higher education & training
Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

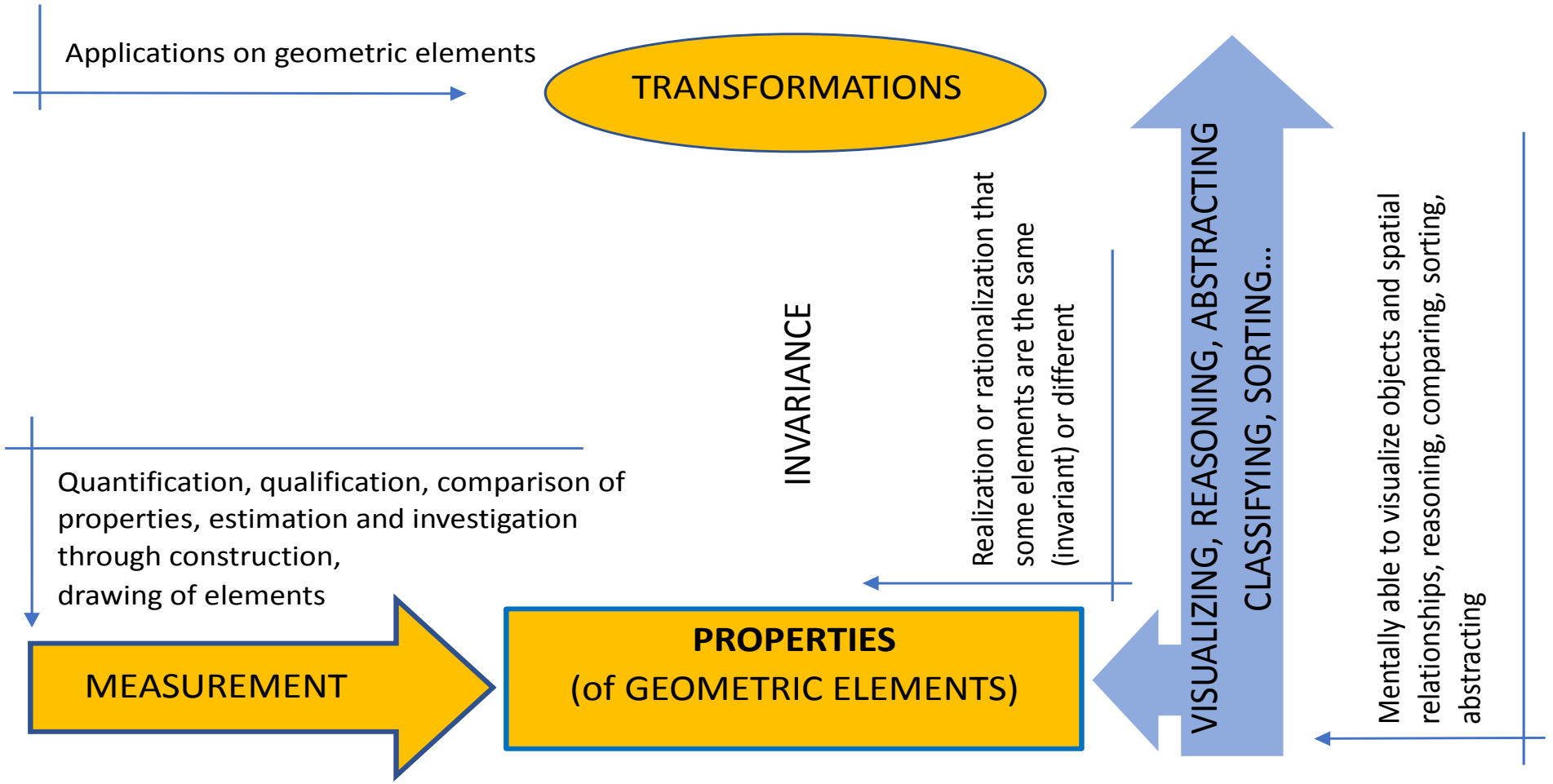
Co- funded by the
European Union

Knowledge and Practice Standards for Mathematics in Initial Teacher Education

Geometry and Measurement

17th of April 2019

t&tldcip
TEACHING & LEARNING DEVELOPMENT CAPACITY IMPROVEMENT PROGRAMME



CORE KNOWLEDGES: DISTANCE, ANGLE, SENSE

Standard 5: Foundational knowledges

Awareness of core knowledge which learners possess prior to the commencement of former schooling.

