

WAMC Lab 2 Template

Math Concept(s): HSG-CO.D.12 making geometric constructions

Source / Text: OSPI standards for math and tech theater costume design

Developed by: Sara Call

E-Mail: sjcall@seattleschools.org

Date: 6/25/24

Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

In the classroom and sewing room students will use their pattern from the previous lab to cut fabric, then measure and mark the fabric for a specific seam allowance and pin neatly, document their work with photos and then sew the seam allowance with a ribbon inside on a machine

Lab Plan

Lab Title: Sewing a Cinch bag.

Prerequisite skills: The student should have an understanding of how to use a sewing machine, pin and fold, and cut to specifications for math measurements.

Lab objective: In this lab students will create a cinch bag out of fabric using the pattern they created with the math equation $C = D + (S \times 2)$ and using measurements to fold and pin the seam allowance then sew it on the sewing machine.

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

[Mathematics K–12 Learning Standards:](#)

- **CCSS.MATH.CONTENT.HSG.MG.A.1:** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a costume piece as a combination of geometric shapes).
- **CCSS.MATH.CONTENT.HSG.MG.A.3:** Apply geometric methods to solve design problems (e.g., calculating fabric requirements based on measured dimensions).
- **CCSS.MATH.CONTENT.HSG.MG.A.2:** Apply concepts of density based on area and volume in modeling situations (e.g., determining fabric quantity based on surface area calculations).

[Standards for Mathematical Practice:](#)

- 1. Follow instructions and persevere to completion
- 2. Use tools appropriately and strategically
- 3. Reason abstractly and quantitatively
- 4. Attend to precision
- 5. Look for and make use of structure

[K-12 Learning Standards-ELA](#) (Reading, Writing, Speaking & Listening):

- Reading Standards for Informational Text 6–12
- 0. By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently

[K-12 Science Standards](#)

- N/A

[Technology](#)

- Sewing Machines
- Computer and Projector
- Students may access assignment and instructions on Schoology page

[Engineering](#)

- N/A

<https://wa-appliedmath.org/>

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

- Global Awareness Financial/Economic/Business/Entrepreneurial Literacy Civic Literacy
 Health/Safety Literacy Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
x Work Creatively with Others
 Implement Innovations

Critical Thinking and Problem Solving

- x Reason Effectively
x Use Systems Thinking
 Make Judgments and Decisions
x Solve Problems

Communication and Collaboration

- x Communicate Clearly
x Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- xAccess and Evaluate Information
 Use and manage Information

Media Literacy

- Analyze Media
 Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
 Be Flexible

Initiative and Self-Direction

- xManage Goals and Time
 xWork Independently
 Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
 Work Effectively in Diverse Teams

Productivity and

Accountability

- Manage Projects
 xProduce Results

Leadership and

Responsibility

- xGuide and Lead Others
 Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Sewing machines
- Pins
- Calculator (to check work)
- Fabric Scissors
- Ruler
- compass
- Tailor Chalk

Set-Up Required:

- To do this lab Students will need simple desk space for cutting the fabric to specs and a sewing machine space in lab area.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

-

Cooperative Learning:

- For this lab students will be working independently and will also be helping others as needed with questions and operations of technology to facilitate discussion and leadership opportunities. Each student will create their own cinch bag

Expectations: Students will be able to:

- Demonstrate practical applications for Measuring and calculating to create a cinch bag using folding techniques, following instructions, completing math calculations.

Timeline: 2 classes: 45-50 minutes each

-

<https://wa-appliedmath.org/>

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Real world applications apply for any field or home project that requires making a pattern to use for a project such as sewing, woodworking, metal fabrication, following simple instructions and using calculations to create a specific size needed for almost any project or category of work.

Career Applications

- Any which require people to follow instructions, cut, calculate and be precise in constructing.

Optional or Extension Activities

- Students could create larger or smaller circle bags depending on their needs for the project.

Washington Applied Math Council

<https://wa-appliedmath.org/>

Costume Design Class, CTE Ms. Call

Measuring and Sewing a Cinch Bag

WAMC Lab 2

Instructions for using mathematical measurements for sewing using a pattern for a cinch bag sewing project (you created the pattern in the 1st lab!).

Objective: By the end of this lab, YOU will complete and document with photos:

- Use a pattern to cut and measure fabric for a cinch bag.
- Measure the seam allowance for the bag.
- Cut out the fabric accurately using scissors.
- Fold and Pin the edges your seam.
- Using a sewing machine, sew the seam.

Step I Collect the Materials Needed:

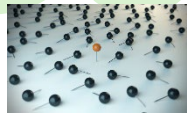
- Tailors chalk



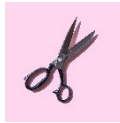
- Rulers



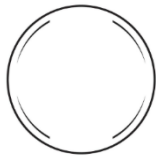
- Sewing Pins



- Fabric Scissors



- Your Pattern



- Fabric



Duration: You have 2 class periods (approximately 45-50 minutes ea.) to complete this lab.

