Force and Motion

Lab #___ Air Track Lab "Friction or frictionless?"

NAME: _____ Date Due:_____
Date: _____

Test #1

Purpose: To discover how objects behave when friction is reduced.
Hypothesis:

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Procedure: Note: The instructor will perform this lab and you will observe.

1. Set up air track.
2. Place ca "A" on track.
3. Give car "A" a small push.
4. Record the distance that the car travelled.
5. Write an observation about the movement of the car.
6. Repeat this three times.
7. Turn the air track on and repeat step 2 to 6.

Data: (write observation here)

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Air track Observations #1

Situation	**Trial #1**	**Trial #2**	**Trial #3**
Air track off			
Air track on			

Test #2

Purpose: To discover the motion that takes place in a frictionless collision between a stationary car and a moving car of the same mass.

Hypothesis #2: (Make a guess as to what **each** car will do after the collision.)

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Procedure:

1. Place car "A" near the middle of the track.
2. Place car "B" at the end of the track.
3. Turn on Air track.
4. Push car "B" into car "A"

Data: (write observation)

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Test #3

Purpose: To discover the motion that takes place in a frictionless collision between a stationary car and a moving car of different mass.

Hypothesis #3: (Make a guess as to what **each** car will do after the collision.)

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Procedure:

5. Place car "A" near the middle of the track.
6. Place car "B" at the end of the track.
7. Turn on Air track.
8. Push car "B" into car "A"

Data: (write observation)

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Test #4

Hypothesis #4: (Guess what each car will do when the elastic is cut)

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Procedure:

1. Place the two cars in the middle of the track.
2. Put a rubber band around the center screws of the cars making them attached.
3. Cut the rubber band and record an observation.
4. Repeat steps 2 and 3 with rubber bands of different tensions.

Data: (observation)

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Analysis Questions: Answer on loose leaf

1. What is kinetic friction?
2. What is static friction?

Test #1

1. **Explain** why the car moved further while riding on air rather than riding on metal.
2. **Explain** how far car "A" would have travelled if the air track went on forever.
3. **Explain** how the air track works.

Test #2

1. **Explain** the motion that car "B" took once it hit car "A"?
2. **Explain** the motion that car "A" took once it was hit by car "B"?
3. Knowing that the air track didn't remove **ALL** friction, explain if car "A" had any *kinetic friction* the start of the experiment?
4. Knowing that the air track didn't remove **ALL** friction, explain if car "A" had any *static friction* the start of the experiment?
5. **Explain** where did all of car "B's" energy go when it hit ca "A"?

Test #3

1. Explain what changed, if anything, in your results of the tests due to the difference in mass of the cars.

Test #4

1. Explain what happened when the elastics where cut.
2. Explain ho could this be a model for a nuclear explosion?