ORANGE PUBLIC SCHOOLS
INTERIM ASSESSMENT DATA FOR SCIENCE

DEPARTMENT OF MATHEMATICS & SCIENCE

GRADES K - 12

THREE DIMENSIONAL LEARNING AND PERFORMANCE

SCIENCE AND ENGINEERING PRACTICES (SEPS) ARE WHAT STUDENTS DO TO MAKE SENSE OF PHENOMENA. SEPS ARE COMPRISED OF THE SKILLS AND BEHAVIORS SCIENTISTS USE TO MAKE SENSE OF PHENOMENA AND ADDRESS PROBLEMS.

CROSSCUTTING CONCEPTS (CCCS) ARE CONCEPTS THAT HOLD TRUE ACROSS THE NATURAL AND ENGINEERED WORLD. STUDENTS CAN USE THEM TO MAKE CONNECTIONS ACROSS SEEMINGLY DISPARATE DISCIPLINES OR SITUATIONS, CONNECT NEW LEARNING TO PRIOR EXPERIENCES, AND MORE DEEPLY ENGAGE WITH MATERIAL ACROSS THE OTHER DIMENSIONS.

DISCIPLINARY CORE IDEAS (DCIS) ARE THE FUNDAMENTAL IDEAS THAT ARE NECESSARY FOR UNDERSTANDING A GIVEN SCIENCE DISCIPLINE, AND CAN BE TAUGHT OVER MULTIPLE GRADE LEVELS AT PROGRESSIVE LEVELS OF DEPTH AND COMPLEXITY.

Achieve. (2018, June). Transforming science assessment: Challenges and recommendations for states. Retrieved from https://www.achieve.org/transforming-science-assessment

NJSLSTANDARDS-SCIENCE AND NJSLA ASSESSMENT-SCIENCE

Grade 5		Performance Level %				
	Total # of Students	Level 1	Level 2	Level 3	Level 4	>Level 3
State of NJ	101,220	34.8%	36.6%	22.7%	6.6%	29.2%
District	371	59.6%	32.1%	7.5%	0.8%	**8.4%**

Grade 8		Performance Level %				
	Total # of Students	Level 1	Level 2	Level 3	Level 4	>Level 3
State of NJ	99,852	35.7%	44.5%	15.3%	4.5%	19.8%
District	302	62.3%	32.5%	5.0%	0.3%	**5.3%**

NJSLSTANDARDS-SCIENCE AND NJSLASSESSMENT-SCIENCE

Grade 11		Performance Level %				
	Total # of Students	Level 1	Level 2	Level 3	Level 4	>Level 3
State of NJ	90,024	49.1%	23.6%	19.5%	7.8%	27.3%
District	288	75.3%	17.0%	6.9%	0.7%	**7.6%**

ASSESSMENT DESIGN

- 1, 2, AND 3 DIMENSIONAL QUESTIONS
- QUESTION CLUSTERS- BACKGROUND INFORMATION, DATA, DIAGRAMS, ETC. PROVIDED FOR REFERENCE. THIS INFORMATION IS ASSOCIATED WITH A SERIES OF QUESTIONS.
- ASSESSMENT TASK WRITERS WERE PROVIDED WITH PROFESSIONAL DEVELOPMENT VIA INNER ORBIT AND NGSS ASSESSMENT ACADEMY (DIAGNOSTIC, FORMATIVE, AND SUMMATIVE ASSESSMENT)
- TEACHER CONTRIBUTIONS: GRADE 2, 3, 4, 6, AND 7 EDULASTIC ASSESSMENTS BUILT FROM A QUESTION BANK DEVELOPED BY TEACHERS
- INNER ORBIT: IN PARTNERSHIP WITH THE MATH & SCIENCE DEPARTMENT, INNER ORBIT BUILT ASSESSMENTS FOR GRADES 5, 8, AND 11. TEACHERS WERE INVITED TO PROVIDE THE ASSESSMENT TEAM WITH FEEDBACK.
- QUESTION TYPES
    - MULTIPLE CHOICE
    - DRAG AND DROP
    - LABELING
    - FREE RESPONSE
    - CLASSIFICATION
    - MODELING/ DRAWING

DISTRICT ASSESSMENT PLAN

	Platform	Q1	Q2	Q3	Q4
Grades 5	Inner Orbit	Q1 Assessment	Q2 Assessment	Q3 Assessment	NJSLA-S
Grades 8	Inner Orbit	Q1 Assessment	Q2 Assessment	Q3 Assessment	NJSLA-S
Grades 11	Inner Orbit	Q1 Combined Assessment: LS, PS, and ESS	Bio, chem, and physics-disaggregated mid-year assessments	Combined Assessment: LS, PS, and ESS	NJSLA-S
Grades 2,3,4,6, and 7	Edulastic	N/A	Mid-Year Assessment	N/A	Final Assessment
Grade K and 1	Observational Assessment	N/A	Mid-Year Assessment	N/A	Final Assessment

STUDENT PERFORMANCE

	MP 1		MP 2	
	Number of Questions	**Average Score**	**Number of Questions**	**Average Score**
K	N/A	N/A	2	32% (% secure)
1	N/A	N/A	3	29% (% secure)
2	N/A	N/A	9	31%
3	N/A	N/A	14	39%
4	N/A	N/A	11	44%
5	17	35%	13	45%
6	N/A	N/A	9	33%
7	N/A	N/A	12	47%
8	17	30%	15	46%
Bio	15	34%	17	25%
Chem			19	36%
Physics			14	43%

KINDERGARTEN OBSERVATIONAL ASSESSMENT DATA

PERFORMANCE TASKS

Grade K

- Task 1: K-2 SEP, Engaging in Argument Based on Evidence
- Task 2: K-PS2-2: Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

GRADE K TASK #1

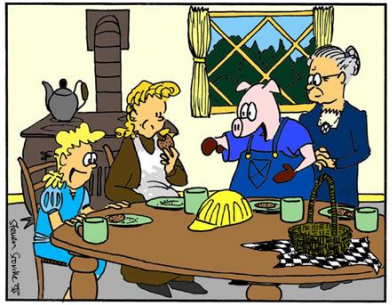
DIRECTIONS: STUDENTS ARE PROVIDED WITH A COPY OF THE CARTOON CARDS ON THE NEXT SLIDE. THE TEACHER WILL MODEL HOW TO MOVE THE CARDS AROUND ON THE GOOGLE DOC BEFORE BEGINNING THE INDEPENDENT WORK TIME. AFTER STUDENTS UNDERSTAND HOW TO MANIPULATE THE CARDS, THEY WILL BE GIVEN 15 MINUTES TO WORK INDEPENDENTLY. DURING THE INDEPENDENT PORTION OF THE TASK, STUDENTS WILL CLOSELY OBSERVE EACH OF THE CARTOON PANELS AND REARRANGE THE CARDS IN A SEQUENCE THAT MAKES THE MOST SENSE TO TELL THE STORY. TEACHER WILL IDENTIFY THE STUDENTS WHO ARE UNABLE TO MOVE THE CARDS BY THEMSELVES AND WILL MANIPULATE THEIR CARDS ON A SHARED SCREEN BASED ON DIRECTIONS THE STUDENT PROVIDES. STUDENTS WILL THEN PRESENT THE SEQUENCE THEY CREATED AND EXPLAIN HOW THEIR OBSERVATIONS LED THEM TO ARRANGE THE CARDS IN THEIR CHOSEN ORDER.

