NEW HAVEN PUBLIC SCHOOLS

SCIENCE PRACTICE
TEACHER KEY AND MANUAL

GRADE 8

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INTRO

Enclosed you will find a practice test for eight graders. This test should be given sometime in the last two weeks of Feb.

All questions are taken from 5th or 8th grade national or state tests (NAEP, TIMMS, MA, CO, VA, TX, NY tests) and have been selected based on the match to our state standards. Many are taken from previous quarterly assessments

Note that it is longer than the real Science CMT… it has 25 multiple choice inquiry questions, while the CMT has 15. The real CMT also has 30 content multiple choice questions and the practice test has 73. Both have three open ended inquiry questions.

Therefore this should be given to students over several days.

The purpose of this test is NOT to serve as a diagnostic or as a reteaching tool. There are 12 units of science content, 25 content standards and 10 inquiry standards. It is not feasible to review all of this with students.

The purpose of the practice test is to familiarize students with the style and type of questions they will see. Teachers should review the guidelines on the open ended questions, especially the idea of short direct answers, with lists, phrases and diagrams.

During the Science CMT no outside materials, posters, vocab, etc.. are allowed.

The BEST way to use it is to have students try a section of questions, then to use class time to have them TALK about the answers , choices and reasoning behind them.

There is also a vocabulary list attached of words found in the performance standards, along with translations. Teachers should encourage students to use this as they try the practice questions, but should NOT take time to review definitions at this point.

8th grade teachers wishing to further review should follow the plan outlined
Review of Inquiry Skills as found in the Embedded Tasks, the Post IT lab, as well as review from the standards and GLE's (Grade Level Expectations) Is also useful.
(all found at www.newhavenscience.org)

8th Grade Plan:
Curriculum and Quarterly Assessment Includes Inquiry Skills Tasks, Practice
(Some Materials sent to Title I Schools in June 2007)

Sep-Oct: Bridges Unit with Significant Tasks, CMT Like First Quarter Assessment
Oct-Nov: Motion, Forces Unit: Slipping and Sliding Embedded Task
Dec-Jan: Circular Motion, Moon, Earth, Seasons Unit Second Quarter Assessments
Jan-Feb: Earth Science Unit: Glaciers, Erosion, Plate Tectonics
Late Feb: Full Court Press Science: Sample inquiry labs (Post It), test questions
March: CMT March 7th

MULTIPLE CHOICE KEY

1	C	CINQ5
2	B	CINQ2
3	B	CINQ8
4	B	CINQ6
5	B	CINQ3
6	B	CINQ1
7	A	CINQ9
8	B	CINQ5
9	D	CINQ3
10	A	CINQ7
11	C	CINQ7
12	A	CINQ3
13	C	CINQ6
14	D	CINQ6
15	D	CINQ4
16	C	CINQ4
17	C	CINQ5
18	B	CINQ9
19	D	CINQ7
20	A	CINQ6
21	C	CINQ5
22	B	CINQ3
23	A	CINQ8
24	B	CINQ1
25	D	CINQ9
26	B	C4
27	D	C6
28	D	C5
29	A	C4
30	A	C7
31	A	C7
32	B	C8
33	D	C9
34	D	C8
35	D	C8
36	C	C8
37	D	C9
38	D	C10
39	C	C11
40	A	C11
41	D	C13
42	B	C13
43	A	C12
44	A	C12
45	A	C14
46	C	C14
47	B	C7
48	C	C3
49	A	C2
50	C	C1
51	B	C1
52	A	C1
53	D	C3
54	D	C15
55	D	C15
56	A	C25
57	C	C27
58	B	C26
59	D	C16
60	A	C27
61	C	C25
62	C	C16
63	D	C15
64	B	C17
65	C	C17
66	C	C17
67	D	C17
68	B	C16
69	B	C21
70	A	C21
71	D	C21
72	C	C23
73	A	C23
74	A	C23
75	C	C23
76	C	C30
77	D	C30
78	B	C22
79	B	C22
80	B	C23
81	A	C24
82	A	C28
83	B	C29
84	D	C29
85	A	C29
86	C	C28
87	B	C29
88	C	C29
89	A	C29
90	D	C20
91	C	C20
92	B	C19
93	A	C19
94	C	C18
95	B	C19
96	D	C18
97	A	C20
98	B	C19

1. **CINQ9**

2. **CINQ3**

3. CINQ8

CONSTRUCTED RESPONSE ITEMS

Open-ended questions, also called "constructed response" items, have a question stem that requires a brief written response (generally, two to four sentences). They are designed to probe students' understanding of complex ideas. As such, these questions include at least two components and there is no single correct answer; rather, they can be answered fully and correctly in a variety of ways.

