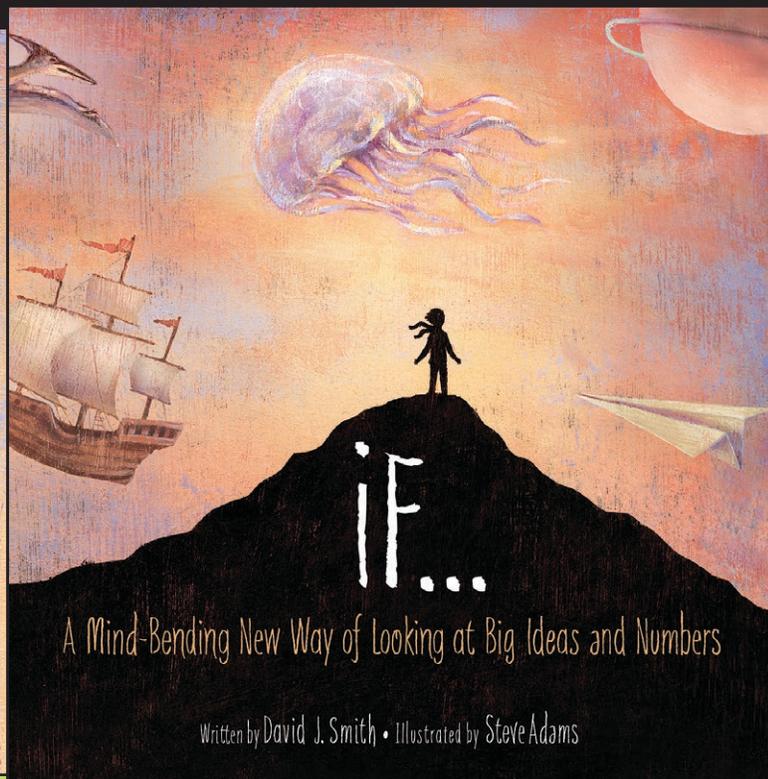# iF... related classroom activities for K–8 teachers

if...
A Mind-Bending New Way of Looking at Big Ideas and Numbers

Written by David J. Smith • Illustrated by Steve Adams

If: A Mind-Bending New Way of Looking at Big Ideas and Numbers

Written by David J. Smith
Illustrated by Steve Adams
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About the Author

David J. Smith is an author, teacher and educational consultant with over 25 years of experience in the classroom. He achieved national recognition for his unique method of teaching seventh graders to draw maps of the entire world from memory, now published as a highly successful curriculum, Mapping the World by Heart, and won the U.S. Department of Education's A+ for Breaking the Mold Award for his work.
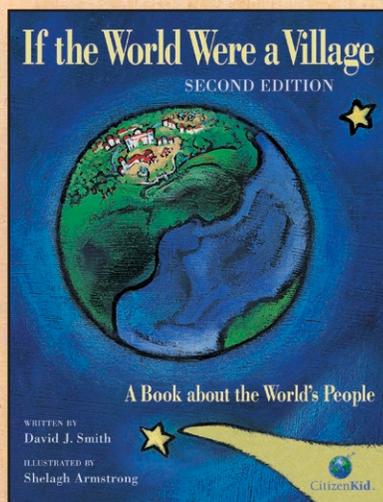
First published to wide acclaim in 2002, his eye-opening and bestselling book *If the World Were a Village* has since become a classic, promoting "world-mindedness" by imagining the world's population — all 7.1 billion of us — as a village of just 100 people. It has received numerous awards including the Notable Social Studies Trade Books for Young People, the International Reading Association's Children's Book Award and the Parents' Choice Award, among many others. *If the World Were a Village* has been updated with current statistics, several new activities and completely new material on food security, energy and health. By exploring the lives of the 100 villagers, children will discover that life in other nations is often very different from their own. **With his new book *If*, David J. Smith now focuses our attention to looking at big ideas and numbers in a mind-bending new way.**

If the World Were a Village
SECOND EDITION
A Book about the World's People

WRITTEN BY
David J. Smith

ILLUSTRATED BY
Shelagh Armstrong

CitizenKid.