DURING THE PRESENTATION PORTION OF THE OBSERVATIONAL ASSESSMENT, THE TEACHER ASKS PROBING QUESTIONS TO HELP STUDENTS DIFFERENTIATE BETWEEN INFERENCES AND OBSERVATIONS.

EXAMPLES OF PROBING QUESTIONS:

- YOU SAID THE WOLF IS ANGRY. WHAT OBSERVATIONS MAKE YOU THINK THAT?
- YOU SAID THAT THE GIRL IS HOLDING COOKIES IN THE BASKET. WHAT EVIDENCE LED YOU TO
- MAKE THAT CLAIM?
- STUDENT A THINKS THESE PICTURES BELONG NEXT TO EACH OTHER. DO YOU AGREE OR DISAGREE?
- WHAT EVIDENCE COULD YOU SHOW THEM TO TRY TO CHANGE THEIR MIND?



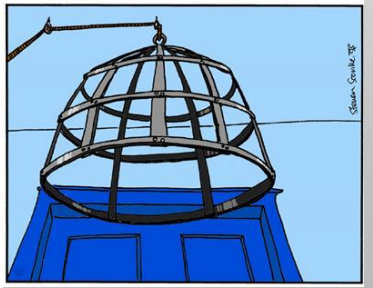












Kindergarten Observational Assessment Data

Beginning	Developing	Secure	Beginning	Developing	Secure	Beginning	Developing	Secure
Task 1: SEP Engaging in Argument From Evidence			Task 2: K-PS2-2: Cause and Effect			Task 2: K-PS2-2: Designing Solutions		
The student demonstrates the ability to meet one of the criteria listed.	The student demonstrates the ability to meet two of the criteria listed.	The student can: • Explain how their argument(s) is/are supported by evidence. • Differentiate between observations and claims. • Listen actively to arguments from peers and explain why they agree/ disagree with the points presented by others.	The student is unable to identify events in the story that caused the cart to move faster or slower.	The student can either Explain how changes in the strength applied affected the cart's movement OR Explain that additional weight, inclines, and the muddy path slowed the cart's movement.	The student can: Explain how changes in the strength applied affected the cart's movement. The student can also explain that additional weight, inclines, and the muddy path slowed the cart's movement.	The student is not able to draw or describe an improved version of the cart.	The student can: Draw a new cart but is unable to explain why their design is better than the one from the story.	The student can: Draw a cart that would be easier to push or pull and explain why it is an improvement over the cart in the story.
13%	**60%**	**27%**	**13%**	**53%**	**34%**	**14%**	**51%**	**35%**

Analysis & Recommendations

- The SEPs are organized by grade band and are vertically aligned. The disparity in the observational assessment scores between K and 1 may indicate that there is a need for common planning within grade bands to define shared expectations, objective rubrics, and exemplars used to monitor SEP progression over multiple years of instruction.
- The use of the CER framework will improve student ability to engage in argument based on evidence.

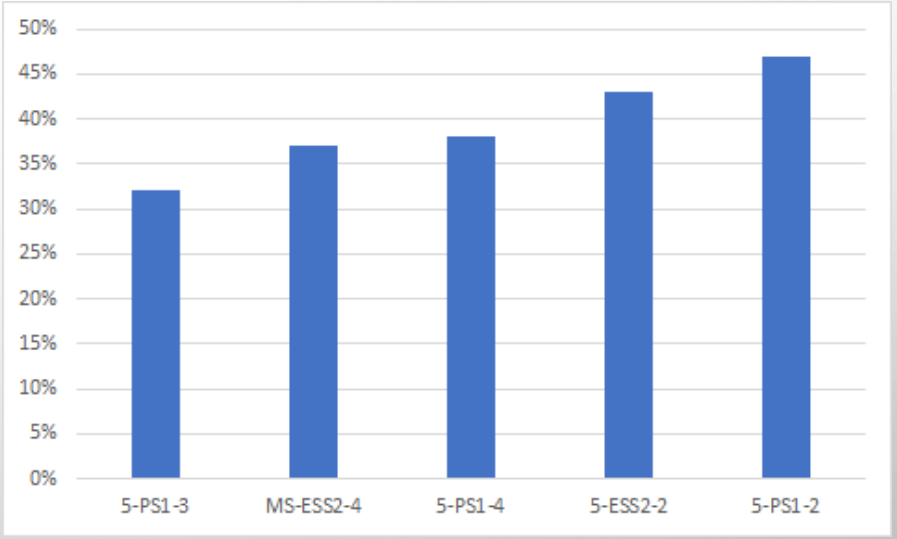
5TH GRADE

Question Number	Standards	Question Type
1	MS-ESS2-4, 5-ESS2-2, Energy & Matter	Drag & Drop
2	MS-ESS2-4, 5-ESS2-2, Using Mathematical & Computational Thinking	Drag & Drop
3	5-ESS2-2, Using Mathematical & Computational Thinking	Multiple Choice
4	5-ESS2-2, Using Mathematical & Computational Thinking	Multiple Choice
5	5-ESS2-2, Using Mathematical & Computational Thinking	Free Response
6	5-PS1-2, Scale, Proportion & Quantity, Using Mathematical & Computational Thinking	Multiple Choice
7	5-PS1-2, Scale, Proportion & Quantity, Using Mathematical & Computational Thinking	Multiple Choice
8	5-PS1-2, Scale, Proportion & Quantity, Using Mathematical & Computational Thinking	Drawing/ Graphing
9	5-PS1-2	Free Response
10	5-PS1-4, Cause & Effect	Multiple Choice
11	5-PS1-4, Planning & Carrying out investigations	Multiple Choice
12	5-PS1-4, Cause & Effect	Multiple Choice
13	5-PS1-4, Planning & Carrying out investigations, Cause & Effect	Free Response

