Name _____ Date _____

MATH EXTENSION—PROBLEM OF THE WEEK A

Investigation 1: Energy and Circuits

The students in a class had a question:

Do all brands of batteries last the same length of time, or do some kinds keep on going after the others have run out of energy?

The students decided to do an experiment. They agreed they should use brand new C-cells for their test. Here is a list of the C-cells they got.

3 Charger industrial-strength C-cells

3 E-Z Volt alkaline C-cells

3 Amp-Champ alkaline C-cells

The students connected each cell to a motor and let it run every day while they were in class. They disconnected the motors every afternoon just before they went home. They kept track of the number of hours each motor ran. Here are the results they recorded.

Kind of C-cell	#1	#2	#3
Charger	30 hours	25 hours	20 hours
E-Z Volt	30 hours	40 hours	35 hours
Amp-Champ	25 hours	40 hours	40 hours

1. Based on these data, which brand of cell would you buy?

   (Show your math here.)

2. Explain why you chose that brand.

Name _____ Date _____

MATH EXTENSION—PROBLEM OF THE WEEK B

Investigation 1: Series and Parallel

A student wants to predict how many wires she will need before she starts building circuits. Can you help her find a pattern?

1. What if she were building series circuits with one strong D-cell and some lightbulbs?

2. What if she were building series circuits with one D-cell, a switch, and some lightbulbs?

3. What if she were building series circuits with one D-cell for every bulb she was including?

4. What if she were building a parallel circuit with one D-cell and some lightbulbs?

Name _____ Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

Investigation 2: The Force of Magnetism

A teacher wanted to buy some science supplies for her class. She wanted to set up a center in her room where students could explore magnets during their free time. She looked in a catalog for science supplies and found these prices.

Kind of Magnet	Unit of Sale	Price per Unit
Large bar magnet	Set of 2	$10.95
Small bar magnet	Each	$2.75
Large horseshoe magnet	Each	$7.95
Small horseshoe magnet	Each	$4.50
Large disk magnet	Set of 4	$4.50
Lodestone	Set of 10	$7.95

She has $50.00 to spend. What materials would you recommend she buy for the science center? Remember, you can spend only $50.00, and you want to have a variety of things for students to explore. Write a short paragraph about why you chose the items you did. Show your work.

Name _____ Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

Investigation 3: Electromagnets

A class in Iowa had just finished building electromagnets. The students wanted to know if electromagnets worked the same in Washington, so they contacted their pen pals with a plan. Each class lifted little washers with 20-wind electromagnets and 40-wind electromagnets. After counting the number of washers, they each sent their results to the other class. When the numbers were organized, this is what the students saw.

Iowa		
Group	**20 winds**	**40 winds**
1	14 washers	30 washers
2	15 washers	35 washers
3	14 washers	28 washers
4	13 washers	38 washers
5	16 washers	41 washers
6	17 washers	33 washers
7	19 washers	29 washers
8	20 washers	30 washers

Washington		
Group	**20 winds**	**40 winds**
1	18 washers	23 washers
2	13 washers	30 washers
3	16 washers	31 washers
4	17 washers	27 washers
5	20 washers	42 washers
6	18 washers	33 washers

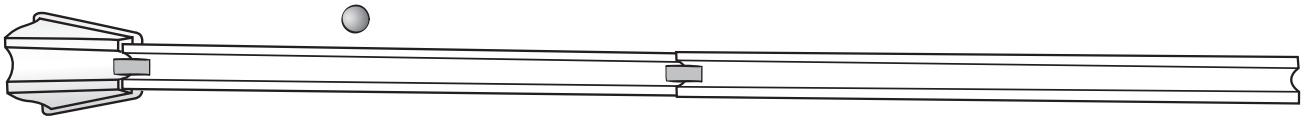
Do you think electromagnets work the same in Iowa as in Washington? Why or why not?

Name _____ Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

Investigation 4: Energy Transfer

A student is using a ramp, two runways, and one ball to make a system. When the ball is released from Starting Position 1, the ball travels one third of the distance across one runway. When the student starts the ball from Position 2, the ball travels two thirds of the distance across one runway. The student finds the pattern continues.



At what position should the student start the ball so the ball stops at the end of the second runway?

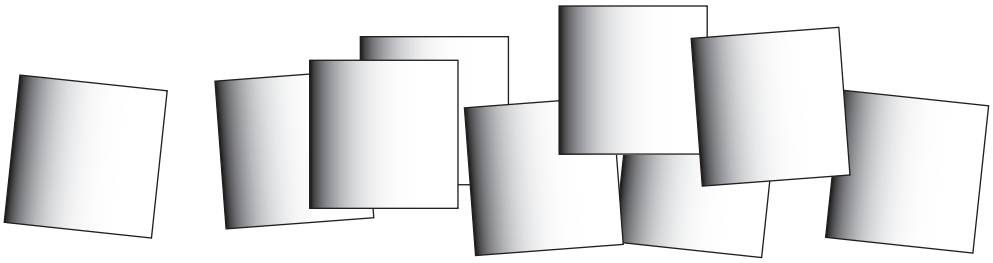
Next, the student places a rubber stopper on the runway. When the ball is released and collides with the rubber stopper, the ball only goes half as far as it did before. What position should the student start the ball now so it stops at the end of the second runway?

Name _____ Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

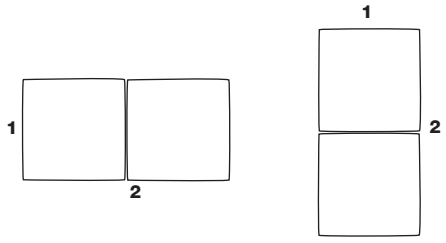
Investigation 5: Waves

A student has nine square mirrors.



How many different sizes of rectangles can she make using her mirrors? She can use any number of the nine mirrors to make a rectangle. (You can use square tiles to help you solve this problem.)

NOTE: These two rectangles have the same dimensions, so they count as one rectangle.



Record your rectangles and label the length and width.