

Reasoning Items about INVESTIGATION

The picture shows what Rena saw on her stopwatch when she timed her brother running.

1. How much time does the stopwatch show?

- a) 10 hours and 27 minutes
- b) 10 minutes and 27 seconds
- c) 10 seconds and 27 hundredths of a second**
- d) 10 and 27 hundredths of a second

2. How should Rena record the time shown on the stopwatch?

- a) 10.27 hours
- b) 10.27 minutes
- c) 10.27 seconds
- d) 10.27 hundredths of a second



3. The pictures show what Rena saw on her stopwatch three different times.
Which stopwatch shows the least amount of time?



a)

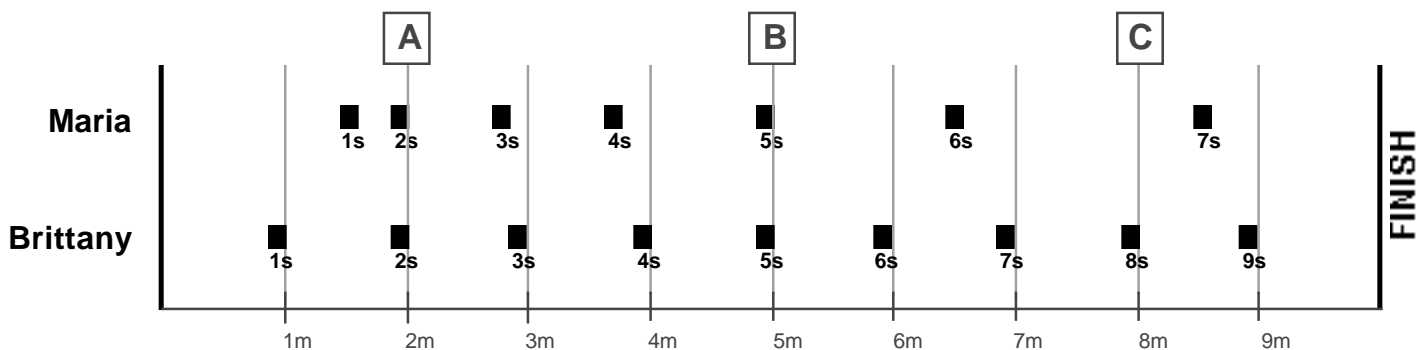


b)



c)

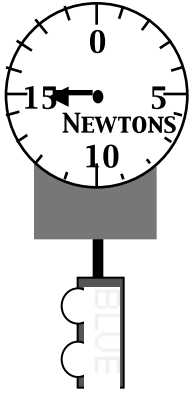
Brittany and Maria ran a race. In the drawing below, black boxes represent their positions at one second intervals.



3. How far did Brittany run in 7 seconds?

- a) 7 meters
- b) less than 7 meters
- c) more than 7 meters

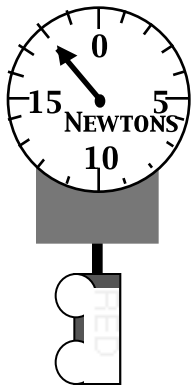
Reasoning Items about INVESTIGATION (cont.)



The drawing shows a spring scale with a BLUE cart hanging from it.

4. How much force does it take to hold up the BLUE cart?

- a) 5 Newtons
- b) 10 Newtons
- c) 15 Newtons
- d) cannot tell



The drawing shows a spring scale with a RED cart hanging from it.

5. How much force does it take to hold up the RED cart?

- a) 15 Newtons
- b) 18 Newtons
- c) 30 Newtons
- d) cannot tell

The drawing shows Shondelle getting ready to launch her rocket. She launched it four times, changing the amount of force each time.



This table shows Shondelle's data.

