

**WESTEST 2
Science**

**March 2008 School Leadership Team Conference
Charleston Civic Center**

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Office of Assessment and Accountability**

Grade 9 - Nature of Science

SC.O.PS.3.1 **synthesize concepts across various science disciplines** to better understand the natural world (e.g., form and function, systems, or change over time)

Depth of Knowledge 2

Directions: While working as a biochemist, you have found that a certain type of bottom-dwelling microorganism thrives under the following environmental conditions: 1.0 to 3.0 Fe^{2+} , $\text{O}_2 < 1.0$, and a pH of > 6 . Using the information in the chart, answer **Question 6** by filling in the circle next to the best answer.

- A depth of 0 centimeters (m) represents the top of the sediment.
- The concentrations are expressed in parts per million (ppm).
- The acidity of a solution is represented on a scale known as pH.

Depth (m)	Temperature (°C)	pH	Concentrations (ppm)					
			SO_4^{2-}	S^{2-}	CO_2	Fe^{3+}	Fe^{2+}	O_2
0	4	7.5	7.0	0.0	1.0	4.0	0.5	2.0
5	5	7.0	5.0	2.0	1.5	3.0	1.5	1.0
10	7	6.5	3.5	3.5	2.0	2.0	2.0	0.7
15	9	5.5	3.3	3.8	3.0	0.8	3.0	0.3
20	10	4.5	3.0	4.0	1.0	0.5	4.0	0.0

Concentration of ions and dissolved gases in the sediment at the bottom of an ocean

Question 6. Based on the information, at which of the following sediment depths would one most likely find this microorganism?

- (A) 5m
- (B) 10m
- (C) 15m
- (D) 20m

Depth of Knowledge

Level 1 Recall

Recall of a fact, information, or procedure.

Level 2 Skill/Concept

Use information or conceptual knowledge, two or more steps, etc.

Level 3 Strategic Thinking

Requires reasoning, developing plan or a sequence of steps, some complexity, more than one possible answer.

Level 4 Extended Thinking

Requires an investigation, time to think and process multiple conditions of the problem.

21st Century Item Writing for WESTEST2 Checklist

Area	Use on Test	RLA	MA	SS	SC
Overall, the focusing lens, when writing test items for 21 st century summative assessment, should be based upon the interpretation of the content and the skill sets of the CSOs.					√
Test Format for Graphic Organizers	Set the stage with high interest engaging topics; use graphic organizers, Venn diagrams, graphs, etc. that can be completed in the test booklet.				√
Rigor	Items skill sets MUST match the rigor of the CSO skill sets.				√
Language of 21 st Century Skills	Use the types of skill sets found in the CSOs that students are expected to be able to use and apply. (Use PISA items as a guide for items to address extrapolation and application.)				√
21 st Century Tools	Use Information, Media and ICT (Information, Communication & Technology) Literacy Skills to develop item stems, answers, and scenarios. For example, you can build your items using <ul style="list-style-type: none"> ▪ appropriate technology tools/scenarios ▪ information and communication technologies ▪ examples of ways to access, manage, integrate and evaluate information ▪ scenarios that might include audio, video, and other media and multimedia and digital tools ▪ item stems, answers, and scenarios that might include electronic probes, iPods, electronic white boards, etc. ▪ snap shots, graphics, and resources with access to online learning communities and resources 				√
Real World Application (also called authentic assessment)	Frame language in item to real life experiences and applications in the 21 st Century. Use examples, applications and settings from students' lives, modern workplaces and school communities to frame items.				√
Critical Thinking	The clear, precise and purposeful use of higher order thinking skills and strategies to include extrapolation and application.				√
Problem Solving	Identify a problem, evaluate options, propose solutions and evaluate results. Problem solving items built upon the context of the grade level CSOs that align to thinking skills in the objectives.				√

Area	Use on Test	RLA	MA	SS	SC
When writing items the areas below are to be used to provide scenarios, formats and items, when appropriate, to the specific content of the CSOs.					√
Information and Media Literacy	How modern media combines sound, image and text to communicate meaning.				√
Visual Literacy	Use images to communicate a message.				√
Communication Skills	Convey messages across cultures and media.				√
Systems Thinking	Recognize patterns. Understand how parts interact and how they form a whole system.				√
Adaptability	Ability to adapt to changing situations and environments while keeping in mind time constraints, budgets etc.				√
Ethical Behavior	Act with integrity.				√
Social/Personal Accountability	Accepting responsibility for one's own behavior. Understanding common good.				√
Project planning and development	Organize work (projects) and achieve goals.				√
Global Awareness	Learning from and working with people from diverse cultures, religions and lifestyles. To include "green" environmental issues.				√
Financial, Economic and Business Literacy	Understanding business, economics and finance (personal too).				√
Civic Literacy	Understanding one's role in government and how government affects our lives.				√
Health and Wellness Literacy	Understanding healthy lifestyles and their benefits.				√

