CALIFORNIA

Assessment of Student Performance and Progress

California Assessment of
Student Performance and Progress

California Science Test

Training Items Scoring Guide

Grade Eight, Braille

2018–19 Administration

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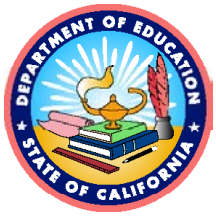

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Introduction to Training Test Answer Guide

This California Science Test (CAST) training items scoring guide offers details about the items, student response types, correct responses, and related scoring considerations for the included samples of training items. These items have been selected to show some of the new approaches to measuring the California Next Generation Science Standards (CA NGSS) that can be found in the assessment. The training test items are not fully representative of all possible item types included in the CAST, but additional samples will be provided over time. The samples cover a selection of items from performance expectations from grade eight.

The following information is presented along with each item:

Performance Expectations (PE) Code: References the assessable evidence statements of what students should know and be able to do.

Science and Engineering Practices (SEP): Descriptions of behaviors that scientists and engineers engage in as they investigate the natural world and design solutions, respectively.

Disciplinary Core Ideas (DCI): Essential ideas in the science disciplines that all students should understand.

Crosscutting Concepts (CCC): Interdisciplinary skills that unify the study of science and engineering through common application across fields.

Depth of Knowledge (DOK): A measure of complexity that considers the students' cognitive process in response to an item (There are four DOK levels, with 4 being the highest.)

Item-Level Claim Statement (ILCS): A brief statement that illustrates how an item aligns to the PE through at least two of the dimensions (An ILCS is included with each item to help item reviewers (1) identify the intent of the alignment, (2) determine if the alignment is appropriate and valid, and (3) identify the content reflected in item-level specifications.)

Item and Stimulus: Item represents the question being asked, while stimulus is supporting information, graphics, animation or simulation included with some items.

Answer Key: The expected student response or example response including score point value.

Rubric and Exemplar: Rubric explains what is needed for each score point. Exemplars give a sample response from a student.

While each item is aligned to a specific PE through its dimensions, certain items, based on their contexts, incorporate aspects of environmental literacy outlined in the Environmental Principles and Concepts adopted by the State Board of Education in 2004. The items in this training test are not fully representative of the full range of ways items can incorporate environmental literacy.

The training test items will include numbered instructional text preceding the first item.

Each item that follows has metadata as shown below. Metadata contains the specific information on the alignment of the item to the NGSS standards.The item number in the table preceding each sample item corresponds to the sequence number of the item as it appears in the training test.

Example of Metadata

Item	Grade	PE	SEP	DCI	CCC	DOK
2	8	MS-LS2-1	4. Analyzing and interpreting data	LS2.A Interdependent Relationships in Ecosystems	2. Cause and effect: mechanism and explanation	2

ILCS: Analyze data to predict changes to certain populations of organisms based on a change to the availability of one specific population of organism.

Environmental Principle II: The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

Grade Eight Braille Sample Items

Item	Grade	PE	SEP	DCI	CCC	DOK
2	8	MS-LS2-1	4. Analyzing and interpreting data	LS2.A Interdependent Relationships in Ecosystems	2. Cause and effect: mechanism and explanation	2

ILCS: Analyze data to predict changes to certain populations of organisms based on a change to the availability of one specific population of organism.

Environmental Principle II: The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

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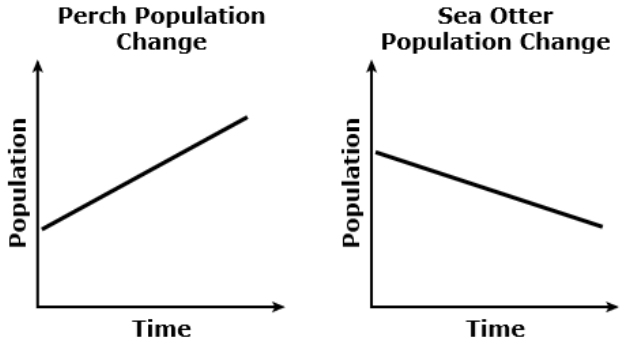
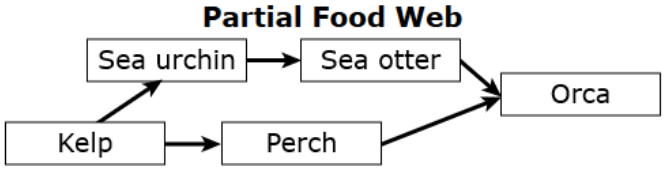
A student studies how populations in a kelp forest ecosystem off the coast of California are affected by changes in their food sources. The two graphs show that a change in a population of perch, a type of fish, also affects a population of sea otters.



