

# Soda Straw Arm Project 2016

**Goal:** The Duhrkopf Engineering Company needs your design team to construct an arm using only soda straws and pins that will support a 100g mass attached 75 cm from the end of the table with the greatest grams/\$ ratio.

## Teams:

Each team will consist of 3-4 individuals

## Description:

Day 1 of the project will be spent doing research and development of a plan. This plan will be presented to Mr. Duhrkopf at the beginning of Day 2. Each team will purchase Culver's straws from the Physics store for \$1 each on Day 2 and commence building your arm. Straight pins are available free of charge. Day 3 will be the actual competition/grading day.

## Rules for building the arm:

1) You may use the pins to connect straws, but no cutting of the straws

## Rules for the competition:

1) One team member will hold the arm in the desired test position against the tabletop with no part of their body extending past the test edge of the table and both palms touching the tabletop. Your hands are a simulated attachment point so you may be asked to change the way you are holding it to maintain the integrity of the competition.

2) The 100g starting mass will be placed 75 cm from the edge of the table on your arm.

3) The arm must support the mass above the chair for 10 seconds without any straws "crimping". Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) Calculate your grams/\$ ratio when competition is completed.

## Grading:

1) Each team that completes a workable soda straw arm with a ratio of 2.0 will receive 14 pts. You will then receive 1 pt for every .5 increase in your ratio.

2) Each team will complete a project report. This report will be completed in a newspaper article format. The article must have a headline and should convey the information that would normally be in a project report: The Challenge, Solution, Results, Errors, Evaluation and Reflection. Be creative with your reporting.

## Points:

Research/Plan:	5 pts (Tests) - Due Monday November 14th
Design:	20 pts in (Tests) -
Report:	10 pts in (Tests) - Due Monday, November 21st

## Timeline:

Day 1 - Introduction:	Thursday, Nov 3 <sup>rd</sup>
Day 2 - Build/Test:	Monday, Nov 14th
Day 3 - Competition	Wednesday, Nov 16th

# Soda Straw Arm Project 2015

**Goal:** The Duhrkopf Engineering Company needs your design team to construct an arm using only soda straws and pins that will support a 100g mass attached 75 cm from the end of the table with the greatest grams/\$ ratio.

## Teams:

Each team will consist of 3-4 individuals

## Description:

Day 1 of the project will be spent doing research and development of a plan. This plan will be presented to Mr. Duhrkopf at the beginning of Day 2. Each team will purchase Culver's straws from the Physics store for \$1 each on Day 2 and commence building your arm. Straight pins are available free of charge. Day 3 will be the actual competition/grading day.

## Rules for building the arm:

1) You may use the pins to connect straws, but no cutting of the straws

## Rules for the competition:

1) One team member will hold the arm in the desired test position against the tabletop with no part of their body extending past the test edge of the table and both palms touching the tabletop. Your hands are a simulated attachment point so you may be asked to change the way you are holding it to maintain the integrity of the competition.

2) The 100g starting mass will be placed 75 cm from the edge of the table on your arm.

3) The arm must support the mass above the chair for 10 seconds without any straws "crimping". Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) Calculate your grams/\$ ratio when competition is completed.

## Grading:

1) Each team that completes a workable soda straw arm with a ratio of 2.0 will receive 14 pts. You will then receive 1 pt for every .5 increase in your ratio.

2) Each team will complete a project report. This report will be completed in a newspaper article format. The article must have a headline and should convey the information that would normally be in a project report: The Challenge, Solution, Results, Errors, Evaluation and Reflection. Be creative with your reporting.

