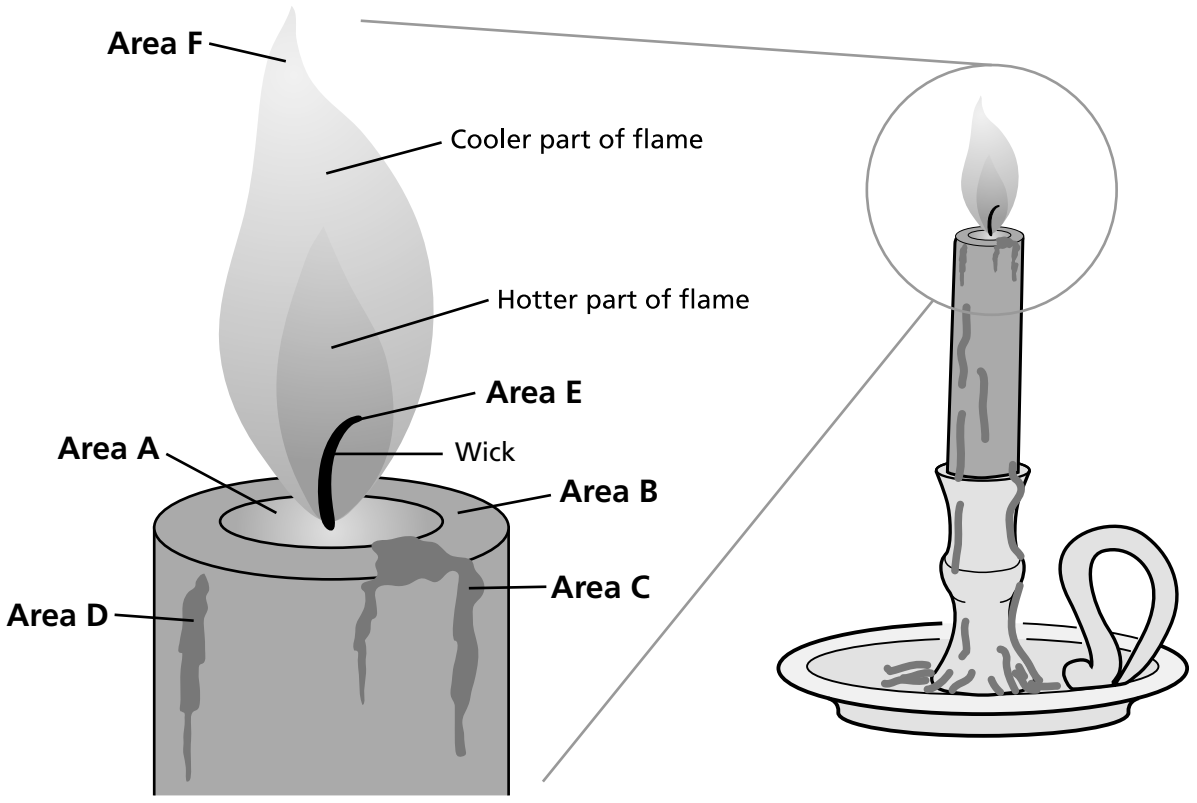
Kentucky Summative Assessments

Grade 7 Science
Released Items
2024

As students enter their classroom, they observe the teacher lighting the wick of a candle. As soon as the candle is lit, the teacher places the candle in a container and tightly seals the container. As the candle burns, they notice the wax melts, flows down the side, and changes back into a solid at the base. This is shown in the model the students drew.

The students recall that when you light a candle, the heat of the flame melts the wax near the wick. This liquid wax is then drawn up the wick by capillary action. The heat of the flame vaporizes the liquid wax (turns it into a hot gas) that combines with oxygen to form carbon dioxide and water vapor.



The candle is burned in a container that is tightly sealed. The mass of the candle is about 45 grams, and the mass of the container is about 505 grams. After a few minutes, the flame goes out.

The teacher reminds the students that what they are observing is a chemical reaction because a chemical change is occurring.

1 SC071625_01_4

In which one part of the model does chemical change **most likely** occur?

