Mathematics Learning Episodes that Promote Reflective Thinking among Elementary Pupils

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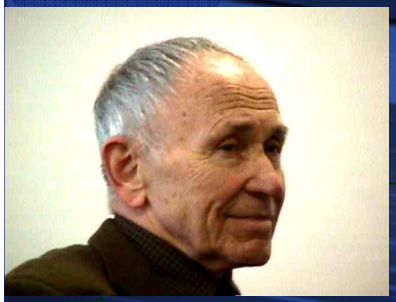
Contents

TRANSFORMATIVE LEARNING

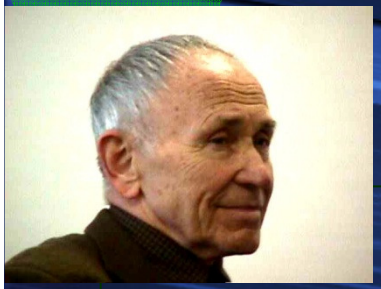


Dr. Jack Mezirow

"Learning is the process of using a prior interpretation to construe a new or revised interpretation of the meaning of one's experience to guide future action."

Retrieved from: http://www.konnections.net/lifecircles/mezirow.htm

TRANSFORMATIVE LEARNING



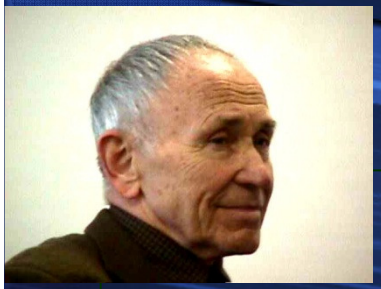
Dr. Jack Mezirow

Three common themes that characterized Mezirow's theory of the mechanism of transformational learning in the classroom:

- Student's life experience
- Critical Self Reflection
- Critical Discourse

Retrieved from: http://www.konnections.net/lifecircles/mezirow.htm

TRANSFORMATIVE LEARNING

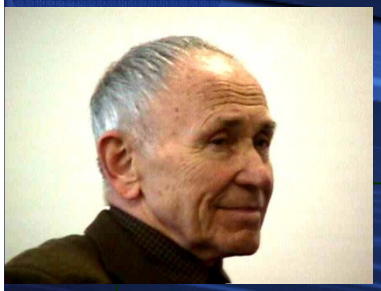


Dr. Jack Mezirow

Ten phases of transformative learning

1. A disorienting dilemma
2. Self examination
3. A critical assessment of assumptions
4. Recognition of a connection between one's discontent and transformation

TRANSFORMATIVE LEARNING

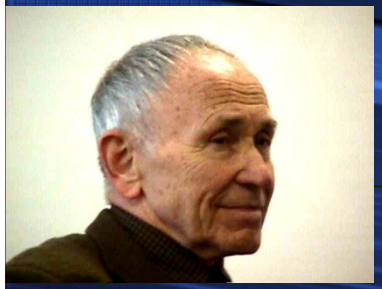


Dr. Jack Mezirow

Ten phases of transformative learning

5. Exploration of options for new roles, relationships and actions
6. Planning a course of action
7. Acquiring knowledge and skills for implementing one's plan
8. Provisional trying of new roles

TRANSFORMATIVE LEARNING



Dr. Jack Mezirow

Ten phases of transformative learning

9. Building competence and self-confidence in new roles and relationships
10. A reintegration into one's life on the basis of conditions dictated by one's new perspectives. (Mezirow & Taylor, 2009)

Defining Reflection

Reflective Thinking
John Dewey (1933)

Reflection is a complex, rigorous, intellectual, and emotional enterprise that takes time to do well.

It is an active, persistent, and careful consideration of a belief or supposed form of knowledge, of the ground that support knowledge, and further conclusions to which that knowledge leads.

Dewey's Criteria for Reflection

Reflection is a meaning making process that moves a learner from one experience into the next with deeper understanding of its relationships.

It is a systematic, rigorous, disciplined ways of thinking with roots in scientific inquiry.

It needs to happen in community in interaction with others.

It requires attitudes that value the personal & intellectual growth of oneself & of others.