5TH GRADE PERFORMANCE BY STANDARD

PERFORMANCE EXPECTATIONS

- MS-ESS2-4: DEVELOP A MODEL TO DESCRIBE THE CYCLING OF WATER THROUGH EARTH'S SYSTEMS DRIVEN BY ENERGY FROM THE SUN AND THE FORCE OF GRAVITY.
- 5-ESS2-2: CONSTRUCT AN EXPLANATION BASED ON EVIDENCE FOR HOW GEOSCIENCE PROCESSES HAVE CHANGED EARTH'S SURFACE AT VARYING TIME AND SPATIAL SCALES.
- 5-PS1-2: ANALYZE AND INTERPRET DATA ON THE PROPERTIES OF SUBSTANCES BEFORE AND AFTER THE SUBSTANCES INTERACT TO DETERMINE IF A CHEMICAL REACTION HAS OCCURRED.
- 5-PS1-4: DEVELOP A MODEL THAT PREDICTS AND DESCRIBES CHANGES IN PARTICLE MOTION, TEMPERATURE, AND STATE OF A PURE SUBSTANCE WHEN THERMAL ENERGY IS ADDED OR REMOVED.
- 5-PS1-3:GATHER AND MAKE SENSE OF INFORMATION TO DESCRIBE THAT SYNTHETIC MATERIALS COME FROM NATURAL RESOURCES AND IMPACT SOCIETY.



SCOPE & SEQUENCE ALIGNMENT

UNIT 1

- 9/9-9/16- INVESTIGATION 1 (5-ESS1-2)
- 9/23-10/14- INVESTIGATION 2 (5-ESS1-1, 5-PS2-1)
- 10/21-10/28- INVESTIGATION 3 (5-ESS1-1, 5-PS1-1)
- 11/4-11/25 INVESTIGATION 4 (5-ESS3-1, 5-PS1-1, 5-ESS2-1, 5-ESS3-1, ETS1:3)
- 12/2-12/16- INVESTIGATION 5 (5-ESS2-2. 5-ESS2-1, 5-PS1-1, 5-ESS3-1)

UNIT 2

- 1/6-1/13- INVESTIGATION 1 (5-PS1-1, 5-PS1-2, 5-PS1-4, ETS1:3)
- 1/20-1/27 INVESTIGATION 2 (5-PS1-2, 5-PS1-3)

Q1 / Q2 BENCHMARK COMPARISON

PERFORMANCE EXPECTATIONS

- MS-ESS2-4: DEVELOP A MODEL TO DESCRIBE THE CYCLING OF WATER THROUGH EARTH'S SYSTEMS DRIVEN BY ENERGY FROM THE SUN AND THE FORCE OF GRAVITY.
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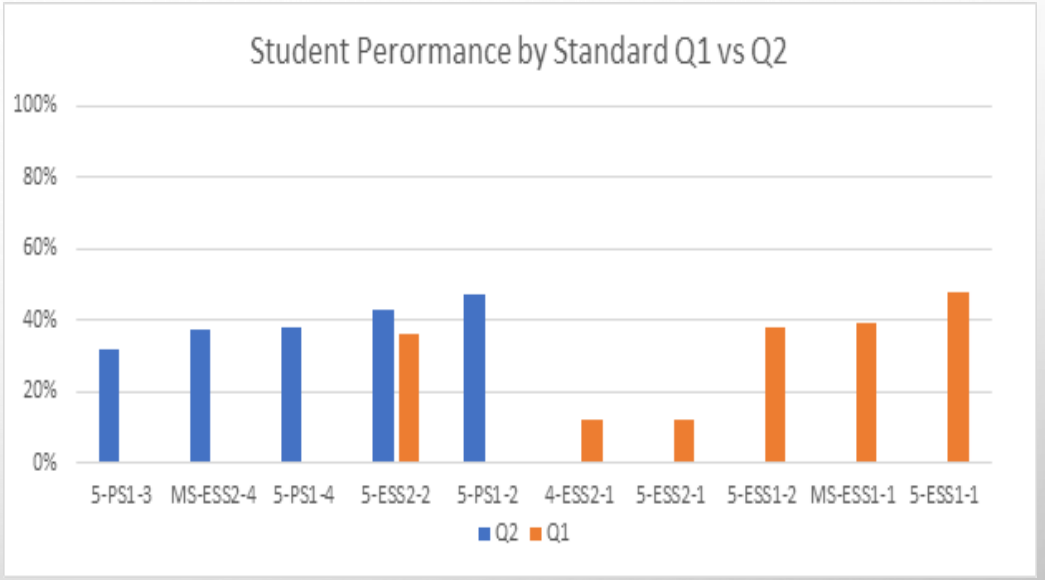