A Area A

B Area B

C Area D

D Area E

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 7
Science

Item: SC071625_01
Book Question Number: 1

Standard: 06-PS1-4, 07-PS1-2, 07-PS1-5

Item Type: MC
Key: D

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**21,511**	52%	0.52	24%	10%	14%	52%
Gender							
Female	**10,580**	52%	0.52	26%	9%	13%	52%
Male	**10,931**	52%	0.52	23%	11%	14%	52%
Ethnicity							
African American	**2,243**	44%	0.44	21%	15%	20%	44%
American Indian or Alaska Native	**22**	18%	0.18	68%	0%	14%	18%
Asian	**420**	52%	0.52	29%	7%	12%	52%
Hispanic or Latino	**1,867**	48%	0.48	24%	13%	15%	48%
Native Hawaiian or Pacific Islander	**44**	57%	0.57	16%	14%	14%	57%
White (non-Hispanic)	**15,806**	54%	0.54	25%	8%	13%	54%
Two or more races	**1,109**	52%	0.52	23%	11%	15%	52%
Migrant	**94**	39%	0.39	23%	12%	26%	39%
English Learner	**800**	44%	0.44	22%	16%	18%	44%
Economically Disadvantaged	**12,781**	50%	0.50	24%	11%	15%	50%
Students with Disabilities	**1,610**	45%	0.45	23%	11%	20%	45%

2

SC071625_02_3,1

How do the substances at Area B and Area F of the model compare?

Select the TWO **best** answers.

A They are different compounds.

B The kinetic energy is higher at B than F.

C The kinetic energy is higher at F than B.

D The substances at F contain new atoms.

E The substance at F is exactly the same as the substance at B.

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 7
Science

Item: SC071625_02
Book Question Number: 2

Standard: 06-PS1-4

Item Type: MS
Key: A,C

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Score Percentages		
				Score 0 (%)	Score 1 (%)	Score 2 (%)
All Students	**21,510**	62.0%	1.24	15%	46%	39%
Gender						
Female	**10,579**	61.5%	1.23	15%	46%	38%
Male	**10,931**	62.5%	1.25	15%	46%	40%
Ethnicity						
African American	**2,243**	53.0%	1.06	22%	50%	28%
American Indian or Alaska Native	**22**	56.8%	1.14	18%	50%	32%
Asian	**420**	69.9%	1.40	9%	42%	49%
Hispanic or Latino	**1,867**	58.4%	1.17	18%	47%	35%
Native Hawaiian or Pacific Islander	**44**	52.3%	1.05	18%	59%	23%
White (non-Hispanic)	**15,806**	63.7%	1.27	14%	45%	41%
Two or more races	**1,108**	59.4%	1.19	19%	43%	38%
Migrant	**94**	52.1%	1.04	24%	47%	29%
English Learner	**800**	49.2%	0.98	26%	51%	24%
Economically Disadvantaged	**12,781**	58.4%	1.17	18%	48%	34%
Students with Disabilities	**1,610**	52.2%	1.04	24%	48%	28%

3

SC071625_03_4

What one way do the particles in Area A of the model **most likely** compare to those in Area B?

A They are larger.

B They move slower.

C They are closer together.

D They have more kinetic energy.

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 7
Science

Item: SC071625_03
Book Question Number: 3

Standard: 07-PS1-2, 07-PS1-5

Item Type: MC
Key: D

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**21,508**	47%	0.47	6%	15%	32%	47%
Gender							
Female	**10,579**	47%	0.47	5%	14%	33%	47%
Male	**10,929**	47%	0.47	7%	15%	31%	47%
Ethnicity							
African American	**2,244**	40%	0.40	7%	18%	35%	40%
American Indian or Alaska Native	**22**	55%	0.55	5%	9%	32%	55%
Asian	**420**	59%	0.59	2%	12%	27%	59%
Hispanic or Latino	**1,867**	43%	0.43	6%	17%	34%	43%
Native Hawaiian or Pacific Islander	**44**	57%	0.57	0%	9%	34%	57%
White (non-Hispanic)	**15,804**	49%	0.49	6%	14%	31%	49%
Two or more races	**1,107**	44%	0.44	8%	16%	32%	44%
Migrant	**93**	53%	0.53	9%	16%	23%	53%
English Learner	**800**	40%	0.40	5%	21%	35%	40%
Economically Disadvantaged	**12,779**	43%	0.43	7%	16%	34%	43%
Students with Disabilities	**1,611**	43%	0.43	9%	16%	32%	43%

4 SC071625_04_3

Which one answer **best** explains why the candle wax solidifies in Area D?