21st Century Item Writing for WESTEST - Science

Check Here	Area	Use on Test
	<p>The focusing lens of the items should be based upon the interpretation of the skill sets of the CSOs. (It is easy to miss the intended skill set of the CSO. An example: The CSO skill set is to interpret relationships, but the item provided was actually measuring the student's ability to compare graphs.)</p>	
	Test Format	<p>Set the stage with high interest engaging topics; use graphic organizers, Venn diagrams, graphs, etc. that can be completed in the test booklet.</p> <p><i>~Students put information into graphs or data collection charts</i></p>
	Rigor	<p>Items skill sets that MUST match the rigor of the CSO skill sets.</p> <p><i>~The CSO states to interpret, examine or demonstrate, etc. ...your questions drive this type of thinking</i></p>
	Language of 21st Century Skills	<p>Use the types of skill sets found in the CSOs that students are expected to be able to use and apply. (Use PISA items as a guide for items to address extrapolation and application.)</p> <p><i>~CSO and question compare and contrast</i></p>
	21st Century Tools	<p>Use Information, Media and ICT (Information, Communication & Technology) Literacy Skills to develop item stems, answers, and scenarios. For example, you can build your items using</p> <ul style="list-style-type: none"> ▪ appropriate technology tools/scenarios ▪ information and communication technologies ▪ examples of ways to access, manage, integrate and evaluate information ▪ scenarios that might include audio, video, and other media and multimedia and digital tools ▪ item stems, answers, and scenarios that might include electronic probes, iPods, electronic white boards, etc. ▪ snap shots, graphics, and resources with access to online learning communities and resources <p><i>~Picture of data collected on computer screen, flat screen TV, GPS, text message, IM, probe, online ad, newspaper ad, etc.</i></p>
	Real World Application	<p>Frame language in item to real life experiences and applications in the 21st Century.</p> <p>Use examples, applications and settings from students' lives, communities and modern workplaces to frame items</p> <p><i>~While walking home, John received a text message stating a Category V hurricane was approaching...</i></p>
	Critical Thinking	<p>The clear, precise and purposeful use of higher order thinking skills and strategies to include extrapolation and application.</p> <p><i>~Questions drive processing information and facilitate drawing conclusion</i></p>
	Problem Solving	<p>Identify a problem, evaluate options, propose solutions and evaluate results. Problem solving items built upon the context of the grade level CSOs that align to thinking skills in the objectives.</p> <p><i>~Using the scientific method to solve a problem</i></p>
<p>When writing items the areas below are to be used to provide context, formats and</p>		

Check Here	Area	Use on Test
		scenarios, when appropriate, to the specific content of the CSOs. Please note, Policy 2520.14 will not be part of an alignment study, but certainly these are rich tools and skills to utilize in the manner defined above.
	Information and Media Literacy	How modern media combines sound, image and text to communicate meaning. ~ <i>Student went online to find information about a recent event...is the source and information reliable...</i>
	Visual Literacy	Use images to communicate a message. ~ <i>A diagram of the water cycle</i>
	Communication Skills	Convey messages across cultures and media. ~ <i>Will students misinterpret what you wrote, using skill sets across international boundaries</i>
	Systems Thinking	Recognize patterns. Understand how parts interact and how they form a whole system. ~ <i>Picking up trends in data</i>
	Adaptability	Ability to adapt to changing situations and environments while keeping in mind time constraints, budgets, etc. ~ <i>Questions make students analyze the changing environment or conditions of fires</i>
	Ethical Behavior	Act with integrity. ~ <i>Use of skepticism in reviewing data...where did your data come from...is it accurate...social accountability</i>
	Social/Personal Accountability	Accepting responsibility for one's own behavior. Understanding common good. ~ <i>Students being environmentally friendly</i>
	Project Planning and Development	Organize work (projects) and achieve goals. ~ <i>Willis has to devise a plan to test the river for pollutants</i>
	Global Awareness	Learning from and working with people from diverse cultures, religions and lifestyles. To include "green" environmental issues ~ <i>Drilling for oil in the Middle East affects environmental decision in the United States...international issues tied to West Virginia...coal</i>
	Financial, Economic and Business Literacy	Understanding business, economics and finance (personal too). ~ <i>Relate the development of science to the economics of the U.S....computers, probes, medicine...how have these managed to make us more efficient and cost effective</i>
	Civic Literacy	Understanding one's role in government and how government affects our lives. ~ <i>Legislative policies influence how science operates</i>
	Health and Wellness Literacy	Understanding healthy lifestyles and their benefits. ~ <i>Questions about healthy living when discussing the human body CSOs or creation of exercise programs and analyzing the data</i>

CSO: SC.0.4.2.15 compare and classify liquids based on density.

