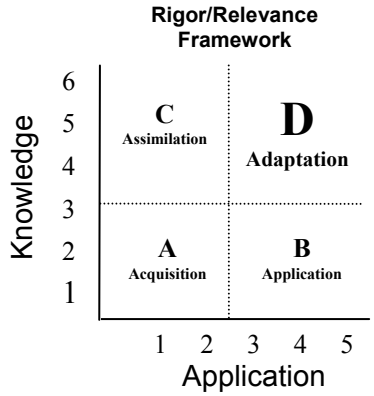
REFLEX TESTER

Gold Seal Lesson



Subject

SCIENCE **Grades** 5-8

Instructional Focus

Science as Inquiry: Students demonstrate knowledge and skills necessary to perform scientific inquiry.

Science in Personal and Social Perspectives: Students apply scientific principles to personal and social issues.

Measurement: Students use a variety of tools and techniques of measurement in a problem-solving situation. Students communicate the reasoning used in solving these problems.

Algebraic Concepts and Relationships: Students use algebraic methods to investigate, model, and interpret patterns and functions involving numbers, shapes, data, and graphs in a problem-solving situation. Students evaluate and communicate the reasoning used in solving these problems.

Performance Task

This is a good task for working on skills of data collection and display. Students use a reflex tester to collect information on reaction time and to draw conclusions from their data. Groups of six would be good for this activity, with sub-groups of three working simultaneously with two reflex testers.

Instructions to students
Your group task is to test the reflexes of several of your friends or relatives. Ask a friend to catch a dollar bill held vertically with Washington between their thumb and index finger. Release the bill whenever you please while talking to your subject. Record all observations and comments in a journal.

Replace the dollar bill with a reflex tester. Hold a stick or thin piece of wood next to the lines on the accompanying diagram and mark them on the stick. The times are in thousandths of a second.

Or you can use a centimeter ruler and the free fall formula from physics (d = 1/2 g t2). Calculate the time by rearranging the formula and solving for time. The free fall formula states that the distance (d) an object falls in a time (t) is given by d = one-half the force of gravity (g = 32ft/sec2) times the time squared. Therefore, the time of fall can be calculated from the distance an object travels as it accelerates toward earth.

Hold the reflex tester at the zero point with the person's thumb and index finger before letting go. After the stick is caught, measure the distance from the zero point to just below the thumb. This will mark the distance the tester fell while the person's nervous system was catching up with the falling object.

Performance Task continued

Each individual should test five different people five times in a row. Place all data in a neatly organized chart showing Trial 1 to Trial 5 and the reaction times. Plot the data on graph paper and draw some conclusions based on your graph. Your write-up should describe your experimental procedure, show your data, list your conclusions and address the following questions:

1. Does reaction time decrease or increase with the number of trials?
2. Do people tend to anticipate when you are going to drop the tester?
3. Chicago Bulls fans claim that Michael Jordan has a hang time of two seconds. Using your knowledge of the free fall formula, is this possible? Prove mathematically and show all work.
4. Why are the time lines on the reflex tester showing more distance as the time increases?

Scoring Guide

RATE THE CRITERIA: 3=Excellent, 2=Satisfactory, 1=Unsatisfactory, 0=Does not attempt or does not understand

Criteria	Score
Experimental procedure and group	
Data table neatly organized	
Graph is clear, legible, and labeled properly	
Conclusion write-up is well organized and scientifically correct	
Write-up addresses all questions in a logical manner	
Math proof of Jordan's hang time is done neatly and correctly with all work shown	

CHART

Expectations	Exceeds	Meets	Approaches	Needs More Work
Follows Direction				
Stays Focused on Task				
Takes Turns				
Listens to Others				
Participates in Group				
Speaks to Class				

Essential Skills

- Know the metric system and the units of metric measure and convert metric units to English units. (s4)
- Make observations using senses and instruments. Inferences and interpretations are arrived at based on observations. Classify observable properties and organize observations in a meaningful and logical way. (s5)
- Exhibit good data management skills by collecting, organizing, and graphing data. (s19)
- Apply in writing the rules and conventions of grammar, usage, punctuation, paragraphing and spelling. (ela1)
- Understand basic algebraic properties (i.e., commutative: ab = ba; associative: ab(c) = a(bc); and distributive: a(b+c) = (ab)+(ac)). (m3)
- Know the components and properties of the rectangular coordinate system, (i.e., x - y axis, origin, quadrants, abscissa (x-coordinate) and ordinate (y-coordinate), and the general representation of a point (x,y)). (m23)

International Center for Leadership in Education
1587 Route 146 - Rexford - NY - 12148
518.399.2776 Fax: 518.399.7607