A Particles speed up.

B Kinetic energy is added.

C Thermal energy is removed.

D Particles stop moving completely.

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 7
Science

Item: SC071625_04
Book Question Number: 4

Standard: 06-PS1-4

Item Type: MC
Key: C

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**21,508**	61%	0.61	12%	11%	61%	16%
Gender							
Female	**10,577**	63%	0.63	12%	10%	63%	15%
Male	**10,931**	59%	0.59	13%	11%	59%	17%
Ethnicity							
African American	**2,242**	48%	0.48	16%	17%	48%	19%
American Indian or Alaska Native	**22**	45%	0.45	14%	32%	45%	9%
Asian	**420**	65%	0.65	10%	6%	65%	18%
Hispanic or Latino	**1,867**	52%	0.52	14%	14%	52%	19%
Native Hawaiian or Pacific Islander	**44**	36%	0.36	27%	16%	36%	20%
White (non-Hispanic)	**15,804**	64%	0.64	11%	9%	64%	15%
Two or more races	**1,109**	59%	0.59	12%	10%	59%	18%
Migrant	**94**	52%	0.52	16%	17%	52%	15%
English Learner	**799**	38%	0.38	19%	21%	38%	22%
Economically Disadvantaged	**12,778**	56%	0.56	14%	13%	56%	18%
Students with Disabilities	**1,610**	47%	0.47	16%	18%	47%	19%

SC071625_00a

After the candle inside the sealed container stopped burning, the teacher measured the mass of the container and candle together. She then measured the mass of the unburned part of the candle alone.

5

SC071625_05_2

Which one answer **best** explains why the candle burns out within a few minutes of being placed in the closed container?

A The water released by combustion cools and puts out the flame.

B One of the substances needed for the reaction is no longer available, so the reaction stops.

C The energy released by the flame is trapped by the container, and it becomes too hot for the reaction to continue.

D The glass container absorbs the heat of the flame, causing the combustion reaction to slow down and then stop completely.

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 7
Science

Item: SC071625_05
Book Question Number: 5

Standard: 07-PS1-5

Item Type: MC
Key: B

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**21,506**	45%	0.45	6%	45%	19%	30%
Gender							
Female	**10,575**	40%	0.40	6%	40%	20%	34%
Male	**10,931**	50%	0.50	7%	50%	18%	25%
Ethnicity							
African American	**2,243**	31%	0.31	8%	31%	28%	33%
American Indian or Alaska Native	**22**	50%	0.50	9%	50%	18%	23%
Asian	**420**	44%	0.44	6%	44%	17%	34%
Hispanic or Latino	**1,867**	34%	0.34	7%	34%	25%	35%
Native Hawaiian or Pacific Islander	**44**	32%	0.32	14%	32%	18%	36%
White (non-Hispanic)	**15,802**	49%	0.49	6%	49%	17%	28%
Two or more races	**1,108**	43%	0.43	7%	43%	20%	30%
Migrant	**94**	35%	0.35	3%	35%	33%	29%
English Learner	**799**	25%	0.25	7%	25%	34%	34%
Economically Disadvantaged	**12,776**	40%	0.40	7%	40%	22%	31%
Students with Disabilities	**1,610**	41%	0.41	9%	41%	23%	27%

6

SC071625_06_4

Which one answer **best** predicts the result of these measurements?

A Candle mass increased, total mass decreased

B Candle mass decreased, total mass increased

C Candle mass increased, total mass remained the same

D Candle mass decreased, total mass remained the same

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 7
Science

Item: SC071625_06
Book Question Number: 6

Standard: 07-PS1-5

Item Type: MC
Key: D

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**21,507**	43%	0.43	16%	27%	15%	43%
Gender							
Female	**10,576**	41%	0.41	16%	28%	15%	41%
Male	**10,931**	45%	0.45	16%	25%	15%	45%
Ethnicity							
African American	**2,242**	29%	0.29	20%	31%	20%	29%
American Indian or Alaska Native	**22**	41%	0.41	18%	18%	23%	41%
Asian	**420**	54%	0.54	9%	25%	12%	54%
Hispanic or Latino	**1,866**	35%	0.35	17%	31%	17%	35%
Native Hawaiian or Pacific Islander	**44**	43%	0.43	14%	23%	20%	43%
White (non-Hispanic)	**15,804**	45%	0.45	15%	26%	14%	45%
Two or more races	**1,109**	40%	0.40	16%	27%	17%	40%
Migrant	**94**	33%	0.33	18%	28%	21%	33%
English Learner	**799**	22%	0.22	21%	29%	28%	22%
Economically Disadvantaged	**12,778**	37%	0.37	18%	28%	17%	37%
Students with Disabilities	**1,609**	35%	0.35	18%	26%	21%	35%