The diagram shows a partial food web for the kelp forest ecosystem.



Use the graphs and the partial food web to predict the changes in the sea urchin and the kelp populations as the perch population increases.

Complete the sentence using the menus. Each of the three options in the menus can be used more than once; not all options may be used.

The sea urchin population will [ ], and the kelp population will [ ].

Key: First drop-down menu: decrease. Second drop-down menu: decrease.

Item	Grade	PE	SEP	DCI	CCC	DOK
3	8	MS-PS3-1	4. Analyzing and interpreting data	PS3.A Definitions of Energy	3. Scale, proportion, and quantity	2

ILCS: Analyze data to determine how to graph the data that best represent the purpose of the investigation.

A student conducts five trials to investigate factors affecting the formation of impact craters. The student drops a marble into a box filled with a fine powder.

The student does the following:

- Measures the mass (*m*) of the marble in grams (*g*)
- Drops the marble from different heights (*h*) in centimeters (cm)
- Measures the amount of time (*t*) in seconds (*s*) for the marble to drop
- Calculates the final speed (*v*) in meters per second (m/s) before impact
- Measures the depth (*d*) of each resulting crater in centimeters (cm)

3

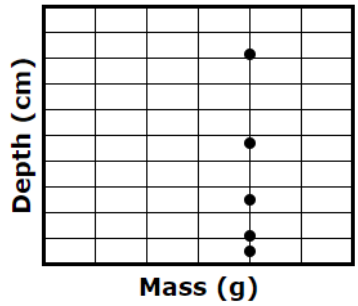
The table shows the results from all five trials.

Results of the Investigation

Trial	Mass (*m*) in g	Speed (*v*) in m/s	Depth (*d*) in cm
1	40	4.4	4.1
2	40	1.4	0.5
3	40	2.2	1.3
4	40	3.1	2.4
5	40	0.9	0.3

Which graph **best** shows the results of the investigation with the correct independent (*x*-axis) and dependent (*y*-axis) variables from the table?

Ⓐ



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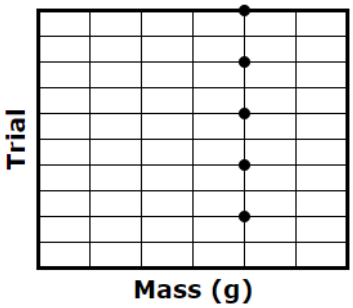

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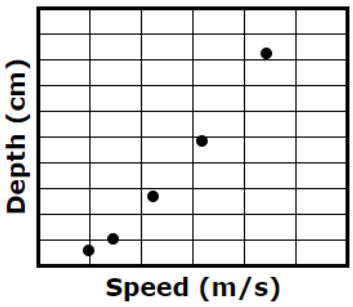

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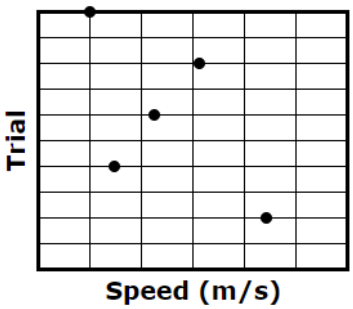


Key: C (1 point)

Item	Grade	PE	SEP	DCI	CCC	DOK
4	8	MS-PS3-1	4. Analyzing and interpreting data	PS3.A Definitions of Energy	3. Scale, proportion, and quantity	2

ILCS: Analyze data to determine what relationship the data are describing.

