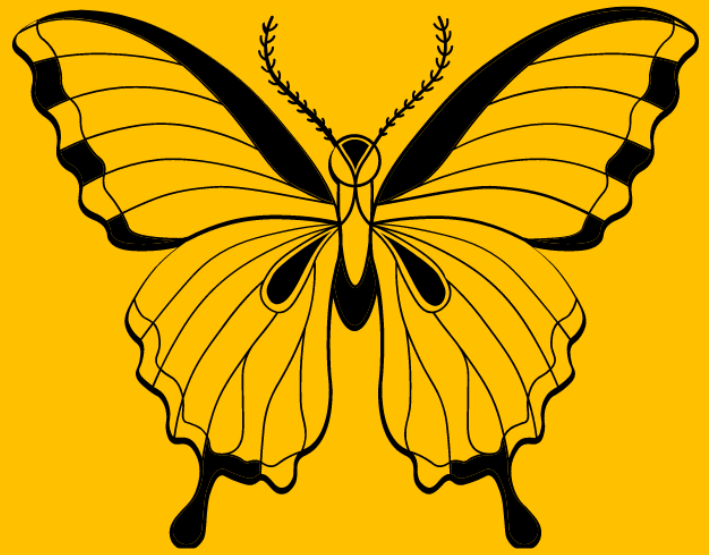
TEACHER EDUCATION ASSEMBLY
2022

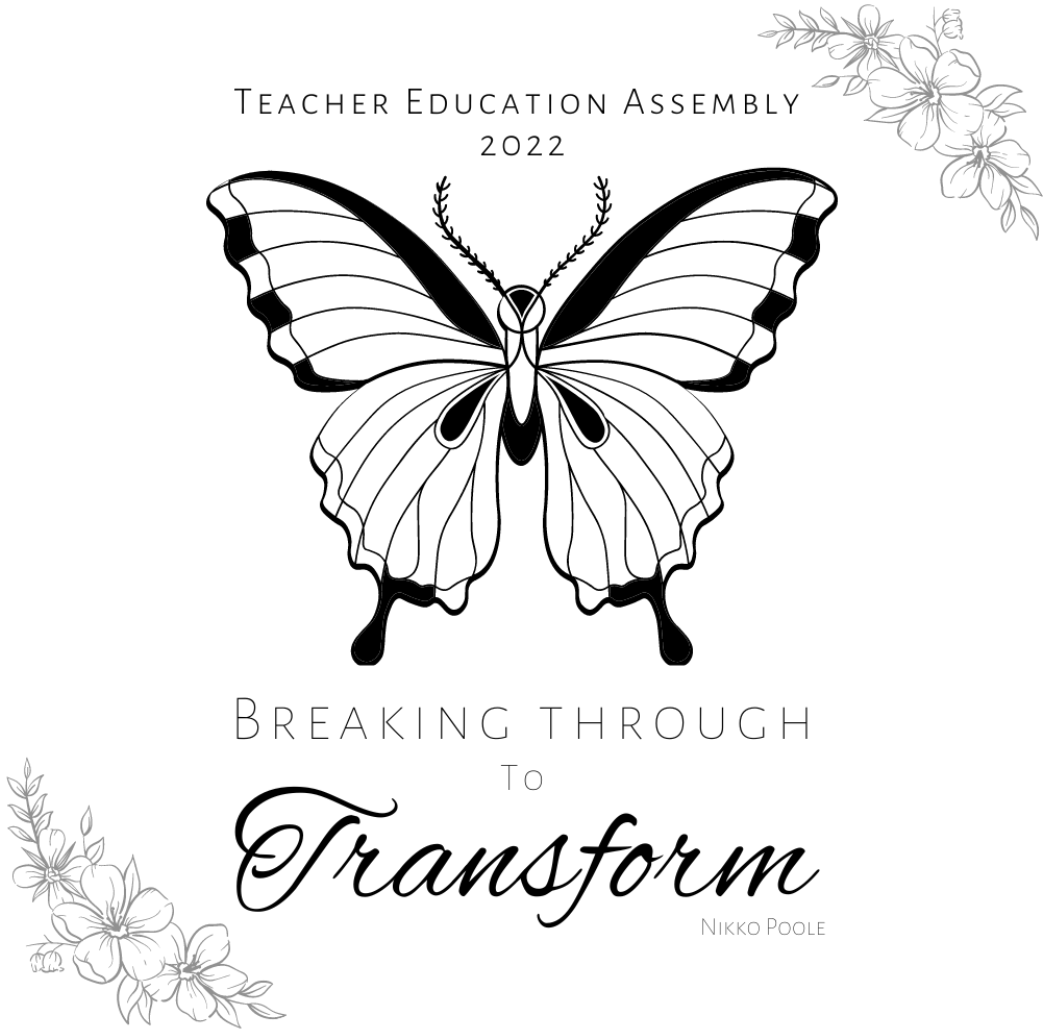


BREAKING THROUGH
TO
Transform
NIKKO POOLE

PAC-TE welcomes you and encourages you to:

