UM PRINTABLES

PREMIUM EDUCATIONAL RESOURCES

SECONDARY MATHEMATICS · GEOMETRY

SCAFFOLDED PROOF BUNDLE

Triangle Congruence Proofs: Task Cards *& Scavenger Hunt*

A differentiated, scaffolded proof-writing resource for SSS, SAS, ASA, AAS, and HL. Three tiers of 12 cards move learners from fill-in-the-reason reasoning to full two-column proofs — with explicit visual supports for Special Education / IEP students and a self-checking scavenger hunt for on-level learners.

TIER A

Fill-in-the-Reason

Statements given. Students supply reasons from a word bank. Includes proof-outline organizer.

TIER B

Fill-in-the-Statement

Reasons given. Students supply statements by reading the color-coded diagram.

TIER C

Full Proof

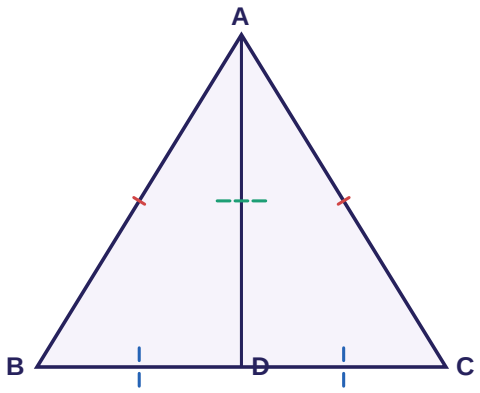
Diagram only. Students construct entire two-column proof from scratch.

36	8	5	4
TASK CARDS	HUNT CARDS	PROOF METHODS	SPED MODIFIED

SpEd / IEP Friendly · Color-Coded Parts · Sentence Stems · Proof-Frame Organizer · Self-Checking Loop · Detailed Solutions

Table of Contents

CARD 3 — SSS



Given: AB ≅ AC; BD ≅ CD

Prove: ΔABD ≅ ΔACD

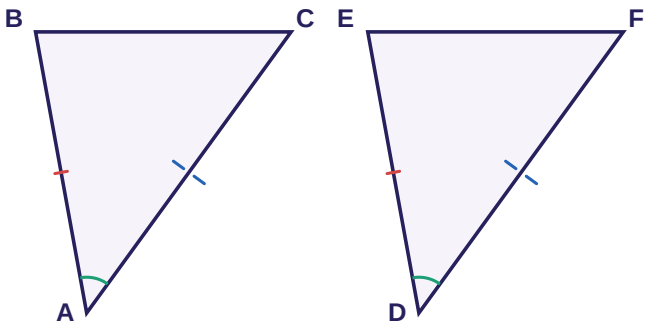
Statement	Reason
AB ≅ AC	Given
BD ≅ CD	_____
AD ≅ AD	_____
ΔABD ≅ ΔACD	_____

Word Bank: Reflexive Property of Congruence · SSS Congruence Postulate · Given · Definition of Perpendicular · SAS Congruence Postulate · HL Congruence Theorem

PROOF OUTLINE

GIVEN: Read the givens from the diagram → IDENTIFY: Find shared sides or angles → CHOOSE: Apply SSS → CONCLUDE: ΔABD ≅ ΔACD

CARD 4 — SAS



Given: AB ≅ DE; ∠A ≅ ∠D; AC ≅ DF

Prove: ΔABC ≅ ΔDEF

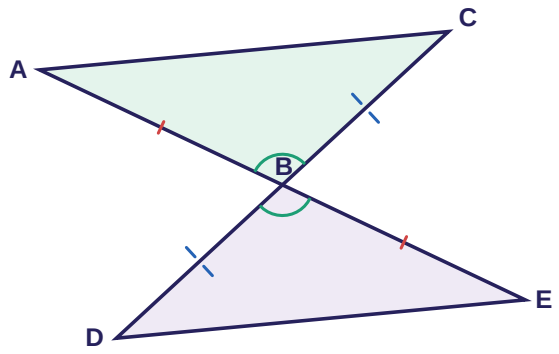
Statement	Reason
AB ≅ DE	Given
∠A ≅ ∠D	_____
AC ≅ DF	_____
ΔABC ≅ ΔDEF	_____

Word Bank: SAS Congruence Postulate · Given · SSS Congruence Postulate · ASA Congruence Postulate · Reflexive Property of Congruence