Reflective Thinking

St. John Baptist De La Salle

DE LA SALLE
PHILIPPINES

LASALLIAN

TRANSFORMATIVE LEARNING

PEDAGOGICAL FRAMEWORK

PERSPECTIVE TRANSFORMATION
KNOWLEDGE ACQUISITION

Knowledge as information to be acquired by students

Knowledge as a result of students' inquiry, action or experimentation

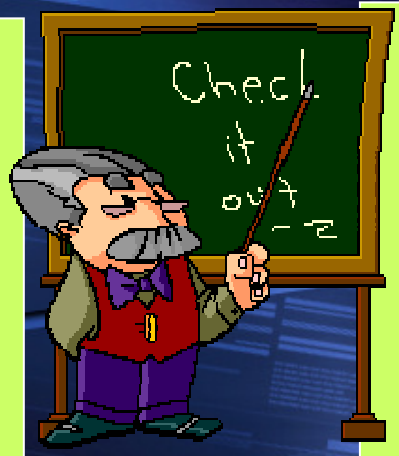
PERSPECTIVE TRANSFORMATION
ROLE OF THE TEACHER

Teacher is the primary source of knowledge.

Teacher facilitates students' identification of questions and develops with them inquiry plans

PERSPECTIVE TRANSFORMATION
ROLE OF THE TEACHER

Teacher is the primary source of knowledge.



Teacher prompts students to take risks & explore multiple viewpoints by interacting & collaborating with one another.

PERSPECTIVE TRANSFORMATION
TEACHING EFFECTIVENESS

Teacher is deemed effective if he or she is able to present information in a clear & compre-hensive way.

Teacher is deemed effective if he or she is able to set the learning environment for collaborative inquiry, self-assessment & reflection.

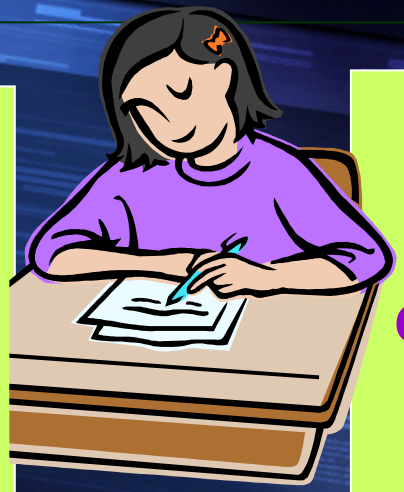
PERSPECTIVE TRANSFORMATION LEARNING ENVIRONMENT

Lecture format is preferred & students appear passive & hardly encouraged to question the information

Teacher creates a supportive atmosphere & encourages critical&creative thinking & expression of a variety of viewpoints.

PERSPECTIVE TRANSFORMATION ASSESSMENT OF LEARNING

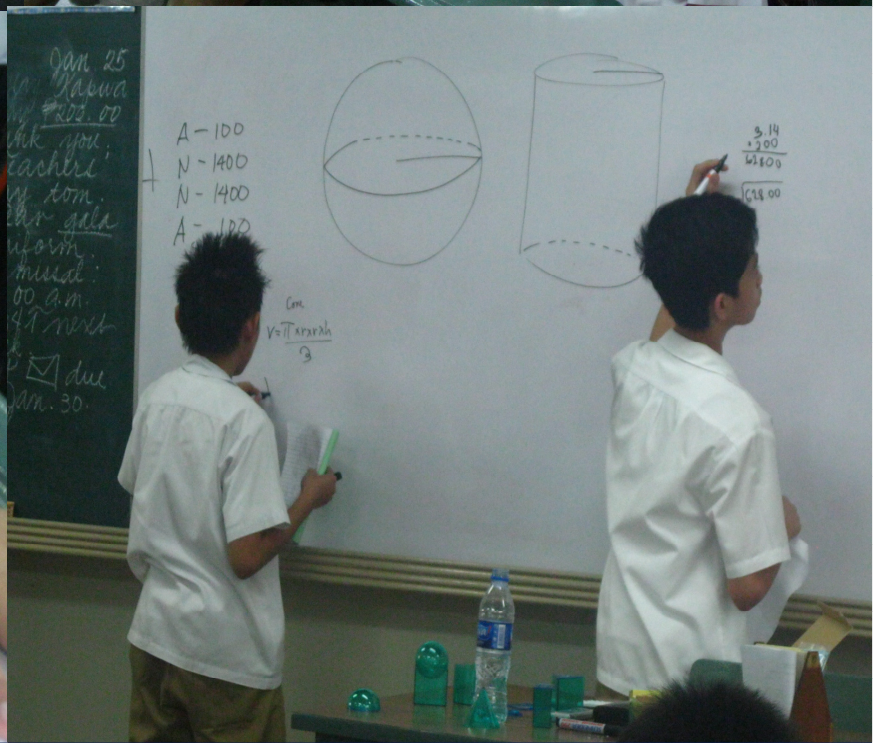
Tests require students to provide factual information and prescribed Procedures.