1. Cast your vote for the open seats on PAC-TE's Board of Directors before you leave the conference, if possible.

2. Register for the Spring Conference, March 22 today and receive a $10 discount.



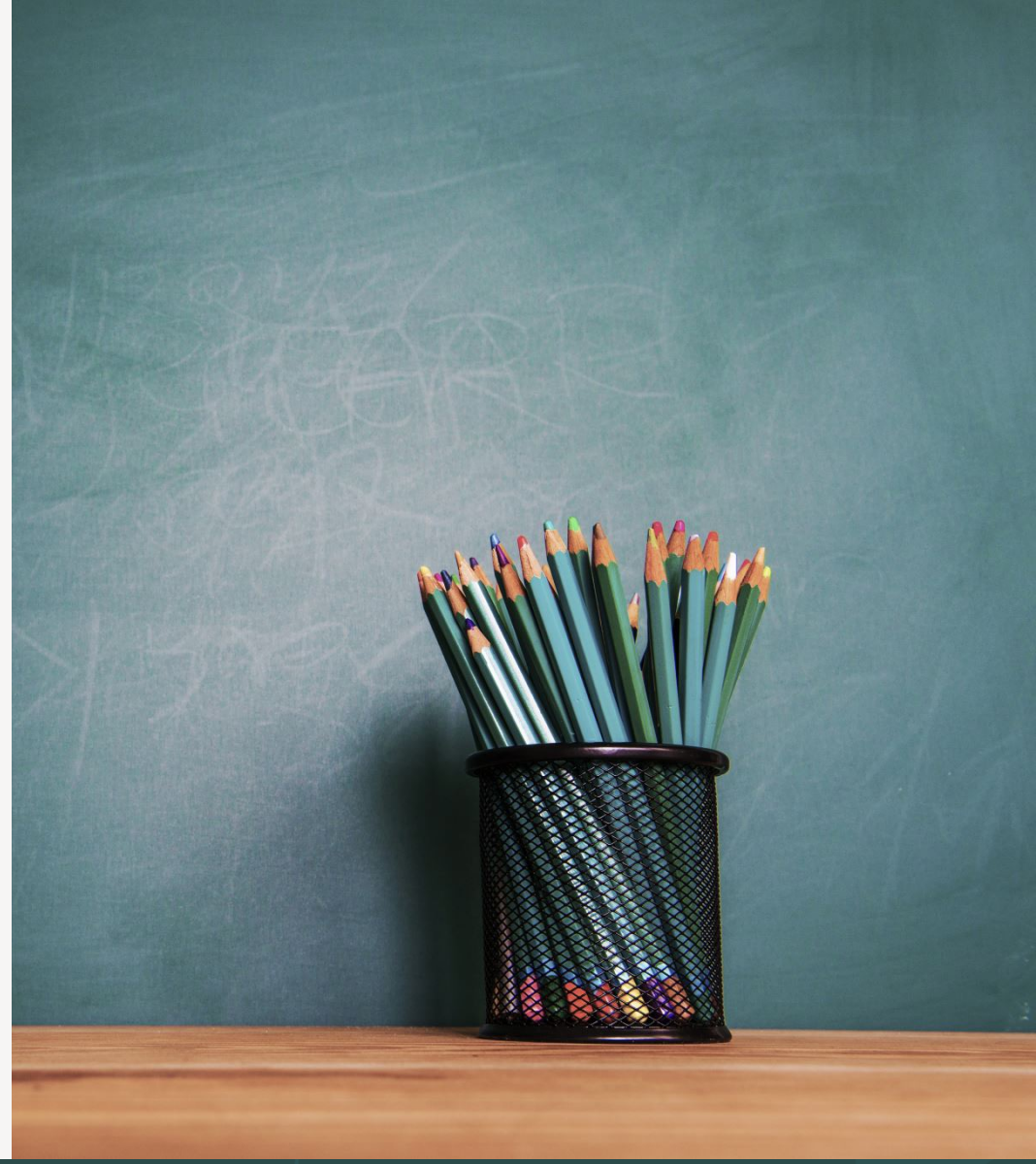
PAC-TE and the presenter(s) of this session desire your feedback.