SCOPE & SEQUENCE ALIGNMENT

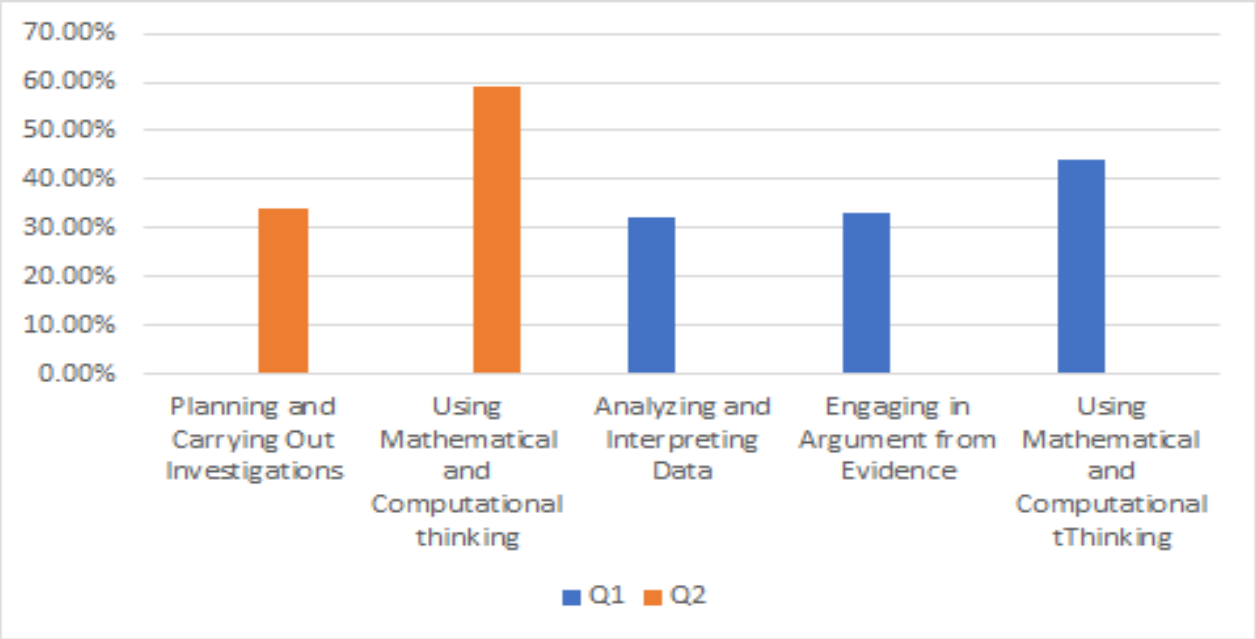
UNIT 1

- 9/9-9/16- INVESTIGATION 1 (5-ESS1-2)
- 9/23-10/14- INVESTIGATION 2 (5-ESS1-1, 5-PS2-1)
- 10/21-10/28- INVESTIGATION 3 (5-ESS1-1, 5-PS1-1)
- 11/4-11/25 INVESTIGATION 4 (5-ESS3-1, 5-PS1-1, 5-ESS2-1, 5-ESS3-1, ETS1:3)
- 12/2-12/16- INVESTIGATION 5 (5-ESS2-2. 5-ESS2-1, 5-PS1-1, 5-ESS3-1)

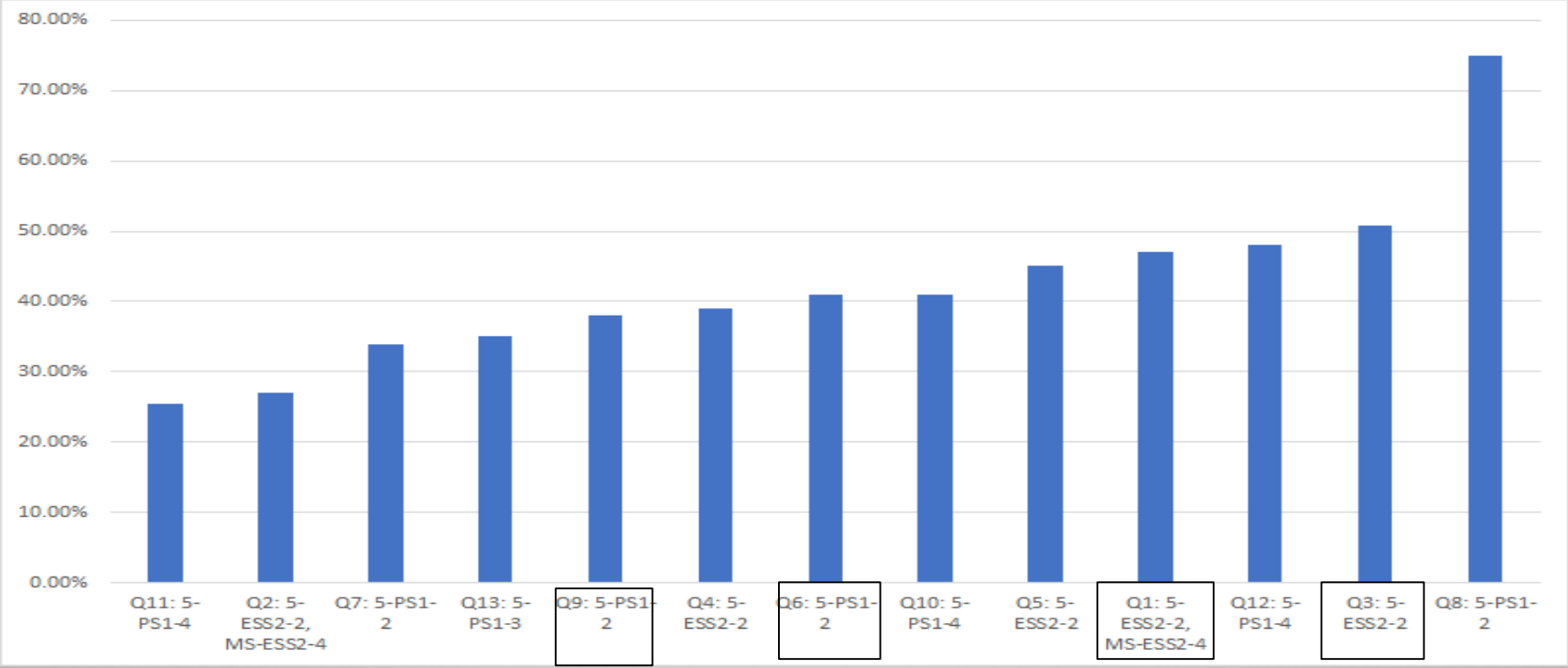
UNIT 2

- 1/6-1/13- INVESTIGATION 1 (5-PS1-1, 5-PS1-2, 5-PS1-4, ETS1:3)
- 1/20-1/27 INVESTIGATION 2 (5-PS1-2, 5-PS1-3)

SEP ANALYSIS



ITEM ANALYSIS



QUESTION 10-13

- 5-PS1-3:**Make observations and measurements** to identify materials based on their properties. (Scale, Proportion, and Quantity).
- 5-PS1-4 **Conduct an investigation to determine** whether the mixing of two or more substances results in new substances. (Cause and Effect)
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.

Your science teacher has just given you an assignment to make Elephant Toothpaste, which isn't helpful for cleaning elephant teeth, but looks like a big, foamy tube of elephant-sized toothpaste.

As you look at the list of materials and step-by-step directions think about the answer this question: Is Elephant Toothpaste a physical change (where a substance changes forms but is basically the same substance) or a chemical change (where an entirely new substance with different properties is formed)?

Materials:
-1 packet of Yeast
-45mL Warm water
-120mL 3% hydrogen peroxide solution
-Food coloring
-25mL Dish soap

Procedure:
1. Combine the warm water and half of the yeast in a bowl.
2. Pour the hydrogen peroxide into a graduated cylinder, and add a few drops of food coloring.
3. Add dish soap to the hydrogen peroxide and food coloring.
4. Finally, pour the yeast and water mixture into the cylinder containing the hydrogen peroxide solution and ... toothpaste!

10. WHICH OF THE FOLLOWING CLAIMS IS BEST SUPPORTED BY THE INFORMATION IN THE INVESTIGATION PROCEDURE?

a. A REACTION IS CAUSED BY ADDING DISH SOAP AND FOOD COLORING TO HYDROGEN PEROXIDE.
b. A REACTION IS CAUSED BY ADDING WARM WATER TO YEAST.
c. A REACTION IS CAUSED BY ADDING YEAST TO HYDROGEN PEROXIDE AND DISH SOAP.
d. A REACTION IS CAUSED BY ADDING WARM WATER TO DISH SOAP.