PROOF OUTLINE

GIVEN: Read the givens from the diagram → IDENTIFY: Find shared sides or angles → CHOOSE: Apply SAS → CONCLUDE: ΔABC ≅ ΔDEF

CARD 5 — SAS



Given: B is the midpoint of AE; B is the midpoint of DC

Prove: ΔABC ≅ ΔEBD

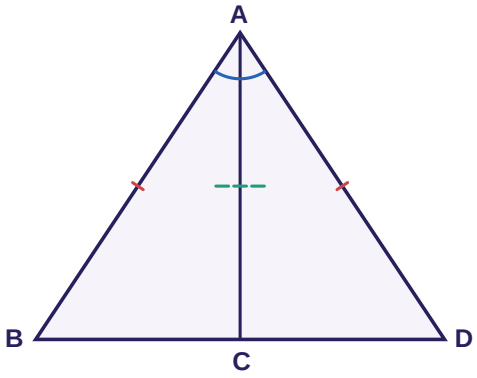
Statement	Reason
AB ≅ BE	Definition of midpoint
DB ≅ BC	_____
∠ABC ≅ ∠EBD	_____
ΔABC ≅ ΔEBD	_____

Word Bank: Definition of midpoint · Vertical Angles Theorem · SAS Congruence Postulate · Given · Definition of Angle Bisector · Reflexive Property of Congruence

PROOF OUTLINE

GIVEN Read the givens from the diagram → **IDENTIFY** Find shared sides or angles → **CHOOSE** Apply SAS → **CONCLUDE** ΔABC ≅ ΔEBD

CARD 6 — SAS



Given: AB ≅ AD; AC bisects ∠BAD

Prove: ΔABC ≅ ΔADC

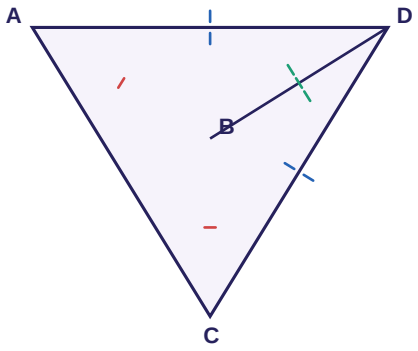
Statement	Reason
AB ≅ AD	Given
∠BAC ≅ ∠DAC	_____
AC ≅ AC	_____
ΔABC ≅ ΔADC	_____

Word Bank: Definition of angle bisector · Reflexive Property of Congruence · SAS Congruence Postulate · Given · Definition of Perpendicular · HL Congruence Theorem

PROOF OUTLINE

GIVEN Read the givens from the diagram → **IDENTIFY** Find shared sides or angles → **CHOOSE** Apply SAS → **CONCLUDE** ΔABC ≅ ΔADC

SOLUTION · CARD 2 Tier A · SSS



Given: B is the midpoint of AC; AD ≅ CD

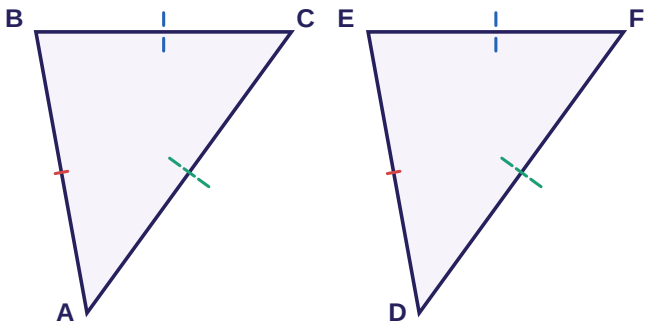
Prove: ΔABD ≅ ΔCBD

Statement	Reason
AD ≅ CD	Given
AB ≅ BC	Definition of midpoint
BD ≅ BD	Reflexive Property of Congruence
ΔABD ≅ ΔCBD	SSS Congruence Postulate

Why this works

B is the midpoint of AC, so by the definition of midpoint AB ≅ BC. The shared side BD is congruent to itself by the Reflexive Property of Congruence — every segment is congruent to itself. Together with the given AD ≅ CD, we now have three pairs of congruent corresponding sides, so SSS yields ΔABD ≅ ΔCBD. Notice that BD is the common leg of the two triangles; identifying shared sides is one of the most common ways the Reflexive Property enters a proof.

