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Expect the Unexpected With
Math

SHAKE, RATTLE, & ROLL

Dear Families:

In school, your child has been taking part in **Shake, Rattle, & Roll**, a dynamic new math program.

Math skills are increasingly important for young people. According to the U.S. Department of Labor, computer and mathematical science occupations are projected to grow fastest among the professional groups by 2014.

Actuaries are statistical experts who provide advice to businesses, governments, and organizations to help answer questions about what to expect in planning for the future. Since 1988, *Jobs Rated Almanac* has consistently rated “actuary” as one of the top five jobs in the country.

The activities inside, developed by Scholastic with The Actuarial Foundation, can help build valuable skills for your child’s future. We hope you enjoy them!

Sincerely,

The Actuarial Foundation
Scholastic



DEVELOPED WITH



THE ACTUARIAL
FOUNDATION®

FAMILY ACTIVITY 1: Insuring for the Uncertain



Actuaries help insurance companies decide what to charge their customers. A *premium* is an annual rate the customer pays to buy insurance coverage. A *deductible* is the amount of money a family pays initially before the insurance company contributes its share: the higher the deductible, the lower the premium. *Risk* is the likelihood that you will need to repair or replace something damaged from an unexpected event.

Floods and flash floods happen in all 50 states. Some houses and buildings are repeatedly at risk because of their construction or location. Look at the table and answer the questions below. Use additional paper if needed.

	Dwelling	Location	Structure
Family 1	house in a valley	Cleveland, OH	wood
Family 2	apartment on a hill	San Francisco, CA	concrete
Family 3	house on the coast	Miami, FL	brick



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Work the Math:

- Which two families are at more risk for floods? _____ Do you think their premiums would be higher or lower than the third family's? _____
- The family next door to Family 1 has a brick house. Do you think Family 1 would pay a higher or lower premium than their next-door neighbor? _____
- Family 2 must get flood insurance and have to decide between a policy with a \$500 deductible and one with a \$1,000 deductible. Which should they choose and why? _____

Answers: 1. Families 1 and 3 have more risk for flooding. Their premiums would likely be higher. 2. Family 1 would likely pay a higher premium because a wooden structure is likely to be damaged more than a brick structure from water. 3. Answers will vary, but students should understand that paying a \$1,000 deductible would likely be a better choice unless the family is concerned about flooding and wants to pay a lower deductible and higher premium.

Talk About It

Are there any natural events that are common in your geographical area? How much does your family pay for insurance? What is your deductible?



FAMILY ACTIVITY 2:

Banking on Inflation



Hurricane Andrew affected Florida, Louisiana, and Mississippi in 1992. It is the second-most costly hurricane ever to hit the United States. In 1992, the estimated cost of the hurricane was \$15.5 million. Because of inflation, that amount was equal to approximately \$21.6 million in 2005. *Inflation* is a general increase in the price of goods and services. Property and casualty actuaries include an inflation adjustment when estimating costs related to possible natural events in the future.

Inflation affects more than the cost of insurance—it affects the prices of items you buy every day. Look at the table and then answer the questions below. Use additional paper if needed.

Item	1960	1970	1980	1990	2000	2005
Average new home price	\$16,500	\$26,600	\$76,400	\$149,800	\$207,000	\$297,000
Gallon gas	\$.31	\$.36	\$1.25	\$1.16	\$1.51	\$2.10
Dozen eggs	\$.57	\$.62	\$.91	\$1.00	\$.91	\$1.35
Gallon milk	\$.49	\$1.15	\$2.16	\$2.78	\$2.78	\$3.74

Work the Math:

1. How much more did a house cost in 2000 than in 1970? _____
What's the percentage increase? (Hint: difference/1970 price x 100) _____
2. How did the price of gas change from 1980 to 1990? _____ What's the percentage change? _____
3. What did a gallon of milk and a dozen eggs cost in 1960? _____ In 2005? _____
By what percentage did the cost increase? _____
4. Based on inflation, what would you estimate the price of a gallon of gas will be when you get your driver's license? _____ What, besides inflation, might affect that price?

Answers: 1. A house cost \$180,400, or approximately 678%, more. 2. The change from 1980 to 1990 was a 9 cent decrease; the percentage decrease was 7%. 3. 1960—\$1.06; 2005—\$5.09. The cost increased approximately 380%. 4. Answers will vary. In addition to inflation, students should consider the availability of resources to produce gasoline and the demand for gasoline by consumers. Is the population increasing or decreasing? Will more or fewer people drive hybrid cars? Talk About It: Answers will vary. The rising costs of construction and building materials, salaries, etc., might affect premiums.

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Talk About It

How do you think inflation might affect insurance premiums, based on replacing things like a roof or a car?



FAMILY ACTIVITY 3:

Planning for the Future



Actuaries cannot predict natural events, but they can expect to pay insurance claims to customers living in areas that are affected by natural events. Actuaries have to plan ahead for any natural event. They must estimate how much can be earned by investing premiums collected now for paying future claims. Thanks to *compound interest*, the invested premiums can grow and reduce the effects inflation might have on the cost of future claims. Compound interest is paid on the money you save and the interest you've earned.

Free Money?



Look at the table below and then answer the questions that follow. Use additional paper if needed.

	Amount	5% Interest Earned	Total Amount
Year 1	\$100	$100 \times .05 = \$5$	\$105
Year 2	\$105	$105 \times .05 = \$5.25$	\$110.25

Work the Math:

Imagine you have \$1,000 to invest, and it earns 5% interest, compounded yearly*:

- How much interest will you earn the first year? _____ How much money will you have in total? _____
- How much interest will you earn the second year? _____ Now how much money will you have in total? _____ (Round your answers to the nearest cent.)
- How much will you have after 10 years? _____ (Round your answers to the nearest cent.)

Answers: 1. You will earn \$50 interest the first year. You will have \$1,050 in total. 2. You will earn \$52.50 interest the second year. You will now have \$1,102.50 in total. 3. If students round their answers as they go, their answer will be \$1,628.91. If they round at the end, their answer will be \$1,628.89. Talk About It: 1. You would have \$7.50 after 30 days. You would have \$91.25 after one year. Rounding as you go, you would have \$116.46 after 5 years at 5% interest compounded annually.

Talk About It

Do you save spare change? If you saved a quarter a day, how much would you have in a 30-day month? If you did that for a year and then put your money in an account earning 5% interest compounded yearly, how much would you have in 5 years even if you added no more money to it?