Tests indicate the kind of cognitive growth that has taken place in the students,thru conceptual representations,or problem solving.

LA SALLE GREENHILLS


ASSIGNMENT
Jan. 25
A - 100
N - 1400
N - 1400
A - 100


Jan. 25
A - 100
N - 1400
N - 1400

KEY TEACHER ACTIONS

Collaboration

Consultation

Resources

Engaging

Executive Control

Coaching

New Knowledge

Performance

Product

Values

Learner Centered Learning Environment

Content

Context

Learning Style

Prior Knowledge

Identifying

Strategic Reasoning

Verifying

Traditional

Rubrics

Portfolio

Rapatan, M., 2004. LCLE Handbook of LSGH

Teacher Cristine

Teacher Cristine

Everytime I write the lesson plan I see to it that it's all about understanding.

Identifying

They construct their own knowledge based on their understanding…. usually the boys …they just memorize the steps and procedures.

I want them to realize the importance and I want them to understand why it came about the procedure po.

Teacher Cristine

Identifying

Usually I give a very mind boggling question…
I keep on asking questions or give a word problem sa motivation.

During that motivation, you also want to know as a teacher what's their prior knowledge

So I can see their calibre, what they know and do not know .

Teacher Cristine

Engaging

To ensure understanding I use problem solving, visual representation, games are very effective like math olympics.

They will listen when you give the steps of the procedure.

Games engage. The teacher has to make sure she gives interesting problems.

Teacher Cristine

Engaging

To ensure understanding I use problem solving, visual representation, games are very effective like math olympics.

They will listen when you give the steps of the procedure.

Games engage. The teacher has to make sure she gives interesting problems.

Teacher Cristine

Coaching

Right after teaching I always give a two items or one item seatwork.

It's been my rule for four years that I will roam around & then look at the notebooks.

Then if I see someone has a problem I'll intervene. But there are certain limitations

Teacher Cristine

If there are questions, then I conduct recitations.

Coaching

Working groups, yes, but in certain ages like 10 yr old boys its always better to put them in pairs or triads.

Teacher Cristine

Coaching

Its so difficult to tell if students are thinking reflectively.

Using worksheets I think is the best. Its more objective Than looking at the physical appearance.

Teacher Cristine

Verifying

I see to it that I don't give test at knowledge level only.

I refer to the TIMSS for higher order thinking skills test items so I can measure their understanding.

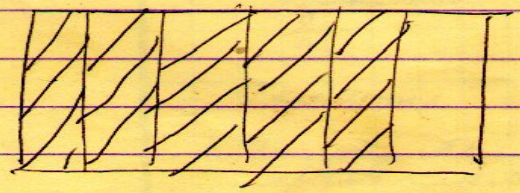
I want them to really think. I also refer to books for the test items.