## Points:

Research/Plan:	5 pts (Tests) - Due Monday, Nov 23 <sup>rd</sup>
Design:	20 pts in (Tests) - Tuesday, Nov 24 <sup>th</sup>
Report:	10 pts in (Tests) - Due Monday, Nov 30 <sup>th</sup>

## Timeline:

Day 1 - Introduction:	Friday, Nov 21 <sup>st</sup>
Day 2 - Build/Test:	Monday, Nov 23 <sup>rd</sup>
Day 3 - Competition	Tuesday, Nov 24 <sup>th</sup>

# Soda Straw Arm Project 2014

**Goal:** The Duhrkopf Engineering Company needs your design team to construct an arm using only soda straws and pins that will support a 100g mass attached 75 cm from the end of the table with the greatest grams/\$ ratio.

## Teams:

Each team will consist of your LabQuest groups

## Description:

Day 1 of the project will be spent doing research and development of a plan. This plan will be presented to Mr. Duhrkopf at the beginning of Day 2. Each team will purchase straws from the Physics store for \$1 each on Day 2 and commence building your arm. Straight pins are available free of charge. There are several different types of straws available and you can mix and match if you so desire. Day 3 will be the actual competition/grading day.

## Rules for building the arm:

1) You may use the pins to connect straws, but no cutting of the straws

## Rules for the competition:

1) One team member will hold the arm in the desired test position against the table top with no part of their body extending past the test edge of the table and both palms touching the table top. Your hands are a simulated attachment point so you may be asked to change the way you are holding it to maintain the integrity of the competition.

2) The 100g starting mass will be placed 75 cm from the edge of the table on your arm.

3) The arm must support the mass above the chair for 10 seconds without any straws “crimping”. Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) Calculate your grams/\$ ratio when competition is completed.

## Grading:

1) Each team that completes a workable soda straw arm with a ratio of 2.0 will receive 35 pts. You will then receive 2.5 pts for every .5 increase in your ratio.

2) The winning team and points will be based on the best grams/\$ ratio.

3) Each team will complete a website project report. This report will be completed in a newspaper article format. The article must have a headline and should convey the information that would normally be in a project report. Be creative with your reporting it will help.

## Points:

Journals: 10 pts each (Homework) - Friday, Monday and Tuesday

Research: 10 pts (Tests) - Due Monday, Nov 24<sup>th</sup>

Plan: 5 pts in (Tests) - Due Monday, Nov 24<sup>th</sup>

Design: 50 pts in (Tests) - Wednesday, Nov 26<sup>th</sup>

Report: 20 pts in (Tests) - Due Monday, Dec 1<sup>st</sup>

## Timeline:

Day 1 - Introduction: Thursday, Nov 20<sup>th</sup>

Day 2 - Build/Test: Monday, Nov 24<sup>th</sup>

Day 3 - Competition: Tuesday, Nov 25<sup>th</sup>

## Soda Straw Arm Project 2013

**Goal:** The Duhrkopf Engineering Company needs your design team to construct an arm using only soda straws and pins that will support the largest mass from a specified distance. Must support at least 100g.

### Teams:

Each team will consist of 3 to 4 individuals

### Description:

Day 1 of the project will be spent doing research and development of a plan. This plan will be presented to Mr. Duhrkopf at the beginning of Day 2. Each team will purchase straws from the Physics store for \$1 each on Day 2 and commence building your arm. Straight pins are available free of charge. There are several different types of straws available and you can mix and match if you so desire. Day 3 will be the actual competition/grading day.

### Rules for building the arm:

- 1) You may use the pins to connect straws, but no cutting of the straws

### Rules for the competition:

- 1) One team member will hold the arm in the desired test position against the table top with no part of their body extending past the test edge of the table and both palms touching the table top. Your hands are a simulated attachment point so you may be asked to change the way you are holding it to maintain the integrity of the competition.

- 2) The 100g starting mass will be placed 75 cm from the edge of the table on your arm.

- 3) The arm must support the mass above the chair for 10 seconds without any straws “crimping”. Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

- 4) Calculate your grams/\$ ratio when competition is completed.

### Grading:

- 1) Each team member will complete a journal after each day of the project.
- 2) The winning team and points will be based on the best grams/\$ ratio.
- 3) Each team will complete a website project report. This report will be completed in a newspaper article format. The article must have a headline and should convey the information that would normally be in a project report. Be creative with your reporting it will help.