CARD 13 — SSS

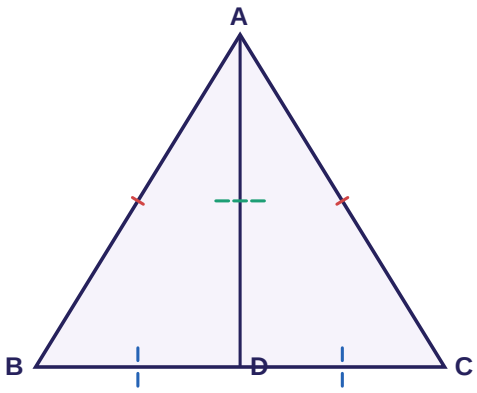


Given: Diagram shows two triangles with all three pairs of corresponding sides marked congruent.

Prove: ΔABC ≅ ΔDEF

Statement	Reason
AB ≅ DE	Given
_____	Given
_____	Given
_____	SSS Congruence Postulate

CARD 14 — SSS

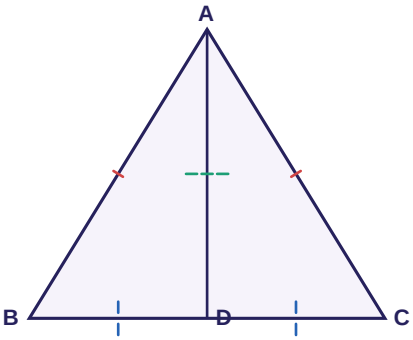


Given: Diagram: AB ≅ AC, BD ≅ CD, with AD drawn.

Prove: ΔABD ≅ ΔACD

Statement	Reason
AB ≅ AC	Given
_____	Given
_____	Reflexive Property of Congruence
_____	SSS Congruence Postulate

SOLUTION · CARD 14 Tier B · SSS



Given: Diagram: AB ≅ AC, BD ≅ CD, with AD drawn.

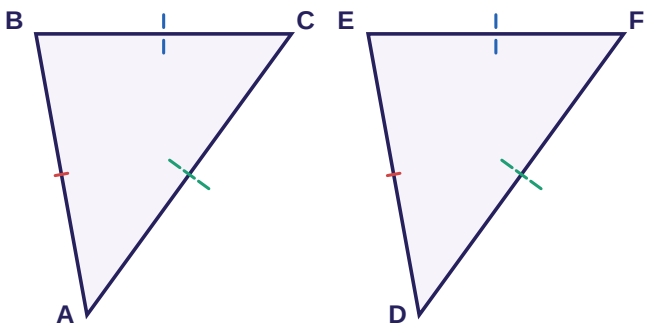
Prove: ΔABD ≅ ΔACD

Statement	Reason
AB ≅ AC	Given
BD ≅ CD	Given
AD ≅ AD	Reflexive Property of Congruence
ΔABD ≅ ΔACD	SSS Congruence Postulate

Why this works

From the diagram, AB ≅ AC (single tick on each) and BD ≅ CD (double tick on each). The segment AD is shared by both triangles, so AD ≅ AD by Reflexive Property. Three pairs of corresponding sides give SSS, hence ΔABD ≅ ΔACD. Reading 'shared side' from the diagram and then writing the reflexive statement is the key Tier B skill.

CARD 25 — SSS

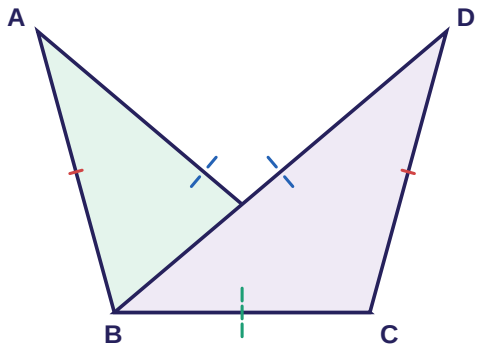


Given: Diagram only — three pairs of corresponding sides marked.

Prove: ΔABC ≅ ΔDEF

Statement	Reason
_____	_____
_____	_____
_____	_____
_____	_____

CARD 26 — SSS

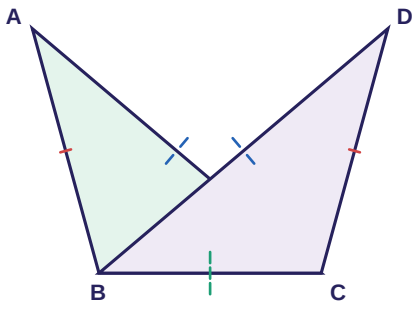


Given: Diagram only — AB ≅ DC, AC ≅ DB, BC shared.