A student conducts five trials to investigate factors affecting the formation of impact craters. The student drops a marble into a box filled with a fine powder.

The student does the following:

- Measures the mass (m) of the marble in grams (g)
- Drops the marble from different heights (h) in centimeters (cm)
- Measures the amount of time (t) in seconds (s) for the marble to drop
- Calculates the final speed (v) in meters per second (m/s) before impact
- Measures the depth (d) of each resulting crater in centimeters (cm)

4

Which statement **best** describes the results from the investigation?

Ⓐ The kinetic energy of the marble just before impact is proportional to the depth of the crater it forms.

Ⓑ The kinetic energy of the marble just before impact is proportional to the mass of the marble.

Ⓒ The depth of the crater is proportional to the trial number of the investigation.

Ⓓ The depth of the crater is proportional to the mass of the marble.

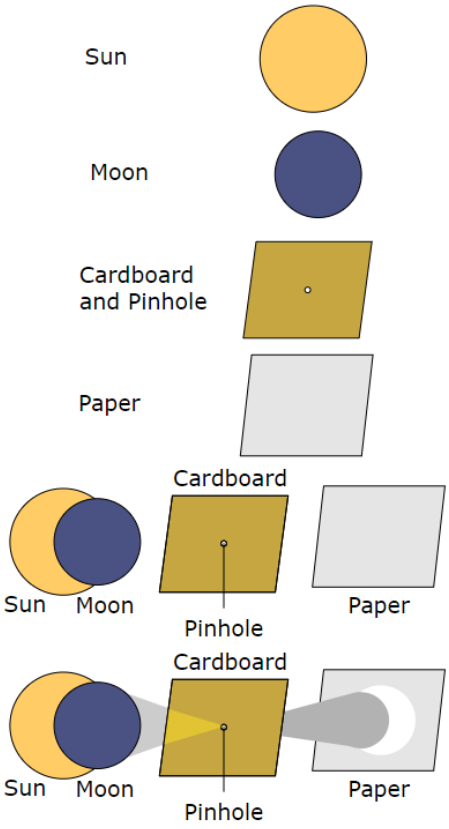
Key: A (1 point)

Item	Grade	PE	SEP	DCI	CCC	DOK
5	8	MS-ESS1-1	2. Developing and using models	ESS1.B Earth and the Solar System	1. Patterns	2

ILCS: Use the model shown to identify where the Moon would be to explain the pattern of the eclipse.

A class creates a pinhole projector to view a total solar eclipse from their location on Earth. Typically, light from the Sun passes through the pinhole to create a disk of light on a card. During an eclipse, the disk of light becomes a ring. The pinhole projector is shown.

Pinhole Projector Materials List



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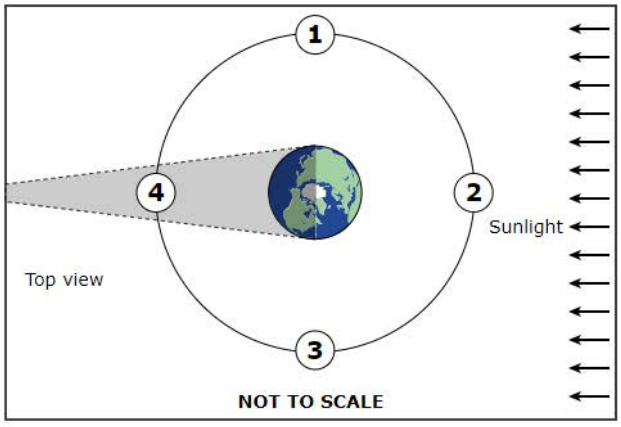
The class knows that the Moon is in the New Moon phase that day. The students create a model to show that the phase of the Moon explains why the disk becomes a ring. The students' model is shown.



Which location in the model supports the explanation that the New Moon phase explains why the disk becomes a ring?

