Name: _____ **Date:** _____

Lesson 4, Sliders Activity – Slip Slidin' Away Worksheet

Static Friction

Data:

1. Measure the mass of the empty box and the empty basket. Record this number in the table below.
2. Add the required weight to the box and record this amount.
3. *Gently* add weight to the basket. Record how much weight is in the basket when the box begins to slide. Why is it important to gently (and gradually) add the weight to the basket?

   _____

   _____

   _____

4. Fill in your data in the table below.

Weight of Empty Box (kg)	Weight of Empty Basket (kg)	Weight in Box (kg)	Weight in Basket (kg)	Total Weight of Basket (kg)	Total Weight of Box (kg)

Calculations and Results:

5. Calculate the normal force of the box for each case.

6. Calculate the coefficient of static friction (μs) for each case using the normal force of the box and the force that made the box start moving. Calculate the average μs.

μ_s
Avg:

Kinetic Friction

Data:

7. Set up the experiment the same as before, except this time position the basket so that it is close enough to the floor in order to land before the box goes over the edge of the table. Measure the distance from the edge of the box to the edge of the table and the distance from the ground to the bottom of the basket.
8. Use a piece of tape or washable marker to mark the starting position of the box so that you do not have to re-measure it for every trial.
9. Place the same amount of weight in the box, but add more weight in the basket than is required to overcome static friction. Release the basket, and time how long it takes for the basket to hit the ground. Record your data in the table below.
10. Measure the distance from the box to the table edge.

Weight in Box (kg)	Distance to Table Edge – Initial (m)	Distance from Floor to Basket (m)	Time to Hit the Floor (s)	Distance to Table Edge – Final (m)

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Calculations and Results

11. For each trial, calculate the speed the basket was moving right before it hit the floor.

12. For each trial, calculate the kinetic energy of the box right as the basket hits the floor.

13. Calculate how far the box slid after the basket hit the floor.

14. Calculate the amount of work done by the frictional force on the box after the basket hit the floor.

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15. Calculate the frictional force on the box.

Weight in Box (kg)	Speed of the Basket (m/s)	Kinetic Energy of Box (Joules)	Work (Joules)	Frictional Force (Newton)

16. Calculate the coefficient of kinetic friction for each case and the average.

μ_k
Avg:

Further Learning

Name: _____ **Date:** _____

17. Why are anti-lock breaks in cars more effective on slick roads than regular breaks? (Anti-lock breaks are used in cars so that when someone slams on their breaks, the breaks lock for a split second and then release, then lock for a quick second again, and so on.)

18. As an engineer, how would you build a solid structure that is extremely difficult to move and easy to move at the same time. Use the information about friction you just learned.

19. How else could you calculate the coefficient of kinetic friction?