11. YOUR LAB PARTNER, STEVE, SAYS THAT IN ORDER TO MAKE SURE THE RESULTS ARE CORRECT, YOU SHOULD DO THE INVESTIGATION ONE MORE TIME. YOUR OTHER LAB PARTNER, COURTNEY, SAYS THAT DOING THE INVESTIGATION ONCE WAS ENOUGH TO ACHIEVE ACCURATE RESULTS. WHOSE REASONING IS CORRECT?

a. STEVE IS CORRECT. A SECOND TRIAL WILL DEFINITELY LET YOU KNOW IF YOUR RESULTS WERE CORRECT OR NOT.
b. COURTNEY IS CORRECT. AS LONG AS YOU FOLLOWED THE STEPS CAREFULLY, YOUR RESULTS SHOULD BE ACCURATE.
c. BOTH ARE TECHNICALLY CORRECT BECAUSE IT DOESN'T MATTER HOW MANY TIMES YOU DO THE INVESTIGATION.
d. STEVE IS ALMOST CORRECT, BECAUSE IT WILL TAKE AT LEAST 3 TRIALS TO DETERMINE WHETHER YOUR RESULTS WERE ACCURATE.

12. STEVE AND COURTNEY ARGUE THAT THIS IS A CHEMICAL CHANGE, BECAUSE A NEW SUBSTANCE HAS BEEN FORMED. WHAT EVIDENCE FROM THE IMAGE SUPPORTS THIS CLAIM?

a. THE FINAL SUBSTANCE IS A DIFFERENT COLOR THAN ANY OF THE SUBSTANCES THAT WERE MIXED TOGETHER.
b. THE FINAL SUBSTANCE HAS A DIFFERENT VOLUME THAN THE SUBSTANCES THAT WERE MIXED TOGETHER.
c. THEY ARE WRONG, BECAUSE THE LIQUIDS HAVE JUST TURNED INTO SOLIDS, WHICH IS A PHYSICAL CHANGE.
d. THEY ARE WRONG, BECAUSE THE LIQUIDS HAVE JUST TURNED INTO GASES, WHICH IS A PHYSICAL CHANGE.

ANALYSIS

- The first question asks students to use deductive reasoning to determine when the reaction occurred by referencing sequence of steps the procedure. Students may have been unfamiliar with the materials (hydrogen peroxide, yeast) listed. Teachers should practice using deductive reasoning with students to tackle problems with unfamiliar terminology.
- The second question asks students to consider the accuracy of the experimental design. Students in 3rd grade also demonstrated difficulty with the concept of trials.
- On this question cluster, students performed best on the third item. The question is a lower order recall question.
- Sample student responses and analysis of the

BIOLOGY

Question Number	Standards	Question Type	Question Number	Standards	Question Type
1	MS-LS1-6 and HS-LS1-5	Matching	10	HS-LS2-5	Free response
2	HS-LS2-3	Free Response	11	HS-LS2-5	Multiple choice
3	HS-LS2-3	Free Response	12	HS-LS2-1	Multiple choice
4	HS-LS2-3	Matching	13	HS-LS2-1	Multiple choice
5	HS-LS2-4	Multiple choice	14	HS-LS2-2	Multiple choice
6	HS-LS2-4	Drawing Modeling	15	HS-LS2-2	Multiple choice
7	HS-LS2-4	Free response	16	HS-LS2-6	Multiple choice
8	HS-LS2-4	Multiple choice	17	HS_ESS3-6, HS-ESS3-5	Multiple choice
9	HS-LS2-5	Drawing/ modeling	18	HS-ESS3-5	Multiple choice

BIOLOGY- PERFORMANCE BY STANDARD

PERFORMANCE EXPECTATIONS

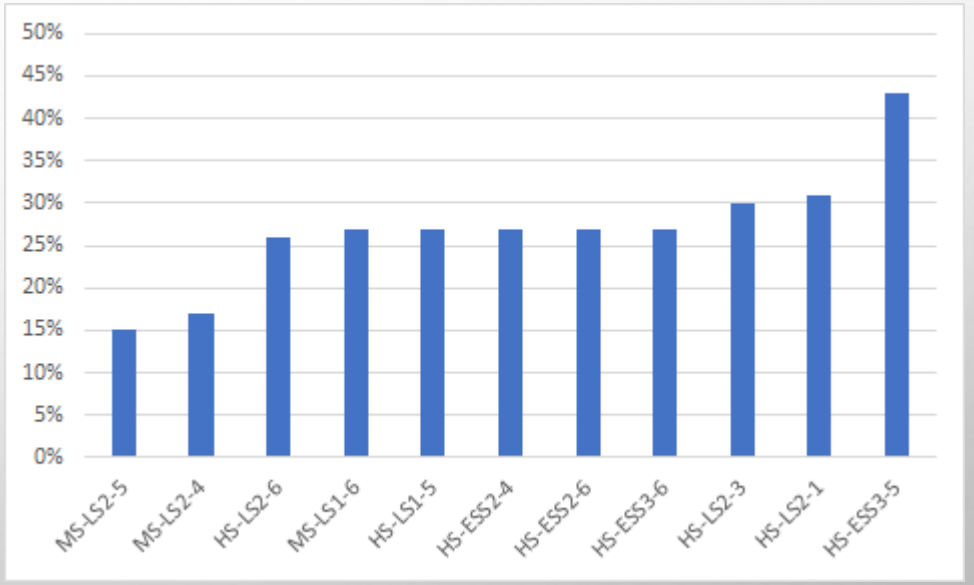
- MS-LS2-5:EVALUATE COMPETING DESIGN SOLUTIONS FOR MAINTAINING BIODIVERSITY AND ECOSYSTEM SERVICES
- MS-LS2-4:CONSTRUCT AN ARGUMENT SUPPORTED BY EMPIRICAL EVIDENCE THAT CHANGES TO PHYSICAL OR BIOLOGICAL COMPONENTS OF AN ECOSYSTEM AFFECT POPULATIONS
- HS-LS2-6:EVALUATE CLAIMS, EVIDENCE, AND REASONING THAT THE COMPLEX INTERACTIONS IN ECOSYSTEMS MAINTAIN RELATIVELY CONSISTENT NUMBERS AND TYPES OF ORGANISMS IN STABLE CONDITIONS, BUT CHANGING CONDITIONS MAY RESULT IN A NEW ECOSYSTEM.
- MS-LS1-6: CONSTRUCT AND REVISE AN EXPLANATION BASED ON EVIDENCE FOR HOW CARBON, HYDROGEN, AND OXYGEN FROM SUGAR MOLECULES MAY COMBINE WITH OTHER ELEMENTS TO FORM AMINO ACIDS AND/OR OTHER LARGE CARBON-BASED MOLECULES.
- HS-LS1-5:USE A MODEL TO ILLUSTRATE HOW PHOTOSYNTHESIS TRANSFORMS LIGHT ENERGY INTO STORED CHEMICAL ENERGY.
- HS-ESS2-4: USE A MODEL TO DESCRIBE HOW VARIATIONS IN THE FLOW OF ENERGY INTO AND OUT OF EARTH'S SYSTEMS RESULT IN CHANGES IN CLIMATE.
- HS-ESS2-6: DEVELOP A QUANTITATIVE MODEL TO DESCRIBE THE CYCLING OF CARBON AMONG THE HYDROSPHERE, ATMOSPHERE, GEOSPHERE, AND BIOSPHERE.
- HS-ESS3-6: USE A COMPUTATIONAL REPRESENTATION TO ILLUSTRATE THE RELATIONSHIPS AMONG EARTH SYSTEMS AND HOW THOSE RELATIONSHIPS ARE BEING MODIFIED DUE TO HUMAN ACTIVITY.
- HS-LS2-3: CONSTRUCT AND REVISE AN EXPLANATION BASED ON EVIDENCE FOR THE CYCLING OF MATTER AND FLOW OF ENERGY IN AEROBIC AND ANAEROBIC CONDITIONS
- HS-LS2-1: USE MATHEMATICAL AND/OR COMPUTATIONAL REPRESENTATIONS TO SUPPORT EXPLANATIONS OF FACTORS THAT AFFECT CARRYING CAPACITY OF ECOSYSTEMS AT DIFFERENT SCALES.
- HS-ESS3-5: ANALYZE GEOSCIENCE DATA AND THE RESULTS FROM GLOBAL CLIMATE MODELS TO MAKE AN EVIDENCE-BASED FORECAST OF THE CURRENT RATE OF GLOBAL OR REGIONAL CLIMATE CHANGE AND ASSOCIATED FUTURE IMPACTS TO EARTH'S SYSTEMS.