On the Whova event main menu, go to the agenda. Tap on a session to view the session detail page, and then tap on the “Rate” button.

MAKING MATH

PRE-SERVICE TEACHERS IN THE MAKERSPACE

Dr. Dawn Turkovich, Saint Vincent College



STEM ACTIVITY

- Tinkercad
- 3d printer
- PSTs in a Geometry class

Association of Mathematics Teacher Educators

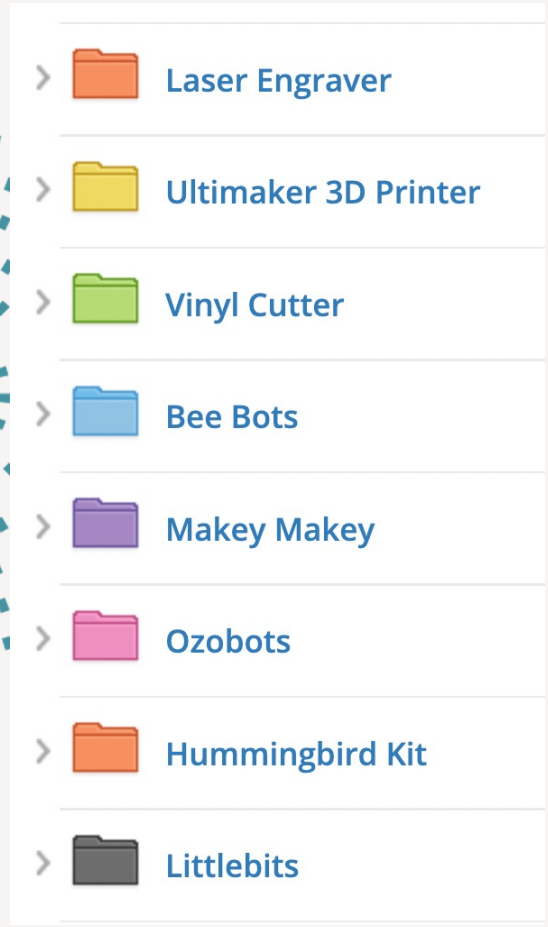
- Supporting teachers in using technology to develop their mathematical content knowledge
- Supporting teachers in using technology to help their students learn mathematics

National Council of Teachers of Mathematics

Candidates engage in the mathematical modeling process and demonstrate their ability to model mathematics.

- Evidence: Students may model mathematics through the use of manipulatives, demonstration, dramatization, diagrams, equations, and conceptual models of mathematics.

PURPOSE OF USING THE MAKERSPACE



- challenge students to create and learn through hands-on, personalized experiences
- foster innovation through hands-on experimentation
- develop their own ideas, methods or products

Prior experience with STEM activities

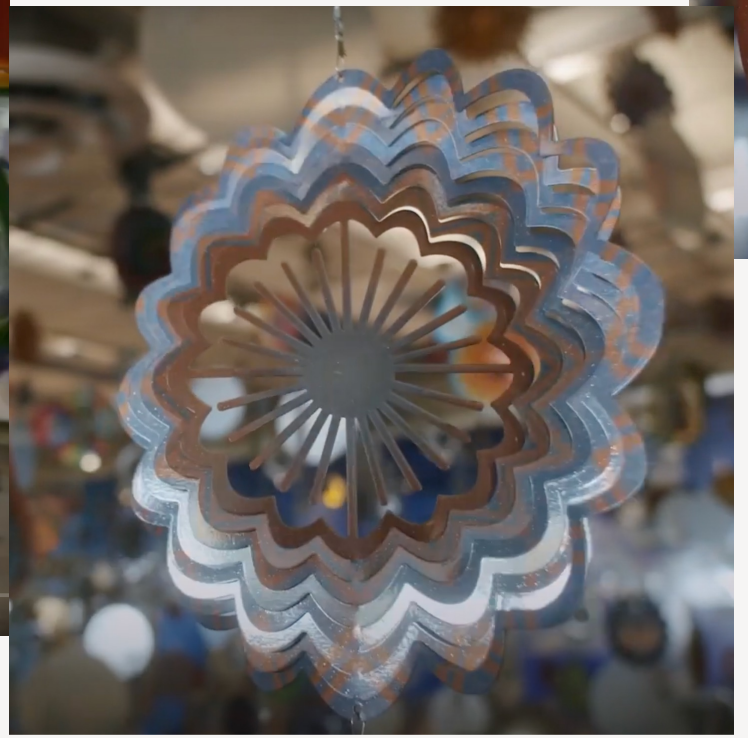
- Brief introduction to makerspace on campus
- Bee-bots
- Some activities in middle school and high school
- Most students said no experience