Ⓐ Location 1

Ⓑ Location 2

Ⓒ Location 3

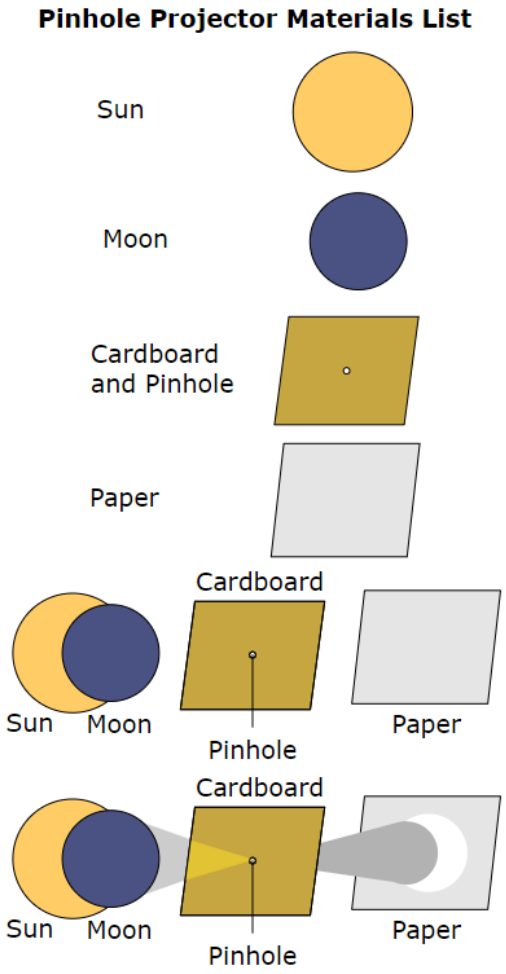
Ⓓ Location 4

Key: B (1 point)

Item	Grade	PE	SEP	DCI	CCC	DOK
6	8	MS-ESS1-1	2. Developing and using models	ESS1.B Earth and the Solar System	1. Patterns	3

ILCS: Use the model of the eclipse to identify a weakness in the model and propose a revision to improve the model.

A class creates a pinhole projector to view a total solar eclipse from their location on Earth. Typically, light from the Sun passes through the pinhole to create a disk of light on a card. During an eclipse, the disk of light becomes a ring. The pinhole projector is shown.



6

A student reviews the model and says that, based on the model, a solar eclipse should happen every time there is a New Moon. However, solar eclipses occur less often than New Moons.

Which feature of the model should be revised to **best** explain why solar eclipses do **not** happen every month?

Ⓐ The model should show that the shape of Earth's orbit around the Sun is an ellipse.

Ⓑ The model should show that the shape of the Moon's orbit around the Earth is an ellipse.

Ⓒ The model should show that Earth's equator is inclined relative to the plane of Earth's orbit around the Sun.

Ⓓ The model should show that the plane of the Moon's orbit around the Earth is inclined relative to the plane of Earth's orbit around the Sun.

Key: D (1 point)

The following stimulus accompanies grade eight items numbered 7 and 8 in the training test.

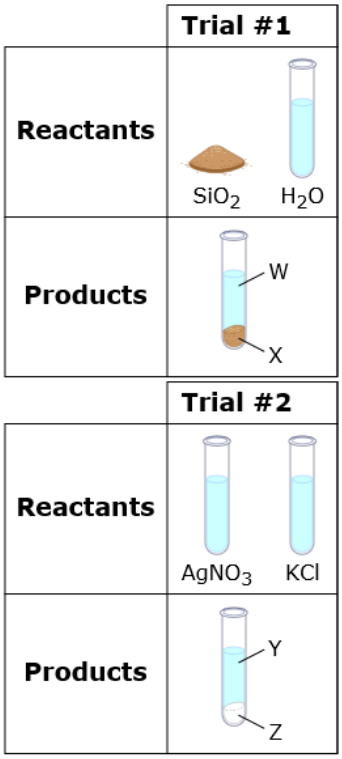
In this performance task, you will answer six questions.

Leah is learning to use properties of substances to identify a chemical reaction. She conducts two trials.

For the first trial, she pours silicon dioxide (SiO_2) into water (H_2O).

For the second trial, she pours a silver nitrate $(AgNO_3)$ solution into a test tube with a solution of potassium chloride (KCl). The diagram shows the reactants and products for both trials.

