Tennessee Comprehensive Assessment Program

TCAP

Science
Grade 5 Test Practice

TN Department of Education

Metadata—Science

Items

Page Number	Cluster (N/A for Standalone items)	Grade	Item Type	Key	TN Standards	SEP	CCC
1	N/A	5	MC	B	5.PS2.3	CEDS	SYS
2	N/A	5	MS	C, D	5.ESS1.2	DATA	SPQ
3	N/A	5	MC	C	5.LS3.1	DATA	CE
4	N/A	5	MS	A, C, D	5.LS4.1	ARGS	SC
5	N/A	5	MC	C	5.PS2.4	DATA	PAT
6	N/A	5	MS	B, C	5.PS1.3	ARGS	CE
8	N/A	5	MC	D	5.ESS1.5	MOD	PAT
11	Mixtures and Changes in Properties	5	MC	C	5.PS1.2	MATH	EM
12	Mixtures and Changes in Properties	5	MC	A	5.PS1.2	ARGS	EM
13	Mixtures and Changes in Properties	5	MC	D	5.PS1.2	CEDS	EM
14	Mixtures and Changes in Properties	5	MC	C	5.PS1.2	DATA	EM
15	Mixtures and Changes in Properties	5	MC	D	5.PS1.3	ARGS	-
16	N/A	5	MC	C	5.ESS1.6	INV	SYS
17	N/A	5	MC	B	5.LS3.2	DATA	-
18	N/A	5	MC	D	5.PS1.1	MOD	EM

Metadata Definitions

Grade	Grade level or Course.
Item Type	Indicates the type of item. MC= Multiple Choice; MS= Multiple Select
Key	Correct answer.
TN Standards	Primary educational standard assessed.
SEP	SEP Science and Engineering Practices: These are the essential practices of scientists and engineers which help students figure out explanations for phenomena or solutions for design problems.
CCC	CCC Cross Cutting Concepts: These are concepts that permeate all science disciplines and provide a lens through which students can apply their science ideas to phenomena or design problems.

00. Students in Africa, Australia, and North America each dropped a 10-gram bag of sand to determine the behavior of the sandbag. Each bag of sand fell straight down to the ground. The table shows additional data the students collected for their sandbag investigation.

Sandbag Drop Investigation

Sandbag Property	Africa	Australia	North America
Time to fall to ground (seconds)	0.5	0.5	0.5
Speed (meters/ second)	9.8	9.8	9.8
Appearance of sand	Fine-texture white grains	Course beige and brown grains	Course yellow, white, and pink grains
Air temperature (degrees Fahrenheit)	81	73	65

Based on the information, which statement **best** explains the behavior of the sandbag at each location?

A. Gravity pushes objects toward the center of Earth at the same speed in the same amount of time.

B. Gravity pulls objects of the same mass toward the center of Earth in the same way.

C. Gravity acts differently on objects that appear different from one another.

D. Gravity acts differently on objects that are at different temperatures.

00. The table shows the sizes and types of galaxies that can be found in the universe. A light-year is the distance it takes light to travel in one year.

Galaxy Data

Galaxy	Type of Galaxy	Size (distance across in light-years)	Distance from Earth (million light-years)
Milky Way	Spiral	100,000	—
Galaxy W	Elliptical	104,000	318
Galaxy X	Elliptical	500,000	760
Galaxy Y	Spiral	220,000	2.5
Galaxy Z	Spiral	33,000	20

Which **two** statements **best** compare the relationships between the Milky Way galaxy with the other galaxies listed in the table?

A. Galaxy Y is closer to Earth than the Milky Way galaxy, and its stars are arranged together at its center like the Milky Way galaxy.

B. The stars in Galaxy X and Galaxy W are arranged into arms that rotate around the galaxy's center like the Milky Way galaxy.

C. Galaxy W is similar in size to the Milky Way galaxy, and Galaxy W is farther from Earth than the Milky Way galaxy.

D. The stars in Galaxy Y and Galaxy Z are arranged in a similar way as the stars in the Milky Way galaxy.

E. Both Galaxy W and Galaxy X are similar in size to the Milky Way galaxy.

00. The table shows information that scientists collected about green sea turtle hatchlings that came from three different nests. Each nest had 100 green sea turtle eggs and had a different typical temperature. Temperature was measured in degrees Celsius (°C).

Characteristics of Green Sea Turtles from Different Temperature Nests

Observations	27°C Nest	29°C Nest	31°C Nest
Typical hatchling body length (centimeters)	5.1	4.9	5.0
Typical hatchling mass (grams)	227	224	229
Number of female hatchlings	0	46	100
Number of hatchlings with hard shells	100	100	100

Which characteristic of green sea turtle hatchlings was **most** affected by their interaction with the environment?

