

Overview

Participants look at examples of how one fact can be presented in many different ways. They discuss which they find most powerful, and why.

When to Use It

When you have key facts or data that you want to communicate to officials or the general public, but the facts as they are don't make a powerful-sounding media message.

Suggested companion activities: See *Communicating With Numbers*.

Steps

1. **Launch the activity:** Effective campaigns have memorable messages. What is a number or statistic that really stuck with you, and why? (Prompt with an pre-prepared example or two, or a story in which using a memorable stat helped a campaign.)
2. **In groups of 4-6:** Here is a set of statements. In each set, the fact is in a gray box; the others are based on that fact. Which statements make the most effective messages? Why? Arrange the statements from most to least effective.
3. **Debrief:**
 - Which were most and least effective? Was there disagreement?
 - How would you improve any of these?
 - What makes a statistic into an effective message?

Take notes on that last question. Distribute *Strategies for Making Memorable Messages*. Is there overlap between the group's ideas and those ideas on the handout? Encourage people to add their own wisdom to the handout.

Worth Noting

If the group seems ready, you can immediately follow by having them practice making memorable messages using their own data. Distribute *Benchmark Numbers* to give the group some numbers to play with. If the group isn't yet comfortable with the math and science involved in their situation, try other SFA activities first.

Smart Moves

- Use friendly numbers
- Talk it out
- Compare it to what you already know
- Play with different ways to show it and say it

Skill: Restate facts and data in more vivid ways.

Time: 30-45 minutes

Preparation

Choose which message set(s) to use:

1. *How toxic is dioxin?*
2. *How many truck trips for the new incinerator?*
3. *How much over the limit?*
4. *How many kids have asthma?*
5. *How much energy does recycling save?*
6. *How many pesticides cause cancer?*
7. *How big was the oil spill?*

Copy card sets and cut up along dashed lines.

Come with an example or two of a number or statistic that made an impression on you.

Materials

Card sets (one per small group)

Strategies for Making Memorable Messages (one 2-sided handout per participant)

Optional: Flip chart and markers for debrief

Optional, if creating your own messages:

- *Benchmark Numbers* (one 2-sided handout per participant)
- Optional: Calculators to share

A year's worth of trucks, lined end to end, would fill Route 7 from the Sandy River to the county line.

Strategies for Making Memorable Messages

The numbers in pollution science can be so big or so small, they're hard to imagine. Numbers are more powerful when people can picture seeing and touching them. Throughout the process, think about the audience for your message and what they care about most.

1. Choose a Strategy

Use familiar units. Convert to units that your audience might hear or see in everyday life.

Cubic meters
kilometers
kilograms

Gallon milk jugs, sugar packets, teaspoons, football fields, 50-gallon drums

Make it local. Use distances, areas, volumes, and heights based on things familiar to your audience.

245 miles
12.3 million gallons

...would reach from Bob's gas station to Dora's Deli.
...would fill Memorial Stadium.

Make it personal. Divide the amount up among the people who will be impacted. Divide it up per person, household, or town.

1,300 tons of trash per day

150 pounds of trash per person, every day

Use time to scale up or down.

800,000 tons of toxic waste per year

One and a half tons per minute.
Fifty pounds per second.

Use the problem to your advantage. Include negative images from the problem that are likely to trouble your audience.

40 truckloads of coal per day

A year's worth of trucks, lined end to end, would fill Route 7 from the Sandy River to the county line.

Show the trade-offs with money.

Incinerator provides \$24,000 in tax revenue

...sounds like a lot, but it's only \$32 per resident. You can barely buy a cake for that!

More Strategies for Making Memorable Messages

2. Check for Common Pitfalls

Make sure it makes sense. Use an example that makes sense for your situation. So if you're talking about a part per million in water...

NO: One pancake in a stack a mile high

YES: One drop in an Olympic swimming pool

Compare to things with a standard size.

NO: Trees, city blocks, houses, lakes

YES: Football fields, gallons, pounds

Focus on understanding. A bigger number doesn't mean bigger impact.

NO: 136,800 minutes

YES: Over three months

Be careful with length, area, and volume. A ratio between lengths changes when you switch to area or volume

NO: 100 cm in a m so 100 cm³ in a m³

YES: 100 cm in a m, but 1,000,000 cm³ in a m³

3. Polish Your Message

Use friendly numbers. When possible, round off your final number.

NO: 197 tons, 2,480,000 people

YES: 200 tons, two and a half million people

Use familiar fractions, ratios and percents instead of decimals or numbers that are hard to picture.