7

SC071625_07b_3

Sofia wants to create a model illustrating the difference between the molecules of wax in the liquid state and the molecules of wax in the solid state. To accomplish this her model must be able to effectively represent which of these differences?

A change in particle mass

B change in molecule size

C change in particle spacing

D change in chemical composition

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 7
Science

Item: SC071625_07b
Book Question Number: 7

Standard: 06-PS1-4

Item Type: MC
Key: C

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**21,506**	34%	0.34	21%	14%	34%	31%
Gender							
Female	**10,578**	32%	0.32	22%	13%	32%	33%
Male	**10,928**	36%	0.36	20%	15%	36%	29%
Ethnicity							
African American	**2,243**	25%	0.25	24%	21%	25%	30%
American Indian or Alaska Native	**22**	27%	0.27	23%	18%	27%	32%
Asian	**420**	42%	0.42	18%	8%	42%	32%
Hispanic or Latino	**1,864**	26%	0.26	25%	14%	26%	35%
Native Hawaiian or Pacific Islander	**44**	39%	0.39	27%	14%	39%	20%
White (non-Hispanic)	**15,804**	36%	0.36	20%	13%	36%	31%
Two or more races	**1,109**	31%	0.31	22%	17%	31%	31%
Migrant	**94**	23%	0.23	22%	20%	23%	34%
English Learner	**797**	19%	0.19	29%	19%	19%	34%
Economically Disadvantaged	**12,777**	30%	0.30	22%	16%	30%	32%
Students with Disabilities	**1,609**	28%	0.28	21%	20%	28%	30%

SC071625_00b

After their experiments, the teacher relit the candle and allowed it to burn until it was no longer visible and the flame went out. John, one of the students, made a comment about the candle being "all burned up." Another student, Sofia, remarked that the candle really was still in the room, but that it just wasn't a candle anymore.

8

SC071625_08

Explain why Sofia's comment is supported by the Law of Conservation of Matter. Describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned.

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 7
Science

Item: SC071625_08
Book Question Number: 8

Standard: 07-PS1-5

Item Type: ER
Key: Rubric

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Score Percentages				
				Score 0 (%)	Score 1(%)	Score 2 (%)	Score 3 (%)	Score 4 (%)
All Students	**20,627**	21.3%	0.85	40%	39%	17%	3%	0%
Gender								
Female	**10,245**	22.2%	0.89	39%	39%	18%	4%	1%
Male	**10,382**	20.5%	0.82	41%	40%	16%	3%	0%
Ethnicity								
African American	**2,028**	12.0%	0.48	61%	31%	7%	1%	0%
American Indian or Alaska Native	**21**	20.2%	0.81	38%	43%	19%	0%	0%
Asian	**411**	29.1%	1.17	26%	40%	26%	7%	1%
Hispanic or Latino	**1,770**	17.2%	0.69	47%	39%	13%	2%	0%
Native Hawaiian or Pacific Islander	**43**	17.4%	0.70	51%	33%	12%	5%	0%
White (non-Hispanic)	**15,306**	23.1%	0.92	36%	41%	19%	4%	1%
Two or more races	**1,048**	17.7%	0.71	47%	37%	13%	2%	0%
Migrant	**83**	13.0%	0.52	60%	28%	12%	0%	0%
English Learner	**714**	7.8%	0.31	73%	23%	3%	0%	0%
Economically Disadvantaged	**12,092**	17.6%	0.70	47%	38%	13%	2%	0%
Students with Disabilities	**1,481**	12.6%	0.50	60%	31%	8%	1%	0%