Launch	Force (N)	Height (m)
1	1	30
2	2	60
3	5	120
4	10	150

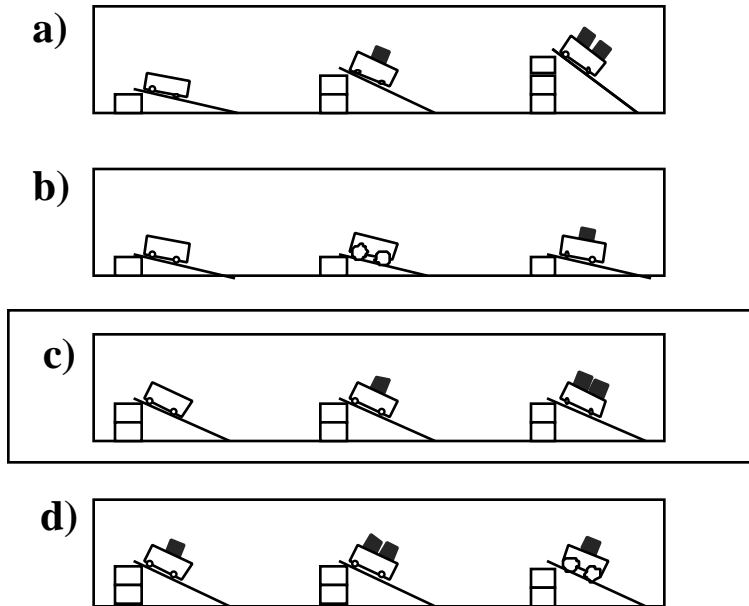
15. How much force did it take to make the rocket go 60 meters?

- a) 1 Newton
- b) 2 Newtons
- c) 5 Newtons
- d) 10 Newtons

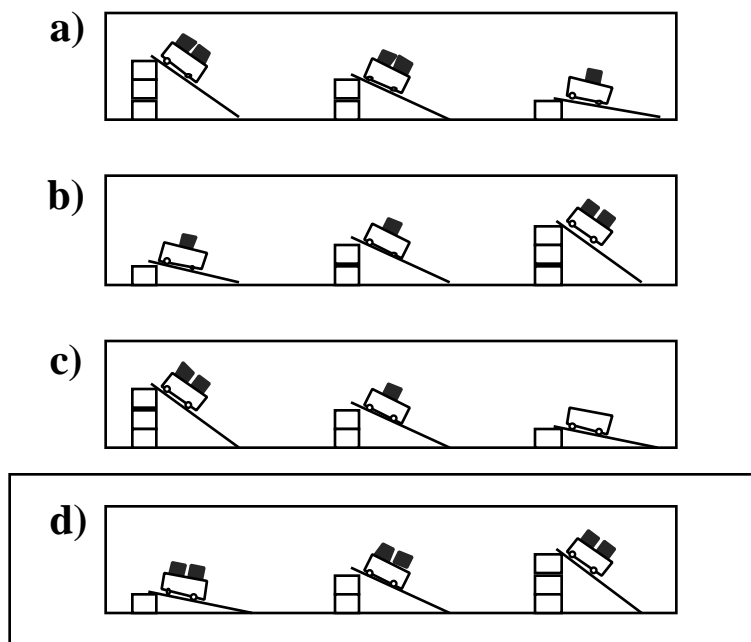
Reasoning Items about INVESTIGATION (cont.)

Abdul carried out different tests with carts with different sized wheels. He started them from different heights and sometimes put blocks in the carts. The blocks he used were of equal mass.

13. Abdul wants to test the idea that *The heavier a cart is the greater its speed at the bottom of a ramp.*
Which set of tests in the drawings below should he use to investigate this idea?

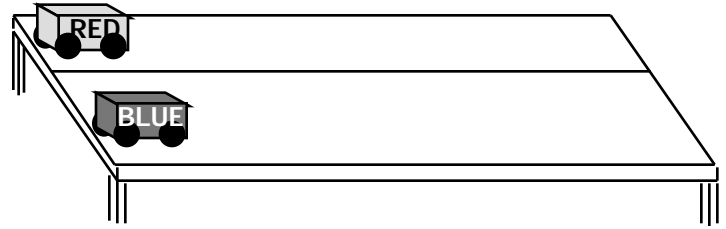


14. Another idea Abdul wanted to test is: *The higher a cart, the greater its speed at the bottom of a ramp.*
Which set of tests in the drawings below should he use to investigate this idea?



Reasoning Items about INVESTIGATION (cont.)

The drawing shows two carts on a counter that is two meters long. The RED cart is much heavier than the BLUE cart. They were pushed the same way to start, and they were timed traveling in a straight line to the end of the counter.