Kids Can Press

Dear Teacher,

My interest in scale began when I was a boy, building model ships. As a teacher, I used a lot of activities related to models and scale to get children thinking about the sizes and relationships of big things. These exercises taught me just how powerful scales and modeling can be. From ideas like this came my books *If the World Were a Village, If America Were a Village* and *This Child, Every Child.* They scale down big ideas and issues into something more digestible, more meaningful.

Here are some activities to use with children to help them understand scale by playing with it and using their imaginations. Try them and, most importantly, have fun, think imaginatively, ask students to create scales and time lines, and rely on rounding. And don't worry — you can't do it wrong.

www.djsmapping.com

Classroom Activities

Start a Scale Collection

Children are surrounded by objects that have been scaled down, such as dolls, toy cars and dinosaurs. Gather some toys and help children figure out their scale. For example, a real *Tyrannosaurus rex* was about 12 m (40 ft.) long. Measure a scaled-down *T. rex* toy and figure out its scale. Let's say the toy dinosaur is 10 cm (4 in.) long. A life-size *T. rex* at 12 m is 1200 cm, so the scale of this model *T. rex* would be 10:1200, which would be expressed as 1:120. In inches, the scale would be 4:480, or 1:120.

Play with the Solar System

Make a scale model of the Solar System in your classroom, on the football field or from one end of the school to the other. Decide what you want to use to represent the Sun, and this website — https://www.exploratorium.edu/explore/solar-system/activity/build-model — will calculate the sizes of the planets and their distances from the Sun. For example, if your Sun is to be a golf ball, with a diameter of 42.6 mm (1.68 in.), then Neptune would be 1.3 mm (1/20 in.) in diameter, and it would be 138 m (452.7 ft.) away from the Sun. A small grapefruit with a diameter of 203 mm (8 in.) puts Mercury at 0.7 mm (1/36 in.) in diameter and 8.5 m (27.9 ft.) away, while Neptune would be 6.6 mm (1/4 in.) and over 656 m (2155 ft. or 2/5 mi.) away.