Prove: ΔABC ≅ ΔDCB

Statement	Reason
_____	_____
_____	_____
_____	_____
_____	_____

SOLUTION · CARD 26 Tier C · SSS



Given: Diagram only — AB ≅ DC, AC ≅ DB, BC shared.

Prove: ΔABC ≅ ΔDCB

Statement	Reason
AB ≅ DC	Given
AC ≅ DB	Given
BC ≅ CB	Reflexive Property of Congruence
ΔABC ≅ ΔDCB	SSS Congruence Postulate

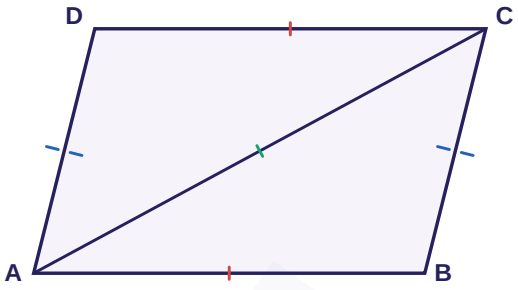
Why this works

Two triangles share side BC. The diagram marks AB ≅ DC and AC ≅ DB. Write BC ≅ CB by Reflexive Property — the segment is shared, so it is congruent to itself. SSS gives ΔABC ≅ ΔDCB. Note vertex correspondence: A ↔ D, B ↔ C, C ↔ B.

PREVIOUS ANSWER

ΔABC ≅ ΔADC by SAS

SCAVENGER HUNT · CARD C



Given: Diagram only — AB ∥ DC, AD ∥ BC, with diagonal AC.

Prove: ΔABC ≅ ΔCDA

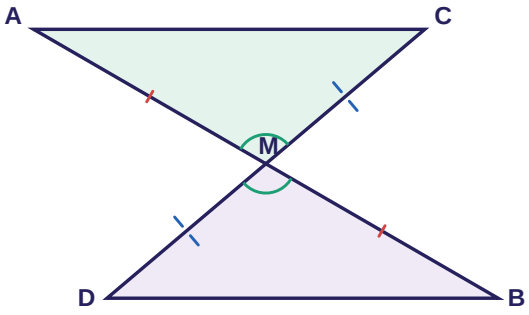
Write your answer:

Δ_____ ≅ Δ_____ by _____

PREVIOUS ANSWER

ΔABC ≅ ΔCDA by ASA

SCAVENGER HUNT · CARD D



Given: Diagram only — M midpoint of AB and CD.

Prove: ΔAMC ≅ ΔBMD

Write your answer:

Δ_____ ≅ Δ_____ by _____

Scavenger Hunt Answer Loop

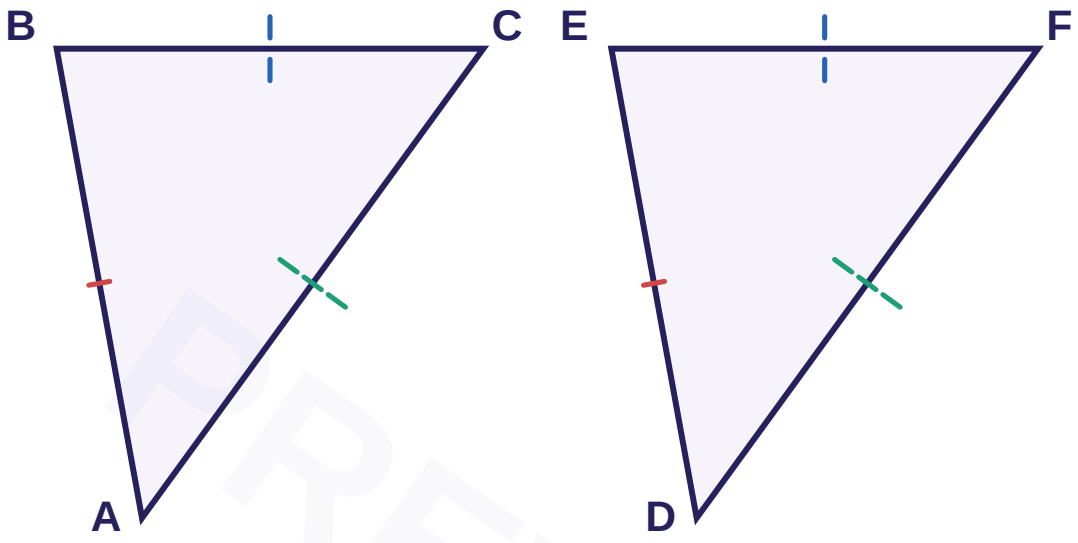
The loop order is shown below. Use this key to verify that students completed the loop correctly, or to help a student who is stuck without revealing the answer outright. The "Previous Answer" on each card matches the answer of the previous card in the loop.