DOK: 2

Using the checklist and DOK charts – Write an item in the lines below.

- A.
- B.
- C.
- D.



CSO: SC.0. **7.1.04** compare and contrast the historical significance of scientific discoveries.

DOK: 2

Using the checklist and DOK charts – Write an item in the lines below.

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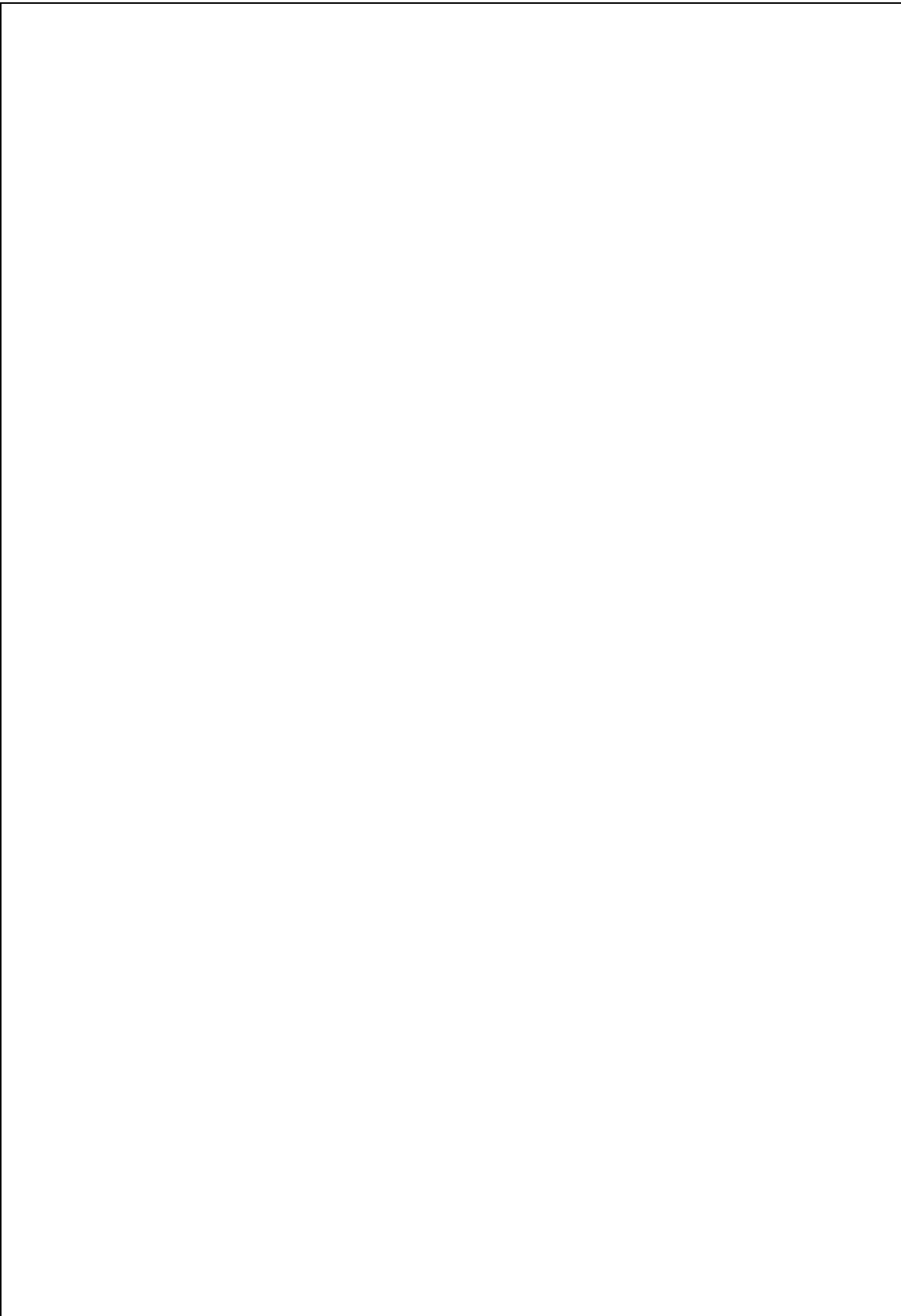
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A.
B.
C.
D.

