DMT INSTITUTE

Developing Mathematical Thinking Institute (DMTI)

Professional Development

Curricular Resources

Assessment

Jonathan Brendefur, PhD
jonathan@dmtinstitute.com

About the DMTI Modules

The DMTI modules are designed to guide classroom instruction and formative assessment for teachers implementing the DMTI curricular materials.

The lessons are not necessarily intended for a single day of instruction. Teachers are encouraged to use their professional judgement regarding pacing. A suggested number of weeks is provided.

DMTI Day Overview

Overall, each module highlights historical and/or cultural themes used to build the lessons. Each Day should start with a warm-up, one or two major components of a lesson, and a take-away.

Components of a DMTI DAY (whether 45, 60, or 90 minutes long)

Warmup (3-5 minutes)

   Lesson Component – Problem Solving Situation

   Lesson Component – Explanation of math concepts and ideas

   Lesson Component – Varied Tasks

   Lesson Component – Varied Practice

Takeaway (2-4 minutes)

DMTI Lesson Component Overview

Overall, each module highlights historical and/or cultural themes used to build the lessons. Each Lesson will focus on one or more of the following Lesson Components:

Lesson Component – Problem Solving Situation *(~3 to 10 minutes)*

Lesson Component – Explanation of Math Concepts and Ideas *(~3 to 5 minutes; explanation of math concepts and ideas (with historically, culturally relevant and mathematically accurate ideas)*

Lesson Component – Varied Tasks *(~10-20 minutes; Completed together, in small groups or individually)*

Lesson Component – Varied Practice *(~15-30 minutes; Enactive, Iconic, Symbolic or Context, Iconic, and Symbolic)*

Lesson Review *(After every few lessons a review with different questions – skill, problem solving, conceptual, and justification – will be incorporated as both practice and a formative assessment or checkpoint for teachers.)*

Grade 4

MEASUREMENT AND GEOMETRY: ANGLES AND SHAPES

BONUS ACTIVITY (ANGLE OF THE SUN)

DMT INSTITUTE

Lesson 5

MEASURING ANGLES: SUN ANGLES

Lesson 5: Field Trip

Today we are going to find angles around our environment. Using your protractor, we are going to walk around the room or building and describe items with angle measures. Then, we are going to walk around outside and look for angles and describe them as well. Use Template 5.1 to describe your findings.

Inside examples: pictures, walls, desks, chairs, ceilings, art, lights, pottery, and other items.

Outside examples: bird wings, bird landing, flowers, trees, bugs, rocks, mountains to name a few.

Practice Worksheet 5.1

Inside items: Find at least 4 items, name them, draw their angle, and state its angle measure.

	Item	Drawing	Angle Measure
1.			
2.			
3.			
4.			
5.			

Practice Worksheet 5.2

Outside items: Find at least 4 items, name them, draw their angle, and state its angle measure.

	Item	Drawing	Angle Measure
6.			
7.			
8.			
9.			
10.			

Lesson 5: Bonus Activity

11. What time do you think it is when the sun is at the following angles?

a. $22\frac{1}{2}^0$ (1 section)

b. 45^0 (2 sections)

c. $67\frac{1}{2}^0$ (3 sections)

Lesson 5: Bonus Activity – Sun Angles

A. Place a branch into the ground that sticks out of the ground about 8 to 12 inches.

B. Cut out 1 section $(22\frac{1}{2}^0)$ and tape it to one section of the meter stick or something that is straight and about 3 feet long (piece of wood, a pole, a longer stick).

C. Place the meter stick with one tip resting on the stick and the other end with the angle section resting evenly on the ground. Place something there.

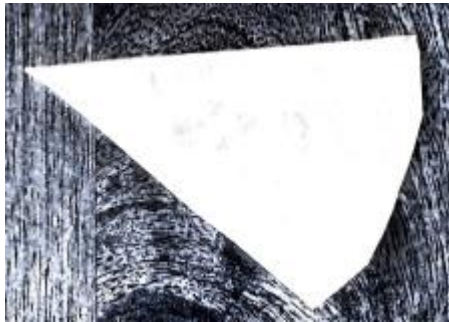D. Now wait until the stick's shadow meets the end of the meter stick. Write down the time.

