Bending Lab Data Collection Worksheet

Section 1: Cantilever Beam Bending From Fixed Central Collar to Hole		
1. Level the MegaZoid: Check that apparatus is level, if not adjust feet	ALUMINUM	BRASS	STEEL

Section 1: Cantilever Beam Bending From Fixed Central Collar to Hole			
1. Level the MegaZoid: Check that apparatus is level, if not adjust feet	ALUMINUM	BRASS	STEEL
2. Measure the distance between the Central Collar and the hole	L = _____ in	L = _____ in	L = _____ in
3. With paperclip in hole move caliper to touch without exerting force on beam			
4. Zero the gauge dial on the caliper			
5. Apply 20g mass to the paperclip	Mass = 20g	Mass = 20g	Mass = 20g
6. Move caliper to touch paperclip without exerting force on beam			
7. Measure deflection	D_{20} = _____ in	D_{20} = _____ in	D_{20} = _____ in
8. Zero the gauge dial on the caliper			
9. Apply 20g mass to the paperclip for 40g total mass	Mass = 40g	Mass = 40g	Mass = 40g
10. Move caliper to touch paperclip without exerting force on beam			
11. Measure additonal deflection	D_{40} = _____ in	D_{40} = _____ in	D_{40} = _____ in
12. Zero the gauge dial on the caliper			
13. Apply 20g mass to the paperclip for 60g total mass	Mass = 60g	Mass = 60g	Mass = 60g
14. Move caliper to touch paperclip without exerting force on beam			
15. Measure additonal deflection	D_{60} = _____ in	D_{60} = _____ in	D_{60} = _____ in
16. Zero the gauge dial on the caliper			
17. Apply 20g mass to the paperclip for 80g total mass	Mass = 80g	Mass = 80g	Mass = 80g
18. Move caliper to touch paperclip without exerting force on beam			
19. Measure additonal deflection	D_{80} = _____ in	D_{80} = _____ in	D_{80} = _____ in

Note: The total deflection is the sum of all previous deflections

Section 2.1: Three Point Bending 6"

1. Move U-Bolt Slider to 12" Position on Red Ruler

2. Move the Gauge Mount Slider to 6" Position on Red Ruler

3. Center sample between U-Cutout Sidewall and U-Bolt Slider support

4. Hang load wire hook beneath Gauge Mount at 6" Position on Red Ruler

5. Move caliper to touch load wire hook without exerting force on beam

6. Zero the gauge dial on the caliper

7. Apply 50g mass to the load wire hook

8. Move caliper to touch load wire hook without exerting force on beam*

9. Measure deflection

10. Zero the gauge dial on the caliper

11. Apply 50g mass to the load wire hook for 100g total mass

12. Move caliper to touch load wire hook without exerting force on beam*

13. Measure additonal deflection

14. Zero the gauge dial on the caliper

15. Apply 50g mass to the load wire hook for 150g total mass

16. Move caliper to touch load wire hook without exerting force on beam*

17. Measure additonal deflection

18. Zero the gauge dial on the caliper

19. Apply 50g mass to the load wire hook for 200g total mass

20. Move caliper to touch load wire hook without exerting force on beam*

21. Measure additonal deflection

ALUMINUM		BRASS		STEEL	
Mass =	50g	Mass =	50g	Mass =	50g
D_{50} =	in	D_{50} =	in	D_{50} =	in
Mass =	100g	Mass =	100g	Mass =	100g
D_{100} =	in	D_{100} =	in	D_{100} =	in
Mass =	150g	Mass =	150g	Mass =	150g
D_{150} =	in	D_{150} =	in	D_{150} =	in
Mass =	200g	Mass =	200g	Mass =	200g
D_{200} =	in	D_{200} =	in	D_{200} =	in

*Watch for number of full rotations of gauge dial while moving down to measure displacement

Note: The total deflection is the sum of all previous deflections

Section 2.2: Three Point Bending 7.5"

1. Move U-Bolt Slider to 15" Position on Red Ruler

2. Move the Gauge Mount Slider to 7.5" Position on Red Ruler

3. Center sample between U-Cutout Sidewall and U-Bolt Slider support

4. Hang load wire hook beneath Gauge Mount at 7.5" Position on Red Ruler

5. Move caliper to touch load wire hook without exerting force on beam

6. Zero the gauge dial on the caliper

7. Apply 50g mass to the load wire hook

8. Move caliper to touch load wire hook without exerting force on beam*

9. Measure deflection

10. Zero the gauge dial on the caliper

11. Apply 50g mass to the load wire hook for 100g total mass

12. Move caliper to touch load wire hook without exerting force on beam*

13. Measure additonal deflection

14. Zero the gauge dial on the caliper

15. Apply 50g mass to the load wire hook for 150g total mass

16. Move caliper to touch load wire hook without exerting force on beam*

17. Measure additonal deflection

18. Zero the gauge dial on the caliper

19. Apply 50g mass to the load wire hook for 200g total mass

20. Move caliper to touch load wire hook without exerting force on beam*

21. Measure additonal deflection

	ALUMINUM		BRASS		STEEL	
Mass =	50g	Mass =	50g	Mass =	50g	
D_{50} =	in	D_{50} =	in	D_{50} =	in	
Mass =	100g	Mass =	100g	Mass =	100g	
D_{100} =	in	D_{100} =	in	D_{100} =	in	
Mass =	150g	Mass =	150g	Mass =	150g	
D_{150} =	in	D_{150} =	in	D_{150} =	in	
Mass =	200g	Mass =	200g	Mass =	200g	
D_{200} =	in	D_{200} =	in	D_{200} =	in	

