INSECT'S SKELETON INVESTIGATION

Problem: Which type of skeleton best protects an animal from falls?

Background Information: An insect's skeleton is on its outside. This hard outer shell is made of chitin (KIE-tun), and it is called an "exoskeleton." In this experiment, you will drop a weight from greater and greater heights onto a model insect (a candy). The greater the height, the harder the hit. In groups of four to six students, find how hard an impact the "exoskeleton" can survive. Then devise a way to protect the exoskeleton.

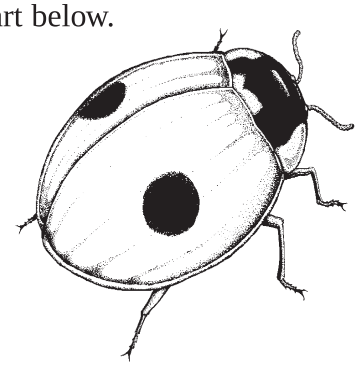
Materials

- Candies (coated and crushable) — *10 per group (two of each kind of candy)*
- Pennies (taped together, but don't pad them with the tape) — *five per group*
- Ruler (meter/yardstick) — *one per group*
- Padding materials (cotton balls, facial tissue, paper towels, etc.) — *several of each per group*
- Masking tape — *one*

Part A Procedure

1. Hold the meter stick steady, perpendicular to a table top, with the zero end down.
2. Place the first candy on the desk top immediately in front of the meter stick.
3. Hold the weight (5 pennies) so that the bottom of it is 10 cm (4 inches) above the table.
4. Allow it to drop to the table (do not throw it down). Does the candy skeleton crack?
5. If not, repeat steps 1-4, holding the weight 10 cm (4 inches) higher each time.
6. Record the weight—drop height at which the candy "skeleton" cracks in the chart below.
7. Repeat the entire test with nine other candies.

Candy/ Trial #	1	2	3	4	5
Cracked at height					



8. Circle the highest and lowest drop height at which a candy cracked.
9. Find the average drop height at which the candy exoskeletons cracked. Do this by adding all the heights you recorded in the chart above and dividing the total by 5. Record your answer here____________________

Part B Procedure

1. Choose the candy with the lowest drop height.
2. Using some padding material and tape, devise some protection for your insect's exoskeleton. The protection you devise must not make the candy "insect" larger than 2.5 cm (1 inch) on any side.
3. Test your new insect's skeleton by dropping the weight from the lowest drop height you circled in Part A step 8. Continue with steps 1 through 4 in Part A until your candy skeleton crushes. Record drop height here___________

Conclusion Find out what a padded skeleton is called. Which kind of skeleton is better for protecting an animal from falls? Write any possible clues and personal thoughts this activity has given you on a separate piece of paper.

INSECT'S WEIGHT INVESTIGATION

Problem: Does an insect's weight affect its leg length?

Directions: Divide into groups of four to six students and find the solution to the problem by following the procedures below.

Materials

- Cardboard (4" x 6" or 10 cm x 15 cm) — *one per group*
- Clay (2 ounces or 57 grams each) — *three lumps per group*
- Pennies — *30 per group*
- Ruler (30 cm or 12 inch) — *one per group*

Part 1 Procedure

1. Using one lump of 2 oz. (57 g) clay, build six legs of equal length to support the piece of cardboard. Then spread 10 of the pennies on top of the cardboard. Make the legs as long as possible.
2. Record the length of one leg to the nearest millimeter (mm) in the chart below.
3. Take apart your "insect" to prepare for Part 2. Make a new lump out of the six legs so that you have a lump of 2 oz. clay again.

Part 2 Procedure

1. Using two lumps of 2 oz. clay (4 oz. total), build six legs of equal length to support the piece of cardboard and spread 20 of the pennies on top of the cardboard (more pennies because this is a larger "insect" whose body weighs more than in Part 1). Make the legs as long as possible.
2. Record the length of one leg to the nearest millimeter in the chart below.

Part 3 Procedure:

1. Using all the clay (6 oz. total), build six legs of equal length to support the piece of cardboard. Then spread all 30 of the pennies on top of the cardboard. Make the legs as long as possible.
2. Record the length of one leg to the nearest millimeter in the chart below.

Part	Total weight of clay (oz.)	Length of leg (mm)
1.		
2.		
3.		

Conclusion How much does the length of the legs increase compared to the weight of the clay and the "insect"? How might this affect a real insect? Write any possible clues and your personal thoughts on a separate piece of paper.