Responses to constructed response items are holistically scored. A score of 2 is awarded for a response that fully and accurately answers the question, a score of 1 is awarded for a response that partially answers the question, and a score of 0 is awarded for a response that does not answer the question or is fundamentally inaccurate.

An item-specific scoring rubric is developed for each constructed response item. The item-specific rubric describes the content expected in a complete and accurate response, as well as the content that would be missing from a partial response. Scorers look for evidence of student understanding of the concepts or processes described in the item-specific scoring rubric. A score point is assigned based on the level of understanding demonstrated and the ***clarity and directness*** of the response.

On the science CMT, written responses are ***not penalized for incorrect grammar, spelling, punctuation, sentence structure or overall organization***. Most important is that the student writes a ***clear and understandable response to the question that is asked***.

Where appropriate, responses ***may be in the form of bulleted lists***, and students may ***insert labeled diagrams or tables*** in order to clarify their thinking. Length of response is not a factor in determining the score; concise responses can provide as much evidence of understanding as lengthy treatises. No scoring advantage is gained by including extraneous details or by rewriting parts of the question in the response***. Using technical vocabulary is not required in order to attain a 2 score.***

Generic Scoring Rubric for CMT Science Open-Ended Items

Score Point 2

The response is correct, complete and appropriate. The student has demonstrated a strong understanding of scientific concepts and inquiry skills. The response may contain minor errors that will not necessarily lower the score.

Score Point 1

The response is partially correct and appropriate although minor inaccuracies or misconceptions may occur. The student has demonstrated limited evidence of an understanding of scientific concepts and inquiry skills.

Score Point 0

The response is an unsatisfactory answer to the question. The student has failed to address the question or does so in a very limited way. The student shows no evidence for understanding scientific concepts and inquiry skills. Serious misconceptions may exist.

Question 1: ITEM-SPECIFIC SCORING RUBRIC

Possible Response may include any two of the following improvements with an appropriate explanation of its impact:

- Amount of soil should be specified and should be equal (students may use the word weight).
- Should measure soil before and after.
- Volume of water poured through samples should be specified and should be equal.
- Volume of water should be enough so that some will exit and be collected.
- How the water is added to the samples should be specified (all at once, gradually, or over a specified period of time).
- Type of cloth filter should be specified and kept the same in size and type for all samples.
- Amount of filtered water could be subtracted from the starting amount. This gives a more accurate measure of how much water is held in the soil.
- Multiple trials should be done; results should be averaged.

Possible Explanations:

- Enables experiment to be replicated (repeated, confirmed)
- Makes it a more fair comparison of the soils
- Reduces variability in data
- Multiple trials increases confidence in data derived
- Multiple trials reduces the effect of outlying data
- Averaging enables raw data to be processed and conclusion to be drawn
- Any other reasonable explanation

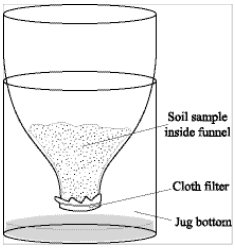
2-Point Rubric:

Score 2 = Two improvements and an explanation for each or one explanation that covers both

Score 1 = Two improvements without an explanation, or one improvement with an explanation

Score 0 = No scientifically valid improvements described

1) A group of students tested different soils to compare how much water they each can hold water. They used the following setup:



They used the following procedure:
Put some sand, clay or garden soil into a funnel.
Pour water into the funnel and measure how much drips through.
Repeat for all 3 soil types.

Describe two improvements that could be made to their procedure. Explain how each improvement would make their data and conclusion more reliable.

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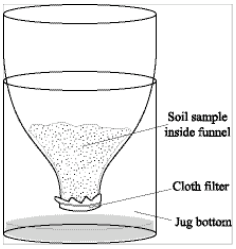


They used the following procedure: Put some sand, clay or garden soil into a funnel.
Pour water into the funnel and measure how much drips through. Repeat for all 3 soil types.
Describe two improvements that could be made to their procedure. Explain how each improvement would make their data and conclusion more reliable.

Question 1 Student Responses – Score 2:

I would have measured the mass of each substance to make sure you have the same amount of everything. I would recommend to do the experiment over about 3 times to see if there were any different results.

