one or two ways you, as a second grader, can change the way you do something so you can save water.”**

**ADDITIONAL WATER USAGE DATA FOR VENN DIAGRAM DISCUSSION**

**BATH/SHOWER** Mrs. Tuttle: 1 per week = 18 gallons/week (bath only)  
 Today: 1 per day = bath or shower: 30 gallons = 210 gallons/week

**FLUSH TOILET** Mrs. Tuttle: 0 (use outhouse)  
 Today:  
     Regular= 6 gal/flush  
     Low flow=3 gal/flush  
     Ultra-low flow= 1 gal/flush  
     Average 3/day @ 3gal/flush (7days/week) = 56 gallons/week

**BRUSH TEETH** Mrs. Tuttle: 1 per week = 0.1 gal  
 Today:  
     2 per Day = ½ gal per day (turn water on/off)  
     2 per Day= 12 gal (leave water running)  
     Weekly average = ½ gal/day (7 days per week) = 3½ gallons

**WASH CLOTHES** Mrs. Tuttle: 1 per week= 18 gallons  
 Today: 1 per day = 60 gallons/load  
 Weekly average = 60 gal/day (7 days per week) = 420 gallons

**WASH DISHES =** Mrs. Tuttle: 1 per day / 2gal / load = 14 gallons  
 Today: Dishwasher 9-12 gallons/load 1 load/day = 70gal/week  
 Weekly average = 70 gallons

**WATER LAWN =** Mrs. Tuttle: 0 gallons  
 Today: 10 gal/minute

**WATER GARDEN =** Mrs. Tuttle: 0 gallons (use recycled laundry rinse water)  
 Today: 10 gallons/minute

**WASH CAR =** Mrs. Tuttle: 0 gallons  
 Today: 30 gallons (bucket/wet/rinse) or 100 gallons (hose running)

**TOTAL FOR WEEK:**

**Mrs. Tuttle = 50.1 gallons**

**Today = 759.5gal (minimum)**

## PREPARATION CHECKLIST

### Important Note

Teachers: Contact the DSRSD Public Information office (925-875-2282) to borrow a costume for this lesson as well as the props listed in the first section, below. Consider asking a volunteer to play the part of Mrs. Tuttle.

### Pre-class Preparation

- Gather these items and place them in a trunk or basket:
  - Log
  - Picture of outhouse
  - Reproduction of vintage Sears & Roebuck catalog
  - Dowsing rod
  - Wooden bucket
  - Plastic jug
  - Washboard
  
- Print page 8 and cut out the table of actual water use numbers. Put it in the apron pocket of the costume, or another handy place where you can refer to it during the graphing activity.
  
- Print out Student Graphing Sheet on 11" x 14" paper, one per student, and one as an overhead transparency
  
- Obtain
  - White-board markers, two colors
  - Overhead markers, same two colors
  - 2 crayons or pencils per child (2 different colors)
  
- Set up overhead projector with transparency
  
- Set up easel-style white board or paper pad on easel