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My initials:		
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B	B	B
C	C	C
D	D	D
E	E	E
F	F	F
G	G	G
H	H	H
I	I	I
J	J	J
K	K	K
L	L	L
M	M	M
N	N	N
O	O	O
P	P	P
Q	Q	Q
R	R	R
S	S	S
T	T	T
U	U	U
V	V	V
W	W	W
X	X	X
Y	Y	Y
Z	Z	Z

**I am a:**

Girl

Boy

**I was born in:**

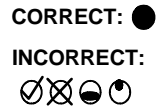
MONTH BORN
<input type="radio"/> January
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**Today the date is:**

MONTH	DAY	YEAR
<input type="radio"/> January		<input type="radio"/> 2010
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<input type="radio"/> March	0	<input type="radio"/> 2012
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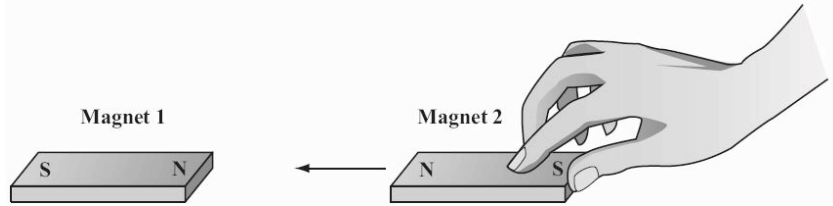
## Marking Instructions

- Use a No. 2 pencil or a blue or black ink pen only.
- Do not use pens with ink that soaks through the paper.
- Make solid marks that fill the response completely.
- Make no stray marks on this form.



For each question below, fill in the bubble for the **BEST** answer.

1. The picture below shows Magnet 2 being pushed toward Magnet 1.



Which of the following will **MOST LIKELY** happen to Magnet 1 as Magnet 2 is moved closer?

- (A) Magnet 1 will not move.
- (B) Magnet 1 will move under Magnet 2.
- (C) Magnet 1 will move toward Magnet 2.
- (D) Magnet 1 will move away from Magnet 2.
2. A transportation engineer works for a city. What is he **MOST LIKELY** to do for his job?

- (A) Drive subway trains.
- (B) Repair city buses when they break down.
- (C) Decide where to put stop signs and traffic lights.
- (D) A transportation engineer would NOT work on any of these things.

3. What would a transportation engineer **NOT** work on?

- (A) Bridges and tunnels
- (B) Roads and highways
- (C) Stop lights and stop signs
- (D) Engines for trains and buses

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[SERIAL]

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4. Which of the following statements is TRUE?

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(A) Some magnets have only one pole.

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(B) Magnets always repel other magnets.

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(C) Magnets always attract other magnets.

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(D) Poles that are the same repel each other.

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5. What kind of work does a transportation engineer do? Choose the BEST answer.

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(A) Drive trains and buses

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(B) Construct and repair roads and bridges

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(C) Repair trains and buses when they break down

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(D) Make sure that roads, bridges, and trains are safe

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6. A student places two magnets on a table exactly four inches apart. They slide towards each other until they meet in the middle. If she places the two magnets four inches apart again, but this time with a book between them, what will happen to the magnets when she lets go?

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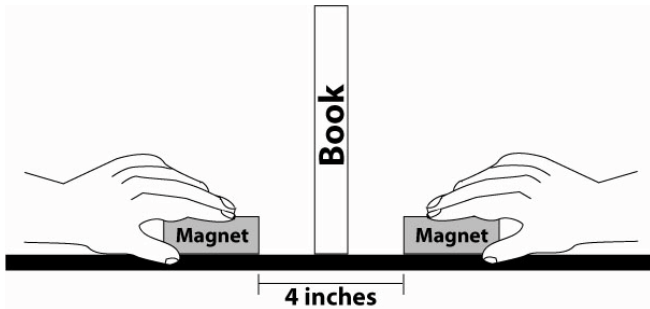
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(A) They will not move.

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(B) They will slide away from each other.

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(C) They will slide around the book, towards each other.

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(D) They will slide together towards each other until they hit the sides of the book.

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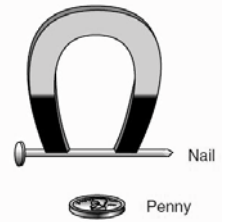
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7. The nail is attracted to the horseshoe magnet pictured here, but the penny is not. What does this tell us about the nail and the penny?