Card	Previous Answer (top of card)	Student writes this answer
A	ΔABC ≅ ΔDEF by AAS	**ΔABC ≅ ΔDEF by SSS**
B	ΔABC ≅ ΔDEF by SSS	**ΔABC ≅ ΔADC by SAS**
C	ΔABC ≅ ΔADC by SAS	**ΔABC ≅ ΔCDA by ASA**
D	ΔABC ≅ ΔCDA by ASA	**ΔAMC ≅ ΔBMD by SAS**
E	ΔAMC ≅ ΔBMD by SAS	**ΔABM ≅ ΔACM by SSS**
F	ΔABM ≅ ΔACM by SSS	**ΔABD ≅ ΔCBD by HL**
G	ΔABD ≅ ΔCBD by HL	**ΔPQR ≅ ΔPSR by HL**
H	ΔPQR ≅ ΔPSR by HL	**ΔABC ≅ ΔDEF by AAS**

Detailed solutions for each hunt card

Each scavenger hunt card uses a scenario you have already seen in Tier C. The solution below shows the full two-column proof. Use these solutions to spot-check student work or to project during the debrief.

MODIFIED CARD M1 · SSS



Given: AB ≅ DE (red); BC ≅ EF (blue); AC ≅ DF (green)

Prove: ΔABC ≅ ΔDEF

Statement	Reason
AB ≅ DE	Given
_____	Given
_____	Given
_____	SSS Congruence Postulate

Sentence stem:
Since _____ congruent to _____ by _____, we can conclude _____.

SpEd Modified Solutions

Each solution shows the complete two-column proof and the filled-in sentence stem. Use these solutions as the teacher key, or share with students after they have attempted the modified card.

SOLUTION · CARD M1 SSS

Statement	Reason
AB ≅ DE	Given
BC ≅ EF	Given
AC ≅ DF	Given
ΔABC ≅ ΔDEF	SSS Congruence Postulate

Sentence stem (filled in)

Since AB ≅ DE, BC ≅ EF, and AC ≅ DF, we can conclude ΔABC ≅ ΔDEF by SSS.

Why this works

Look at the colors. Each color marks a pair of sides that must match. Red matches red (AB ≅ DE). Blue matches blue (BC ≅ EF). Green matches green (AC ≅ DF). When all three pairs of sides match, the triangles are congruent by SSS.

SOLUTION · CARD M2 SAS

Statement	Reason
AB ≅ DE	Given
∠A ≅ ∠D	Given
AC ≅ DF	Given
ΔABC ≅ ΔDEF	SAS Congruence Postulate

Sentence stem (filled in)

Since AB ≅ DE, ∠A ≅ ∠D, and AC ≅ DF, we can conclude ΔABC ≅ ΔDEF by SAS.

Why this works

Two sides and the angle BETWEEN them are congruent. The angle is included — it touches both pairs of sides. That is exactly the SAS pattern.

Triangle Congruence: A Concept Refresher

Two triangles are **congruent** if and only if their corresponding sides and corresponding angles are congruent — that is, the two triangles are identical in shape and size. They may be flipped, rotated, or translated, but if you could pick one up and lay it on top of the other, every side and every angle would match exactly. In symbols, we write **ΔABC ≅ ΔDEF** to mean "triangle ABC is congruent to triangle DEF." The order of the letters matters: it tells you which vertices correspond — A to D, B to E, C to F.

Proving that two triangles are congruent does not require checking all six pairs of parts (three sides and three angles). The five congruence shortcuts below let us conclude congruence from just three pairs of parts. Each shortcut is the subject of a theorem or postulate, and each is used throughout this bundle.

