

CUT & GLUE SORT



CPCTC: CORRESPONDING PARTS OF CONGRUENT TRIANGLES

What Does CPCTC Give?

Already given, new, or cannot be used

FREE

1	$\begin{array}{l} AB \cong DE \\ BC \cong EF \\ CA \cong FD \end{array}$ $BC \cong EF$	2	$\begin{array}{l} AB \cong DE \\ BC \cong EF \\ CA \cong FD \end{array}$ $\angle A \cong \angle D$	3	$\begin{array}{l} AB \cong DE \\ \angle C \cong \angle F \\ BC \cong EF \end{array}$ $AC \cong DF$	4	$\begin{array}{l} AB \cong DE \\ \angle A \cong \angle D \\ AC \cong DF \end{array}$ $BC \cong EF$
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Cut & Glue Sort — how to run it

25 minutes, including the cutting

1. **Hand out pages 3 and 4**, one of each per student, with scissors and glue. Nothing else is needed.
2. **Say this once:** *“First decide if the three facts prove the triangles congruent. If they do, CPCTC gives the other matching pairs. A pair that is already a fact is nothing new.”*
3. **Check a sheet in ten seconds:** every row gets four pieces.

Student sheets	pages 3 and 4, one of each per student. Page 3 shows the four criteria as small marked triangles, and what CPCTC means.
Answers	page 5.

What the sheet practices. Two triangles have six pairs of matching parts: three pairs of sides and three pairs of angles. A criterion such as SAS uses three of them to prove the triangles congruent. After that, CPCTC gives the other three. Many students then write a pair that was already given, “by CPCTC.” That is true, but it adds nothing. The first row collects those pairs, and the second row collects the new ones.

The last row is the most important. CPCTC can be used only after the triangles are proved congruent. In three pieces the facts are two sides and an angle that is not between them (SSA), and in one piece they are three pairs of angles. Neither proves the triangles congruent, so CPCTC cannot be used. Three equal angles give the same shape, but not the same size.

How to see a mistake. A student who only looks for the pair among the facts gets eight pieces right. The last row then stays empty, and the second row holds eight pieces. Ask that student which criterion the facts are. Guessing does not work: every simple guessing rule places at most six of the twelve pieces correctly.



This is the free lesson this activity came from. The worksheet, the full answers and the lesson plan are on it, at three levels of difficulty.
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What does CPCTC give?

Already given, new, or cannot be used

Name _____

Period _____

Date _____

INTO a congruence. These facts prove $\triangle ABC \cong \triangle DEF$. The reason is the name.



SSS



SAS



ASA



AAS



SSA



AAA

These prove nothing.

OUT OF a congruence. After $\triangle ABC \cong \triangle DEF$ is proved, every matching part is congruent. The reason is **CPCTC**: Corresponding Parts of Congruent Triangles are Congruent. A matches D. B matches E. C matches F.

Cut out the twelve pieces on the next page. Every piece is about $\triangle ABC$ and $\triangle DEF$. Above the line are three given facts. Below the line is one more pair of matching parts. **For each piece, decide what CPCTC says about the pair below the line. Glue the piece in that row.**

Already given. The pair is one of the three given facts. CPCTC adds nothing new.

New from CPCTC. The facts prove $\triangle ABC \cong \triangle DEF$, and this pair is not one of the facts.

CPCTC cannot be used. The facts do not prove $\triangle ABC \cong \triangle DEF$.

The twelve pieces

Cut along the dotted lines

1 $AB \cong DE$ $BC \cong EF$ $CA \cong FD$ $BC \cong EF$	2 $AB \cong DE$ $BC \cong EF$ $CA \cong FD$ $\angle A \cong \angle D$	3 $AB \cong DE$ $\angle C \cong \angle F$ $BC \cong EF$ $AC \cong DF$	4 $AB \cong DE$ $\angle A \cong \angle D$ $AC \cong DF$ $BC \cong EF$
5 $AC \cong DF$ $BC \cong EF$ $\angle A \cong \angle D$ $\angle B \cong \angle E$	6 $\angle B \cong \angle E$ $AB \cong DE$ $BC \cong EF$ $\angle B \cong \angle E$	7 $\angle A \cong \angle D$ $\angle B \cong \angle E$ $\angle C \cong \angle F$ $AB \cong DE$	8 $\angle A \cong \angle D$ $AB \cong DE$ $\angle B \cong \angle E$ $AB \cong DE$
9 $BC \cong EF$ $\angle B \cong \angle E$ $\angle C \cong \angle F$ $AB \cong DE$	10 $\angle B \cong \angle E$ $\angle C \cong \angle F$ $AB \cong DE$ $\angle C \cong \angle F$	11 $AB \cong DE$ $AC \cong DF$ $\angle B \cong \angle E$ $BC \cong EF$	12 $\angle A \cong \angle D$ $\angle B \cong \angle E$ $BC \cong EF$ $\angle C \cong \angle F$



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Cut & Glue Sort — answers

For the teacher

Already given	1 — The facts are SSS: three pairs of sides. $BC \cong EF$ is one of them, so CPCTC adds nothing new.	6 — The facts are SAS: two sides and the angle between them. $\angle B \cong \angle E$ is one of them, so CPCTC adds nothing new.	8 — The facts are ASA: two angles and the side between them. $AB \cong DE$ is one of them, so CPCTC adds nothing new.	10 — The facts are AAS: two angles and a side that is not between them. $\angle C \cong \angle F$ is one of them, so CPCTC adds nothing new.
New from CPCTC	2 — The facts are SSS: three pairs of sides. So the triangles are congruent. $\angle A \cong \angle D$ is a matching pair that is not a fact, so CPCTC gives it.	4 — The facts are SAS: two sides and the angle between them. So the triangles are congruent. $BC \cong EF$ is a matching pair that is not a fact, so CPCTC gives it.	9 — The facts are ASA: two angles and the side between them. So the triangles are congruent. $AB \cong DE$ is a matching pair that is not a fact, so CPCTC gives it.	12 — The facts are AAS: two angles and a side that is not between them. So the triangles are congruent. $\angle C \cong \angle F$ is a matching pair that is not a fact, so CPCTC gives it.
CPCTC cannot be used	3 — The facts are SSA: two sides and an angle that is not between them. They do not prove the triangles congruent, so CPCTC cannot give $AC \cong DF$.	5 — The facts are SSA: two sides and an angle that is not between them. They do not prove the triangles congruent, so CPCTC cannot give $\angle B \cong \angle E$.	7 — The facts are AAA: three pairs of angles. They do not prove the triangles congruent, so CPCTC cannot give $AB \cong DE$.	11 — The facts are SSA: two sides and an angle that is not between them. They do not prove the triangles congruent, so CPCTC cannot give $BC \cong EF$.

Every row holds four pieces. In every piece, A matches D, B matches E and C matches F. First decide whether the three facts are one of the four criteria: SSS, SAS, ASA or AAS. If they are not, the piece goes in the last row. If they are, look for the pair below the line among the facts. If it is there, the piece goes in the first row. If it is not there, the piece goes in the second row.

To check a piece with a student, ask two questions. Do the facts prove the triangles congruent? Is the pair below the line already one of the facts?