<https://wa-appliedmath.org/>

Washington

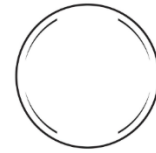
STEP II Procedure:

1. Use Pattern to Cut Fabric accurately (10 minutes)

- Make sure you use accurate measurements and calculations in pattern making for sewing.
- Use the pattern you created from Lab 1 to pin it to your fabric with straight pins measured every 2" around the circumference.
- Cut the fabric after you have taken a photo of your pinned pattern as evidence.

STEP III Measure the Seam allowance 'S' (10 minutes)

2. Using the cut fabric, rulers, tailors chalk, and compasses each student draws the seam allowance to precision by doing the following:
3. Use the compass and tailors chalk to mark and measure the seam allowance $\frac{1}{2}$ " around the circle perimeter.
4. The inner circle on the fabric should equal the diameter 'D' that corresponds to your calculated value you used in Lab 1.
5. Remember: Neatness and accuracy in drawing both the circle and the seam allowance is important
- 6.



STEP IV Pin the Seam allowance (15 minutes)

1. Carefully fold and pin every 2" inches around the circle diameter on your chalk line seam allowance.
2. Emphasize the importance of precision in folding and measuring to ensure the seam is $\frac{1}{2}$ " all the way around.
3. Take a photo to document the pinned seam.

STEP V Clean-Up, Label Fabric, Discuss (10 minutes)

1. Clean up your area and put all tools away, label your fabric with your name pinned on a post it on it and turn in both your pinned fabric and photos should be uploaded to a one drive slide with your name (you will upload more photo documentation of your process later and complete an evaluation on a group one drive document).
2. Reflect on any challenges you and your team faced and how you overcame them.
3. Discuss the practical applications of these skills in sewing and pattern making.

Assessment: Your math measurements, pinning, documentation, and final bag completion will be graded as follows 36 points possible.

Rubric: Cinch Bag Sewing Project

Criteria	Excellent (4)	Good (3)	Fair (2)	Needs Improvement (1)
Measurement Accuracy	All measurements for the bag and ribbon are precise and match the pattern specifications.	Most measurements for the bag and ribbon are accurate and match the pattern specifications.	Some measurements for the bag and ribbon are inaccurate but still within acceptable tolerances.	Measurements for the bag and ribbon are consistently inaccurate or significantly deviate from specifications.
Cutting Precision	Fabric pieces are accurately cut along the pattern lines with smooth edges.	Fabric pieces are mostly accurately cut along the pattern lines with mostly smooth edges.	Fabric pieces are unevenly cut along the pattern lines with some jagged edges.	Fabric pieces are haphazardly cut with many jagged edges and uneven shapes.
Pinning Technique	Fabric pieces are pinned securely and strategically prior to sewing, ensuring alignment and ease of sewing.	Fabric pieces are pinned adequately to facilitate sewing, but some pins may be placed inaccurately.	Fabric pieces are loosely pinned, affecting sewing accuracy and alignment.	Fabric pieces are poorly pinned, leading to significant misalignment and difficulty in sewing.
Sewing Skill	Seams are consistently straight, even, and correctly aligned according to the sewing pattern.	Seams are mostly straight and even, with occasional minor deviations from the sewing pattern.	Seams are uneven, crooked, or inconsistently aligned with the sewing pattern.	Seams are highly uneven, crooked, or not aligned with the sewing pattern, affecting the bag's integrity.
Incorporation of Cinching Ribbon	A ribbon is securely attached to the bag's opening, allowing for smooth and easy cinching.	A ribbon is attached adequately to the bag's opening, allowing for effective cinching.	The ribbon attachment is somewhat secure, but cinching may be difficult or uneven.	The ribbon attachment is insecure or improperly placed, hindering effective cinching.
Overall Craftsmanship	The finished bag demonstrates excellent craftsmanship	The finished bag demonstrates good craftsmanship with mostly neat seams,	The finished bag shows basic craftsmanship with some neat	The finished bag displays poor craftsmanship with messy seams,

Criteria	Excellent (4)	Good (3)	Fair (2)	Needs Improvement (1)
Attention to Detail	with neat seams, secure stitching, and a professional appearance. Attention is given to small details such as finishing edges, trimming threads, and ensuring overall neatness.	secure stitching, and a presentable appearance. Some attention is given to small details, but there are areas that could be neater or more carefully finished.	seams and stitching but lacks a polished appearance. Minimal attention is given to small details, resulting in a somewhat messy or unfinished appearance.	insecure stitching, and an unprofessional appearance. Little to no attention is given to small details, resulting in a noticeably messy and unfinished appearance.
Documentation of Process	Detailed documentation includes clear records of design decisions, progress photos, and reflections on challenges and solutions.	Documentation includes adequate records of design decisions and progress, with some reflections on challenges and solutions.	Documentation is minimal and lacks detail on design decisions, progress, challenges, and solutions.	Documentation is incomplete or missing records of design decisions, progress, challenges, and solutions.
Self-Evaluation	Thoughtful self-evaluation reflects on personal growth, skills acquired, and areas for improvement in the project.	Self-evaluation discusses personal growth and skills acquired in the project.	Self-evaluation mentions some aspects of the project but lacks depth or reflection.	Self-evaluation is superficial or missing, without meaningful reflection on the project experience.