Sub-Standards:

- 5.1: An awareness of position (location), distance (length), direction (angle), and “sameness” (invariance)
- 5.2: Ability to describe position relative to other positions or markers
- 5.3 Estimation and comparison of distances and lengths (magnitude)
- 5.4 Ability to indicate direction or describe an angle in terms of directions
- 5.5 Awareness of sameness and difference and similarities
- 5.6 Recognition of invariance after transformations

Standard 6: Knowledge of Geometry Properties

One of the most important underpinning ideas in the teaching and learning of geometry in school mathematics is those *properties* which define geometric elements to be what they are.

Sub-Standards:

6.1: Understand dimension

6.2: Rational classification of 3-dimensional objects according to observed properties

6.3: Rational classification of 2-dimensional shapes according to observed properties

6.4: Realisation of inclusivity with regard to objects and shapes

6.5: Economy of definitions

Standard 7: Knowledge of Transformations

Sub-Standards:

7.1 Understanding and representing translations, reflections, rotations, and dilations of objects in the plane

7.2 Drawing and constructing representations of tessellations of two-dimensional geometric shapes or three-dimensional objects using transformations and a variety of tools

7.3 Comparing geometric patterns (tessellations) that share common characteristics (e.g. form, line, angle, vertex arrangement, space)

7.4 Demonstrating how (elements and principles) can be used to solve specific spatial visual problems

7.5 Planning and producing works of art applying mathematical techniques, and processes with skill, confidence, and sensitivity

Standard 8: Knowledge of Measurement

Emphasizing relations between different applications of measurement (ie. length, area, volume, capacity, time, mass, etc.) is critical in developing a robust conception of what measurement is.

Sub-Standards:

8.1 Recognizing the attribute being measured

8.2 Identifying a unit

8.3 Cardinality of the units employed

8.4 Iterating units

8.5 Estimation

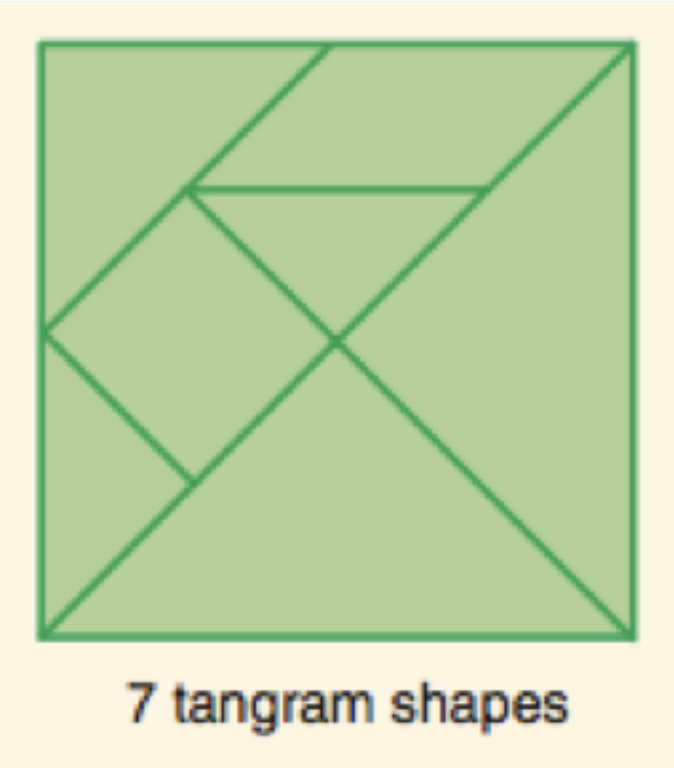
8.6 The relation between Number and Measurement

Practice standards

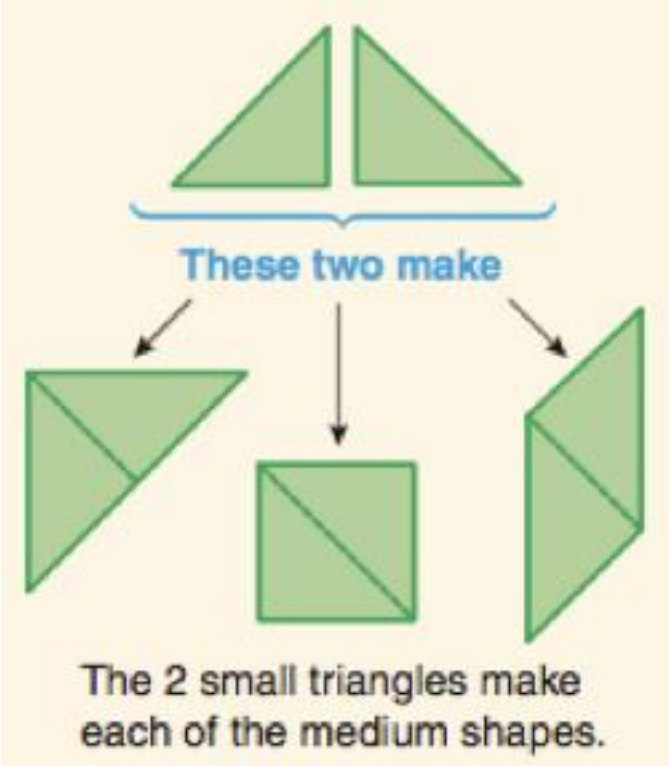
While some of the standards listed here may be specific to Geometry, most are common across all content areas, and are included in the Mathematical Thinking standards.