You can stretch your model Solar System across the classroom on a string, or pick locations around the school the correct distance from the "Sun." This works best when students work in groups of four or five, and each group comes up with their own solution.
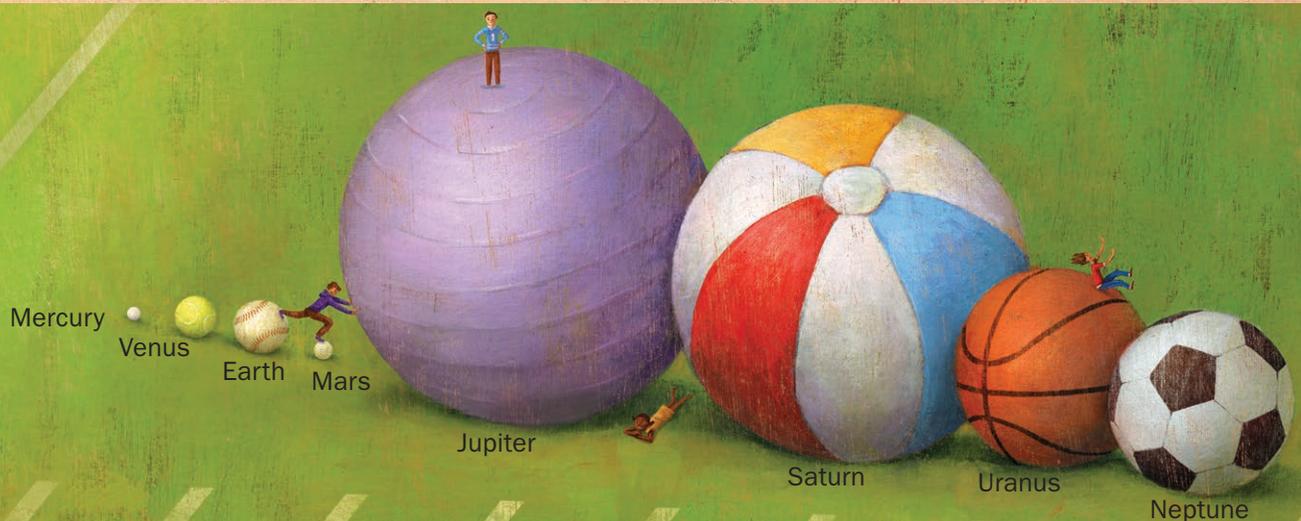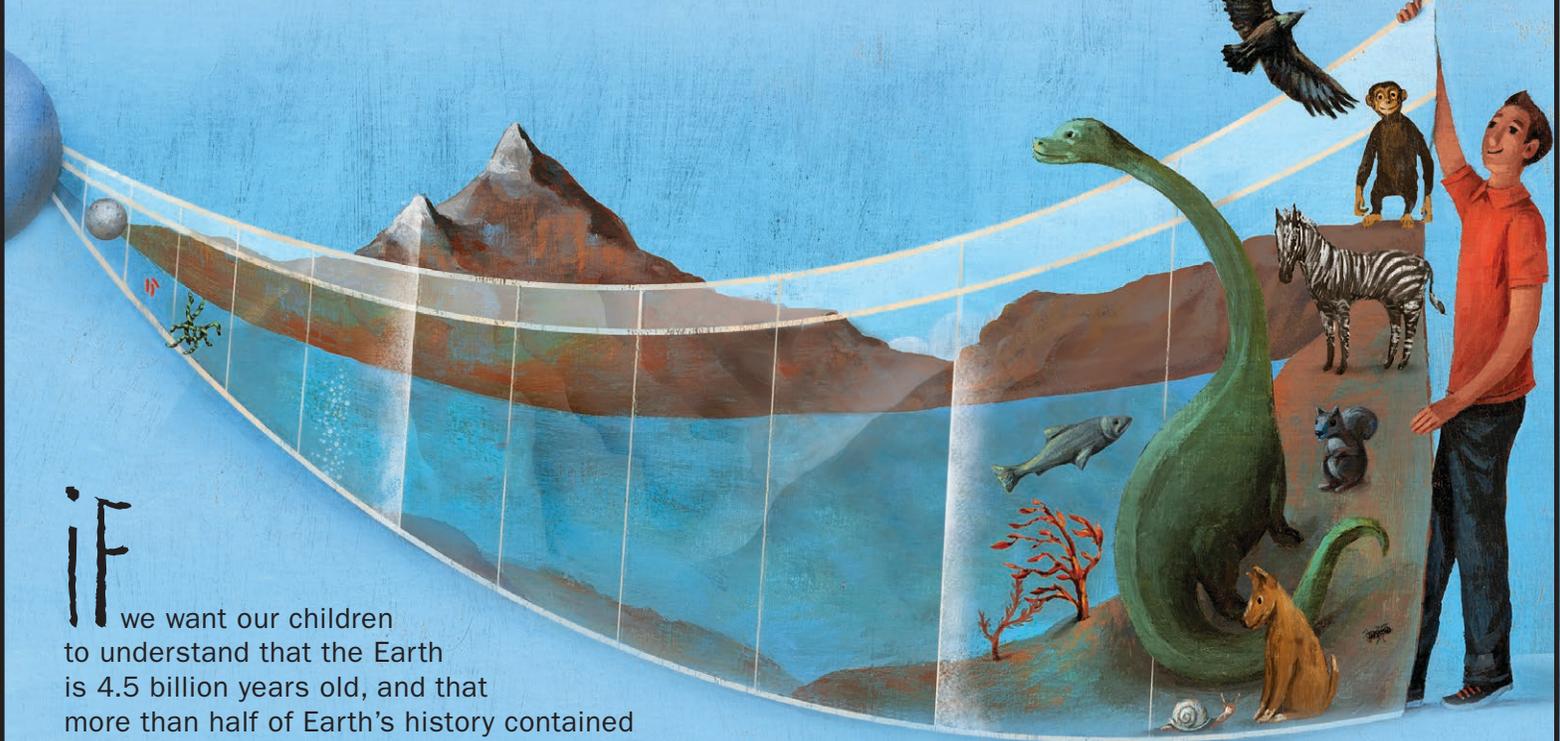
iF we want our children to understand that the Earth is 4.5 billion years old, and that more than half of Earth's history contained no living creatures except one-celled bacteria, then it helps to be sure that they understand just how big a billion is. If a football field — which in the United States is 100 yards (300 ft.) long — represents Earth's history, then the last million years is only about 8/10 in. near the goal line. Each foot along the field represents 15 million years. More than half the field represents the era that contained no life except one-celled organisms.