NO: 12.4% of town residents

YES: About one in eight town residents

Benchmark Numbers

Comparing numbers to familiar, local, or impressive things helps make a message memorable. Below are some ideas to help you get started. See the rest of this activity for more of examples of how these might be used. Grab a calculator and keep notes, so you don't lose track of what your numbers represent.

Just one ounce of arsenic can contaminate enough water to fill an Olympic-sized swimming pool.



A few common units and conversions: This list is just a sample to get you thinking. Check the internet for more conversions.

Mile	5,280 feet = 1.61 km = 1610 m
Pound	16 ounces = 453.6 grams = 0.4536 kg
Acre	66 ft x 660 ft = 43,560 sq ft = 1/640 of a square mile = 0.40 Hectares
Hectare	100 m ²

Cubic foot	7.48 gallons
Cubic meter	1,000 Liters = 264 gallons = 35.3 cubic feet
1 gallon	= 3.8 L = 4 quarts = 8 pints = 16 cups = 128 fluid ounces = 256 tablespoons = 768 teaspoons = 75,708 drops

Everyday items: Here are a few things most people have seen, touched, picked up, or walked by. What are other things you see and touch that have a standard size?

Pea	0.28" - 0.43" diameter
Dime	Diameter 0.705", Thickness 0.053", Weight 2.268 g
One Sheet of Letter-size paper	Single sheet: 8.5" x 11" Thickness: 0.0038", 0.01 lbs (4.5 g).
One Ream (500 sheets) of paper	8.5" x 11". 1.9" thick. 5 lbs.
US paper money	2.61" x 6.14", 1 gram
Index card	4" x 6"
Deck of Cards	2.5" x 3.5" x 0.625", 3.3 ounces
iPhone	4.8 ounces
Average newborn	7.5 lbs
Can of Coca-Cola	12 fluid ounces
Red Clay Brick	3.625" x 7.625" x 2.25", about 5 lbs
Typical toilet flush	Older: 3-4 gals. After 1994: 1.6 gals.
Gallon milk jug	8 pounds

Cinder block	33 lbs.
Kitchen trash bag	13 gallons
Trash barrel	32 gallons
Typical bathtub	About 50 gallons
Utility/Phone pole	40 ft (35 ft are above ground)
VW Beetle	2,939 lbs (1.47 tons)
Ford F-150 Truck	4,685 lbs (2.34 tons)
School bus	8' wide, 10' high, 24'-40' long, 23,000-29,500 pounds fully loaded
Football field	No end zones: 300'x160', 1.1 acres. w/end zones: 360' x 160', 1.32 acres
Tanker truck tank	5,500 to 9,000 U.S. gallons
Olympic-size Swimming Pool	2,500 m ³ = 2,500,000 L = 660,430 gal
Acre-foot	325,851 gallons (volume of water covering an acre of land one foot deep)


More Benchmark Numbers

Impressive Numbers: Sometimes you just want to underscore the relative size something by comparing it to something really big. Or, break down a huge number by saying how much there would be per person, or per mile.

If they approve the permit, the landfill could be nearly half the height of the Empire State Building!

U.S. Population	308,745,538 (2010 Census)
Passenger vehicles in the U.S. (cars and small trucks)	254,212,610 (US Bureau of Transportation Statistics, 2009)
Pop. of New York City	8,244,910 (2011 US Census est.)
Number of post offices	26,927 (2011)
Madison Square Garden	19,763 seats
Empire State Building	1250 ft

Span of the Grand Canyon at its widest point	18 mi
New York to San Francisco	2,563 mi
Circumference of the earth	24,900 mi
From Earth to the Moon	220,000 mi
Rhode Island	1,214 sq. mi
Texas	268,581 sq mi




Close to Home: The best references are most familiar or known well by your target audience.

- Population of your town, county, or state
- Seats at a local stadium, or school auditorium
- Height of a well-known local building
- Distance between landmarks in your town
- Distance from your town to the nearest city
- Area of your town, county, or state
- Area of the high school gym floor

- Area of a stretch of street (length x width)
- Price of a coffee (or hamburger) at a local restaurant
- Annual town budget for [a particular service]
- Median home value or tax bill in your town
- Cost of a gallon of gas today
- Typical local garbage truck (weight, capacity)
- Profits or CEO salary of a polluting company

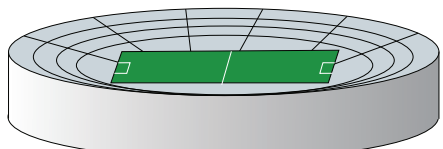
An extra challenge: Another dimension!