	Kentucky Academic Standards Science Rubric
Score Point	**Description**
4	There is evidence in this response that the student has a complete and thorough understanding of the multi-dimensional question as evidenced by their explanation of the phenomenon and/or solution to the problem. The response is complete, thorough and correct and based on appropriate knowledge and skills The response does not contain errors or flaws in logical thinking or those flaws are irrelevant to the accuracy of the answer The response reflects complete synthesis and understanding of complex ideas The response is completely coherent and based on effective application of relevant dimensions (SEP and/or DCI and/or CC) The response integrates a solution that is completely correct and based on the principles of engineering design (if applicable)
3	There is evidence in this response that the student has a general understanding of the multi-dimensional question as evidenced by their explanation of the phenomenon and/or solution to the problem. The response is generally complete and the question is answered using appropriate knowledge and skills The response may contain minor errors or flaws in logical thinking and those flaws may or may not be irrelevant to the accuracy of the answer The response reflects a general synthesis and understanding of complex ideas The response is generally coherent and based on application of relevant dimensions (SEP and/or DCI and/or CC) The response integrates a solution that is generally correct and mostly based on the principles of engineering design (if applicable).
2	There is evidence in this response that the student has a limited understanding of the multi-dimensional question as evidenced by their explanation of the phenomenon and/or solution to the problem. The response is partially complete and/or the question is answered using limited understanding of knowledge and skills The response may contain significant errors or flaws in logical thinking The response reflects a limited synthesis and understanding of complex ideas The response may or may not be coherent and based on some application of relevant dimensions (SEP and/or DCI and/or CC) The response integrates a solution that is partly correct and may or may not be based on the principles of engineering design (if applicable).
1	There is evidence in this response that the student has a minimal understanding of the multi-dimensional question as evidenced by their explanation of the phenomenon and/or solution to the problem. The response is minimal and/or the question is answered using minimal understanding of knowledge and skills The response may contain major significant errors or flaws in logical thinking The response reflects a minimal synthesis and understanding of complex ideas The response is not coherent or is not based on application of relevant dimensions (SEP and/or DCI and/or CC) The response integrates a solution that is minimally correct and may or may not be based on the principles of engineering design (if applicable).
0	There is no evidence that the student has an understanding of the material related to the question being asked in terms of science content and logical thinking skills. The response is blank, entirely incorrect and/or irrelevant.

Anchor Set

A1

So like if or when a candle don’t work the candle still a candle it don’t work any more because it dose not have wire thing anymore to work.

Anchor Annotation, Paper 1
Score Point 0

There is no evidence that the student has an understanding of how to explain why Sofia’s comment is supported by the Law of Conservation of Matter or how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The explanation does not contain any information relevant to the Law of Conservation of Matter and there is no model described.

A2

It is supposted because it is just burnt up and you really can't tell it's a candle which it is but, it isn't a candle because it is so burnt up and has lost most of it's wax.

Anchor Annotation, Paper 2
Score Point 0

There is no evidence that the student has an understanding of how to explain why Sofia’s comment is supported by the Law of Conservation of Matter or how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The explanation does not contain any information relevant to the Law of Conservation of Matter.

A3

The reason the candle has been burned out is the way that has been dryed up it been melted by the heat of the fire and it all go's down to the base of the candle.

Anchor Annotation, Paper 3
Score Point 0

There is no evidence that the student has an understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter or how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The explanation contains a description of the candle melting down but does not contain any information relevant to the Law of Conservation of Matter.

A4

It's supported because a pysical change happened to the wax. All that happend was the wax changed form it was still the same amount

Anchor Annotation, Paper 4
Score Point 1

There is evidence in this response that the student has a minimal understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The response is minimal and the question is answered using minimal understanding of knowledge and skills *(the wax changed form it was still the same amount*).

A5

Sofias comment is supported By the law of conservation of matter because no matter canw be created or destroyed

Anchor Annotation, Paper 5
Score Point 1

There is evidence in this response that the student has a minimal understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The response contains only an explanation of how and why the Law of Conservation of Matter applies, which does reflect minimal understanding (*because no matter can be created or destroyed*).

A6

Sofia is right because, after the candle burns it turns to chemicals or gas and the smell and atoms are all over the room after the waxs melted all the way off the wick its soild next you melt it more it turns to a gas.