*Watch for number of full rotations of gauge dial while moving down to measure displacement

Note: The total deflection is the sum of all previous deflections

Section 2.3A: Three Point Bending 9"

1. Move U-Bolt Slider to 18" Position on Red Ruler

2. Move the Gauge Mount Slider to 9" Position on Red Ruler

3. Center sample between U-Cutout Sidewall and U-Bolt Slider support

4. Hang load wire hook beneath Gauge Mount at 9" Position on Red Ruler

5. Move caliper to touch load wire hook without exerting force on beam

6. Zero the gauge dial on the caliper

7. Apply 50g mass to the load wire hook

8. Move caliper to touch load wire hook without exerting force on beam*

9. Measure deflection

10. Zero the gauge dial on the caliper

11. Apply 50g mass to the load wire hook for 100g total mass

12. Move caliper to touch load wire hook without exerting force on beam*

13. Measure additonal deflection

14. Zero the gauge dial on the caliper

15. Apply 50g mass to the load wire hook for 150g total mass

16. Move caliper to touch load wire hook without exerting force on beam*

17. Measure additonal deflection

18. Zero the gauge dial on the caliper

19. Apply 50g mass to the load wire hook for 200g total mass

20. Move caliper to touch load wire hook without exerting force on beam*

21. Measure additonal deflection

ALUMINUM		BRASS		STEEL	
Mass =	50g	Mass =	50g	Mass =	50g
D_{50} =	in	D_{50} =	in	D_{50} =	in
Mass =	100g	Mass =	100g	Mass =	100g
D_{100} =	in	D_{100} =	in	D_{100} =	in
Mass =	150g	Mass =	150g	Mass =	150g
D_{150} =	in	D_{150} =	in	D_{150} =	in
Mass =	200g	Mass =	200g	Mass =	200g
D_{200} =	in	D_{200} =	in	D_{200} =	in

*Watch for number of full rotations of gauge dial while moving down to measure displacement

Note: The total deflection is the sum of all previous deflections

Section 2.3B: Three Point Bending 9" - Deflection Along Length at 100g

	ALUMINUM		BRASS		STEEL	
1. Unload the mass, zero the gauge dial on the caliper on surface of beam						
2. Apply 100g mass to the load wire hook	Mass =	100g	Mass =	100g	Mass =	100g
3. Measure deflection at 1" on Red Ruler	D_1	in	D_1	in	D_1	in
4. Measure deflection at 2" on Red Ruler	D_2	in	D_2	in	D_2	in
5. Measure deflection at 3" on Red Ruler	D_3	in	D_3	in	D_3	in
6. Measure deflection at 4" on Red Ruler	D_4	in	D_4	in	D_4	in
7. Measure deflection at 5" on Red Ruler	D_5	in	D_5	in	D_5	in
8. Measure deflection at 6" on Red Ruler	D_6	in	D_6	in	D_6	in
9. Measure deflection at 7" on Red Ruler	D_7	in	D_7	in	D_7	in
10. Measure deflection at 8" on Red Ruler	D_8	in	D_8	in	D_8	in
11. Measure deflection at 9" on Red Ruler**	D_9	in	D_9	in	D_9	in

**Do not include thickness of load wire hook when measuring displacement

Section 2.3C: Three Point Bending 9" - Deflection Along Length at 200g

	ALUMINUM		BRASS		STEEL	
1. Unload the mass, zero the gauge dial on the caliper on surface of beam						
2. Apply 200g mass to the load wire hook	Mass =	200g	Mass =	200g	Mass =	200g
3. Measure deflection at 1" on Red Ruler	D_1	in	D_1	in	D_1	in
4. Measure deflection at 2" on Red Ruler	D_2	in	D_2	in	D_2	in
5. Measure deflection at 3" on Red Ruler	D_3	in	D_3	in	D_3	in
6. Measure deflection at 4" on Red Ruler	D_4	in	D_4	in	D_4	in
7. Measure deflection at 5" on Red Ruler	D_5	in	D_5	in	D_5	in
8. Measure deflection at 6" on Red Ruler	D_6	in	D_6	in	D_6	in
9. Measure deflection at 7" on Red Ruler	D_7	in	D_7	in	D_7	in
10. Measure deflection at 8" on Red Ruler	D_8	in	D_8	in	D_8	in
11. Measure deflection at 9" on Red Ruler**	D_9	in	D_9	in	D_9	in

**Do not include thickness of load wire hook when measuring displacement