A. the typical hatchling body length

B. the typical hatchling mass

C. the number of female hatchlings

D. the number of hatchlings with hard shells

00. The table shows data some scientists collected about two groups of young lemon sharks between 1998 and 1999. Length was measured in centimeters (cm) and mass was measured in kilograms (kg).

Lemon Shark Data

Characteristic	Group 1 Sharks		Group 2 Sharks	
	1998	**1999**	**1998**	**1999**
Typical length (cm)	48	48	54	56
Typical mass (kg)	1.4	1.3	1.8	2.0
Survival rate (out of 100)	56	61	51	41

The scientists claim that smaller lemon sharks are more likely to survive than larger lemon sharks. Which **three** pieces of evidence from the table **best** support the scientists' claim?

A. In both years, Group 1 sharks were smaller and had a higher survival rate than Group 2 sharks.

B. In each year, more Group 2 sharks had a shorter typical length and had a lower mass than the Group 1 sharks.

C. Group 2 sharks in 1998 had a shorter typical length and had a higher survival rate than Group 2 sharks in 1999.

D. Group 1 sharks in 1999 had a lower mass and had a higher survival rate than Group 1 sharks in 1998.

E. Group 1 and Group 2 had higher survival rates in 1998 compared to 1999.

00. The table shows data for a student who rode a sled down different snow-covered hills. Hill height was measured in meters (m) and sled speed was measured in meters per second (m/s).

Sled Data

Hill	Hill Height (m)	Sled Speed (m/s)
W	13	16.0
X	10	14.0
Y	7	12.0
Z	4	?

Based on the data in the table, at which speed was the sled **most likely** going down Hill Z?

A. 18.0 m/s

B. 12.0 m/s

C. 10.0 m/s

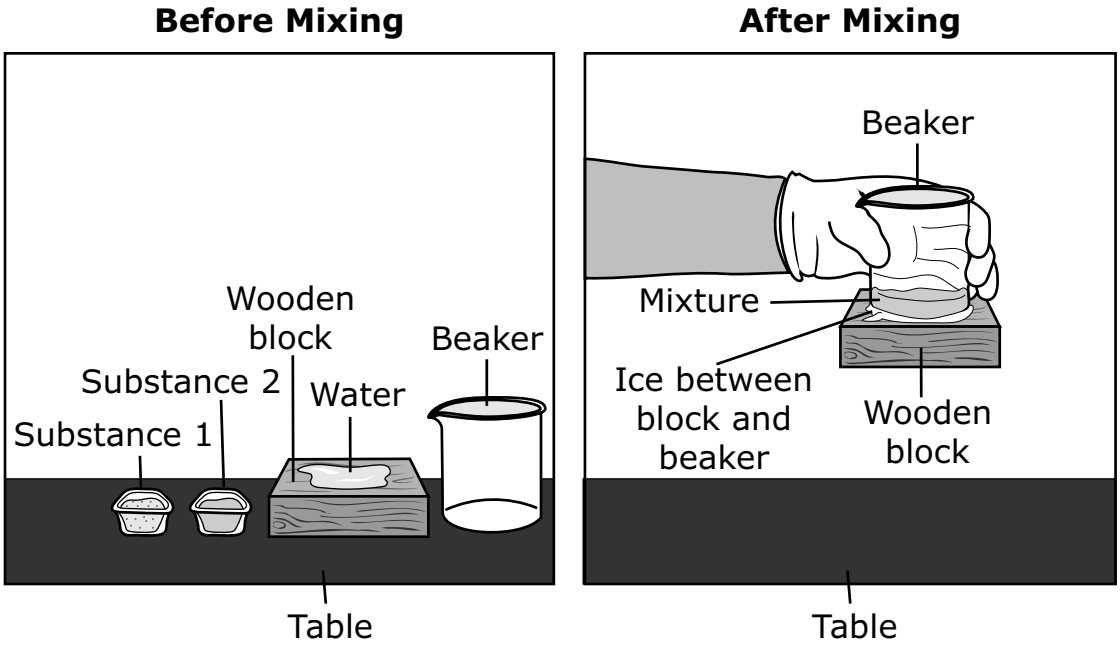
D. 6.0 m/s

00. Students want to determine whether mixing two powdered solids creates a change in the properties of those substances. The teacher shows the students a demonstration**:**

- The teacher places a wooden block on the table and pours a small amount of water on the block.
- Then the teacher takes a beaker and places it on the wet wooden block.
- The teacher mixes two powdered solid substances in the beaker, forming a mixture.
- After 30 seconds, the teacher lifts the beaker, and the wooden block is frozen to the bottom of the beaker.