Anchor Annotation, Paper 6
Score Point 1

There is evidence in this response that the student has a minimal understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The explanation contains minimally relevant information describing the changes that occur as the candle burns and how the mass of the candle remains in the room (*it turns to chemicals or gas and the smell and atoms are all over the room*). The response is hindered by a lack of connection of how the Law relates to the movement of the molecules around the room but does reflect minimal synthesis and understanding.

A7

The law of conservation of matter means that matter never is created or destroy it just changes form. The candle it was a solid but after it burned up it became a gas floating around in the air. That is why the candle, you can't see it pysically but you can feel the warmth it gave off.

Anchor Annotation, Paper 7
Score Point 2

There is evidence in this response that the student has a limited understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The response contains an explanation of how and why the Law of Conservation of Matter applies (*The law of conservation of matter means that matter never is created or destroy it just changes form*) along with information describing changes as the candle burns and how the candle remains in the room (*it was a solid but after it burned up it became a gas floating around in the air . . . you can't see it pysically*). The information regarding warmth is not relevant. Holistically, the response is partially complete and reflects limited understanding.

A8

Sofia's comment is supported by law of conservation. Because the candle really was still in the room because when the flame was there it was evaporating the candle to carbon dioxide as the text said the hot wax the heat of the flame vaporizes the liquid gas.

Anchor Annotation, Paper 8
Score Point 2

There is evidence in this response that the student has a limited understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The explanation supports Sofia's comment and includes some specific information about changes to the candle as it burns and the reason why it would remain in the room (*the candle really was still in the room because when the flame was there it was evaporating the candle to carbon dioxide as the text said the hot wax the heat of the flame vaporizes the liquid gas*). Holistically, the response reflects limited synthesis and understanding.

A9

The reason why the candle is still around in the room is because the law of consrevation of matter states that mass can not be created nor destroyed so the candle is just in a different form in the room like a gas.

Anchor Annotation, Paper 9
Score Point 2

There is evidence in this response that the student has a limited understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The explanation supports Sofia's comment and concisely connects that to a description of changes to the candle as it burns and the reason why it would remain in the room (*because the law of consrevation of matter states that mass can not be created nor destroyed so the candle is just in a different form in the room like a gas*). Compare this response to Anchor Paper 6, which does not connect the Law to the burning candle. Holistically, the response reflects limited synthesis and understanding.

A10

Sofias answer best describes this law, because the Law of Conservation of Matter states "matter can not be created nor destroyed" For example if you let a candle burn until the flame goes out the particles are still in the air (the wax just vaporized) so the mass of the candle still exist, it didnt just vanish like John claimed. Another example of this would be if you put water into a container and let it sit for a week. The water level would decrease but the water didnt just vanish it simply vaporized.

Anchor Annotation, Paper 10
Score Point 3

There is evidence in this response that the student has a general understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The response explains how the Law of Conservation of Matter applies (*matter can not be created nor destroyed*) along with specific information describing how the candle changes form and still remains in the room [*the particles are still in the air (the wax just vaporized) so the mass of the candle still exist, it didn't just vanish*]. A reasonable model is also provided (*if you put water into a container and let it sit for a week. The water level would decrease but the water didn't just vanish it simply vaporized*). Holistically, the response is generally correct, coherent and reflects general synthesis and understanding.

A11

The Low of Conservation of Matter explains that matter is neither created nor destroyed but only changes its form (solid, liquid, gas). Sofia commented that "The candle is still in the room, but it just isn't a candle anymore", this is supported by law which explains that matter only changes form, which is relivent to this situation. if i was to create a model I would describe how the candle had melted into a liquid state, and in that liquid state it was evaporated by the flames heat into gas. Therefore, Sofia is right, as the candles matter can't be destroyed (or created) because the law says so, the candle had only changed form.

Anchor Annotation, Paper 11
Score Point 3

There is evidence in this response that the student has a general understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The response explains how the Law of Conservation of Matter applies [*matter is neither created nor destroyed but only changes its form (solid, liquid, gas) . . . matter only changes form*] to support Sofia's comment. Some specific information is included by way of the model describing changes as the candle burns and how the candle remains in the room are provided in the model (*if i was to create a model I would describe how the candle had melted into a liquid state, and in that liquid state it was evaporated by the flames heat into gas*). Holistically, the response is generally complete and correct reflecting general synthesis and understanding.