Reactants and Products



Leah records the properties of these substances before each trial. She also records the properties of the unknown products after the trial. The tables show some of the properties for each substance before and after the trials.

Table 1: Properties Before the Trials

Used in Trial #	Substance	State of Matter	Mass (g)	Color
1	H_2O	Liquid	10.0	Colorless
1	SiO_2	Solid	5.0	Tan
2	KCl	Liquid	12.5	Colorless
2	$AgNO_3$	Liquid	25.5	Colorless

Table 2: Properties After the Trials

Resulted from Trial #	Substance	State of Matter	Mass (g)	Color
1	W	Liquid	10.0	Colorless
1	X	Solid	5.0	Tan
2	Y	Liquid	16.5	Colorless
2	Z	Solid	21.5	White

Item	Grade	PE	SEP	DCI	CCC	DOK
7	8	MS-PS1-2	4. Analyzing and interpreting data	PS1.B Chemical Reactions	1. Patterns	2

ILCS: Analyze the substance property data from the two trials to determine which trial had a chemical reaction.

7

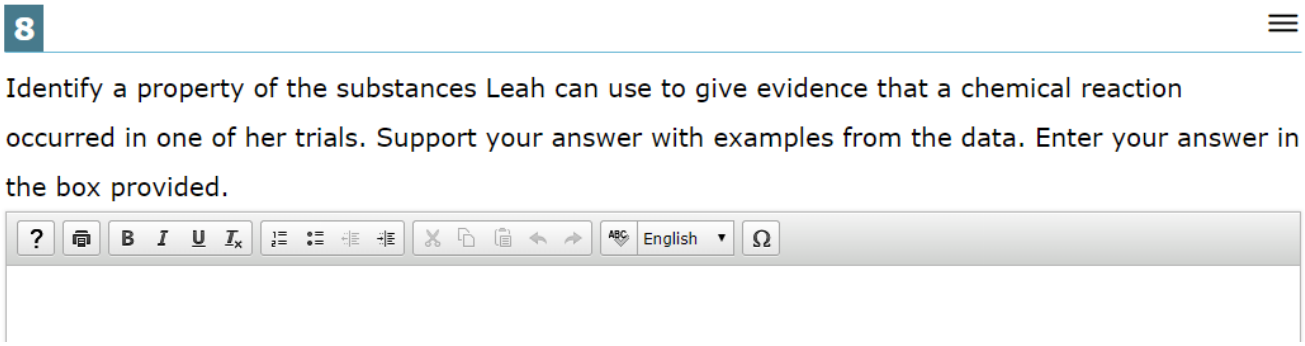
Leah determines that a chemical reaction occurred in one of her trials. Click the terms that **best** complete the sentence.

A chemical reaction occurred in Trial [▾] because substances [▾] have properties that are [▾] the reactants.

Key: First drop-down menu: #2. Second drop-down menu: Y and Z. Third drop-down menu: different from (1 point)

Item	Grade	PE	SEP	DCI	CCC	DOK
8	8	MS-PS1-2	4. Analyzing and interpreting data	PS1.B Chemical Reactions	1. Patterns	2

ILCS: Analyze the substance property data from the two trials to determine which two properties to use to decide whether a trial had a chemical reaction.



1 point

Exemplar(s):

"States of matter because substance Z is a solid not a liquid like the reactants." OR

"States of matter because $AgNO_3$ and KCl are colorless liquids and when mixed result in a white solid, substance Z."

Rubric:

The student response should contain information on:

States of matter OR

Substance Z being a different state of matter than either reactant for trial #2 OR

Color OR

Silver nitrate being a clear color and Substance Z being a white color

0 points

Exemplar(s):

"Substances Y and Z from Trial #2 have different masses than the reactants, which indicates a chemical reaction."

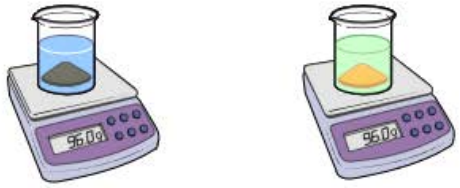
Rubric:

The student attempts to answer the prompt but is incorrect.