Scope & Sequence Alignment

Unit 1: Matter & Energy
- 9/9-10/7 (MS-LS1-5, HS-LS2-3, HS-LS2-4, HS-LS2-5)

Unit 2: Interdependent Relationships in Ecosystems
- 10/14-11/11 (HS-LS2-1, HS-LS2-2, HS-LS2-6)

Unit 3: Human Activity & Climate
- 11/18-12/16 (HS-ESS3-1, HS-ESS3-6, HS-ESS3-5, HS-ETS1-3)



Q1/Q2 BENCHMARK COMPARISON

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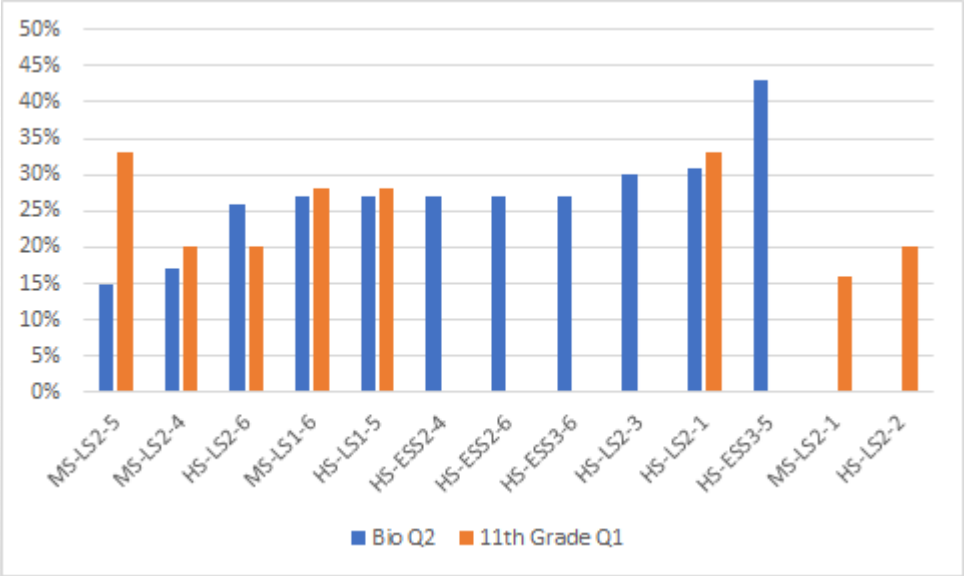
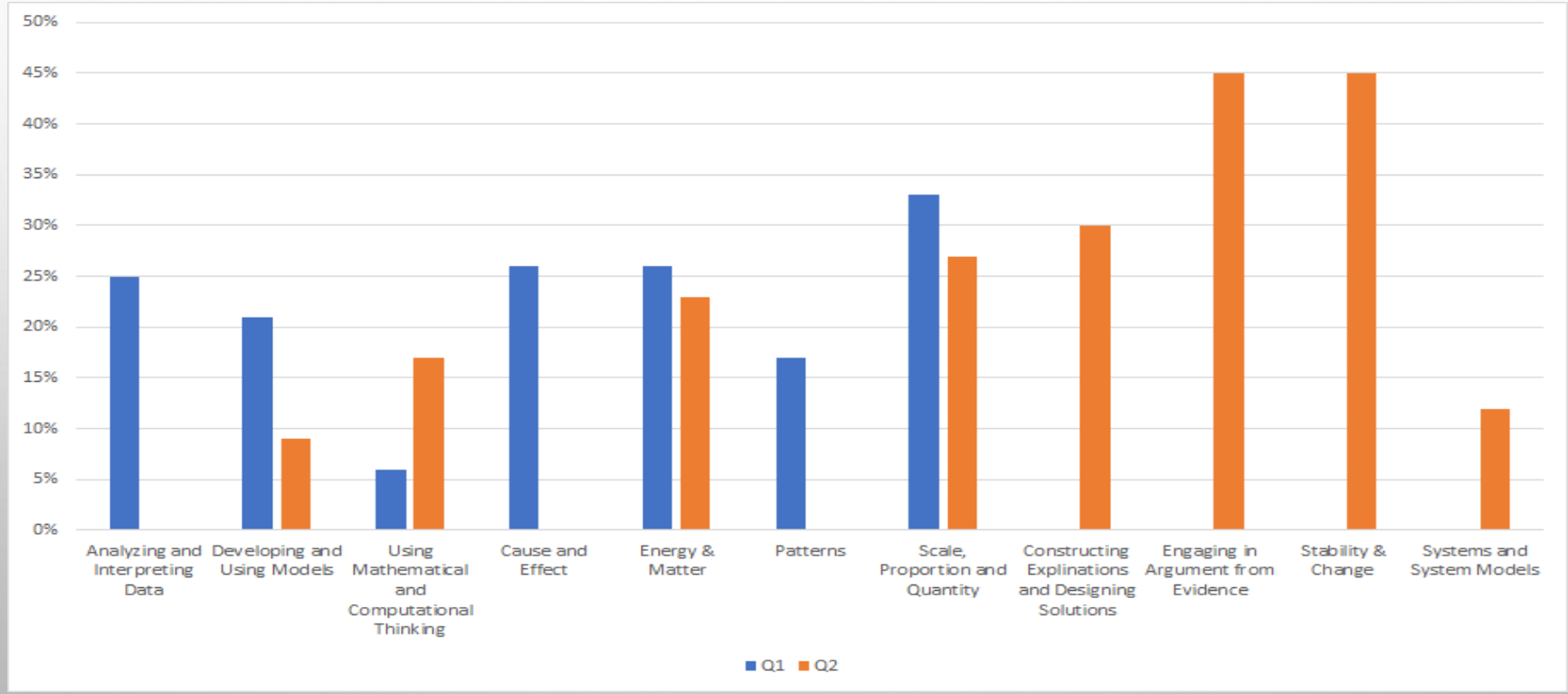
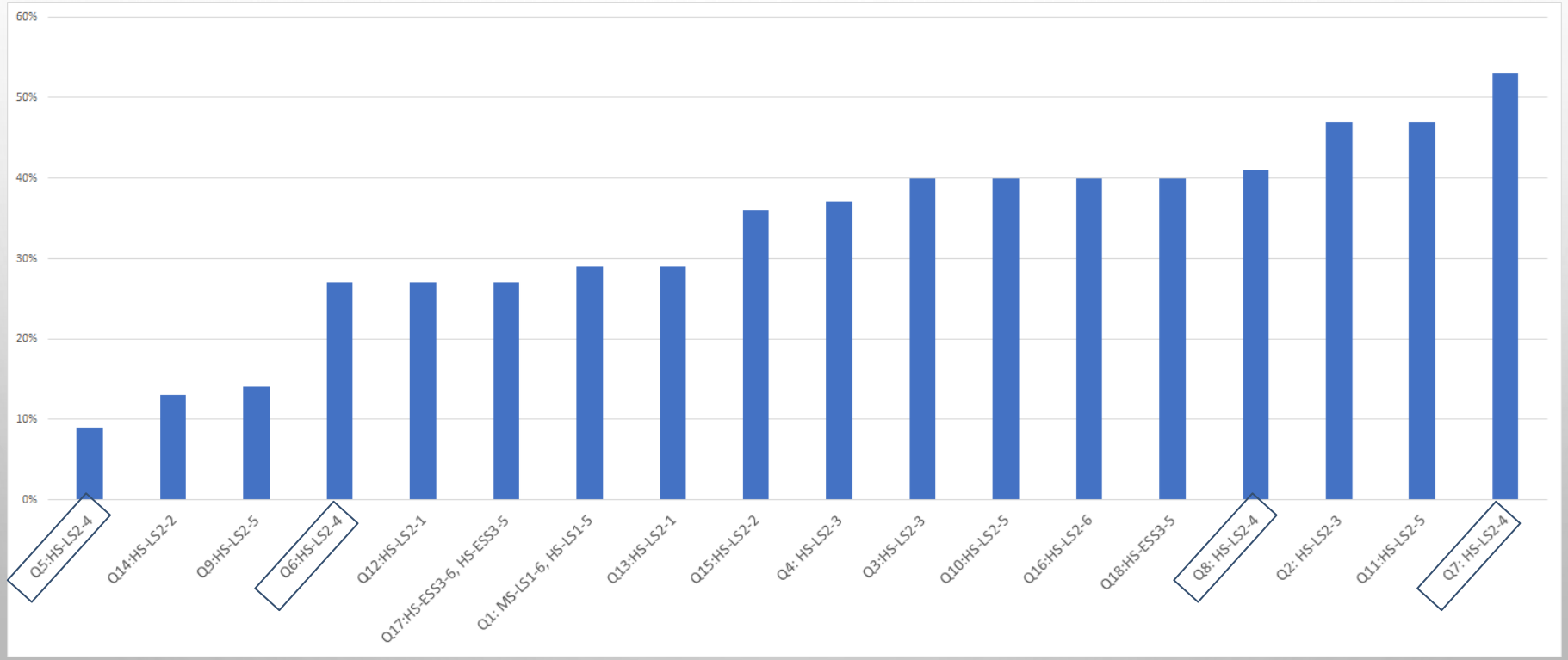


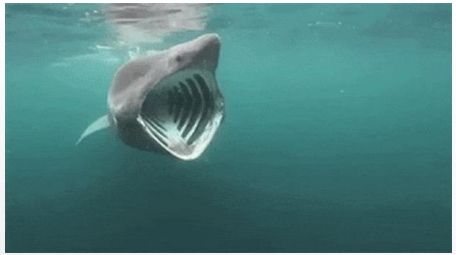
SEP/ CCC ANALYSIS



ITEM ANALYSIS



QUESTIONS 5-8



HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

IN THE ABOVE GIF, WE SEE A BASKING SHARK FILTERING WATER THROUGH ITS GIANT MOUTH. THESE CREATURES ARE THE SECOND LARGEST FISH IN THE WORLD AND THEY FEED ON PHOTOSYNTHETIC PHYTOPLANKTON AND SMALL PRIMARY CONSUMERS, SUCH AS ZOOPLANKTON, IN THE OCEAN.