Use the time scales in the book to figure out where you would stand along the sidelines to represent the first living organisms, the dinosaurs, etc.

Do the same thing by turning a 12-month calendar into an Earth-history time line. Each day represents 12 328 767 years; each hour represents 513 698 years; each minute equals 8561 years; each second in the 12-month year represents 142 years. So where in the calendar year would you place the arrival of first organisms, fish, primates, fungi, dinosaurs and humans?

| Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Use of iron becomes widespread.	2	3 First Olympic Games are held (776 BCE).	4	5 Buddha is born (560 BCE). Confucius is born (551 BCE).	6
7 Alexander the Great builds a vast empire (336—323 BCE).	8 Great Wall of China is built (221 BCE).	9	10 Jesus Christ is born (5 BCE).	11 City of Pompeii is destroyed by Vesuvius eruption (79 CE).	12 Paper is invented in China (105 CE).	13
14	15 The Middle Ages begin.	16 Muhammad is born (570).	17	18 Medicine and the sciences flourish in Arab Spain (around 750).	19	20 Vikings are the first Europeans to reach North America (late 900s).
21 William the Conqueror invades England and becomes king (1066).	22	23 Genghis Khan becomes head of the Mongols (1206).	24 The Black Death ravages Europe (1347—1350).	25 Columbus reaches the Americas (1492).	26 African slaves are first shipped to the Americas (1510).	27 The dodo bird goes extinct (1690).
28 The French Revolution begins (1789) and ends (1799).	29 Alexander Graham Bell invents the telephone (1876).	30 The first computer is built (1939). The Internet is created (1969).	31 Evidence of water is discovered on Mars (2013).			

Think About Scaling Up Rather Than Down

For another activity, try scaling up small things. Many towns celebrate something important to them with a large-scale version. For example, Alma, Arkansas, has the world's largest spinach can, while Moose Jaw, Saskatchewan, has a huge moose, and Tampa, Florida, has a gigantic bowling pin. What would be a good symbol for your family or school? Decide on something and help children work out the scale they would like it to be. Then help them calculate the dimensions of the scaled-up symbol.

Or scale up a small picture or map. Divide the picture you want to scale up into sections by making a grid. Make a larger grid on a blank piece of paper at the enlarged size. Then copy each of the sections of the small picture onto the equivalent sections of the larger grid.

Additional Science Resources
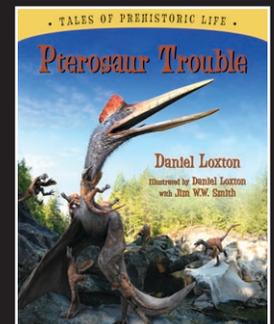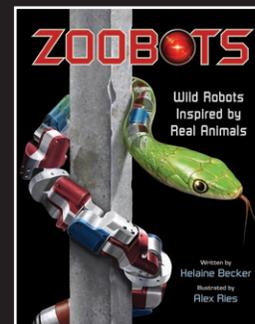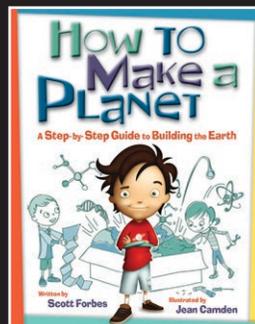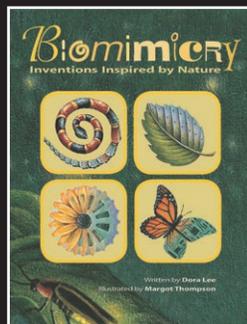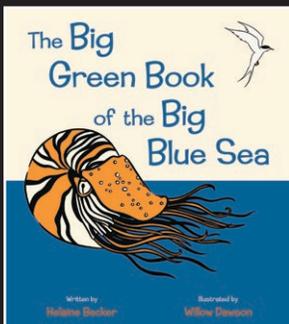
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