The table below shows the times that each cart took to reach the end of the counter, in four trials.

Trials	Distance (meters)	RED Cart	BLUE Cart
		Time (seconds)	Time (seconds)
1	2	11	4
2	2	10	5
3	2	9	6
4	2	10	5

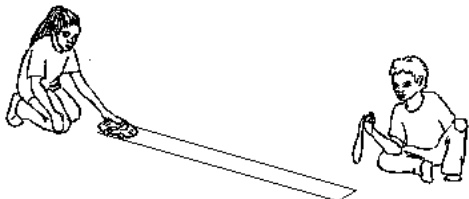
6. How much time did it take the RED cart get to the end of the counter in Trial 2?

- a) 2 seconds
- b) 5 seconds
- c) 10 seconds
- d) 40 seconds

7. How much time did it take the BLUE cart get to the end of the counter in Trial 2?

- a) 2 seconds
- b) 5 seconds
- c) 10 seconds
- d) 20 seconds

The drawing shows how Jada gave her toy car a push to see how fast it would go. Jamal measured the time the car took to get to the end of the 100-centimeter track. The table shows their data.



Trials	Distance	Time
	traveled (cm)	(seconds)
1	100	10
2	100	8
3	100	9
4	100	13

10. In Trial 1, how much time did it take the car to reach the end of the track?

- a) 8 seconds
- b) 10 seconds
- c) 13 seconds
- d) 150 seconds

11. What was the average time it took Jada's car to reach the end of the track?

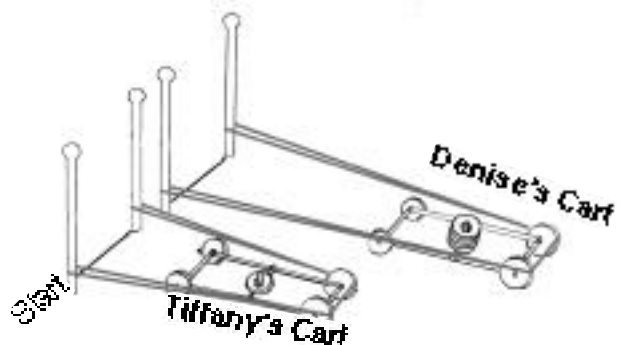
- a) 8 seconds
- b) 10 seconds
- c) 13 seconds
- d) 40 seconds

12. Why do you think the car took different amounts of time to reach the end of the track? Circle all of the choices that might be correct.

- a) Jada pushed the car differently.
- b) Jamal did not time the car the same way each time.
- c) Jada gave the car a push from different starting places.
- d) Jamal stopped the timer when the front of the car got to the end of the track.

Reasoning Items about ANALYSIS/CLAIMS

The picture shows how Denise and Tiffany started their carts with a rubberband. Denise's cart had more washers, and it was pulled back farther to start.



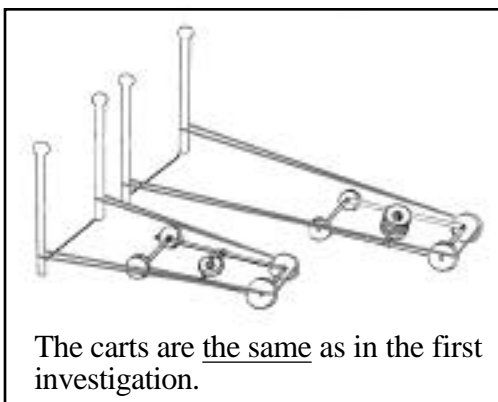
Denise and Tiffany investigated the motion of the carts *after* the carts crossed the starting line. They found that *Denise's* cart went faster.