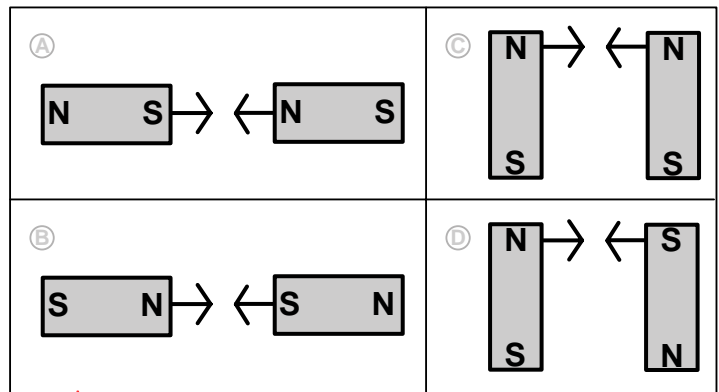
(A) The nail weighs less than the penny.

(B) A flat object is more magnetic than a round object.

(C) The nail and penny are made of the same material.

(D) The nail and the penny are made of different materials.

8. Which pair of magnets would be MOST difficult to push together where the arrows show?



9. The South pole of a magnet will REPEL:

(A) All magnets.

(B) Anything made of metal.

(C) The North pole of another magnet.

(D) The South pole of another magnet.

10. At work, a transportation engineer would probably NOT:

(A) Drive trains that carry people and cargo.

(B) Figure out how to make a highway safer.

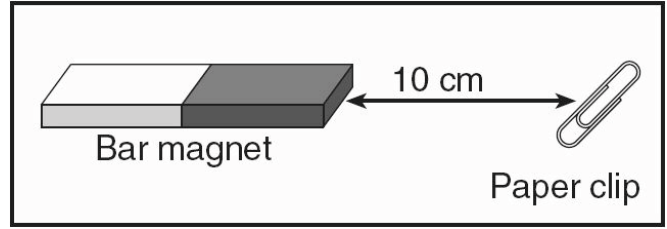
(C) Improve how well a subway system works.

(D) Decide on the best place to put a crosswalk.

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A girl is testing the properties of magnets. She slides a magnet towards a metal paperclip, as shown in the picture, and measures the distance the paperclip travels to stick to the magnet. She records her results in a table shown below.

Use this information to answer questions 11 and 12.



Magnet Type	Distance
Bar Magnet	10 cm
Ring Magnet	5 cm
Disc Magnet	15 cm
Strip Magnet	20 cm

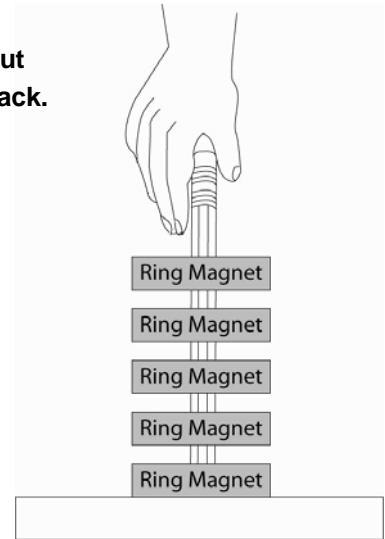
11. If she repeats her experiment using an iron nail that is heavier than the paperclip, what will happen to the distance the iron nail travels to stick to the magnets?

- A All the distances travelled will be greater.
- B All the distances travelled will be smaller.
- C All distances travelled will remain the same.
- D The iron nail will NOT move at all.

12. Based on the table, which magnet has the strongest magnetic field?

- A Bar magnet
- B Ring magnet
- C Disc magnet
- D Strip magnet

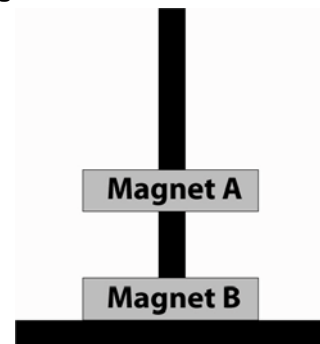
13. This picture shows five ring magnets on a pencil. The magnets do not touch, but seem to float in the air. When the magnets are pushed together, they bounce back.



Which statement BEST describes what is happening?

- A The magnets have opposite poles facing each other.
- B The magnets have the same poles facing each other.
- C The magnets floating higher weigh less than those floating lower.
- D Some magnets have like poles facing and some have opposite poles facing.