A BASKING SHARK'S FULL STOMACH CAN FIT AROUND 1000 LBS OF MICROSCOPIC PLANKTON (SEEN BELOW), WHICH GIVES THE SHARK ABOUT 250,000 CALORIES. BASKING SHARKS CAN GROW TO BE UP TO 29 FT LONG AND CAN WEIGH UP TO 14,000 LBS. THE ONLY PREDATORS OF THIS ORGANISM ARE GREAT WHITE SHARKS AND KILLER WHALES.

AS YOU ANSWER THE QUESTIONS THAT FOLLOW, THINK ABOUT HOW MUCH ENERGY IS TRANSFERRED TO THE BASKING SHARK FROM ITS FOOD AND THE AMOUNT OF ENERGY THAT'S TRANSFERRED TO THE PREDATORS THAT CONSUME THE BASKING SHARKS

Q5: Organize the different organisms below from greatest biomass to least biomass that you'd expect to find in the ecosystem_____ <--greatest _____ _____ _____biomass <--least biomass

great white shark | phytoplankton | zooplankton | basking shark

Q6: If a basking shark eats 100% phytoplankton (producers) in one day, approximately what percentage of the Sun's energy is the basking shark able to use?

a. 1%
b. 10%
c. 30%
d. 50%

Q7: Draw a model to show the percentage of energy that moves along this path: 1] Starting with 100% energy from the Sun 2] Used by plankton 3] Eaten by a basking shark 4] Eaten by a great white shark.