Denise claimed: *My cart went faster because I pulled it back farther at the start.*

Tiffany claimed: *Your cart went faster because it was heavier.*

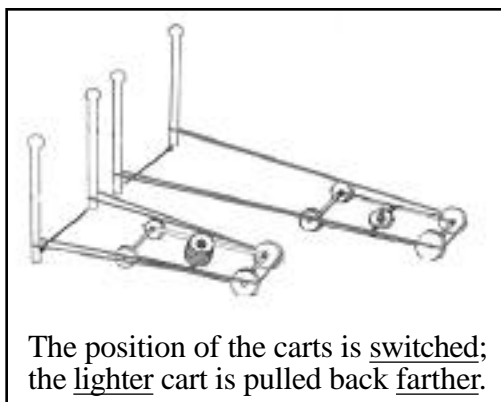
17. Which set up should Denise use to investigate her claim?

a)



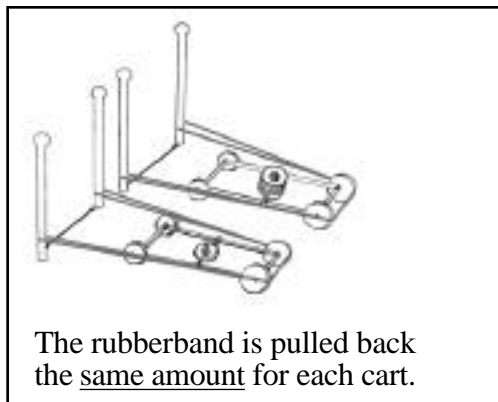
The carts are the same as in the first investigation.

b)



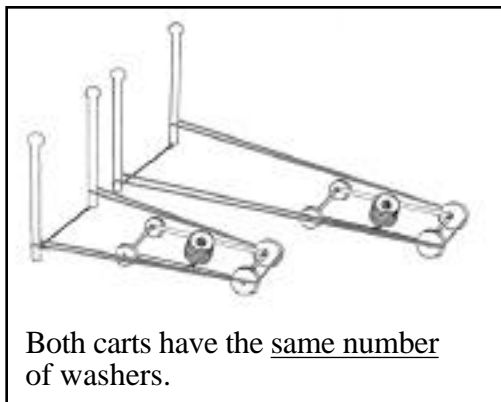
The position of the carts is switched; the lighter cart is pulled back farther.

c)



The rubberband is pulled back the same amount for each cart.

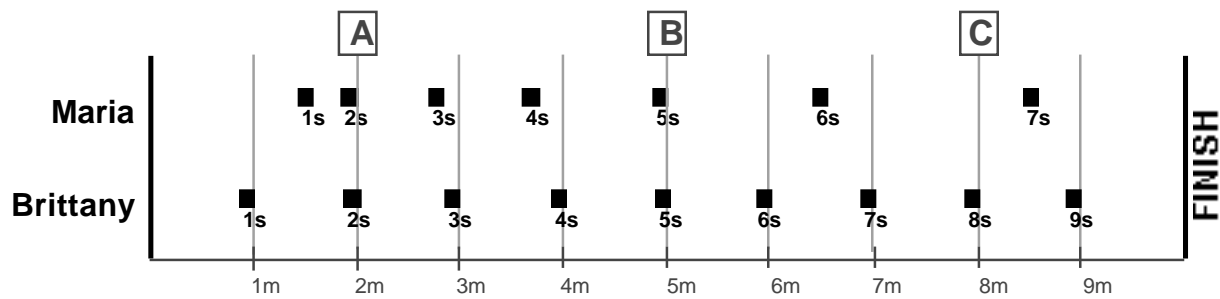
d)



Both carts have the same number of washers.

Reasoning Items about ANALYSIS/CLAIMS (cont.)

Brittany and Maria ran a race. In the drawing below, black boxes represent their positions at one second intervals.



- How much time did it take Maria to finish the race?
 - 7 seconds
 - less than 7 seconds
 - more than 7 seconds
- After two seconds, who ran farther?
 - Maria
 - Brittany
 - They both ran the same distance.
- After six seconds, who ran farther?
 - Maria
 - Brittany
 - They both ran the same distance.
- Who took more time to get from point A to point B?
 - Maria
 - Brittany
 - They both took the same amount of time.
- Who took more time to get from point B to point C?
 - Maria
 - Brittany
 - It took them each the same amount of time.

The drawing shows two ice skaters, Tara and Nancy, about to be pushed into motion.



- Although the skaters start at the same time, Tara glides faster. Why might that have happened?
 - Tara is lighter than Nancy.
 - Tara is heavier than Nancy.
 - Tara glides farther than Nancy.
 - Tara glides more than Nancy.