- Knowledge of visualizing
- Knowledge of reasoning and justification
- Knowledge of generalizing geometric ideas
- Knowledge of classifying and defining
- Knowledge of investigating invariants
- Analysing and interpreting a figure
- Knowledge of technology
- Mixing deduction with experimentation
- Knowledge of Mathematical Problem Solving
- Dispositions

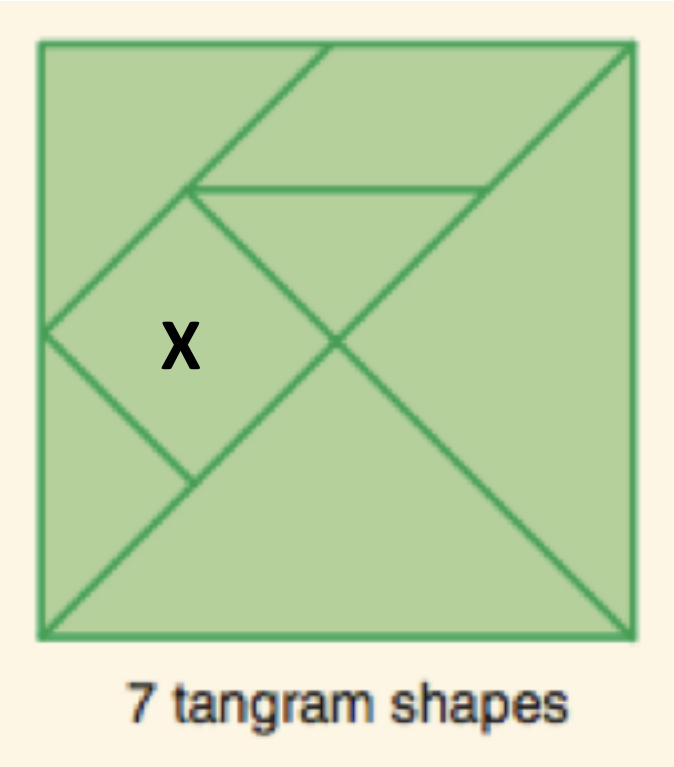
Standard 8.2
Identifying a **unit**

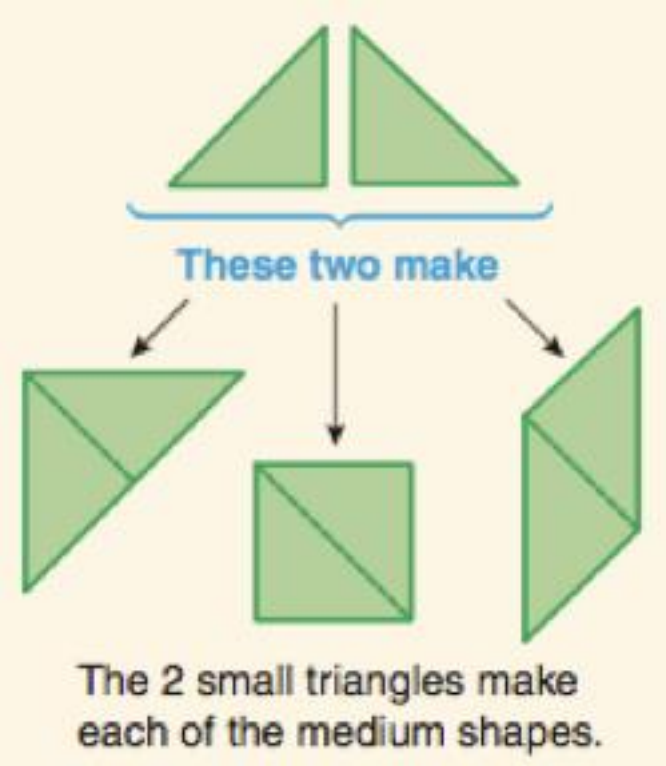


7 tangram shapes



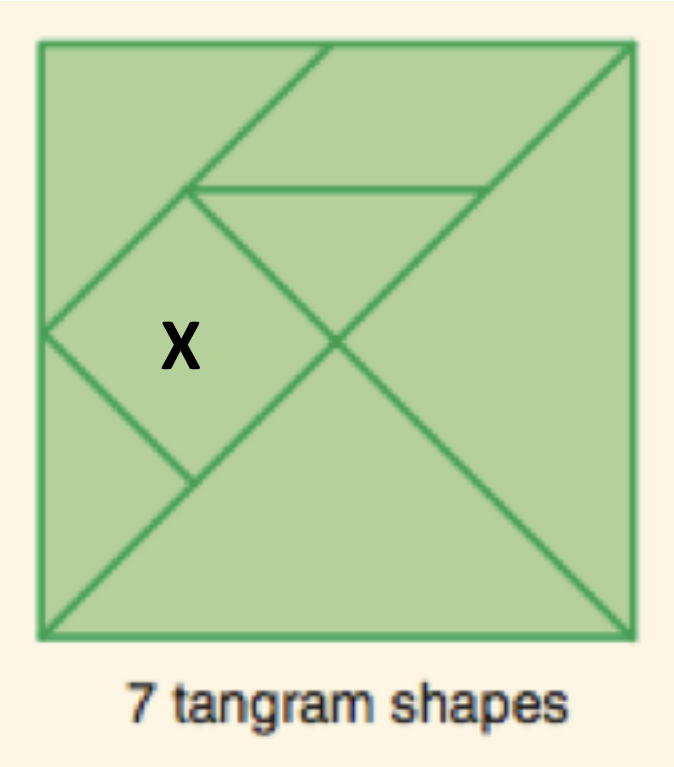
Standard 14.2
Identifying a **unit**

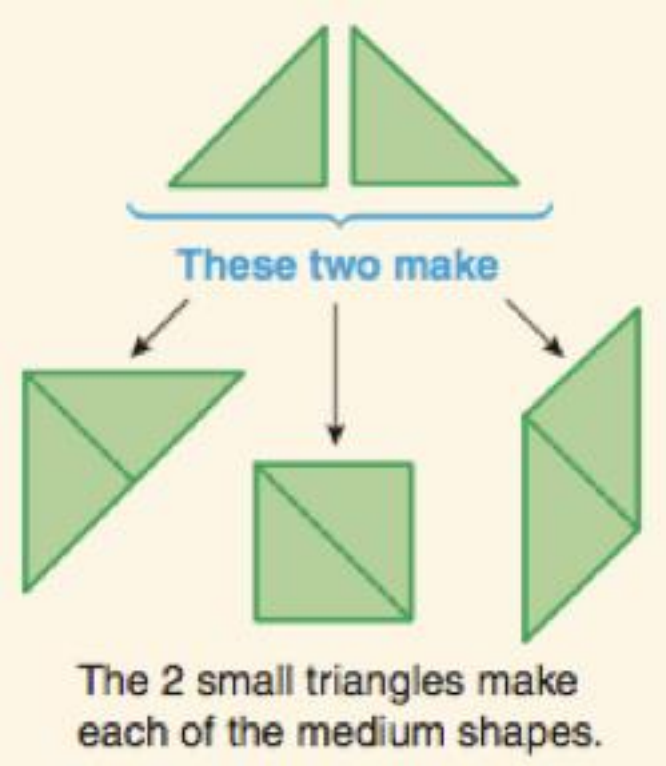




How many of the shape marked with an **X** would make up the area of all the shapes put together?