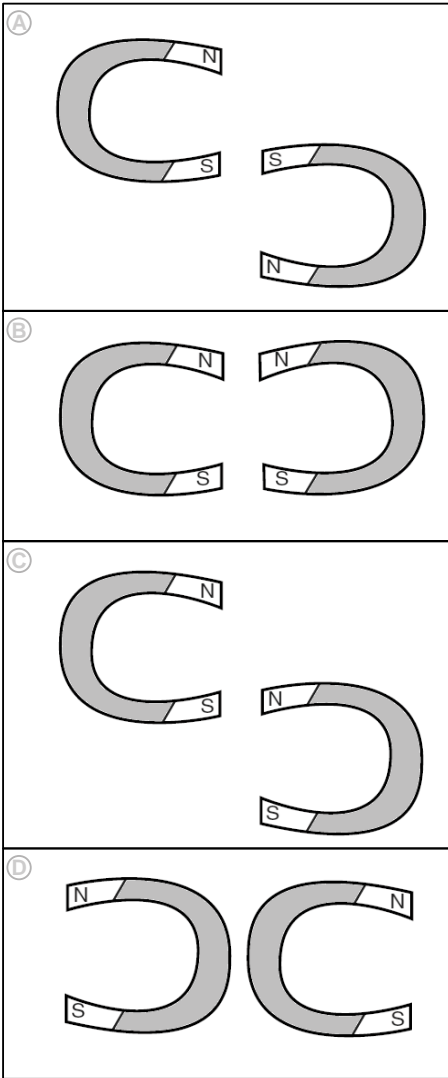
14. A boy stacked two ring magnets on a peg. He made Ring Magnet A float over Ring Magnet B and measured the distance between them. What will happen if he wraps Ring Magnet A in cloth?



- A Ring Magnet A will stick to the bottom magnet.
- B The distance between Ring Magnets A and B will increase.
- C The distance between Ring Magnets A and B will decrease.
- D The distance between Ring Magnets A and B will stay the same.

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15. Which of the following diagrams shows two magnets that would be attracted to each other?



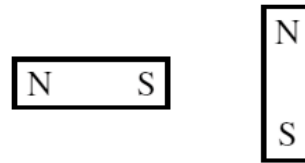
16. A girl found a box containing two magnets. Only one magnet has markings showing its North and South poles. How could she identify the poles of the unmarked magnet?

- (A) Stick both magnets together.
- (B) Stick both magnets to a refrigerator.
- (C) Sprinkle iron filings on both magnets.
- (D) Check to see if aluminum foil sticks to both magnets.

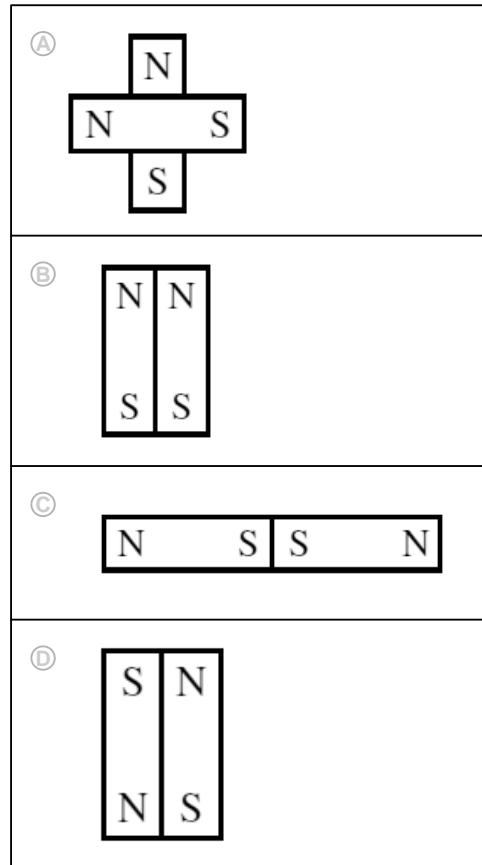
17. A country is building a new train system. What is a transportation engineer MOST LIKELY to do to help?

- (A) Repair the new trains when they break.
- (B) Drive machines to construct the train tracks.
- (C) Figure out what kinds of trains and train track to use.
- (D) Improve the engines for the trains that will run on the tracks.

18. The diagram shows 2 bar magnets.



A girl moves the 2 magnets closer together. Which of the pictures below shows what is MOST LIKELY to happen?