Math concepts/vocabulary

Pre-activity questions –Vocabulary

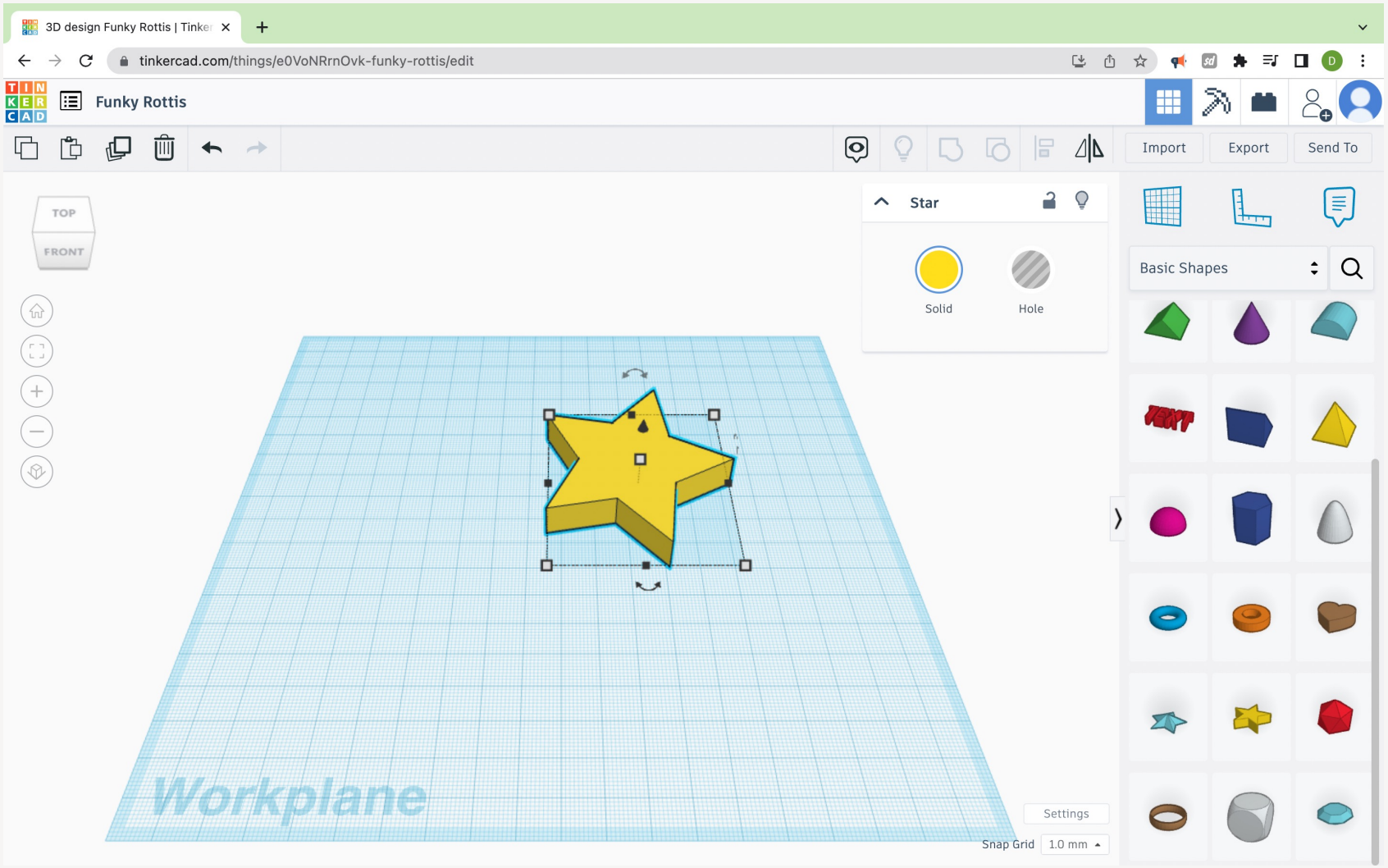
polygon
convex
translation
reflection
congruent
concave
concentric
rotation
similar