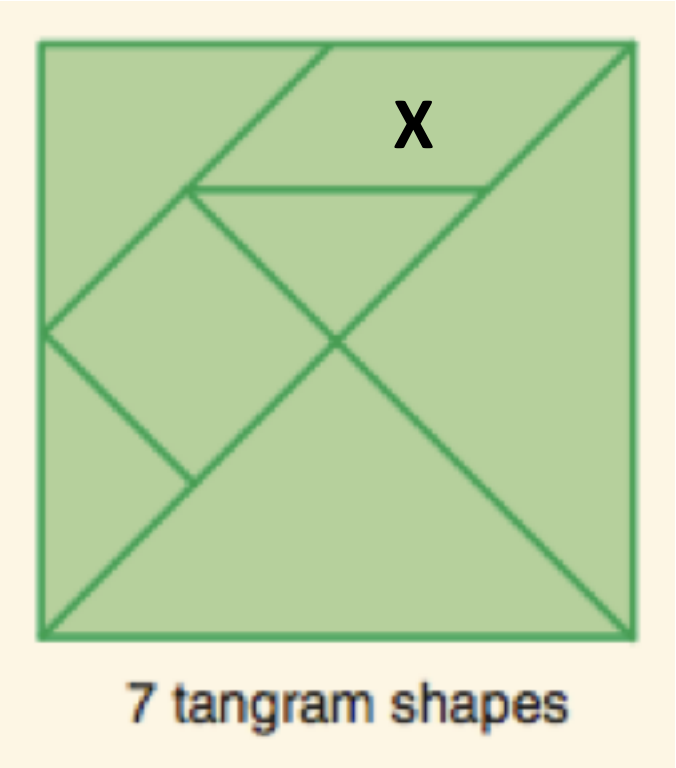
Standard 14.2
Identifying a **unit**

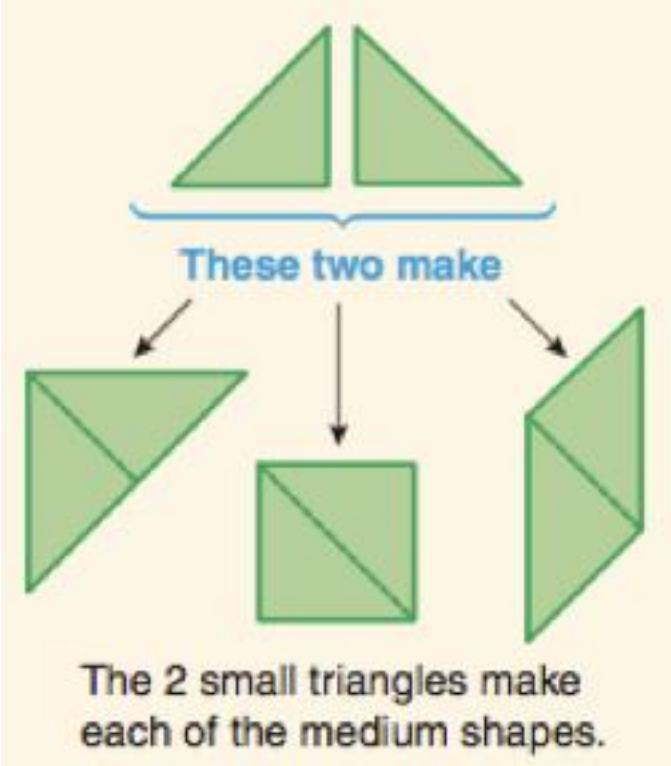




How many of the shape marked with an **X** would make up the area of all the shapes put together? **8**