### Points:

Journal:	10 pts each day (Homework) - Due Wednesday, Thursday and Friday by start of class.
Plan:	10 pts in (Tests) - Due Thursday, Nov 14 <sup>th</sup>
Design:	50 pts in (Tests)
Report:	20 pts in (Tests) - Due Monday, Nov 20 <sup>th</sup>

### Timeline:

Day 1 - Introduction:	Tuesday, Nov 12 <sup>th</sup>
Day 2 - Testing:	Thursday, Nov 14 <sup>th</sup>

Day 3 - Competition

Friday, Nov 15<sup>th</sup>

# Soda Straw Arm Project 2011

**Goal:** The Duhrkopf Engineering Company needs your design team to construct an arm using only soda straws and pins that will support the largest mass from a specified distance.

## Teams:

Each team will consist of 2 to 3 individuals

## Description:

Each team will be given jumbo plastic straws and straight pins. Your team will be given the construction materials at the beginning of the project and will spend the rest of Day 1 and Day 2 developing a design and testing. Day 3 will be the actual competition/grading day.

## Rules for building the arm:

- 1) You will be given 100 straws for the construction of the arm. You may use the pins to connect straws.
- 2) No cutting of straws.

## Rules for the competition:

1) One team member will hold the arm in the desired test position against the table top with no part of their body extending past the test edge of the table and both palms touching the table top. Your hands are a simulated attachment point so you may be asked to change the way you are holding it to maintain the integrity of the competition.

2) The 100g starting mass will be placed 75 cm from the edge of the table on your arm. Mass will be added in 10g increments.

3) The arm must support the mass above the chair for 10 seconds without any straws “crimping”. Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) Calculate your mass per straw ratio when competition is completed.

## Grading:

1) Each team member will complete a journal after each day of the project on their Physics website for the Soda Straw Project.

2) The winning team and points will be based on the best mass/straw ratio along with largest mass that successfully completes the challenge. The overall winner will receive lunch from Taco John's!!!

3) Each team will complete a website project report. This report will be completed in a newspaper article format. The article must have a headline and should convey the information that would normally be in a project report. Be creative with your reporting it will help. The standard rules for reports and websites apply.

## Points:

Journal:	10 pts each in homework
Design:	50 pts in test
Report:	20 pts in test

## Timeline: (After Chapter 4 – Test)

Day 1 - Introduction:	Nov. TBA
Day 2 - Testing:	Nov. TBA
Day 3 - Competition	Nov. TBA



# Soda Straw Arm Project 2010

**Goal:** The Duhrkopf Engineering Company needs your design team to construct an arm using only soda straws and pins that will support the largest mass.

## Teams:

Each team will consist of 2 to 3 individuals and will be randomly chosen

## Description:

Each team will be given jumbo plastic straws, straight pins and one #1 paper clip. The paper clip, bent to an “S” shape, is to be used only for attaching the hook for adding mass. It must be attached by looping it over a single straw or pin. It may not be used in any way to strengthen or help construct the arm.

Your team will be given the construction materials at the beginning of the project and will spend the rest of Day 1 and Day 2 developing a design and testing. Day 3 will be the actual competition/grading day.

## Rules for building the arm:

- 1) You will be given 100 straws for the construction of the arm. You may use the pins to connect straws.
- 2) No cutting of straws.

## Rules for the competition:

1) One team member will hold the arm in the desired test position against the table top with no part of their body extending past the test edge of the table and both palms touching the table top.

2) The 100g starting mass will be placed 75 cm from the edge of the table on your arm. Mass will be added in 10g increments.

3) The arm must support the mass above the chair for 10 seconds without any straws “crimping”. Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) Calculate your mass per straw ratio when competition is completed.

## Grading:

The winning team and points will be based on the best mass/straw ratio along with largest mass that successfully completes the challenge.