Lesson:
Kinetic Spinner & Transformations

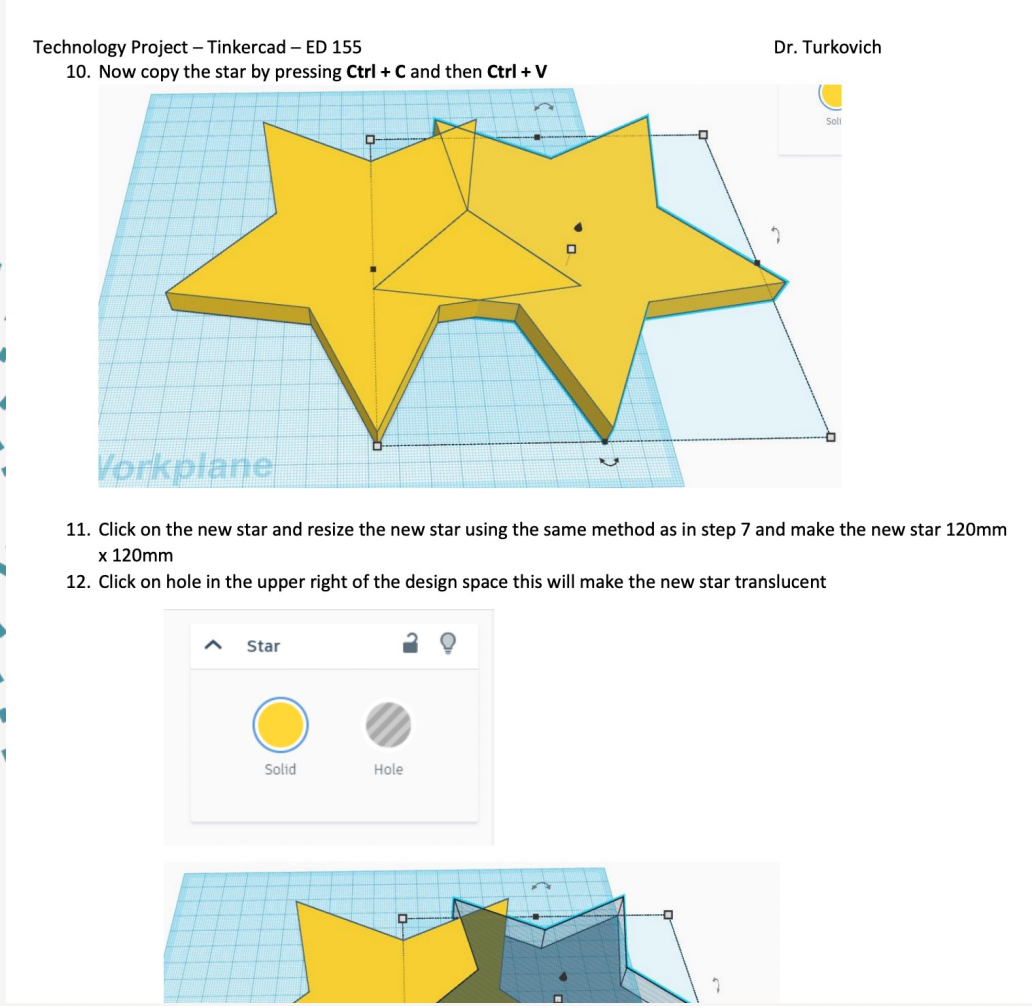


Nick Cave - artist

Tinkercad- Free web app 3D design, electronics, and coding



Building the Project


Technology Project – Tinkercad – ED 155 Dr. Turkovich

10. Now copy the star by pressing **Ctrl + C** and then **Ctrl + V**

Workplane

11. Click on the new star and resize the new star using the same method as in step 7 and make the new star 120mm x 120mm
12. Click on hole in the upper right of the design space this will make the new star translucent

Star

Solid Hole

- Time to explore
- Worked at their own pace individually or in pairs, but stayed mostly together as a group
- Incorporated use of vocabulary throughout process

- Future work related to project:
  - Solving proportions
  - Working with similar figures

Finishing the project

- Export the stl file
- Use the Ultimaker Cura Slicer to choose settings
- Send to 3d printer

Student Perceptions of a Makerspace and Math

- Chance to explore
- Relate what you are doing in math to something you are interested in
- Chance to experiment and create
- Hands-on processing of knowledge

- Hands-on
- Eye-opening to what students could do
- Way to connect math with real life
- Way to make math exciting and interesting

Now what?

- Other opportunities in Makerspace
- Similarity problems in geometry
- Lesson plans in methods class next semester

Select References

- *Kinetic Spinners & Rigid transformations*. Tinkercad. https://www.tinkercad.com/projects/Kinetic-Spinners-Rigid-Transformations
- NCMT. (2020). *Standards for the preparation of Middle Level Mathematics Teachers*. https://www.nctm.org/uploadedFiles/Standards_and_Positions/NCTM_Middle_School_2020_Final.pdf
- *Position of the association of mathematics teacher educators on technology*. (n.d.). https://amte.net/sites/amte.net/files/AMTE%20Technology%20Statement%20Oct%202022.pdf