If they were to do this experiment again, I would make sure to mention to them that they had to use the same amount of water for each soil type. For example, if too much water was put into one type, and too little in the other, it wouldn't be accurate. They also should make sure to put in the same amount of soil in each one for consistency.

Scorer Commentary: *Response 1 correctly states two improvements with brief explanations: soil and water amounts should be specified so they can be kept the same; and multiple trials to see consistent results. Response 2 meets the minimum requirements for a 2. It correctly states that the soil and water amounts should kept the same. The explanation vaguely describes improved consistency and accuracy.*

Student Responses – Score 1:

They should measure the amount of soil and water.

The first recommendation I have is to use a container with measuring line on it all ready. The I would put the soil into a strainter and put a cloth on the bottom, the water will drip into your jug. Your measurements will be more accurate.

Scorer Commentary: *Response 1 states one improvement with no explanation. Response2 offers some evidence of understanding of the need to measure substances in the container. There is extraneous information, and no explanation of how measuring would improve the experiment.*

Student Responses – Score 0:

I wouldn't use a funnel. I would use a bottle because you would have to put the sand, clay, or garden soil in it first and then the water. With a funnel you aren't able to do that because the soil would fall out before you put the water.

I would tell them to do all different soils at one but in different set-ups so that they can get it done faster and to see which holds the most water.

Scorer Commentary: *The response 1 does not answer the question. It describes an alternative procedure, but does not address improvements to its scientific reliability. Response 2 shows no evidence that the student understands how to control experimental variables.*

2. **A class does an experiment to test if running in place affects heart rate. They measure the heart rate of each person at the beginning of class.**
They average the heart rate of the whole class, then each person runs for 5 minutes.
They then measured the heart rate of each person afterwards, and found that the average went up 10 beats per minute.

Their data table is shown below:

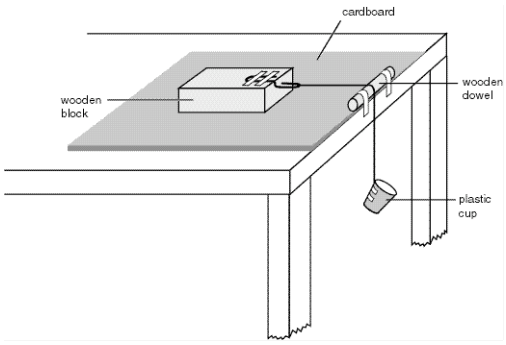
Start of class (26 people) : average heart beat is 88 bpm

End of class (23 people) : average heart beat is 98 bpm

The class then decides to investigate whether listening to different kinds of music affects people's pulse rate. Write a step-by-step procedure you could use to collect reliable data related to your question. Include enough detail so that someone else could conduct the same experiment and get similar results

0. Describes an experiment without mentioning type of music, or a heart rate experiment with no explanation.	*1. Describes an experiment with independent variable of type of music using same people, and describes method to measure heart rate as dependent. May not address any other design concerns.*	*2. Describes an experiment with independent variable of type of music using same people, and describes method to measure heart rate as dependent. Describes some of controlling variables, multiple trials, control group.*

3.



A class does an experiment to test if surface texture affects sliding force. They measure the amount of weights needed to slide three different blocks off a table with cardboard as shown. They then repeat the experiment with 2 different grain sizes of sandpaper.

Their data table is shown below:

Washers to Slide Block:

	BLOCK 1	**BLOCK 2**	**BLOCK 3**
	(40 grams)	**(20 grams)**	**(10 grams)**
SURFACE:			
Cardboard	5 washers	4 washers	2 washers
#100 coarse sandpaper	15 washers	8 washers	4 washers
#50 fine sandpaper	20 large washers	40 washers	15 washers

(CINQ8) (What conclusions can be drawn from their experiment and results? How valid do you think these conclusions are, based on the group's experiment and results? Explain your answer fully.

0. Conclusion wrong, or conclusion about texture affects sliding force with no explanation. t little reference to experiment and results (may refer to own experience or other info).	*1. Correct conclusion about texture affects sliding force and generally valid, refers to experiment and results and average sliding force (number of washers). Little or unimportant validity concerns expressed.*	*2. Conclusion correct, refers to Group experiment and results and average sliding force. Expresses important concerns about validity use of different mass blocks, and possible need for more trials.*

SCIENTIFIC LITERACY TERMINOLOGY: MIDDLE SCHOOL

This list, while not exhaustive, includes vocabulary that should be used by teachers and students during classroom discourse.

