**Lesson Plan 1**

## Learning Experience Plan

Subject: Geometry Grade level: 10

Unit: Congruence Length of LEP: Day 1, 25 minutes

Topic: Congruent Triangles

Content Standards: (include only standards addressed in this LEP)

6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure, given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

8. Explain how the criteria for triangle congruence (ASA,SAS, and SSS) follow from the definition of congruence in terms of rigid motion.

12. Make formal geometric constructions with a variety of tools and methods

Literacy Standards: (include only standards addressed in this LEP)

7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts

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| **Learning Experience Outcomes** (knowledge/skills)  Students will:  -Understand the definition of congruent figures  -Apply their knowledge of rigid motions to find congruent figures.  -Discover criteria of congruent triangles. | | | **Learning Experience Assessments**  -Q&A throughout powerpoint presentation  -Worksheet completed with partner  -Q&A during discussion at end of lesson  -Homework sheet | |
| **Differentiation** (What will you do to meet the needs of students at these different levels?) | | | | |
| **Approaching**  During group work I will be able to help these particular students. They will be matched with a student who is good at using the tools for the activity. | | **On-level**  These students will be able to complete the worksheet with a partner on their level and ask questions when they need to. | | **Beyond**  These students will not only be able to complete the group work but be able to discuss and explore bigger ideas found in the worksheets. |
| **Curriculum Integration** (Does this lesson correlate with any other content area? Describe.) | | | | |
| **Materials** | **Procedures/Strategies** | | | |
| Powerpoint  Worksheet and homework sheet  Straws  Protractors  Paper  Pen | **Day 1** (add additional days as needed)  Sponge Activity (activity that will be done as students enter the room to get them into the mindset of the concept to be learned) Students will look at the first page of the powerpoint and be asked to discuss which shapes they think are congruent and why?  Anticipatory Set (focus question/s that will be used to get students thinking about the day’s lesson)  What does congruence mean? How do you know two shapes are congruent?  Activating Prior Knowledge (what information will be shared with/among students to connect to prior knowledge/experience) Students will be using their work with rigid motions of reflection, rotation, and transformation to understand the definition of congruence.  Direct Instruction (input, modeling, check for understanding)  The teacher will ask for students to share what they discussed during the sponge activity and to share what they think the definition of congruence is.  The students will then follow the powerpoint and learn the definition of congruence as Two geometric figures are congruent if there is a sequence of rigid motions (reflections, rotations, and translations) that carries one onto the other while filling in information on their note sheets. The teacher will then go back to the original figures given to the students in the beginning of the lesson to reinforce this definition in those figures and ask the students which rigid motions these figures need to be congruent.  Then the students will continue filling in notes from the powerpoint onto their note sheet which will explain criteria to prove triangles are congruent (SSS,SAS,ASA) and how they come from the definition of congruence. Teacher should demonstrate congruent triangles after talking about each one.  Next the students will complete the worksheet titled Discovering Congruent Triangles Activity.  The class will discuss what they found from doing the activity and go over answers.  Ask if there are any more questions and discuss that finding congruent triangles will be useful in geometric proofs because of CPCTC.  Guided Practice (how students will demonstrate their grasp of new learning)  The students complete the worksheet and participate in a discussion about the worksheet.  Closure (action/statement by teacher designed to bring lesson presentation to an appropriate close)  We are going to be doing a lot of geometric proofs in class and being able to find congruent triangles from SSS SAS and ASA will be very helpful because of CPCTC. Understanding how to find congruent triangles will make the rest of the topics easier.  Independent Practice (what students will do to reinforce learning of the lesson)  Students will complete Homework sheet #1 | | | |

**Lesson Plan 2**

## Learning Experience Plan

Subject: Geometry Grade level: 10

Unit: Congruence Length of LEP: Day 2, 25 minutes

Topic: Congruent Triangles

Content Standards: (include only standards addressed in this LEP)

6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure, given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

Literacy Standards: (include only standards addressed in this LEP)