In addition to the design competition, you will be required to complete a project report. This report will be completed in a newspaper article format on your website. The article must have a headline and should convey the results, trials, tribulations, suggestions and lessons learned while completing this project.

## Points:

Design: 50 pts  
Report: 20 pts

## Timeline: (After Chapter 4 – Test)

Day 1 - Introduction: Nov. TBA  
Day 2 - Testing: Nov. TBA  
Day 3 - Competition: Nov. TBA



# Soda Straw Arm Project 2009

**Goal:** The Duhrkopf Engineering Company needs your design team to construct an arm using only soda straws and pins that will support the largest mass.

## Teams:

Each team will consist of 2 to 3 individuals and will be randomly chosen

## Description:

Each team will be given jumbo plastic straws, straight pins and one #1 paper clip. The paper clip, bent to an “S” shape, is to be used only for attaching the hook for adding mass. It must be attached by looping it over a single straw or pin. It may not be used in any way to strengthen or help construct the arm.

Your team will be given the construction materials at the beginning of the project and will spend the rest of Day 1 and Day 2 developing a design and testing. Day 3 will be the actual competition/grading day.

## Rules for building the arm:

- 1) You will be given 100 straws for the construction of the arm. You may use the pins to connect straws.
- 2) No cutting of straws.

## Rules for the competition:

1) One team member will hold the arm in the desired test position against the table top with no part of their body extending past the test edge of the table and both palms touching the table top.

2) The 100g starting mass will be placed 75 cm from the edge of the table on your arm. Mass will be added in 10g increments.

3) The arm must support the mass above the chair for 10 seconds without any straws “crimping”. Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) Calculate your mass per straw ratio when competition is completed.

## Grading:

The winning team and points will be based on the best mass/straw ration along with largest mass that successfully completes the challenge.

In addition to the design competition, you will be required to complete a project report. This report will be completed in a newspaper article format on your website. The article must have a headline and should convey the results, trials, tribulations, suggestions and lessons learned while completing this project.

## Points:

Design: 50 pts  
Report: 20 pts

## Timeline: (After Chapter 4 – Test)

Day 1 - Introduction: Oct. TBA  
Day 2 - Testing: Oct. TBA  
Day 3 - Competition Oct. TBA

# Soda Straw Arm Project 2008

**Goal:** The Duhrkopf Engineering Company needs your design team to construct an arm using only soda straws and pins that will support the largest mass.

## Teams:

Each team will consist of 3 to 4 individuals and will be randomly chosen

## Description:

Each team will be given jumbo plastic straws, straight pins and one #1 paper clip. The paper clip, bent to an “S” shape, is to be used only for attaching the hook for adding mass. It must be attached by looping it over a single straw or pin. It may not be used in any way to strengthen or help construct the arm.

Your team will be given the construction materials at the beginning of the project and will be spend the rest of Day 1 and Day 2 developing a design and testing. Day 3 will be the actual competition/grading day.

## Rules for building the arm:

- 1) You will be given 100 straws for the construction of the arm. You may use the pins to connect straws.
- 2) Arms must be ready at the start of testing day.

## Rules for the competition:

1) One team member will hold the arm in the desired test position against the table top with no part of their body extending past the test edge of the table and both palms touching the table top.

2) The hanging mass will be placed 75 cm from the edge of the table on your arm. Mass will be added in 5g increments.

3) The arm must support the mass above the chair for 10 seconds without any straws “crimping”. Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) Calculate your mass per straw ratio when competition is completed.

## Grading:

The winning team and points will be based on the largest mass that successfully completes the challenge along with the mass/straw ratio.

In addition to the design competition, you will be required to complete a project report. This report will be completed in a newspaper article format. The article must have a headline and should convey the results, trials, tribulations, suggestions and lessons learned while completing this project.