ENGLISH	SPANISH
adaptation (adapt)	adaptación (adaptar)
analyze	analizar
assumption	asunción
atmosphere	atmósfera
average	promedio
axis	eje
balance	balance
beaker	vaso
boiling point	hacer hervir
camouflage	camuflaje
categorize	categorizar
Celsius	centígrado
centimeter (cm)	centímetro
characteristic property	propiedad característica
classify	clasificar
climate	clima
collect data	colectar data
compare	comparar
composition	composición
compound	combinar, compuesto
conclusion	conclusión
conclusion based on data	conclusión basada en la data
condense, condensation	condensar; condensación
conduct (an experiment)	conducir (un experimento)
conserve, conservation	conservar; conservación
constant	constante
contrast	contrastar; comparar
control	control
controlled experiment	experimento controlado
credibility	credibilidad
critique	crítica; criticar
cycle	ciclo
data	data
decrease	rebajar; bajar
demonstrate	demostrar
density, dense	densidad; espeso
dependent variable	variable dependiente
describe, description	describir; descripción

ENGLISH	SPANISH
design	diseño
determine	determinar
develop	desarrollar
diagram	diagrama
differentiate	diferenciar
dissolve	disolver
draw a conclusion	llegar a una conclusión
distinguish	distinguir
droplets	gotas; gotitas
ecosystem	ecosistema
element	elemento
energy transformation	transformación de energía (enérgica)
environment	ambiente
erode, erosion	erosionar; erosión
evaluate	evaluar
evaporate, evaporation	evaporar; evaporación
evaluate	evaluar
evidence	evidencia
examine	examinar
experiment	experimento
experimental design	diseño experimental
explain your reasoning	Explica tu razón.
explain, explanation	explicar; explicación
explore	explorar
extinct	extinto
Fahrenheit	Fahrenheit
fair test	prueba imparcial
findings	hallazgos
force	fuerza; forzar
formulate	formular
friction	Fricción
function	función
graduated cylinder	cilindro graduado
gram	gramo
gravity	gravedad
habitat	hábitat
hemisphere	hemisferio
hypothesis	hipótesis
identify	identificar
increase	aumento; aumentar
independent variable	Variable independiente
infer	inferir
interact	interactuar
interpret	interpretar
investigate	investigar

ENGLISH	SPANISH
joules	joules
kilogram	kilogramo
life cycle	ciclo de vida
liter	litro
mass	masa
materials	materiales
metal	metal
meter, meter stick	metro
microscopic	microscópico
milliliter (mL)	mililitro (ml)
mixture	mezcla
model	modelo
moisture	humedad
molecule	molécula
motion	moción
natural resources	recursos naturales
Newtons Neutrons	Newtons neutrón ¿
nonmetal	no metal
nutrients	alimentos; nutrientes
object	objeto
observe, observation	observar; observación
offspring	crías
orbit	orbita
organism	organismo
organize	organizar
oxygen	oxígeno
particles	partículas
pattern	patrón
perform an experiment	hacer un experimento
photosynthesis	fotosíntesis
position	posición
precipitation	precipitación
predict, prediction	predecir; predicción
pressure	presión
procedure	procedimiento
process	proceso
property	propiedad
range	orden; ordenar; extender
record (data)	apuntar; documentar (data)
reliability (data)	fiabilidad; seguridad (de la data)
reproduce	reproducir
resources	recursos

ENGLISH	SPANISH
result	resultado
revolve, revolution	rotar; dar vuelta; revolución
rotate, rotation	rotar; rotación
scale	escala; balanza, escama (de pez)
scientific observation	observación científica
separate	separar; separado
sequence	secuencia
soluble	soluble
solution	solucion
speed	velocidad
state of matter	estado de la materia
structure	estructura
substance	sustancia
surface	superficie
support with data	respaldar con data
survive	sobrevivir
synthesize	sintetizar
technique	técnica
temperature	temperatura
tension	tensión
tentative	tentativo
testable question	pregunta que se puede comprobar
theory	teoría
trials	pruebas
valid	valido
variable	variable
volume	volumen
water cycle	ciclo del agua
weather, weathering	el tiempo; el clima; aguantar el tiempo
weigh, weight	pesar; el peso
work	trabajar; el trabajo, la obra