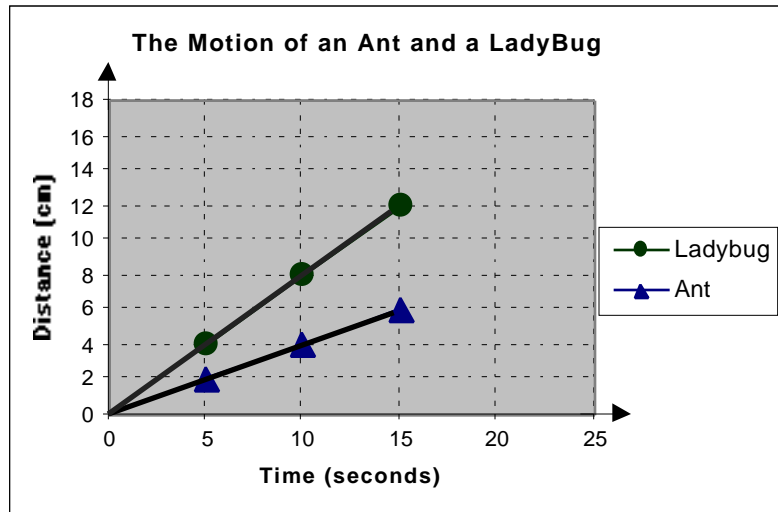
Reasoning Items about ANALYSIS/CLAIMS (cont.)

The graph shows the motion of an **ant** and a **ladybug** walking on the sidewalk in a straight line.

The **ant** and **ladybug** are about the same size and weight.

12. If the **ant** keeps moving at the same speed, how far will it have traveled at the end of 25 seconds?

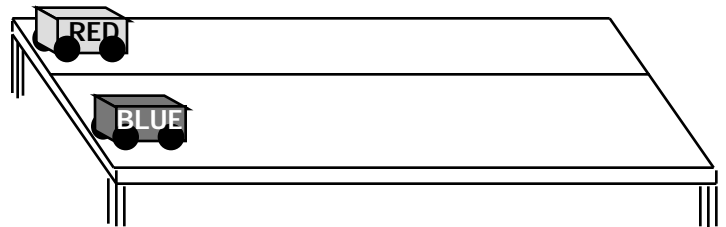
- a) 6 cm
- b) 8 cm
- c) 10 cm
- d) 20 cm



14. What is the best explanation for the difference in their motion?

- a) The **ant** went *farther* in the same amount of time.
- b) The **ladybug** went *farther* in the same amount of time.
- c) The **ant** used more *force* to move.
- d) The **ladybug** used more *force* to move.

The drawing shows two carts on a counter that is two meters long. The RED cart is much heavier than the BLUE cart. They were pushed the same way to start, and they were timed traveling in a straight line to the end of the counter.



The table below shows the times that each cart took to reach the end of the counter, in four trials.

Trials	Distance (meters)	RED Cart	BLUE Cart
		Time (seconds)	Time (seconds)
1	2	11	4
2	2	10	5
3	2	9	6
4	2	10	5

8. Which statement makes the best claim about these data?

- a) Carts take different amounts of time to get to the end of a counter.
- b) The heavier a cart is, the more time it takes it to go the same distance as a lighter cart.
- c) Red carts take more time than Blue carts to get to the end of a counter.
- d) The longer the time a cart takes to go a certain distance, the slower the cart is.

Reasoning Items about ANALYSIS/CLAIMS (cont.)

The drawing shows Shondelle getting ready to launch her rocket. She launched it four times, changing the amount of force each time.



This table shows Shondelle's data.

Launch	Force (N)	Height (m)
1	1	30
2	2	60
3	5	120
4	10	150

16. What is the best claim you can make from these data?

- a) The heavier an object, the more force it takes to move it.
- b) The more launches, the farther an object will travel.
- c) The more force applied to an object, the farther it will travel.
- d) The higher an object, the more force it has.

The drawing shows Deon pushing a stroller down a sidewalk. He measured how much time it took to travel from one line to the next in the sidewalk. The table shows what he measured.

Distance (meters)	Time (seconds)
1	5
2	10
3	15



9. Which is the best graph of the motion of the stroller?