The figure shows the demonstration before and after the powdered solids are mixed.

Mixing Powdered Solids Demonstration



The table shows the properties of the substances and the mixture. Temperature is measured in degrees Celsius (°C).

Mixing Powdered Solids Data

Property	Substance 1	Substance 2	Mixture
Mass (grams)	20.00	10.00	30.00
Appearance	Solid	Solid	Liquid
Temperature (°C)	24	24	Below 0

Based on the data, which **two** pieces of evidence support the claim that the properties of the two substances changed?

A. The mass increased by the end of the investigation.

B. The temperature decreased by the end of the investigation.

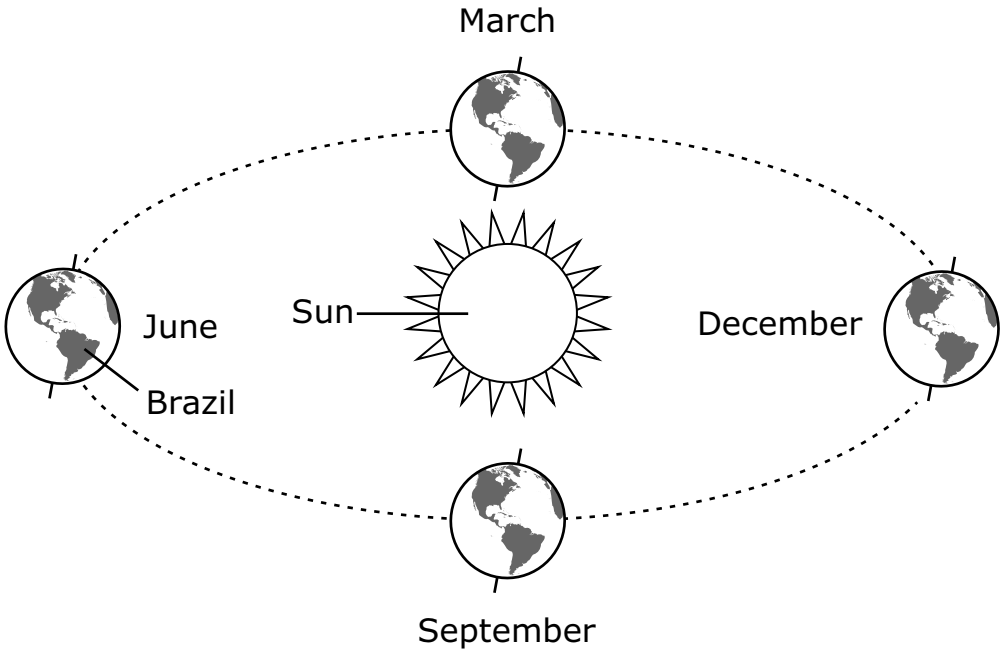
C. Substance 1 and Substance 2 were solids that formed a liquid after mixing.

D. The mass of the two solids is equal to the mass of the liquid.

E. The temperature of each solid was 24°C in the beaker.

00. As Earth revolves around the sun, different parts of the planet experience different seasons. The figure shows where the country of Brazil is located on Earth as well as the movement of Earth around the sun.

Movement of Earth around the Sun



Based on the model, which season does Brazil experience during June?

A. fall, because Earth revolves around the sun

B. spring, because rays of light from the sun travel in straight lines

C. summer, because there is more daylight than darkness during this time

D. winter, because that portion of Earth is tilted away from the sun

Questions XX–XX refer to the passage(s) and image(s) shown.

Mixtures and Changes in Properties – Part 1

Students complete investigations to determine how two substances interact with each other. Table 1 shows the students' investigation using water and sugar in a bottle.

Table 1. Water and Sugar Investigation

Type of Data	Before Mixing		After Mixing
Substance	Water	Sugar	Mixture
Mass (grams)	101	3	104
Observations	Clear liquid	Solid, white crystal	Clear liquid with no visible solid

Table 2 shows the students' investigation using milk and vinegar.

Table 2. Milk and Vinegar Investigation

Type of Data	Before Mixing		After Mixing
Substance	Milk	Vinegar	Mixture
Mass (grams)	80	2	?
Observations	White liquid with no smell	Clear liquid with a sour smell	Light-yellow liquid with lumps and a strong spoiled smell

Mixtures and Changes in Properties – Part 2

One student claims that every combination of substances results in a change of properties. The students complete additional investigations to gather evidence to determine whether the claim is supported. Table 3 shows the students' investigation using water and a tablet in a capped bottle and after the bottle was uncapped.

