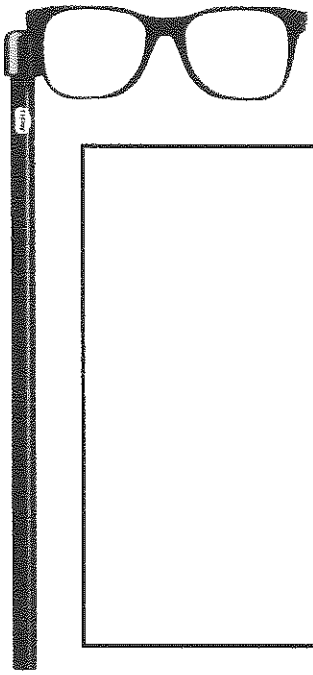
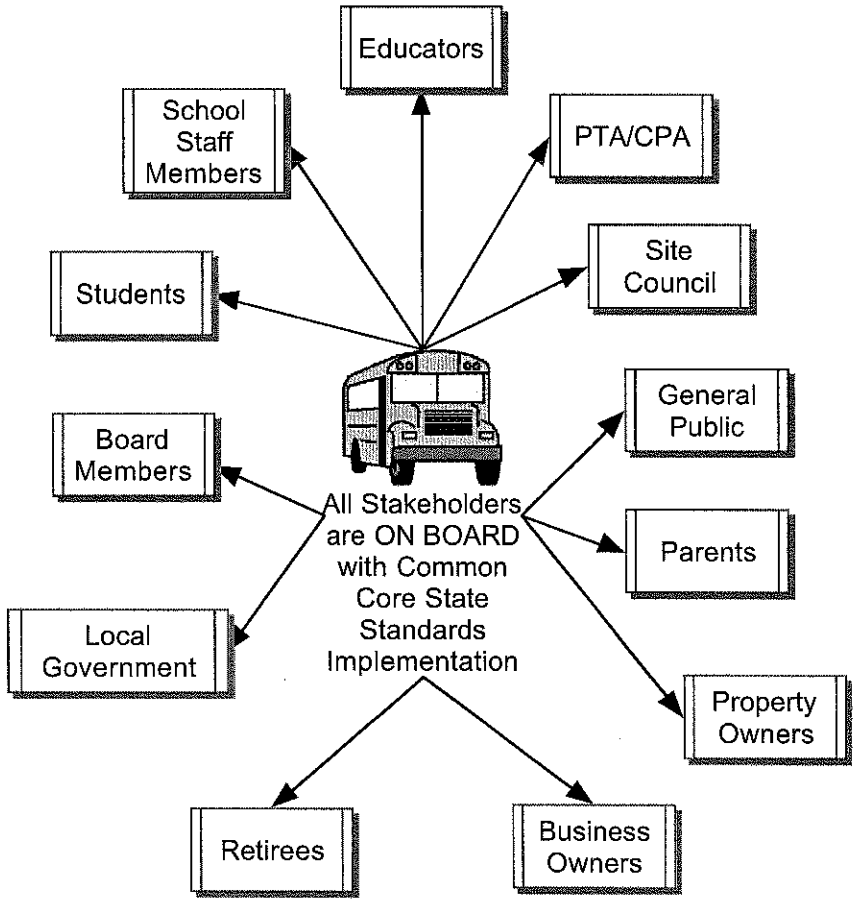


Possibilities:
Mail
Newsletters
Web Sites
Local Newspaper
Text Messaging
Automated Phone Messaging
Television
Web Streaming
Radio
Flyers
Open Meetings
Included in School Events
Door to Door Visits



Science Performance	
Grade **Topic –**	**Title**
Performance Expectation:	
Performance Assessments:	

Student Science Performance

Gathering

Reasoning

Communicating

Science Essentials (*Student Performance Expectations From Appendix C, D, E)*

Science Practices	
Crosscutting Concepts	
Disciplinary Core Ideas	

Reading Correlations	
Writing Correlations	
Language Correlations	
Math Correlations	

Science Performance	
Grade 4 **Topic – Force and Speed in motion**	**Title** ***Simply Marbleous***

Performance Expectation:

4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.

Performance Expectations: Construct explanations for how force affects speed.

Student Science Performance

Gathering(Activating Prior Knowledge)

In groups of three the students will:

a.) View a video clip of Olympic ski jumping. (http://www.nbcolympics.com/video/examining-ski-jumping-normal-hill)

b.) Using the snips from the video attached to this paper, identify and describe the causes of the ski jumping phenomena. Share out to the whole group.

c.) Using materials provided by the teacher, (3 books, tape, 3 meter sticks and a marble) construct a model that can be used to test your cause hypothesis. Use 4 different heights in 8 trials.