Q8: Explain how your model shows the percentages of energy from the Sun's energy that is taken into plankton, eaten by the basking shark, and is then eaten by a great white shark.

HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

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b. 10%
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d. 50%

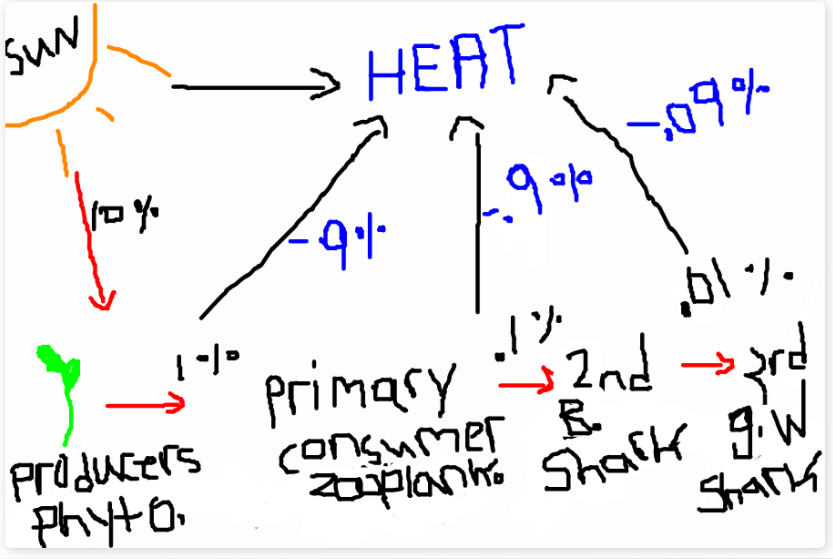
Q5: THIS QUESTION ASKS STUDENTS STUDENTS TO USE INFORMATION FROM THE PASSAGE AND APPLY THEIR KNOWLEDGE OF THE RELATIONSHIP BETWEEN TROPHIC LEVELS AND BIOMASS TO SEQUENCE THE ORGANISMS LISTED.

Q6: THIS QUESTION ASKS STUDENTS TO RECALL THAT 10% OF THE TOTAL ENERGY STORED IN AN ORGANISM IS TRANSFERRED TO THE NEXT TROPHIC LEVEL.

RECOMMENDATION: REVIEW ENERGY TRANSFER WITHIN ECOSYSTEMS USING SCENARIOS, MODELING, AND MATHEMATICAL RELATIONSHIPS. THIS PARTICULAR EXAMPLE SET SHOULD BE REVISITED DURING SYNCHRONOUS INSTRUCTION TO FACILITATE CLASS DISCUSSION. INTERESTING RELATED PHENOMENA MAY BE THE IMPACT OF THE MEAT INDUSTRY ON THE ENVIRONMENT. STUDENTS COULD CONSTRUCT A CER RESPONSE IN SUPPORT OF OR OPPOSING MANDATORY VEGETARIANISM.

Q7: Draw a model to show the percentage of energy that moves along this path: 1] Starting with 100% energy from the Sun 2] Used by plankton 3] Eaten by a basking shark 4] Eaten by a great white shark.

Q8: Explain how your model shows the percentages of energy from the Sun's energy that is taken into plankton, eaten by the basking shark, and is then eaten by a great white shark.



100% of the Sun's energy goes to the plankton, which only use 10% of it.
The basking shark can only use 10% of the plankton's energy, which means it can use 1% of the Sun's energy.
The great white shark can only use 10% of the basking shark's energy, which means it only uses 0.1% of the Sun's energy.

Teacher did not score this student's response. Inconsistency in grading likely impacted our ability to analyze open ended response data.

8 Explain how your model shows the percentages of energy from the Sun's energy that is taken into plankton, eaten by the basking shark, and is then eaten by a great white shark.

This model shows the percentages of energy from the sun to the great white. This is because with the sun's energy 90% of it goes to heat and the 10% of it goes to the producers, the phytoplankton. Then as the phytoplankton has 10% of the sun's energy, as that energy transfers on to the zooplankton 9% of that is lost to heat, meaning that the zooplankton gets 1% of the sun's energy, and also means that the Basking Shark would as well if it were to taking the spot of the primary consumer and eat 100% of the phytoplankton, as said in question 6. Then, as the zooplankton goes to give energy to the secondary consumer, the Basking Shark, they will lose .9% of the energy and the Basking shark would receive .1% of the sun's energy. Lastly, as the basking shark leaves behind .09% of their energy to heat, the tertiary consumer, the Great White Shark, would receive .09% of the sun's energy.

Score:
Feedback:

DISTRICT-WIDE TRENDS & RECOMMENDATIONS

FINDINGS

- Focuso on planning & carrying out investigations and analyzing & interpreting data- need for PD and vertical alignment
- Q1/ Q2 comparisons of SEPS and CCCS indicate growth at 10 of 16 available data points.
- Prerequisite standards- there is a need for pre-assessment of previous grade band PEs. If students have forgotten or never mastered content from prior years, components of the current standard will be inaccessible to them (4 out of 5 exams indicate that prior grade band pes were within the bottom 25% of standards assessed)
- Inconsistent scoring of open ended responses/ modeling questions
- There is a need for cross-curricular collaboration and professional development to establish consistency and common expectations across the district.
- Average scores for every tested grade improved when comparing Q1 to Q2 interim data.

INTERIM 3 ASSESSMENT (SAMPLE)

	In Progress/Current
	To Be Reassessed
	To Be Pre-Assessed
	Developing/Showing Progress
	Taught in a prior grade/course

Platform(s)	Standards Assessed	Duration
InnerOrbit	**Grade 5** Performance Expectations: • 5-PS1-1 • 5-PS1-2 • 5-PS1-3 • 5-PS1-4 • 5-ESS2-1 • 5-ESS2-2 • 5-ESS3-1 • 3-5-ETS1-3 SEP3 Planning and Carrying out Investigations SEP4 Analyzing and Interpreting Data SEP7 Engaging in Argument Based on Evidence CCC's (Patterns), (Stability and Change), (Scale, Proportion, and Quantity) (Cause and Effect), (Systems and System Models)	45 – 60 min; *may use an additional instructional period*

THANK YOU!