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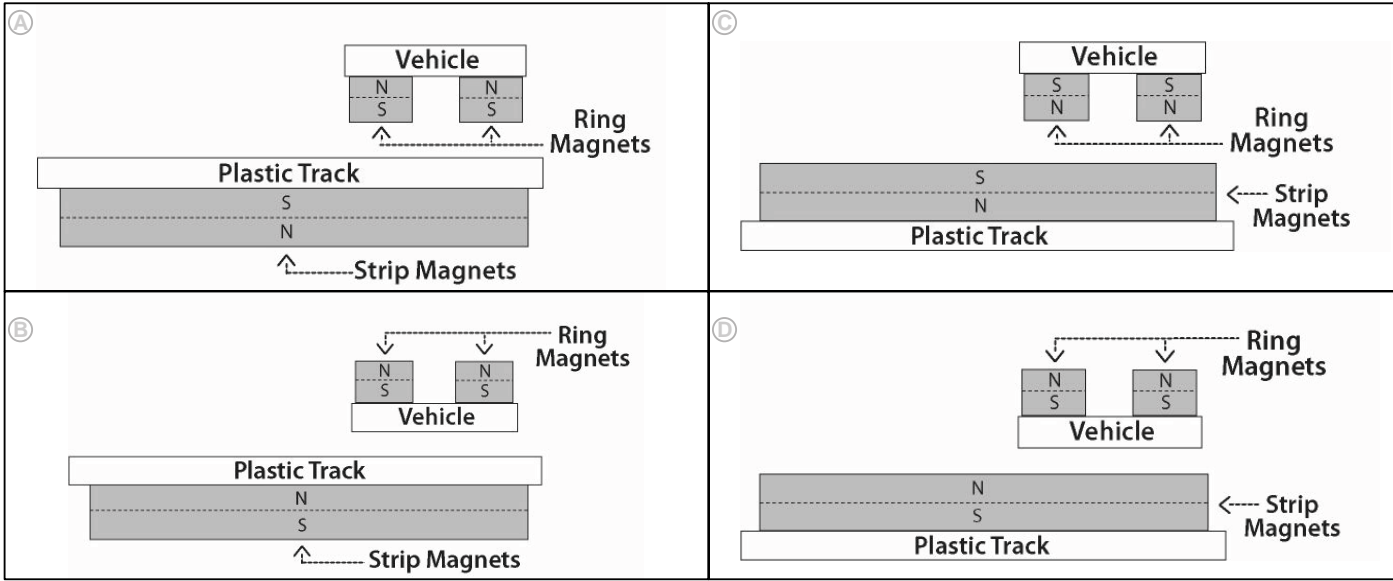


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A Maglev transportation system is a way to get people and things from one place to another. It is made up of a vehicle and a track. The vehicle does not touch the track as it moves - instead it levitates (floats in the air) above the track.

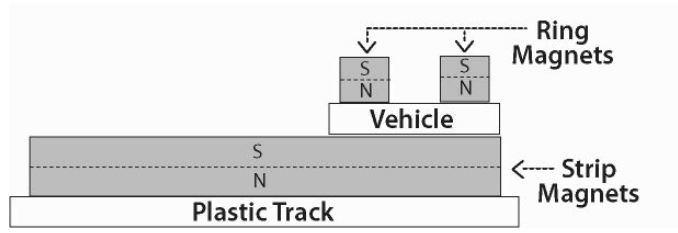
A group of students are designing a Maglev transportation system to transport packages. They need to make the vehicle levitate as it is pushed along the track.

19. The students imagined the following designs. Which one shows a vehicle that might levitate?



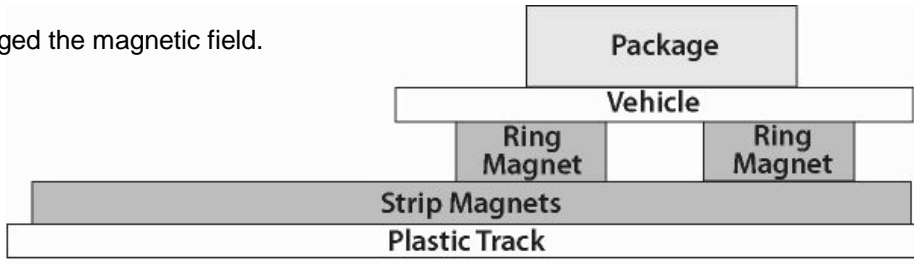
20. The students created a design, made a plan, and built this model. They tested it, but it didn't levitate. What should they do to solve this problem?