## Points:

Design: 50 pts  
Report: 20 pts

## Timeline: (After Chapter 4 – Test)

Day 1 - Introduction: Oct. TBA  
Day 2 - Testing: Oct. TBA  
Day 3 - Competition Oct. TBA

# Soda Straw Arm Project 2007

**Goal:** The Duhrkopf Engineering company needs your design team to construct an arm using only soda straws and pins that will support a 50-gram mass

## Teams:

Each team will consist of 3 to 4 individuals and will be randomly chosen

## Description:

Each team will be given jumbo plastic straws, straight pins and one #1 paper clip. The paper clip, bent to an “S” shape, is to be used only for attaching the 50-gram mass. It must be attached by looping it over a single straw or pin. It may not be used in any way to strengthen or help construct the arm.

Your team will be given the construction materials at the beginning of the project and will be spend the rest of Day 1 and Day 2 developing a design and testing. Day 3 will be the actual competition/grading day. Your team will be given 30 minutes to complete their design and begin the testing phase.

## Rules for the competition:

1) One of the team members will hold the arm in the desired test position against the table top with no part of their body extending past the test edge of the table and both palms touching the table top.

2) The length of the soda straw arm will be measured horizontally from the edge of the table.

3) The arm must support the mass above the chair for 10 seconds without any straws “crimping”. Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) The timing will start when the mass is hooked to the clip. Each team will be allowed to test for extra distance immediately after a successful test.

## Grading:

The team with the longest arm that successfully completes the challenge will receive 50 pts. The remaining teams will receive points in accordance with their distance accomplished. For example, if the winning team hits 50 cm and your team is 45 cm you will receive  $45/50 * 50 \text{ pts} = 45 \text{ pts}$ .

In addition to the design competition, you will be required to complete a project report. This report will be completed in a newspaper article format. The article must have a headline and should convey the results, trials, tribulations, suggestions and lessons learned while completing this project.

## Points:

Design:	50 pts
Report:	20 pts

## Timeline:

Day 1 - Introduction:	Oct. TBA
Day 2 - Testing:	Oct. TBA
Day 3 - Competition	Oct. TBA

# Soda Straw Arm Project 2006

**Goal:** To construct the longest arm only using soda straws and pins that will support a 50-gram mass

**Teams:**

Each team will consist of 3 to 4 individuals

**Description:**

Each team will be given 20 jumbo plastic straws, 20 straight pins and one #1 paper clip. The paper clip, bent to an “S” shape, is to be used only for attaching the 50-gram mass. It must be attached by looping it over a single straw or pin. It may not be used in any way to strengthen or help construct the arm.

Your team will be given the construction materials at the beginning of the project and will be spend the rest of Day 1 and Day 2 developing a design and testing. Day 3 will be the actual competition/grading day. Your team will be given 30 minutes to complete their design and begin the testing phase.

**Rules for the competition:**

1) One of the team members will hold the arm in the desired test position against the table top with no part of their body extending past the test edge of the table and both palms touching the table top.

2) The length of the soda straw arm will be measured horizontally from the edge of the table.

3) The arm must support the mass above the floor for 10 seconds without any straws “crimping”. Crimping is understood as a fold line across the straw and will be allowed in the original construction only.

4) The timing will start when the mass is hooked to the clip. Each team will be allowed to test for extra distance immediately after a successful test.

5) The winning team will receive points based on the number of entries. Remaining teams will receive points based on their placement and distance accomplished.

**Grading:**

Each team that has a workable entry will receive a minimum of 35 pts in the design phase. The team with the longest arm that successfully completes the challenge will receive 50 pts. The remaining teams will receive points in accordance with their placement and distance accomplished.

In addition to the design competition, you will be required to complete a project report. This report will be completed in a newspaper article format. The article must have a headline and should convey the results, trials, tribulations, suggestions and lessons learned while completing this project.

**Points:**

Design:	50 pts
Report:	20 pts

**Timeline:**

Day 1 - Introduction:	Oct. 3 <sup>rd</sup>
Day 2 - Testing:	Oct. 4 <sup>th</sup>
Day 3 - Competition	Oct. 5 <sup>th</sup>