Picture Frame Build (Lesson 3)

Carpentry

Grades
- Grade 3
- Grade 4

Objective
Students will accurately measure, cut, and assemble the four sides of their picture frames.

Concepts
- Measurement
- Angles

Description and Trades Connection

In this lesson, students will review progress on their picture frame projects and receive feedback on their work. The teacher will highlight successful practices and address any mistakes from Lesson 2, providing demonstrations on how to correct them. Students will then have dedicated time to continue working on their projects, applying the feedback and improving their skills, with the goal of finishing the cutting and gluing of the four sides of their frames by the end of the lesson.

This lesson connects to carpentry by teaching skills such as accurate measurement, precise cutting, and proper assembly techniques. These skills are important in carpentry, where precision and attention to detail are crucial for creating well-fitted and structurally sound projects. The hands-on experience with tools and materials mirrors real-world carpentry tasks, helping students develop practical skills they can apply in future carpentry projects.

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Scan to access video demonstrations, activities, classroom resources and more at learninginnovation.ca/k-12STEM

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Picture Frame Build

Curriculum Connections

Grade 3 | Math | Measurement

Learning outcome

Students determine length using standard units.

Knowledge:

- Standard measuring tools show iterations of a standard unit from an origin.

Understanding:

- Length is measured in standard units according to the metric system and the imperial system.
- Length can be expressed in various units according to context and desired precision.

Skills & procedures:

- Measure lengths of straight lines

Learning Outcome

Students relate geometric properties to shape.

Knowledge:

- Right angles can be identified using various referents, such as
  - the corner of a piece of paper
  - the angle between the hands on an analog clock at 3:00
  - a capital letter L

Understanding:

- Geometric properties are relationships between geometric attributes.

Skills & Procedures:

- Investigate the relationships between vertices of a polygon, including equal or right angles, using direct comparison or referents for 90°.

Grade 4 | Math | Measurement

Learning Outcome

Students determine and express angles using standard units.

Knowledge:

- One degree represents 1/360 of the rotation of a full circle.
- Angles can be classified according to their measure:
  - Acute angles measure less than 90°.
  - Right angles measure 90°.
  - Obtuse angles measure between 90° and 180°.
  - Straight angles measure 180°.

Understanding:

- Angles are quantified by measurement and based on the division of a circle.
- An angle is measured with equal-sized units that themselves are angles.

Skills & Procedures:

- Relate angles of 90°, 180°, 270°, and 360° to fractions of a circle.

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Procedure

Preparation

Review student work from the previous lesson and note mistakes and successes. The first part of this lesson is troubleshooting errors and celebrating strengths on their picture frame build so far!

Lesson Activities (30 minutes total)

Check-In and Troubleshooting (10 minutes):

- Begin with a brief check-in to see how students are progressing with their picture frame projects.
- Highlight some great things you've seen so far from students. For example:
  - Accurate measurements and cuts.
  - Proper use of the mitre box and hand saw.
  - Good safety practices, such as wearing PPE and careful cutting.
- Address any common mistakes you've noticed. For example:
  - Incorrect angle cuts (e.g., corners that aren't 90° or cuts made in the wrong direction).
  - Misaligned measurements.
  - Issues with securing the trim in the mitre box.
- Demonstrate how to correct these mistakes. For example:
  - Show how to re-measure and mark the trim correctly.
  - Demonstrate the correct way to align the trim in the mitre box for accurate cuts.
  - Emphasize the importance of double-checking measurements and angles before cutting.
- Check corners to see if they are 90°.
- Encourage students to ask questions and share any challenges they are facing.

Time

30 minutes

Materials

- 90° tracer of some kind (optional) - *not included in kit*
- Fiberboard trim 42" (40)
- Mitre box (12)
- Clamps (24)
- Tape measures (12)
- Carpentry pencils (24)
- Hand saw (12)
- Glue gun (6)
- Glue sticks (1 pk)
- Safety glasses (20)
- Gloves 12pk (2)
- Carpentry pencil sharpeners (3)
- Mitre box locking pins (24)

Picture Frame Build

Procedure

Work Time (20 minutes):

- Allow students to continue working on their projects, focusing on measuring, cutting, and assembling the frame.
- Circulate around the classroom to assist students with their tasks. Provide guidance and support as needed with:
  - Measuring and marking the fiberboard trim accurately.
  - Securing the trim in the mitre box and making precise cuts.
  - Using the glue gun to assemble the frame pieces.
  - Ensuring all joints are aligned correctly and securely glued.
- Encourage students to work carefully and safely, using the PPE provided.
- If students start finishing, encourage them to help slower students with cutting.
- Encourage all students to finish cutting and gluing together the four sides of their frame by the end of this lesson.

Picture Frame Build

Assessment and Online Resources

Assessment Suggestions

- Collect student work
- Have group conversation about what's going well and what still needs work

Online Resources

- Mitre Box - Home Page (Lethbridge Polytechnic, 2023)
- Mitre Box Kit: Overview Video [0:47] (Lethbridge Polytechnic, 2023)
- Mitre Box Kit: Station Setup [7:34] (Lethbridge Polytechnic, 2025)
- Mitre Box Kit: Picture Frame Project [10:28] (Lethbridge Polytechnic, 2024)

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