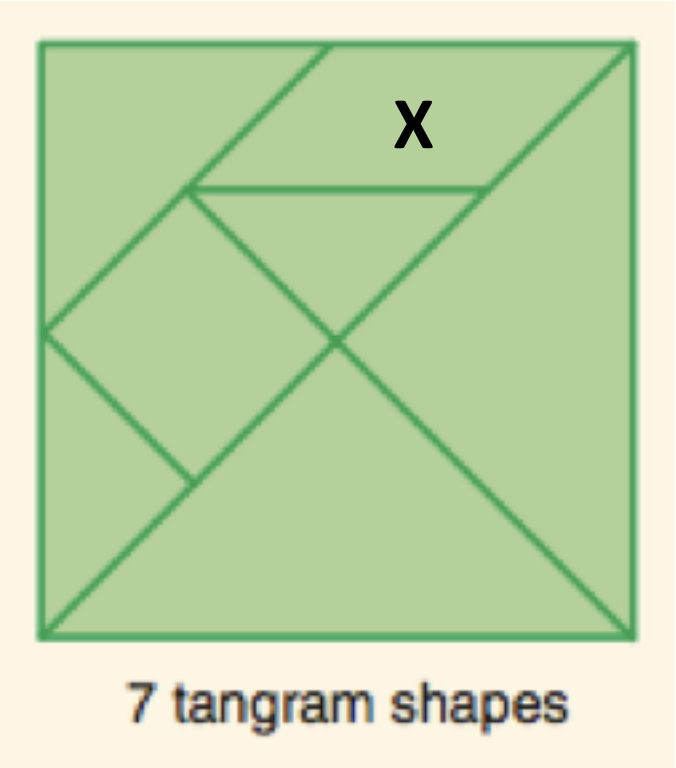
Standard 14.2
Identifying a **unit**

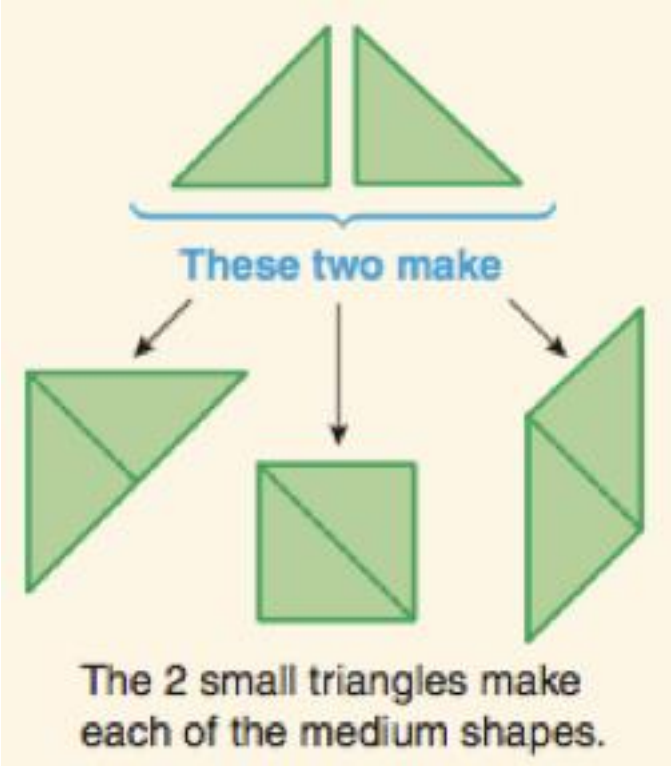




How many of the shape marked with an **X** would make up the area of all the shapes put together?