E. Repeat B through D with a 2 section section (45^0) and so on.
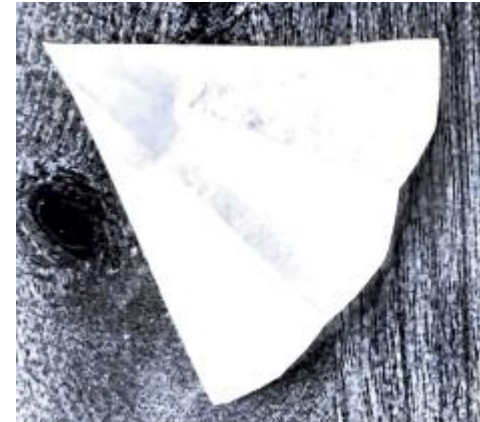
9:35 am

A $22\frac{1}{2}^0$
angle section

DMT INSTITUTE
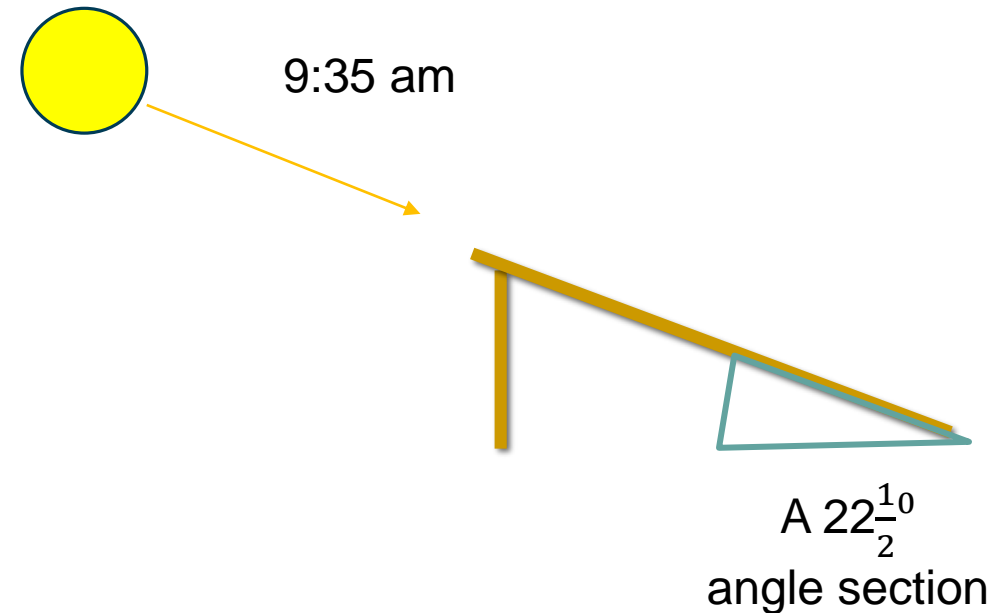
Lesson 5: Sun Angles

$22\frac{1}{2}^0$
angle section
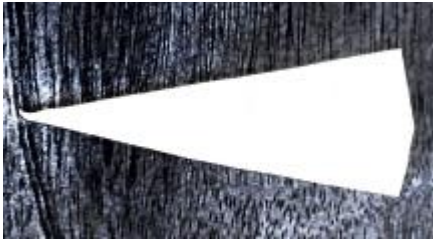
45^0
angle section

$67\frac{1}{2}^0$
angle section

DMT INSTITUTE

Lesson 5: Sun Angles

Here is the set up for a $22\frac{1}{2}^0$ angle. Place the 1 section wedge on the meter stick and then lay on the top of the stick and move it until the bottom ray is even with the ground.

Then, mark the spot where the sun will be when the shadow reaches $22\frac{1}{2}^0$. Wait until the shadow meets the mark. What time is it?

It is 9:35 am.

At 43^0 latitude in the fall.

Lesson 5: Sun Angles

Here is the set up for a 45^0 angle. Place the 2 section wedge on the meter stick and then lay on the top of the stick and move it until the bottom ray is even with the ground.

Then, mark the spot where the sun will be when the shadow reaches 45^0. Wait until the shadow meets the mark. What time is it?

It is 12:05 pm.

2 ½ hours later.

At 43^0 latitude in the fall.

DMT INSTITUTE

"The Developing Mathematical Thinking Institute (DMTI) is dedicated to enhancing students' learning of mathematics by supporting educators in the implementation of research-based instructional strategies through high-quality professional development, curricular resources and assessments."

For more information contact
Dr. Brendefur at jonathan@dmtinstitute.com