

Nets of 3D Shapes

Topic Area:
Math (Geometry)

Duration:
60-80 minutes

Difficulty Level:
Intermediate

Objectives:

By the end of the session, participants will be able to:

- Identify three-dimensional shapes and describe their features and properties.
- Identify three-dimensional shapes based on their two-dimensional nets.
- Design and create a three-dimensional net of a known geometric shape.

Suggested Materials:

- Cricut Design Space
- 3D net Cricut design files
- Medium weight cardstock
- Scoring wheel (#10)
- Pre-assembled 3D figures

Background:

- Participants will learn the structure of 3D objects using two-dimensional nets and use these manipulatives to assist with understanding properties of shapes.

Introduction:

- Provide participants with solid 3D shapes or objects assembled from the 2-D nets. Ensure some of the shapes are prisms and some are pyramids.

- The 3D shapes should be the same figures as the nets that participants will work with later in the session.
- Ask participants to individually or in small groups identify each object and describe the properties of each shape.
- Review the responses as a group. Individuals who struggle with identifying appropriate properties or identifying the 3D shapes can be pulled into a smaller group during the main session activity for a review.
- Have the group compare and contrast the features of the prisms and the pyramids. If knowledge level allows, participants can even identify the bases and shapes that comprise each shape.

Session Activity:

- Show participants one geometric net and model for them how the two-dimensional net can be folded up to form a 3-dimensional shape.
- Discuss the shapes that make up the net and how they relate to the properties of the three-dimensional shape. Model how one of the nets was created in Cricut Design Space.
- Then, provide each group with a set of geometric nets. Ask participants to explore the nets they have received.
 - Have each group identify the three-dimensional shape that their net will make and justify their answers using the properties and characteristics discussed in the introductory activity. Depending on the knowledge of each group, they can also classify the shapes based on their nets.
 - Once these predictions have been made, participants will use the nets to see if they were correct or incorrect.
- After participants have had a chance to explore the nets provided by the instructor, challenge them with designing and creating their own net. This net should be one that has not been demonstrated during this session. Allow each group to choose their own shape, or assign each group a shape so that each group is able to create a unique net.

Closing:

- Have each group share their net and how they were created.
- Discuss the challenges of designing the net and if their design was successful.
- Compare and contrast the nets they created and the creation process.
- Brainstorm other ways nets can be used.

Reflection

- Have each person think about what they learned about themselves as they progressed through this session.

Extensions and Customizations:

- Design the nets to include a small cut-out hole and weave a skinny string through the holes. Ensure there is enough slack to allow the net to stay flat.
- Participants can pull on this string to fold the edges of the net together and form the shape, rather than needing to fold each side in.
- Have participants solve surface area problems using the nets.

Template Links

Square Pyramid Net:

- <https://design.cricut.com/landing/project-detail/65c3bdf49d2e0f7dbb1210d1>

Cuboid Net:

- <https://design.cricut.com/landing/project-detail/65c3de1b8a70e4021f8db166>

Tetrahedron Net:

- <https://design.cricut.com/landing/project-detail/65c3dd23030039d09ceec07f>

Triangular Prism Net:

- <https://design.cricut.com/landing/project-detail/65c3e176c71baf6ddfc0523d>



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Instructional Guide