Teacher instructions: Students in groups of three investigate the force of an object as related to speed. Each group will design a ramp from two meter sticks and tape. (Leave a gap between meter sticks where the marble will rest but not fall through. The meter sticks should be parallel. Place tape on the back in about four places to hold in place.) Place a dictionary on the floor and measure 80 cm and mark a start line with tape. Place the edge of the meter stick on the start line and the other end on a dictionary (2 in incline plane). Place the marble on the ramp at the edge of the book and release applying no additional force with the hand. Mark the place where the marble comes to rest. Measure the distance from the start line to where it rested and record on answer sheet. Repeat 4 more times and compute the mean distance. Increase the incline plane by adding another book (4 in.) and repeat the steps. Continue increasing the incline plane testing 8 in, 16in. by repeating the process.

d.) Measure and record the distance the marble travels in each trial run. Use an appropriate graphic organizer for the data you are recording.

e.) Draw a diagram and make a prediction as to the effect that having a fifth book would have on the marble.

Reasoning

Students construct an explanation for how force affects speed. They support the explanation with evidence (both quantitative and qualitative. What caused the results? Where did the energy come from?

Class Discussion Questions:

a.) What is/are the force(s) creating the movement in this system?
b.) How do we know there is speed in your models when we didn't measure speed?
c.) Did your marbles go as fast as the skiers did? How do you know that?
d.) What were the constant variables in our models?
e.) What was the independent variable?
f.) How did this independent variable change the system?
g.) How did this independent variable affect the force?
h.) Where was the energy coming from that caused your model to "work"?
i.) When ski jumping is there more to control than the height of the run?
j.) Is there a way to predict the speed of your marble using the information in the attached clips from the video?
k.) What causes the marble to eventually stop if it doesn't hit another object?
l.) Where did the energy come from?
m.) Where does the energy go when the marble stops?
n.) In which one of your models does the marble have the most potential energy?
o.) When is it demonstrating the greatest kinetic energy?
p.) What was the system?

q.) What did you observe when the incline plane increased?
r.) What causes this to happen?

(Extend the thinking by asking what might happen if the surface of the floor changed (tile vs. carpet). Would the results change if you used a larger or smaller marble? Students could repeat the investigation using a different variable.)

Communicating
Plot your predicted distance on the class graph and go back to your seat, compare the results and have a class discussion about the graphs or plots.

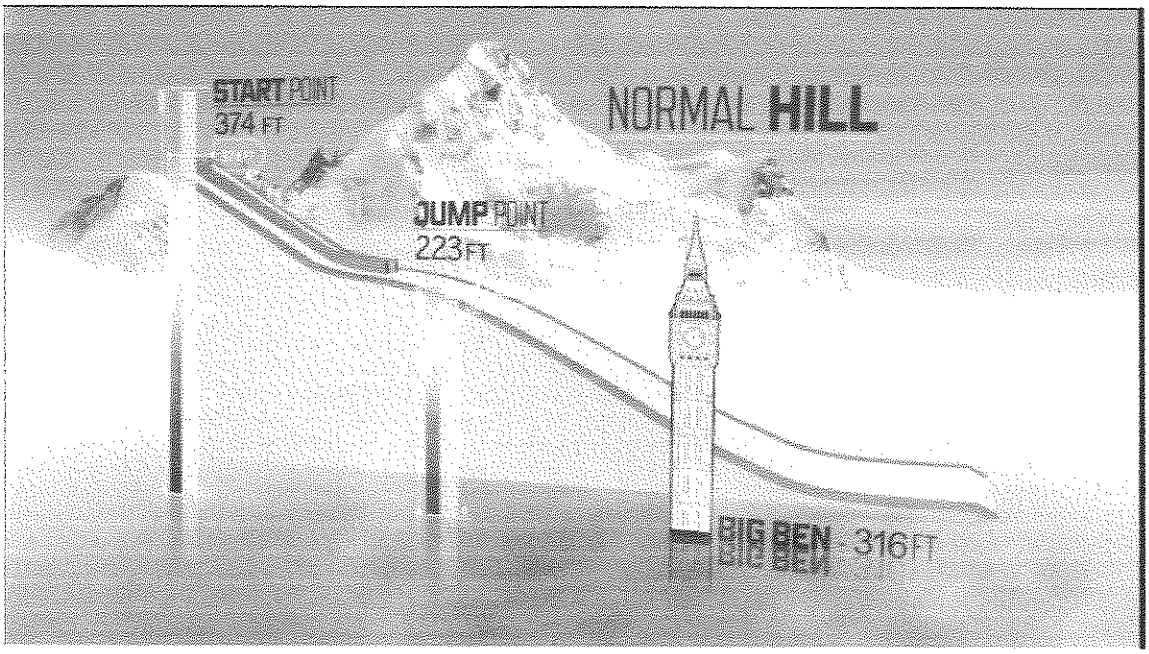
Class discussion Questions:

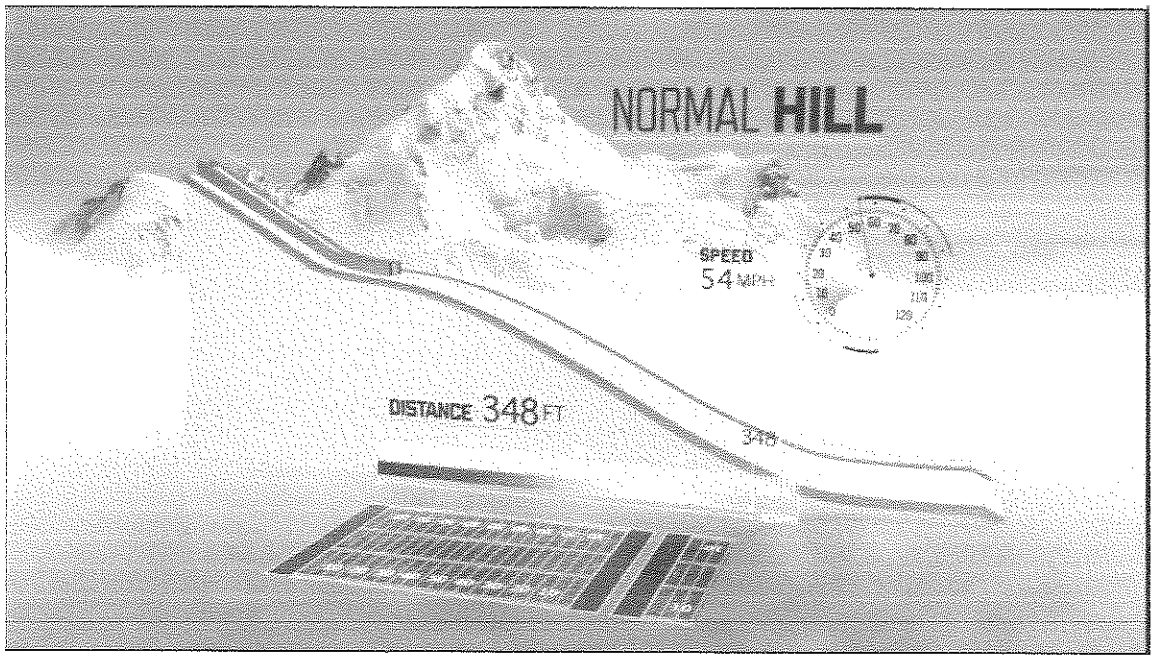
a.) What do you see about our prediction graph/plot?
b.) Is there a common plot? Why?
c.) Are there outliers? Why?

Students individually write an explanation for how force affects speed and where the energy originated.

Science Essentials (*Student Performance Expectations From Appendix C, D, E)*	
Science Practices	
Constructing Explanations and Designing Solutions	Constructing Explanations and Designing Solutions: Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4 – PS3-1)
Crosscutting Concepts	
System and system models	Energy and Matter : Energy can be transferred in various ways and between objects.
Cause and Effect	Cause and effect relationships are routinely identified and used to explain change. Identify and describe the causes of phenomena.
Patterns	Use patterns to make predictions. Use patterns as evidence to support explanations. Use graphs and charts to investigate and analyze patterns in data.
Quantity	Use measurement to compare phenomena represented by models.
Disciplinary Core Ideas	Ps3.A: Definitions of Energy – The faster a given object is moving the more energy it possesses. (4 –PS3-1) Gravity is a common force we use to develop explanations for motion of matter.
Energy	
Math Correlation	M.4.MD.4-represent and interpret data: Make a line plot to display a data set of measurements.
ELA Correlation	W.4.2-Write informative/explanatory texts to examine a topic and convey ideas and information clearly. W.4.7-Conduct short research projects that build knowledge through investigation of different aspects of a topic.