Table 3. Water and Tablet Investigation

Type of Data	Before Mixing		After Mixing	After Removing Bottle Cap
Substance	Water	Tablet	Mixture	Mixture
Mass (grams)	142	?	145	144
Observations	Clear liquid	Solid, white disk	Clear liquid with formation and disappearance of bubbles on tablet pieces	Clear liquid

Table 4 shows the students' investigation using water and sand.

Table 4. Water and Sand Investigation

Type of Data	Before Mixing		After Mixing
Substance	Water	Sand	Mixture
Mass (grams)	200	100	300
Observations	Clear liquid	Solid brown, tan, and beige grains	Clear liquid with solid brown, tan, and beige grains on the bottom of the container

00. Based on the information in Table 2 (Part 1), what should the mass of the milk and vinegar be after these substances are combined?

A. 78 grams

B. 80 grams

C. 82 grams

D. 84 grams

00. A student claims that the lumps in the milk and vinegar mixture cause the mass of the mixture to be greater than the total mass of the substances before mixing.

Based on the information in Table 2 (Part 1), which statement **best** evaluates the claim?

A. The claim is incorrect because the lumps are just a rearrangement of matter that was already present.

B. The claim is incorrect because when the vinegar disappears, the combined mass is less than what was measured.

C. The claim is correct because the matter in the lumps is closer together than the matter in the liquid.

D. The claim is correct because when the materials change phase, there is an increase in the combined mass.

00. Based on the information in Table 1 (Part 1), which statement **best** explains why the mass of the water and sugar mixture is 104 grams?

A. The sugar combined with water to make a new substance at the bottom of the bottle.

B. The sugar reacted with water to create a new gas that left the bottle.

C. The sugar is no longer in the bottle because it cannot be seen.

D. The sugar is still in the bottle even though it cannot be seen.

00. Based on the information in Table 3 (Part 2), what was the mass of the tablet used in the water and tablet investigation?

A. 1.0 g

B. 2.0 g

C. 3.0 g

D. 4.0 g

00. A student claims that the mixing of two substances may not produce a new substance. Based on the information in Part 2, which evidence **best** supports the student's claim?

A. Before the cap was removed in the investigation in Table 3, the mass of the mixture was equal to the mass of the water and the tablet.

B. After the cap was removed in the investigation in Table 3, the mass of the mixture decreased by 1 gram as gas left the bottle.

C. Before the substances were mixed in the investigation in Table 4, the water was a clear liquid and the sand was brown, tan, and beige grains.

D. After the substances were mixed in the investigation in Table 4, the initial properties of the water and sand stayed the same.

00. A student demonstrates an activity by completing these steps**:**

1. The student places drawings of different constellations on the walls of the classroom.
2. The student stands in the middle of the classroom and spins slowly.
3. The student observes how the constellations appear to move as the student spins.

Which statement **best** describes what the student is modeling with this activity?

A. As Earth revolves around the constellations, the constellations appear to move across the sky.

B. As constellations revolve around Earth, the positions of the constellations in the sky change.

C. Earth’s rotation makes the constellations appear to move around Earth.

D. Constellations move at the same speed that Earth rotates on its axis.

00. Scientists noticed that wolves of the same species have different fur colors. The scientists observed the fur colors of two generations of wolves living among other wolves in Yellowstone National Park. The scientists' data are shown in the table.

Wolf Parents and Pups Fur Color

Male Parent Fur Color	Female Parent Fur Color	Number of Pups with Gray Fur	Number of Pups with Black Fur
Black	Gray	4	10

Which statement about how wolves pass on fur color to offspring is **best** supported by the data?

A. Wolves with either fur color are more likely to have offspring with gray fur.

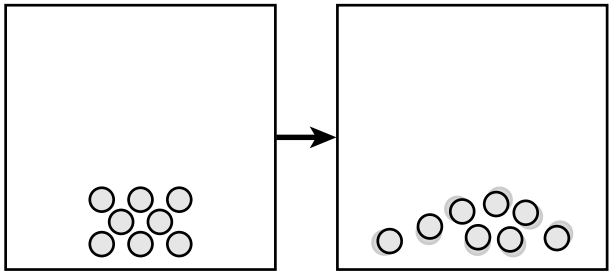
B. Wolves with either fur color can produce offspring with either color of fur.

C. Female wolves with gray fur are less likely to have offspring with black fur.

D. Male wolves with black fur are less likely to have offspring with black fur.

00. The figure shows changes that occur in a substance in a sealed container.

Substance in Sealed Container



Mass = 5 grams Mass = 5 grams

Which statement **best** explains why the changes to the substance occurred?

A. A gas turned into a liquid because energy was removed from the particles.

B. A gas turned into a liquid because the particles absorbed energy.

C. A solid turned into a liquid because energy was removed from the particles.

D. A solid turned into a liquid because the particles absorbed energy.

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