2.1 Critical Thinking and Problem Solving

Related Areas: Critical Thinking, Academic Skills

Lesson Objective(s): *In this lesson, the instructor will work with students to understand how they make decisions and the steps that go into solving problems.*

Outcome Goal(s): *By the end of the lesson, the student will have a better understanding of the steps involved in solving problems and will have gained tools for organizing his/her thoughts.*

Instructor Preparation Checklist

☐	Supplies and Tasks	Materials and Resources
	Media & Audio	YouTube playlist of videos, video player
	Websites	
	Read/Review	
	Field Trips/Co-op/Outings	
	Supplies Needed	Poster board, marker, video playing device
	Print/Copy/Laminate	Brainteasers sheet and answer sheet for instructor, papers and pens/pencils for students
	Miscellaneous	

Additional Notes:

Warm Up: Brainteasers

Description: Begin with a series of brainteasers (Worksheet 1, Critical Thinking: Brainteasers). Give students 10 minutes to contemplate and complete the problem. Afterward, have the class try to answer the problems together and discuss how they got their answers.

Purpose/Key Skills: Critical reading and thinking, creative problem solving, mathematic strategies, the ability to consider a multi-step solution.

Notes/Vocabulary: This can be done with a variety of brainteasers or similar problems based on what is age- and class appropriate.

Materials: Brainteaser sheet for students, brainteaser sheet with answers for teacher.

(1) Class Problem Solving Models

Description: Begin by showing students a number of problem-solving models and asking if they like one better than another and why. Then ask them how they seem similar or different. Many fields have their own problem solving jargon, but when broken down, it's all very similar. Next, have the students write their own classroom problem-solving model in terms that make sense to them and keep this list displayed for the duration of the course. It can be something they go back to over and over again when they face an issue.

Purpose/Key Skills: Making sound decisions, problem solving, thinking critically and creatively, using reading and writing skills.

Notes/Vocabulary: Problem solving model

Materials: List of problem solving models (attached), chalk/white board and writing implements for planning, poster board, marker

(2) Historic Problem Solving

Description: Show a number of videos about how everyday items were invented, often by recognizing problems and modifying failures. Afterward, discuss how these inventions might connect to the problem solving models mentioned previously.

Purpose/Key Skills: The purpose of this lesson is to demonstrate how innovators are people who recognize problems and think of creative ways to solve them.

Notes/Vocabulary: e.g. WD-40 — he saw a problem, came up with an idea based on knowledge he had, experimented and refined it over and over, then finally created a product we all use today.

Materials:
Video Link for WD-40: **https://www.youtube.com/watch?v=6A2cq1X2Iog**
Video Link for Masking Tape: **https://www.youtube.com/watch?v=hSbdzZG53Pc**
Video Link for Ballpoint Pen: **https://www.youtube.com/watch?v=X19beLKVOlM**
Video Link for Revolving Doors: **https://www.youtube.com/watch?v=dFbRmzK6Q4w**
Video Link for Super Glue: **https://www.youtube.com/watch?v=gufHk-udGYQ**

(3) Student Problem Solving

Description: Break students up into groups of three or four and give them problems that face the group specifically, e.g. handing in essays with grammatical errors, not having materials for class, etc. Give them 10 minutes to use the problem-solving model they designed and come up with a solution that would benefit the class. Then have each group explain their solution, allowing time for questions. Instructor has the option to implement some of these ideas.

Purpose/Key Skills: This activity is intended to help students to put their critical thinking and problem solving skills into place. It also gives them a role in determining class structure and taking control of their own education, empowering them within the class.

Notes/Vocabulary:

Materials: pens/pencils, paper

Formative Assessment

	Skill Description and Assessment	Notes
	Student is able to concisely explain the problem.	
	Student is able to comprehend and explain the problem solving steps	
	Student is able to implement problem solving steps to an issue	

Reteach and Supplemental Materials

Concept	Lecture/Activity
Using creative problem solving in the business world	Atlantic Article: https://www.theatlantic.com/magazine/archive/2014/07/creative-solutions/372285/
How innovation helped make the car accessible to the masses.	PBS Article: http://www.pbs.org/wgbh/aso/databank/entries/dt13as.html

Sources:
Brainteasers: https://icebreakerideas.com/brain-teasers/#Longer_Brain_Teasers_for_Adults
Scientific Method: http://astro1.panet.utoledo.edu/~ljc/ScientificMethod.htm
FEMA: https://emilms.fema.gov/IS0241b/DMPS0103080text2.htm
Hurson's: https://www.mindtools.com/pages/article/productive-thinking-model.htm
CalTech: https://hr.caltech.edu/documents/234-problem_solving_model_workbook_fillable.pdf
Engineering: https://me.byu.edu/sites/default/files/Problem%20Solving%20Sheet%201.0.pdf