By: Charlotte Neugebauer USD 259 and Mary Cerny USD 305

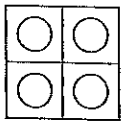

START POINT
374 FT
NORMAL HILL
JUMP POINT
223 FT
BIG BEN 316 FT


NORMAL HILL
SPEED
54 MPH
DISTANCE 348 FT
348

Ten Views for Integrating the Curricula: How Do You See It?

1

Cellular
Periscope—one direction; one sighting; narrow focus on single discipline or content area

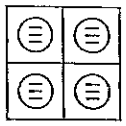


Description
The traditional model of separate and distinct disciplines, as depicted by student learning standards in each discipline area.

Example
The teacher applies this view in mathematics, science, social studies, language arts or sciences, humanities, fine and practical arts.

2

Connected
Opera glass—details of one discipline; focus on subtleties and interconnections

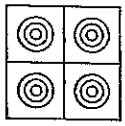


Description
Within each subject area, course content is connected topic to topic, concept to concept, one year's work to the next, and relates ideas explicitly.

Example
The teacher relates the concept of fractions to decimals, which in turn relates to money, grades, etc.

3

Nested
3-D glasses—multiple dimensions to one scene, topic, or unit

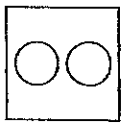


Description
Within each subject area, the teacher targets multiple skills: a social skill, a thinking skill, and a content-specific skill based on standards.

Example
The teacher designs the unit on photosynthesis to simultaneously target consensus seeking (social skill), sequencing (thinking skill), and plant life cycle (science content).

4

Sequenced
Eye glasses—varied internal content framed by broad, related topics

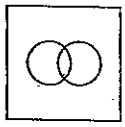


Description
Topics or units of study are rearranged and sequenced to coincide with one another. Similar ideas are taught in concert while remaining separate subjects.

Example
An English teacher presents a historical novel depicting a particular period while the history teacher teaches that same historical period.

5

Shared
Binoculars—two disciplines that share overlapping concepts and skills

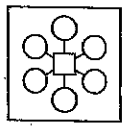


Description
Shared planning takes place in two disciplines in which overlapping concepts or ideas emerge as organizing elements.

Example
Science and mathematics teachers use data collection, charting, and graphing as shared concepts.

6

Webbed
Telescope—broad view of an entire constellation as one theme, webbed to the various elements

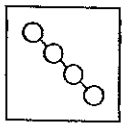


Description
Webbed curricula represent the thematic approach to integrating subject matter.

Example
The teacher presents a simple topical theme, such as the circus, and webs it to the subject areas. A conceptual theme, such as conflict, can be webbed for a broader thematic approach.

7

Threaded
Magnifying glass—big ideas that magnify all content through a metacurricular approach

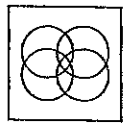


Description
Standards, thinking skills, social skills, study skills, graphic organizers, technology, and a multiple intelligences approach to learning thread through all disciplines.

Example
The teaching staff targets prediction in reading, mathematics, and science lab experiments while the social studies teacher targets predicting current events, and thus threads prediction across all four disciplines.

8

Integrated
Kaleidoscope—new patterns and designs that use the basic elements of each discipline

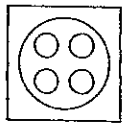


Description
The integrated curricular model represents a cross-disciplinary approach similar to the shared model.

Example
In mathematics, science, social studies, fine arts, language arts, and practical arts, teachers look for patterns and approach content through these patterns in all the discipline areas.

9

Immersed
Microscope—intensely personal view that allows microscopic exploration as all content is filtered through lens of interest and expertise

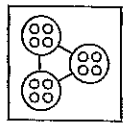


Description
The individual integrates all data, from every field and discipline, by funneling the ideas through his or her area of interest.

Example
A student or doctoral candidate has an area of expert interest and sees all learning through that lens.

10

Networked
Prism—a view that creates multiple dimensions and directions of focus



Description
The networked model of integrated learning is an ongoing external source of input, forever providing new, extended, and extrapolated or refined ideas.

Example
An architect, while adapting the CAD/CAM technology for design, networks with technical programmers and expands her knowledge base, just as she had traditionally done with interior designers.

Figure 0.5 Toward an Integrated Curriculum

SOURCE: Based on *Design Options for an Integrated Curriculum*, by H. H. Jacobs (Ed.), 1989, Alexandria, VA: Association for Supervision and Curriculum Development.