A12

The mass of a burnt candle could still be in the room. When you burn a candle it starts out as a solid and as it burns turns to a liquid, and then finally to a gas. When transformed into a gas it releases into the air. You can never truely get rid of matter. Sofias comment, "the candle was still in the room, it just wasn't a candle anymore." Although the physical representation of the candle isn't there the particles from the candle have been released into the air in the form of a gas.

Anchor Annotation, Paper 12
Score Point 3

There is evidence in this response that the student has a general understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. A generally correct and specific explanation is provided to support Sofia's comment (*You can never truely get rid of matter*) and to explain the transformation of the candle while burning (*The mass of a burnt candle could still be in the room . . . it starts out as a solid and as it burns turns to a liquid, and then finally to a gas. When transformed into a gas it releases into the air*). A relevant and generally effective description provides some additional relevant information (*Although the physical representation of the candle isn't there the particles from the candle have been released into the air in the form of a gas*). Holistically, the response is a generally complete and correct reflecting general synthesis of complex ideas.

Sofia's comment is supported by the Law of Conservation of Matter because no matter can be created or destroyed.The candle had turned into H2O and CO2 through the chemical reaction of the flame burning. None of the wax or oxygen was lost, it just changed form.

Before the reaction, there was the air containing Oxygen (O2). The candle consists of Carbon (C) and hydrogen (H) (along with other substances). During the reaction, the oxygen and wax are being combined and heated up.

Anchor Annotation, Paper 13
Score Point 4

There is evidence in this response that the student has a complete and thorough understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The Law of Conservation of Matter is used as support for Sofia's comment (*no matter can be created or destroyed . . . it just changed form*). Relevant information is provided in the explanation and description focusing on the chemical reaction that results from the burning of the candle [*The candle had turned into H2O and CO2 through the chemical reaction of the flame burning. None of the wax or oxygen was lost, it just changed form. Before the reaction, there was the air containing Oxygen (O2). The candle consists of Carbon (C) and hydrogen (H) (along with other substances)*]. It is also made very clear how the matter that results from this chemical reaction remains in the room (*None of the wax or oxygen was lost, it just changed form*). Holistically, the strength of the description along with the specific information in the explanations reflect complete synthesis and understanding of the complex ideas associated with the question. Note the more specific reactant/product information in this response compared to Anchor Paper 12.

Sofia's comment is supported by the Law of Conservation of Matter, as the Law states that matter cannot be destroyed, it can only change phase or state. Sofia said that the candle was still in the room, but it wasn't a candle anymore. This is true, because the molecules of the candle dispersed due to the intense thermal heat that spaced out the atoms enough that the substance turned into what we would describe as a gas.

A model that would explain how the mass of the candle could still remain in the room after it has all been burned would show a close up view of the candle at a solid state, showcasing the atoms being grouped close together. Then, there would be a section of the model where the candle would start to get burnt, wherein the closeup would show the atoms slowly moving away from each other. Finally, there would be a section of the model where the candle was not visible anymore, but the closeup shows only a few atoms flying around where the candle was. The model would also show closeups of other parts of the room, where atoms from the candle would be shown.

Anchor Annotation, Paper 14
Score Point 4

There is evidence in this response that the student has a complete and thorough understanding of how to explain why Sofia's comment is supported by the Law of Conservation of Matter and how to draw or describe a model that explains how the mass of the candle could still remain in the room even after it has all been burned. The Law of Conservation of Matter is asserted (*the Law states that matter cannot be destroyed, it can only change phase or state*) to support Sofia's comment. Complete and correct information is provided to explain what happens as the candle burns (*the candle dispersed due to the intense thermal heat that spaced out the atoms enough that the substance turned into what we would describe as a gas*). A relevant model of the kinetic theory of matter is also described (*show a close up view of the candle at a solid state, showcasing the atoms being grouped close together . . . a section of the model where the candle would start to get burnt, wherein the closeup would show the atoms slowly moving away from each other . . . the closeup shows only a few atoms flying around where the candle was. The model would also show closeups of other parts of the room, where atoms from the candle would be shown*). Holistically, although it may contain minor errors that do not detract, the response contains all the information needed to reflect complete synthesis and understanding of the complex ideas associated with the question.

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