The five congruence shortcuts

Method	What you need	Type	Memory hook
SSS	Three pairs of corresponding sides	Postulate	*Side-Side-Side* — every side matches
SAS	Two pairs of sides + the angle *between* them	Postulate	*Side-Angle-Side* — sandwich the angle
ASA	Two pairs of angles + the side *between* them	Postulate	*Angle-Side-Angle* — sandwich the side
AAS	Two pairs of angles + a non-included side	Theorem	*Angle-Angle-Side* — side is opposite
HL	Right angle + hypotenuse + one leg	Theorem	*Hypotenuse-Leg* — right triangles only

Visual reference: SAS vs. SSA (the "ambiguous" case)

A common student error is confusing SAS with SSA. SAS works because the angle is **included** between the two sides — it pins down the triangle. SSA does not work in general, because the angle is **not** between the two sides, and the same two side lengths and angle can produce two different triangles (the "ambiguous case"). The diagram below shows why: with the same two sides and a non-included angle, two non-congruent triangles can be drawn.

Properties you will use over and over

Most proofs in this bundle rely on a small set of supporting properties. Knowing these by name (and by their precise wording) is half the battle of writing two-column proofs.

- **Reflexive Property of Congruence:** Any segment or angle is congruent to itself. Use this whenever two triangles share a side or share an angle.
- **Symmetric Property of Congruence:** If A ≅ B, then B ≅ A. Use this to reorder a congruence statement when needed (e.g., writing AC ≅ CA).
- **Transitive Property of Congruence:** If A ≅ B and B ≅ C, then A ≅ C. Use this to chain congruences through a shared middle element.

Teacher Notes & How to Use This Resource

Welcome! This resource is a complete, differentiated unit on **triangle congruence proofs** using the SSS, SAS, ASA, AAS, and HL methods. It is designed for a Secondary Geometry class (typically Grade 9–10) and includes explicit scaffolds for Special Education / IEP students while still challenging on-level learners. Every proof in the bundle has been classroom-tested for mathematical correctness, and the three-tier structure means you can meet students where they are without writing three separate curricula.

What is in the bundle?

The bundle contains **36 task cards in three tiers of 12**, an **8-card self-checking scavenger hunt**, a **4-proof modified version for IEP/SpEd students**, a student recording sheet, and detailed solutions for every problem. The three tiers are designed to be used sequentially as a learning progression, but they can also be used in parallel as differentiated stations within a single lesson. Each tier contains three SSS proofs, three SAS proofs, three ASA/AAS proofs, and three HL proofs — so every method is reinforced in every tier.

Three-tier learning progression

Tier	What students do	Best for
A	Statements given; students fill in **reasons** from a word bank. Includes a proof-outline visual organizer.	Entry point, IEP/SpEd students, students new to two-column proofs
B	Reasons given; students fill in **statements** by reading the color-coded diagram.	Students who can identify theorems but struggle to translate diagram marks into statements
C	Diagram only; students construct the **entire proof** from scratch.	On-level and above-level students; end-of-unit assessment

How to use the cards

Option 1 — Sequential progression (3–4 days). Use Tier A on Day 1 to introduce the structure of two-column proofs. Move to Tier B on Day 2 to develop diagram-reading fluency. Finish with Tier C on Day 3 as independent practice. Use the scavenger hunt on Day 4 as a review activity that gets students moving.

Option 2 — Differentiated stations (1 day). Print Tier A, B, and C cards in three different stations. Assign students to the station that matches their readiness level. Have each student complete 4–6 cards in the period. Rotate every 15 minutes.

Option 3 — Homework + scavenger hunt. Assign 6 Tier C cards as homework over two nights. Use the scavenger hunt in class on the third day as a self-checking review.

Option 4 — IEP/SpEd pull-out. Use the modified 4-proof version with enlarged diagrams, color-coded parts, and printed sentence stems. The modified version covers one proof per method family, so students still see all five methods in a single sitting.

Special Education Supports & Differentiation Guide

This resource was built from the ground up with Special Education and IEP students in mind. The scaffolds are not "extras" bolted onto a standard worksheet — they are integral to the design of every card and every tier. Research on scaffolding in mathematics (Brousseau, 1997; Hiebert et al., 1997; NCTM Principles to Actions, 2014) emphasizes that scaffolds must be **structured, removable, and visual**. The supports below follow that research.