The following stimulus accompanies grade eight items numbered 9 through 12 in the training test.

Leah conducts another investigation by placing iron filings (Fe) in a solution of copper (II) sulfate ($CuSO_4$), which produces copper (Cu) and iron (II) sulfate ($FeSO_4$). She notices in the first investigation that the total mass remained the same from start to finish. She wonders if this will be true for this reaction. She combines the substances in a beaker on a digital balance. The images show the start and finish of this reaction.

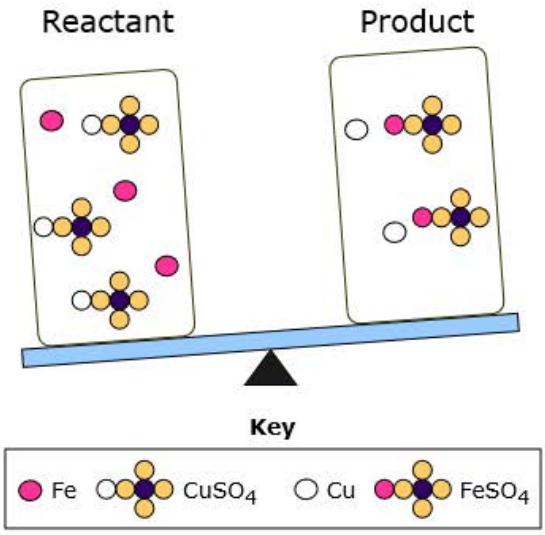
Fe and $CuSO_4$ Chemical Reaction



Start **Finish**

Leah observes that the total mass did not change. She makes a model to help explain why the total mass did not change.

Leah's Model



Item	Grade	PE	SEP	DCI	CCC	DOK
9	8	MS-PS1-5	2. Developing and using models	PS1.B Chemical Reactions	5. Energy and matter: Flows, cycles, and conservation	2

ILCS: Evaluate a model of a chemical reaction to determine why it is not showing that mass is conserved.

9

While sharing her model with a classmate, Leah realizes it needs improvements. Click the terms that **best** describe why Leah's model needs improvements.

Leah's model needs to be improved because the [▾] of each type of atom for the products is [▾] the reactants.

Key: First drop-down menu: number; Second drop-down menu: different from (1 point)

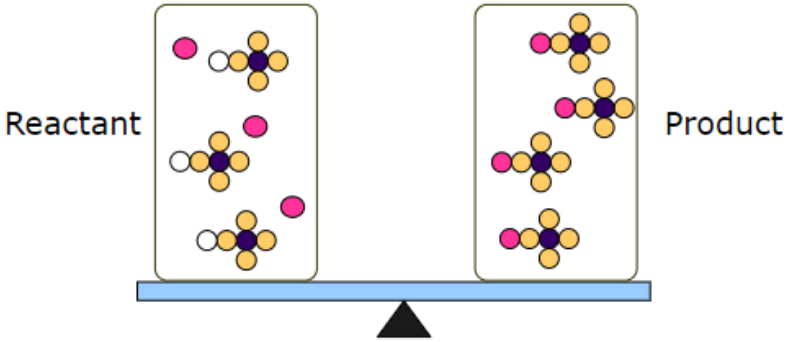
Item	Grade	PE	SEP	DCI	CCC	DOK
10	8	MS-PS1-5	2. Developing and using models	PS1.B Chemical Reactions	5. Energy and matter: Flows, cycles, and conservation	2

ILCS: Use the model to show why the mass for the chemical reaction is conserved.

10

Which model shows the correct product side that will improve Leah's model?