7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts

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| **Learning Experience Outcomes** (knowledge/skills)  Students will:  -Discover why SSA and AAA are not criteria that conclude a triangle is congruent.  -Understand how AAS comes from ASA  -Understand why HL proves right triangles congruent.  -Use HL AND AAS to prove triangles congruent. | | | **Learning Experience Assessments**  -Q&A throughout lesson  -Q&A during production of proofs  -Completing worksheet  -Homework sheet | |
| **Differentiation** (What will you do to meet the needs of students at these different levels?) | | | | |
| **Approaching**  These students might have trouble being able to complete the worksheet and decide why the triangles are congruent, but I can go around and help the students who need extra help or have other students who really understand it work to help others. | | **On-level**  These students will be able to understand why HL and AAS work and be able to use them in the worksheet. | | **Beyond**  These students can use HL and AAS to prove triangles congruent and give reasons for how they come up with their conclusions which can help other students. |
| **Curriculum Integration** (Does this lesson correlate with any other content area? Describe.)  The lesson will discuss all of the jobs that use congruent triangles with problems relating to engineering | | | | |
| **Materials** | **Procedures/Strategies** | | | |
| Worksheet  Computer  Projector  Paper  Notesheet from day 1 | **Day 1** (add additional days as needed)  Sponge Activity (activity that will be done as students enter the room to get them into the mindset of the concept to be learned) Powerpoint will discuss four new criteria for triangles, AAS, HL, AAA, and SSA. Students will have to think about which one of these can show triangle congruency and which ones can’t.  Anticipatory Set (focus question/s that will be used to get students thinking about the day’s lesson)  Can you show triangles that have this criteria and are not congruent?  Activating Prior Knowledge (what information will be shared with/among students to connect to prior knowledge/experience) Students will be shown how AAS comes from ASA and use all triangle congruence together.  Direct Instruction (input, modeling, check for understanding)  The teacher will ask if any students know which triangles in the sponge activity are congruent and why?  The students will be told that the AAA and SSA cannot prove that triangles are congruent and it will be demonstrated by showing triangles that follow this criteria but are not congruent.  The teacher will show on the board how AAS can come from ASA while asking students questions.  The teacher will also why HL works.  The students will then copy definitions of AAS and HL from the powerpoint and the teacher should demonstrate each of these.  Students will complete worksheet independently and teacher will go over it.  Teacher will ask why the students think it is important to study congruent triangles, then show them the website <http://www.xpmath.com/careers/topicsresult.php?subjectID=3&topicID=3> which will show different professions that use them.  Guided Practice (how students will demonstrate their grasp of new learning)  Students will be asked questions throughout the lesson and complete worksheet.  Closure (action/statement by teacher designed to bring lesson presentation to an appropriate close)  Teacher will review material learned in the last two lessons by a question and answer with students not looking at notes. Teacher can also explain how we know even more ways to find congruent triangles. Using all of these methods together, along with other geometric properties you have learned before, we can complete very interesting proofs.  Independent Practice (what students will do to reinforce learning of the lesson)  Students will complete Homework sheet #2 | | | |
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**Lesson Plan 3**

## Learning Experience Plan

Subject: Geometry Grade level: 10

Unit: Congruence Length of LEP: Day 1, 25 minutes

Topic: Triangle Proofs

Content Standards: (include only standards addressed in this LEP)

5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

12. Make formal geometric constructions with a variety of tools and methods

Literacy Standards: (include only standards addressed in this LEP)

1a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence

1e. Provide a concluding statement or section that follows from and supports the argument presented.

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| **Learning Experience Outcomes** (knowledge/skills)  Students will:  -complete geometric proofs  -provide logical reasons for every statement made  -understand the importance of giving reasons in your proof | | | **Learning Experience Assessments**  -Q&A throughout powerpoint presentation  -Worksheet completed with partner  -Q&A during discussion at end of lesson  -Homework sheet | |
| **Differentiation** (What will you do to meet the needs of students at these different levels?) | | | | |
| **Approaching**  These students might have trouble completing the proof on their own and I can help them by giving them possible reasons and they can use or statements and they can explain which they can use in the proof to complete it. | | **On-level**  These students should be able to use the information they have been learning to complete the proof. | | **Beyond**  These students should be able to complete the proofs and can be given longer proofs that take deeper thinking to complete |
| **Curriculum Integration** (Does this lesson correlate with any other content area? Describe.) | | | | |
| **Materials** | **Procedures/Strategies** | | | |
| Projector  Youtube video  Worksheet A and B  White board  Pen | **Day 1** (add additional days as needed)  Sponge Activity (activity that will be done as students enter the room to get them into the mindset of the concept to be learned) Students will watch the video clip Sherlock Holmes – The master of deduction does it again.  Anticipatory Set (focus question/s that will be used to get students thinking about the day’s lesson)  How does the way Sherlock Holmes makes his conclusions relate to mathematical proofs?  One of the main goals in studying geometry is to develop your ability to reason critically, to draw valid conclusions based upon observations and proven facts. Master detectives do this sort of thing all the time. Take a look as Sherlock Holmes uses seemingly insignificant observations to draw amazing conclusions.  Activating Prior Knowledge (what information will be shared with/among students to connect to prior knowledge/experience) In order to complete these proofs you will need to give reasons for every statement you made, the reasons will be definitions or theorems you have already learned in class.  Direct Instruction (input, modeling, check for understanding)  The teacher will explain how a proof is like an argument and you need to be able to support every statement you make. The teacher will show a sample proof finished to the class at first that is located in the powerpoint and explain the proof should have two columns one for statements and one for reasons and every statement should have a corresponding reason.  Now the teacher will complete a proof on the board dealing with congruent triangles asking the students questions to have them try to figure it out as they go along.  Next the students will be asked to complete the worksheet for day 3 and fill in the blanks and then the class will go over it.  Now the students will be given another sheet with a diagram and proof question on it. They will be asked to first predict what reasons they will be using in the in the proof and we will discuss it, then the students will independently work on completing the proof and then discuss what answers they found and reflect on how they solved problems.  Guided Practice (how students will demonstrate their grasp of new learning)  The students complete a worksheet and a proof and participate in a discussion about the worksheet and proof.  Closure (action/statement by teacher designed to bring lesson presentation to an appropriate close)  Creating proofs are very important in mathematics. The claims that you make need to be supported by evidence. This is important for any claim you make ever, if you want someone to believe it you have to be able to back it up with evidence. In mathematics there are many types of proofs. Being able to think in this way, is very valuable and will allow you to find the reasons of why things are true and solve problems.  Independent Practice (what students will do to reinforce learning of the lesson)  Students will complete Homework sheet #3 | | | |