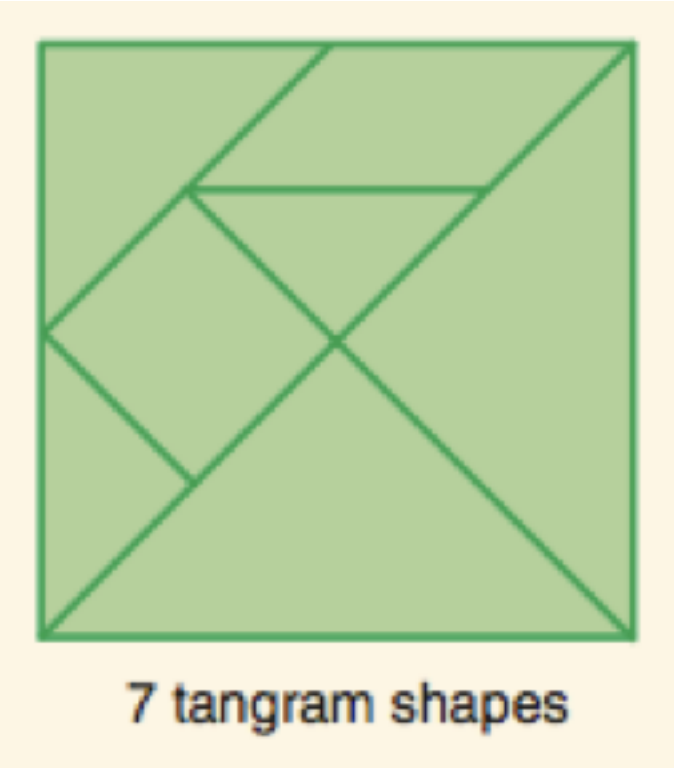
Standard 14.2
Identifying a **unit**

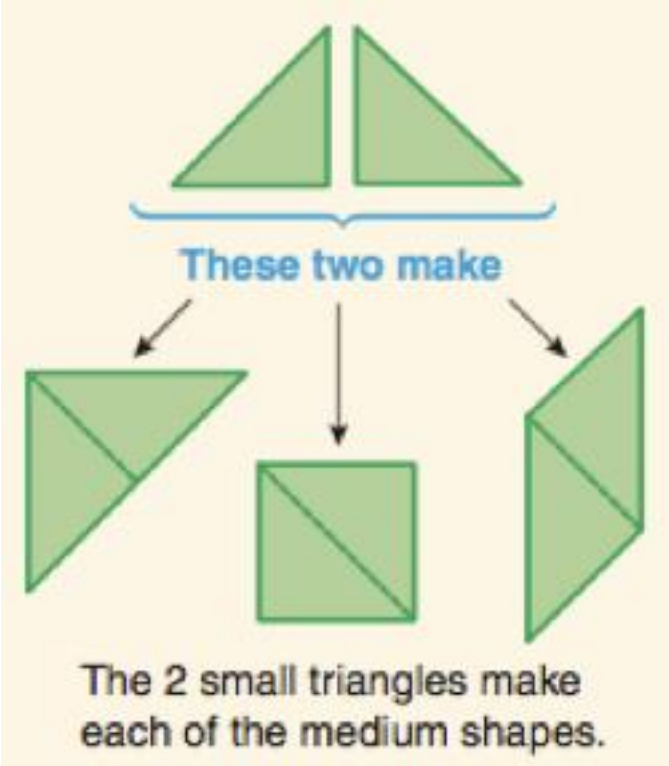




How many of the shape marked with an **X** would make up the area of all the shapes put together? **8**