For most of these, you need to compare like to like: length to length, volume to volume, weight, etc. But if you're skilled you can combine dimensions: The area of a rectangle is its length times its width (using the same units). Give that area a height or a depth and you can calculate a volume. With that, you can say things like...



Each fracking well uses 9 million gallons of water per frack.

That's enough water to cover a football field more than 20 feet deep!



Set 1: How toxic is dioxin?

The legal limit for dioxin in drinking water is 0.00003 µg/L. That's the same as 1 gram of dioxin added to 8.8 billion gallons of water.

1 gram of dioxin is enough to poison the amount of water one American would use in 15,000 years.

1 gram of dioxin is enough to poison the water that 15,000 Americans – the population of [nearby town] – use in one year.

1 gram of dioxin is enough to make 33 billion liters of soda unsafe to drink.

1 gram of dioxin would poison over 13,000 Olympic-sized swimming pools' worth of water.

It's like one dime poisoning the entire U.S Federal Budget.

Set 2: How many truck trips for the new incinerator?

The new incinerator would take in 3600 tons of construction and demolition waste per day. A standard garbage truck holds about 25 tons.

The new incinerator would add 144 garbage truck trips per day.

The new incinerator would add over a thousand garbage truck trips per week.

The new incinerator would add over fifty thousand garbage truck trips per year.

During the daytime, garbage trucks would be going in or out of the new incinerator plant every two and a half minutes, on average.

The new incinerator would add a thousand garbage truck trips per week. Lined up end to end, those trucks would fill Route 7 from City Hall to the county line.

Set 3: How much over the limit?

The legal limit for TCE in drinking water is 5 $\mu\text{g}/\text{L}$.

Local tap water tests found TCE levels as high as 200 $\mu\text{g}/\text{L}$.

Testing found TCE as high as 4000% of the legal limit.

Testing found TCE as much as 40 times the legal limit.

Tests showed that some TCE levels were 195 $\mu\text{g}/\text{L}$ over the limit.

If the legal limit is like a measuring cup's worth of TCE, what the tests found was like two and a half gallons' worth!

There's enough TCE in David's tap water to make his family sick 40 times over.

Set 4: How many kids have asthma?

A new health study surveyed the parents of 335 children in one community. Of these children, 81 had been told by a health care worker that they had asthma.

81 out of 335 children in our community have asthma.

24.2% of children in our community have asthma.

One in four children in our community have asthma.

A quarter of the children in our community have asthma.

Think of four kids in our community: Your daughter, your neighbor's son, the paper boy, your niece. Now pick one of them. You just chose the next child to get asthma.

Set 5: How much energy does recycling save?

Making a plastic bottle from new materials uses 5200 BTUs of energy.

Making a plastic bottle from a recycled bottle only uses 1400 BTUs.

Recycling a plastic bottle saves 73% of the energy used to make a new plastic bottle.

Making a bottle from new plastic takes uses three times as much energy as using recycled plastic.

With the energy it takes to make one bottle from new plastic, you can make *three* bottles with recycled plastic.

The energy you save by recycling a plastic bottle could power a 60-W lightbulb for half a day.

The energy you save by recycling a plastic bottle could bring three gallons of water to a boil.

Set 6: How many pesticides cause cancer?

17 of 32 of LawnCo pesticide products contain possible carcinogens.

9 of 32 LawnCo pesticide products contain known or suspected reproductive toxins.

53% of LawnCo pesticides contain possible carcinogens, and 28% contain reproductive toxins.

More than half of LawnCo pesticides contain possible carcinogens, and more than a quarter of them contain reproductive toxins.

One in two LawnCo pesticides contain possible carcinogens, and one in four contain reproductive toxins.

Flip a coin...
Heads: your LawnCo pesticide causes cancer.
Tails: it doesn't.
Do you want to take that chance?

Set 7: How big was the oil spill?

The 2010 BP oil spill in released an estimated 172 million gallons of oil into the Gulf of Mexico. That's enough oil to...

...fill the Giant Ocean Tank at the New England Aquarium 866 times.

...fill over a million bathtubs, 22 inches deep.

...fill a billion 22-ounce soft drink cups – more than three for every person in America.

...run through 26.4 million eight-minute showers – three for every person in Massachusetts.

...fill 264 Olympic-sized swimming pools.