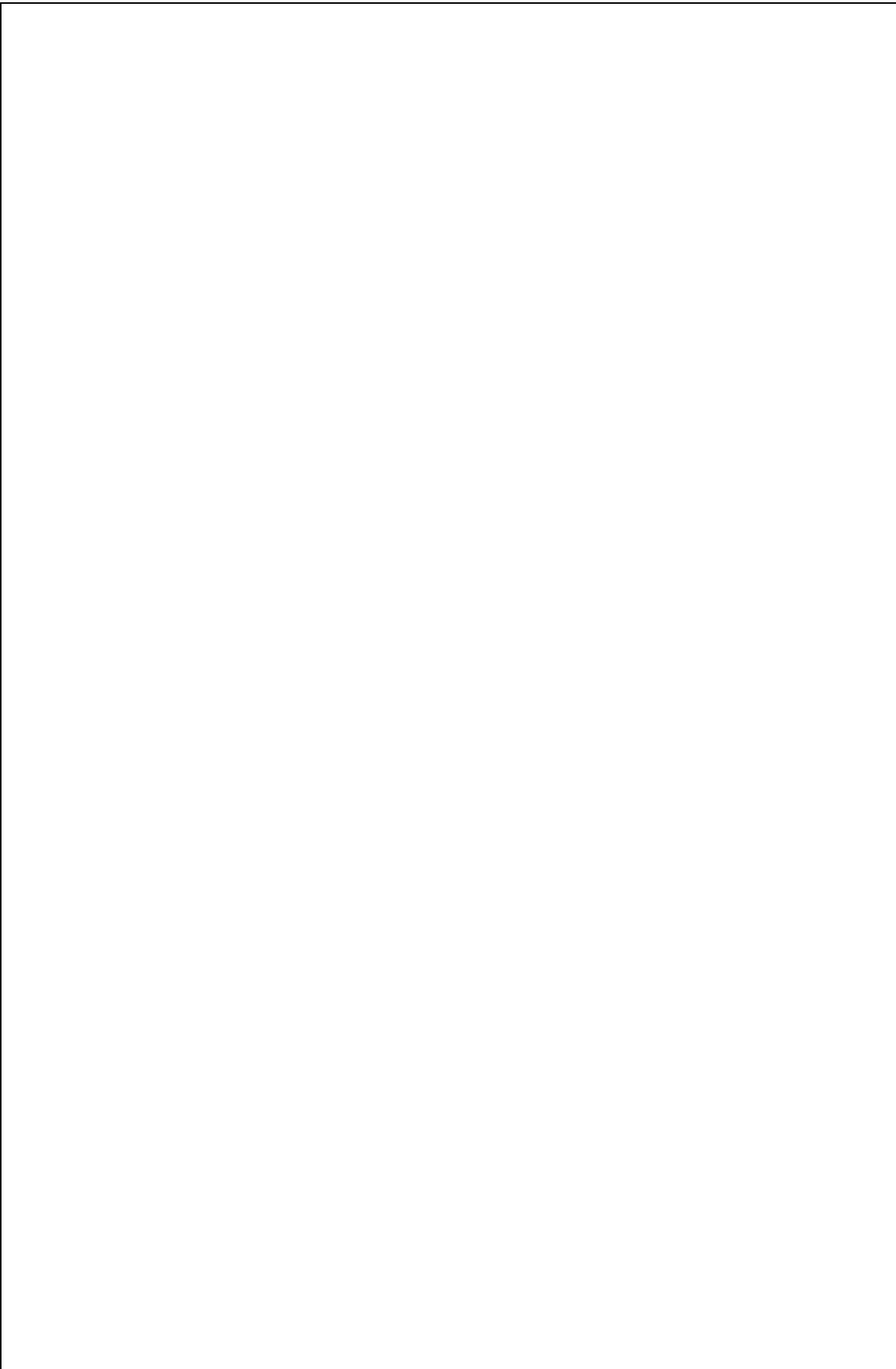


CSO: SC.O.PS.3.1 synthesize concepts across various science disciplines to better understand the natural world (e.g., form and function, systems, or change over time).

DOK: 2

Using the checklist and DOK charts – Write an item in the lines below.

- A.
- B.
- C.
- D.



FURTHER REFLECTION TO ITEM WRITING

a. Did you use authentic assessment language when writing your item? If not, please re-work your item to frame the question or scenario. For example:

Your third grade class is going on a field trip.....

You have borrowed your friend's laptop computer.....

Your school community service program.....

Your lab group

Rework item in the space below.

b. Did you use a graphic organizer when writing your item? If not, please re-work your item to include some type of graphic organizers. For example: Venn diagram, matrix, rankings, webbing, tables, other)

Rework item in the space below