Ⓐ



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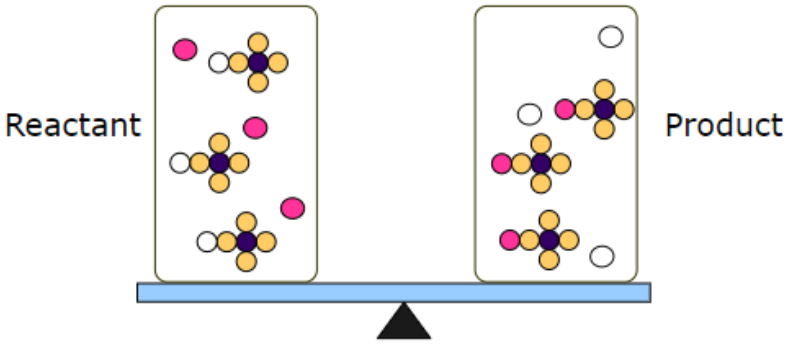

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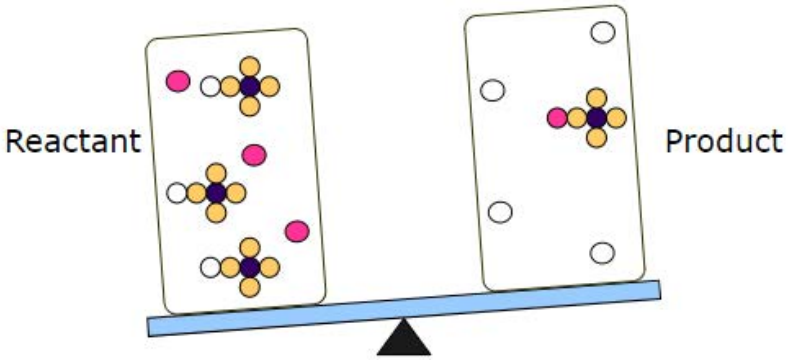

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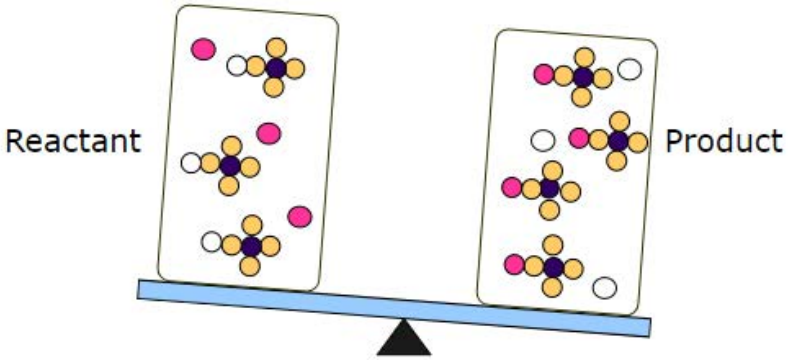

Key: B (1 point)

Item	Grade	PE	SEP	DCI	CCC	DOK
11	8	MS-PS1-5	2. Developing and using models	PS1.B Chemical Reactions	5. Energy and matter: Flows, cycles, and conservation	3

ILCS: Describe changes to the model of a chemical reaction that will still show mass is conserved based on a given scenario.

11

Leah repeats the reaction and adds a greater mass of Fe than before. The total mass of the products of the system did not change during the reaction, and the additional mass of Fe remained unreacted.

Select the **two** changes to the model that will correctly show how the reaction proceeded with a greater mass of Fe.

- ☐ unreacted Fe on the product side of the model
- ☐ a decreased amount of Cu on the product side of the model
- ☐ an increased amount of Fe on the reactant side of the model
- ☐ an increased amount of $FeSO_4$ in the product side of the model
- ☐ a decreased amount of $CuSO_4$ and an increased amount of Fe on the reactant side of the model

Key: First and third options (1 point)

Item	Grade	PE	SEP	DCI	CCC	DOK
12	8	MS-PS1-5	2. Developing and using models	PS1.B Chemical Reactions	5. Energy and matter: Flows, cycles, and conservation	2

ILCS: Describe how the model also shows a chemical reaction happened.

12

Leah's model can also be used to show that a chemical reaction occurred because the products

Ⓐ are the same size as the reactants.

Ⓑ have the same composition as the reactants.

Ⓒ are at different states of matter compared to the reactants.

Ⓓ have differently arranged atoms compared to the reactants.

Key: D (1 point)