Identifying, Engaging, Coaching & Verifying

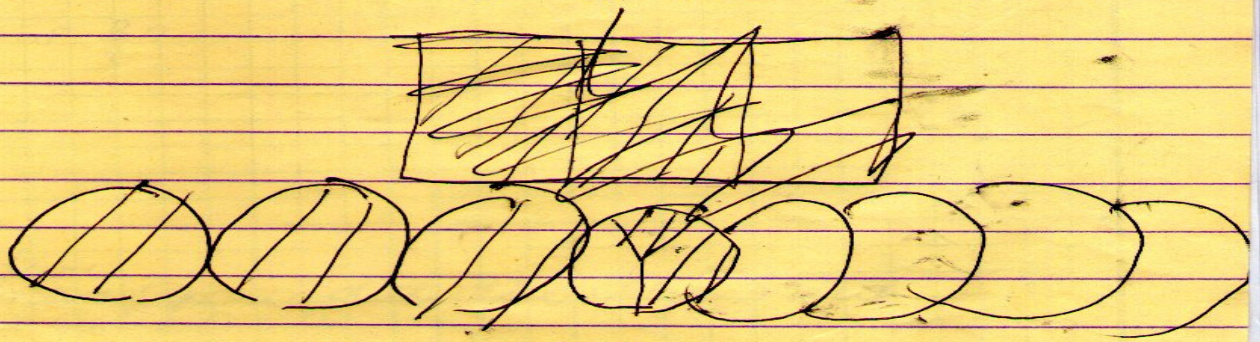
Asking Process Questions

24 Seth Arcilla and Jose Enrique Reyes
4-C

1. $1 - \frac{5}{6} = \frac{1}{6}$



2. $8 - 3\frac{2}{3} = 4\frac{1}{3}$



3 In Question #1, what did you to 1 whole before you subtracted
We changed it into a fraction

Why Did you those choose that fraction
because it is the equal fraction

In question #2, what did you do to 8? we subtracted

Do you subtract 8 and 3? Yes

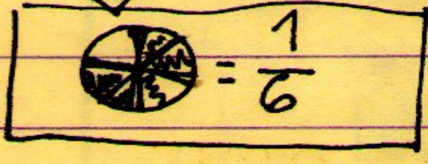
How did you answer # 2? She subtracted 1 whole from 8 and changed the subtracted number into a fraction.

Name: Michael Joseph V. Medina + Dos Trinidad

(A) ~~(answer no. 1)~~

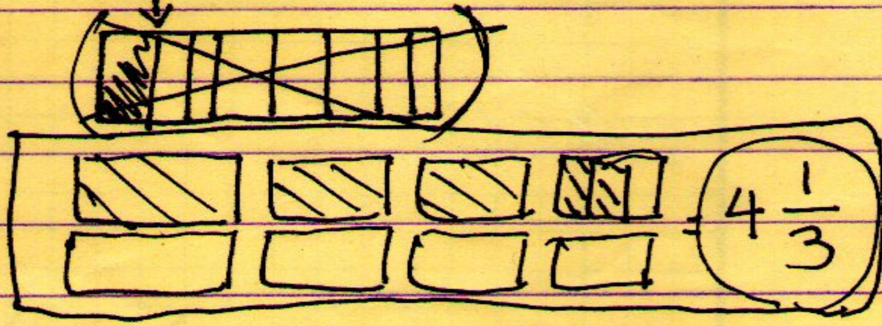
1. $1 - \frac{5}{6}$

$\frac{6}{6} - \frac{5}{6} = \frac{1}{6}$



2. $8 - 3\frac{2}{3}$

$7\frac{3}{3} - 3\frac{2}{3} = 4\frac{1}{3}$



3.

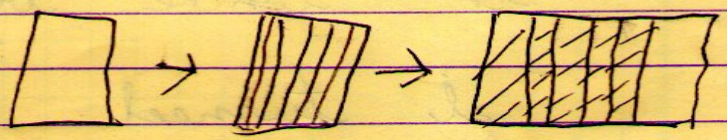
ANS: A ~~Chang~~ Change 1 to $\frac{6}{6}$ so we could subtract from $\frac{5}{6}$

ANS: B because that is in lowest terms

ANS: C we changed it into $7\frac{3}{3}$

ANS: D no we should turn 8 into $7\frac{3}{3}$ to subtract

① $1 - \frac{5}{6} =$

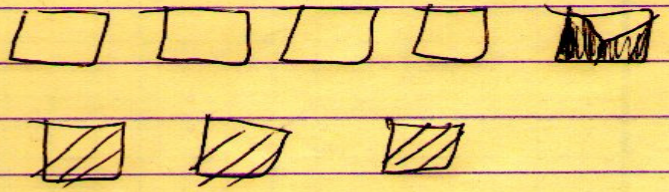


$\frac{6}{6} - \frac{5}{6} = \frac{1}{6}$ 1 whole $\rightarrow \frac{6}{6}$ $\frac{5}{6} = \frac{1}{6}$

Turn 1 whole to $\frac{6}{6}$ (Fraction)

and then subtract $\frac{5}{6}$ from $\frac{6}{6} = \frac{1}{6}$

② $8 - 3\frac{2}{3}$



$7\frac{3}{3} - 3\frac{2}{3} = 4\frac{1}{3}$

Turn 8 into 7 and $\frac{3}{3}$ so that you may have something to subtract for the whole number fraction. Subtract 3 from 7 and $\frac{2}{3}$ from $\frac{3}{3}$.