Five evidence-based supports built into every tier

Enlarged, color-coded diagrams

Each diagram uses three or four colors (red, blue, green, purple) to mark corresponding parts. The tick-mark convention is consistent across the entire bundle: a single tick on a side always pairs with a single tick on the corresponding side; a single arc on an angle always pairs with a single arc on the corresponding angle. Students who struggle with diagram-reading can rely on the color match as a redundant cue, while students who are colorblind can rely on the tick-mark count alone.

Proof-frame graphic organizer (Tier A, cards 1–12)

Every Tier A card includes a four-step visual organizer showing the logical flow: **Given** → **Identify** → **Choose** → **Conclude**. This frame is a metacognitive scaffold — it makes the proof-writing process visible. Students who internalize the frame eventually stop needing it, at which point they are ready for Tier B.

Sentence stems for reasoning

The SpEd modified version prints a sentence stem at the bottom of each card: *"Since ____ congruent to ____ by ____, we can conclude ____."* This stem reduces the cognitive load of producing mathematical English from scratch. It also gives language-learners and students with working-memory weaknesses a syntactic frame to fill in. The stem is intentionally general so that it works for all five proof methods.

Reduced-item modified version (4 proofs)

The SpEd modified version contains only 4 proofs — one per method family. Each modified card has an enlarged diagram (1.5× scale), color-coded parts, and the sentence stem printed on the card itself. This reduced cognitive load matches the IEP goal of "demonstrate mastery of triangle congruence at a reduced item count." The four proofs cover SSS, SAS, ASA, and HL — so the student still experiences every required method.

Word bank on every Tier A card

Tier A cards print a word bank directly on the card. This eliminates the need for students to retrieve vocabulary from long-term memory while they are still learning the structure of two-column proofs. The word bank includes the correct reason plus three distractors, so students must still **evaluate** which reason fits — they cannot simply write the only option.

Differentiation matrix

Student profile	Recommended starting tier	Suggested progression
IEP / modified curriculum	**SpEd Modified Version**	Modified → Tier A (cards 1–6) → Tier A (cards 7–12)

Student Recording Sheet

Print one recording sheet per student. Students write the card number, the method they used, and the final congruence statement for each card they complete. The sheet fits all 36 task cards or all 8 scavenger hunt cards on a single page (front/back).

Tier A — Cards 1–12

#	Card #	Method	Congruence Statement	☐
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			

Tier B — Cards 13–24

#	Card #	Method	Congruence Statement	☐
	13			

THANK YOU FOR USING THIS RESOURCE!

Your feedback directly shapes future UM Printables releases. If this resource saved you planning time, engaged your students, or helped an IEP student access grade-level content, please take a moment to leave a review on Teachers Pay Teachers.

Log in to your TPT account.

Go to "My Purchases" → locate this resource.

Click "Provide Feedback" — it takes less than 60 seconds.

Each review earns you TPT credits toward future purchases.

What to mention in your review

Mention which tier your students used (A, B, C, or Modified), how long the unit took, and any specific student win — "My IEP student completed her first full proof independently with the modified version" — these stories help other teachers decide if this resource fits their classroom.

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◆ TRIANGLE CONGRUENCE PROOFS · TASK CARDS & SCAVENGER HUNT ◆

What's Inside the Full 90-Page Resource

★ PREMIUM BUNDLE

A complete, differentiated unit on triangle congruence proofs — scaffolded from fill-in-the-reason to full two-column proofs, with explicit SpEd supports.

90	36	3	5
TOTAL PAGES	TASK CARDS	SCAFFOLDED TIERS	PROOF METHODS

WHAT YOU GET

- **A** **Tier A — Fill-in-the-Reason (12 cards)**
  Statements given · Word bank · Proof outline organizer
- **B** **Tier B — Fill-in-the-Statement (12 cards)**
  Reasons given · Color-coded diagrams · Diagram-reading fluency
- **C** **Tier C — Full Proofs (12 cards)**
  Diagram only · On-level target · End-of-unit assessment
- ★ **Self-Checking Scavenger Hunt (8 cards)**
  Looped around the room · Immediate feedback · Answer key
- **M** **SpEd Modified Version (4 proofs)**
  Enlarged diagrams · Sentence stems · Reduced cognitive load
- ✓ **Detailed Solutions (every problem)**
  Two-column proof + lucid "why this works" explanation
- **T** **Teacher Notes & Differentiation Guide**
  Pacing · 4 usage options · SpEd matrix · Printing tips
- **R** **Student Recording Sheet**
  All 36 cards + 8 hunt cards on a single printable page

Get the full 90-page resource on TPT

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