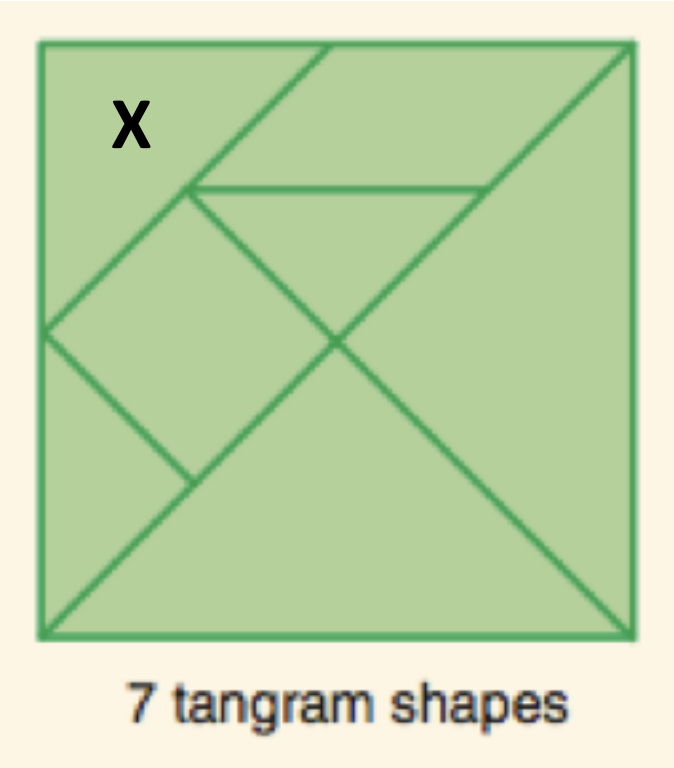
Standard 14.2
Identifying a **unit**

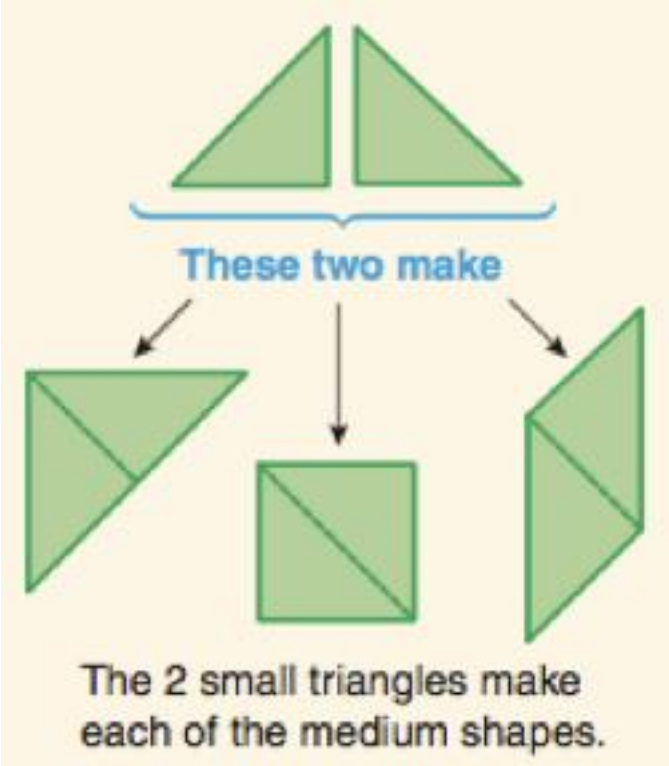




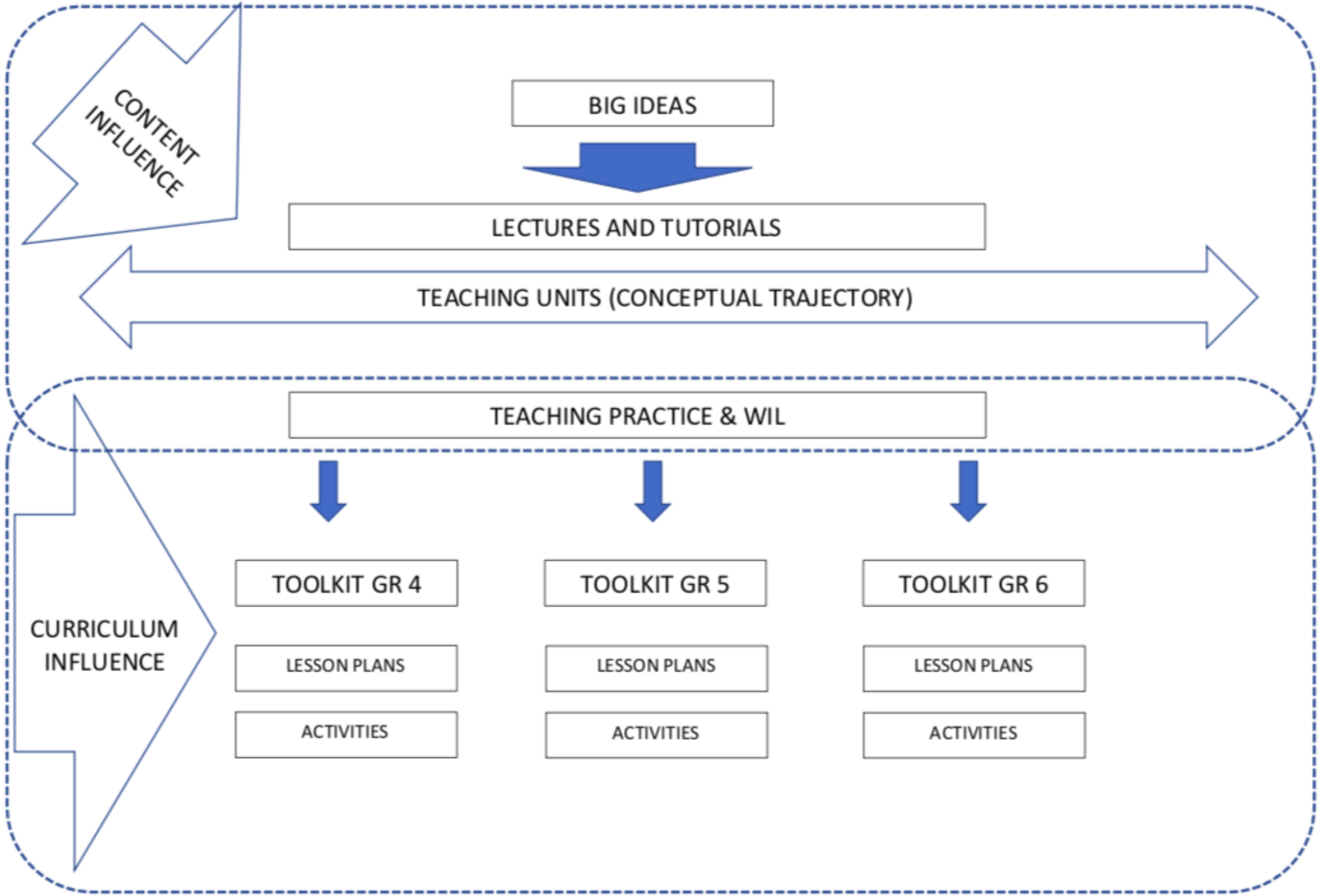
Mark with an **X** another shape in the tangram that could be tessellated **8** times to cover the area that the complete tangram occupies.

Standard 14.2
Identifying a **unit**





Mark with an **X** another shape in the tangram that could be tessellated **8** times to cover the area that the complete tangram occupies.


CONTENT INFLUENCE
BIG IDEAS
LECTURES AND TUTORIALS
TEACHING UNITS (CONCEPTUAL TRAJECTORY)
TEACHING PRACTICE & WIL
CURRICULUM INFLUENCE
TOOLKIT GR 4
TOOLKIT GR 5
TOOLKIT GR 6
LESSON PLANS
LESSON PLANS
LESSON PLANS
ACTIVITIES
ACTIVITIES
ACTIVITIES