Teacher Niño

Teacher Niño

First I look for the standards in the SPC (Skills Performance Chart), then I look at the capabilities of the pupils. Then I do my work.

Identifying

I determine the learning tools and design the learning sequence.

I follow the structured learning sequence. Sometimes I deviate by giving more time on games and processing the games

Teacher Niño

Identifying

Actually, in this school we follow a standard sequence. We start with brainteasers, then a little review on the previous lesson.

Then after that, if we still have time we conduct drills. Pupils really love drills, esp. mental math. They are very competitive.

Teacher Niño

Identifying

I believe that games are very helpful to them because it really helps them learn to cooperate as well as to generalize based on what they have done.

After the games, we generalize and process the games.

Teacher Niño

Identifying

Many pupils enjoy math but I must admit that some pupils do not because they think it is boring. But I try to motivate them.

Actually some strategies that I use is more on constructivism. I get their prior knowledge & use it to discuss my topic for the day.

Teacher Niño

Engaging

I believe that it should follow the 3 sequence from concrete to representation to abstract form.

I get their prior knowledge about the topic, then use and enhance them by exploring other situations.

Teacher Niño

Engaging

Actually teaching problem solving is very difficult. I start with familiar situations, then give them more challenging situations.

We are trying to promote group work. They will answer worksheets, then present their observation. Since they are competitive, they engage in the activity

Teacher Niño

Coaching

First we have what we call formative assessment. If they can generalize in their own words then I believe they have learned the topic already.

I just polish their generalizations.

Teacher Niño

Coaching

I sometimes give exercises that help them understand the topic. I let them draw figures to learn the area of plane figures. & infer the formula from one figure to another.

It is more experiential to help them generalize the topic.

Teacher Niño

Coaching

I give follow up questions. It is like ladderized questions that help them inquire some more and find out their own difficulty in understanding the topic.

Teacher Niño

Coaching

You may observe them while doing the task in the group work to tell if they are doing reflective thinking. You may interview them during the group activities.

Teacher Niño

Verifying

In order for students to understand the topic I sometimes give exercises.

After I evaluate the papers and at least 80% of the pupils get the drills, then I believe that mastery is already there.

Volume of Solids

Adding Integers

Read each problem carefully then solve.

1. Mother saved P 5000. She spent P 2500 to buy food and P 500 to buy things needed in the house. How much of the money was left?

Solution:

A
+5000

L
2500
500
−3000

B
+ 5000
− (−3000)
+ 2000

Answer: ₱2000 money was left.

2. Mother lost 3 kg when she is ill. After recovering, she gained 9 kg and then lost 4 kg. How much weight did she lose or gain?

Solution:

A
+9

L
3
4
−7

B
+9
−7
+2

Answer: she gained 2 kg.

3. An elevator went up 7 floors from the first floor; went down 2 floors; went up 1 floor; and went down 2 floors. On which floor did the elevator stop?

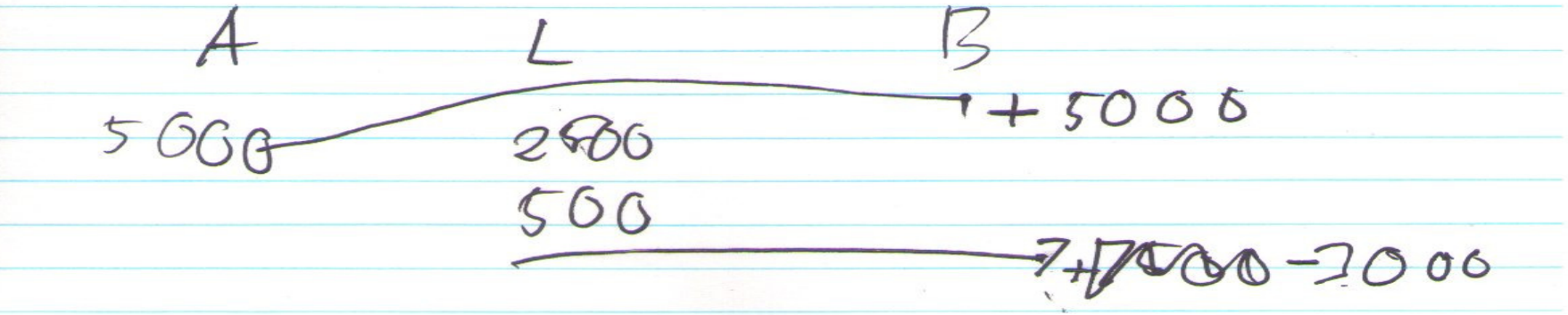
Solution:

A
+7
+1
F 8

L
1−2
−2
−4

B
+8
−4
+4

Answer: The elevator stopped at the fourth floor



5000
− 3000
+2000

A
9

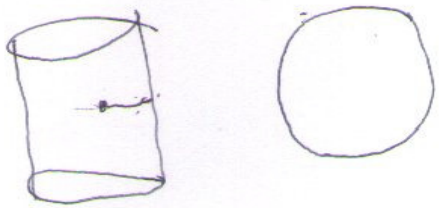
L
3
4
7

B
+9
−7
+2

A
+7
+1
+8

L
−2
−2
−4

B
+6
−4
+4



$$\begin{array}{r} -12 \\ +\ 8 \\ \hline -20 \end{array}$$

$$\begin{array}{r} -12 \\ -\ 8 \\ \hline -20 \end{array}$$

$$\begin{array}{r} 12 \\ +\ -8 \\ \hline +20 \end{array}$$

$$\begin{array}{r} 12 \\ +\ 8 \\ \hline +20 \end{array}$$

KEY STUDENT ACTIONS

Collaboration

Consultation

Resources

Interacting

Executive Control

Transforming

New Knowledge

Performance

Product

Values

Learner Centered Learning Environment

Content

Context

Learning Style

Prior Knowledge

Reflecting

Strategic Reasoning

Evaluating

Traditional

Rubrics

Portfolio

Rapatan, M., 2004. LCLE Handbook of LSGH

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

- Text
- Text

- Text
- Text
- Text

Grade 4C Student 1

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

- Text
- Text

- Text
- Text
- Text

Grade 4C Student 2

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Text

Text

Text

Grade 4C Student 2

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Can draw generalizations and conclusions

Can verify correctness of their solutions

Text

Text

Text

Grade 4C Student 3

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Can draw generalizations and conclusions

Can verify correctness of their solutions

Grade 6F Student 1

Can interpret geometric concepts using precise model or representation

Text

Text

Text

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Can draw generalizations and conclusions

Can verify correctness of their solutions

Grade 6F Student 1

Can interpret geometric concepts using precise model or representation

Text

Text

Text

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Can draw generalizations and conclusions

Can verify correctness of their solutions

Can interpret geometric concepts using precise model or representation

Can modify their understanding based on new information.

Text

Text

Grade 6F Student 2

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Can draw generalizations and conclusions

Can verify correctness of their solutions

Can interpret geometric concepts using precise model or representation

Can modify their understanding based on new information.

Text

Text

Grade 6F Student 2

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Can draw generalizations and conclusions

Can verify correctness of their solutions

Can interpret geometric concepts using precise model or representation

Can modify their understanding based on new information.

Text

Text

Grade 6F Student 2

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Can draw generalizations and conclusions

Can verify correctness of their solutions

Can interpret geometric concepts using precise model or representation

Can modify their understanding based on new information.

Can assess what they know, & what they need to know

Grade 6F Student 3

Text

Manifestations of Reflective Thinking

Are able to think about their solutions in the worksheet

Can implement alternative solution strategy

Can draw generalizations and conclusions

Can verify correctness of their solutions

Can interpret geometric concepts using precise model or representation

Can modify their understanding based on new information.

Can assess what they know, & what they need to know

Can transfer their learning to new situation.

Grade 6F Student 4

Promoting Reflective Lasallian Education

Administrators	Teachers	Community
Set a clear pedagogical framework upon w/c learner centered teaching principles are anchored.	Exhibit openness to the learner centered principles of teaching & learning & assume their new role as facilitators of reflective learning.	Is supportive of the needs of both teachers & students to help them develop the skills they need to establish a learner centered environment.

TEACH MINDS

TOUCH HEARTS

TRANSFORM LIVES

Maraming Salamat!

www.themegallery.com

Harold Culala, FEU

Acknowledgement

LSGH

Mr. Jose Ramelle E. Javier
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Teacher Ms. Cristine Ann P. Mallari
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