- (A) Use stronger ring magnets.
- (B) Flip the ring magnets over so the North poles are up.
- (C) Attach the ring magnets to the bottom side of the vehicle.
- (D) Any of these ideas would work.



21. The students tried again and got the vehicle to levitate above the track. However, when they put a package on the middle of the vehicle, the vehicle sank onto the track. What happened?

- (A) The strip magnets are too strong and attracted the vehicle.
- (B) The package is magnetic, and it changed the magnetic field.
- (C) The ring magnets are in the wrong place to hold the package on top.
- (D) The ring magnets on the vehicle are not strong enough to lift the package.



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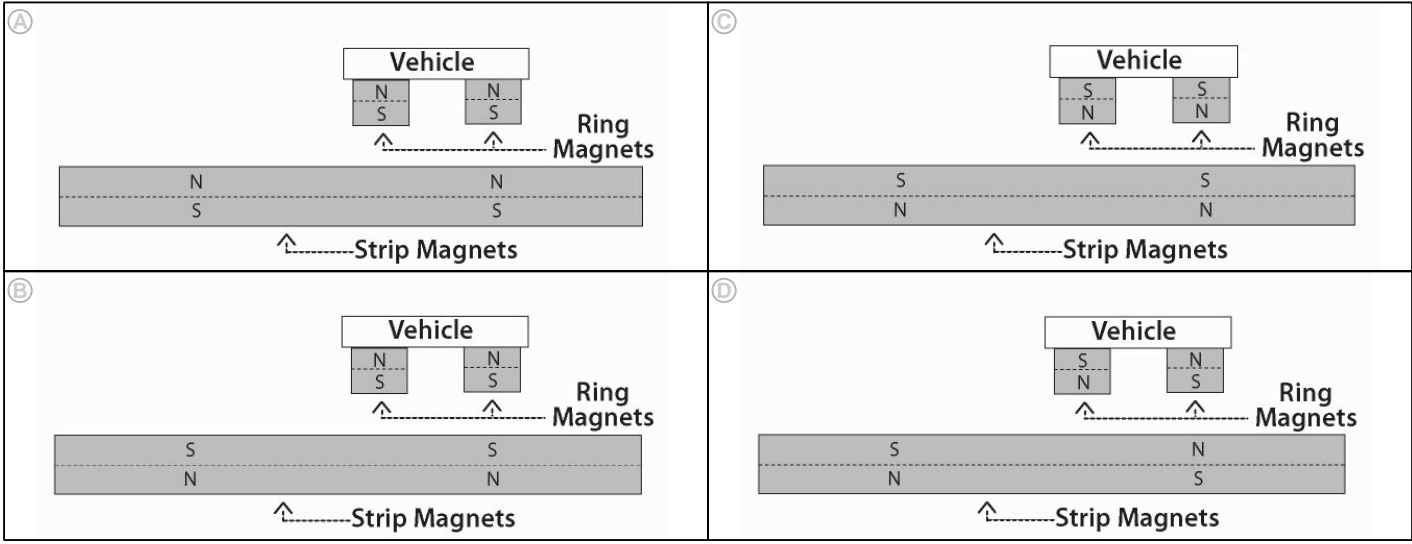
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22. A boy designed a Maglev system to make a vehicle levitate (float in the air) over a track made of strip magnets. He set up his track and vehicle in four different ways. Which picture shows a vehicle that MIGHT levitate?



23. Which change to a working Maglev system will keep the vehicle at the SAME height?

- (A) Flip all the magnets over.
- (B) Add more magnets to the vehicle.
- (C) Make the vehicle out of a lighter material.
- (D) Replace the magnets on the vehicle with stronger magnets.

24. Why would you want to use strong magnets in a Maglev design?

- (A) Strong magnets will help to keep the vehicle from toppling over.
- (B) Strong magnets will help to keep the vehicle attached to the track.
- (C) Strong magnets will help to levitate a vehicle higher above the track.
- (D) Strong magnets will help to keep the vehicle moving faster along the track.

Question 1: adapted from MCAS 2008 - Grade 5.

Question 7: adapted from Virginia Standards of Learning Assessments, Spring 2001 - Science q. 38, Grade 3.

Question 11: adapted from NYSED Regents 2006 - Grade 4.

Question 13: adapted from MCAS 2006 - Grade 5.

Question 15: adapted from MCAS 2002 - Grade 5.

Question 18: adapted from MCAS 2004 - Grade 5.

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