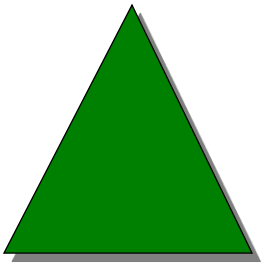
Sternberg's Triarchic Theory of Intelligence

Robert Sternberg, a Professor of Psychology at Yale University, has developed a theory that people possess three different types of intelligence in varying amounts. His research indicates that people learn best when their dominant intelligence is addressed (Sternberg, 1997).

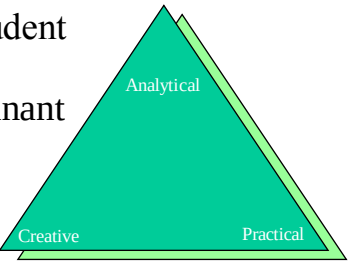
Triarchic Theory

- Triarchic teaching is a strategy that you can use to differentiate according to Sternberg's theory of "successful intelligence":
  - Creative Intelligence
  - Practical Intelligence
  - Analytical Intelligence

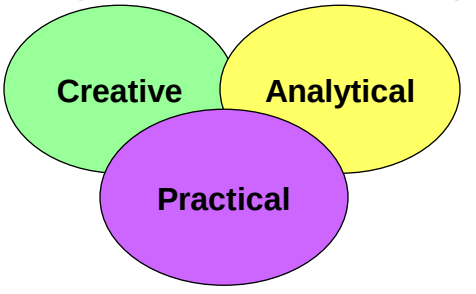


Triarchic Teaching

- The idea behind Triarchic teaching is that you provide students with assignments, centered around the same earning goals, that are designed for their intelligence strengths. This way, students learn the material more efficiently and successfully.
- Sternberg's research shows that student achievement rises when learning experiences take into account dominant learning preferences.



Sternberg's Three Intelligences



•We all have some of each of these intelligences, but are usually stronger in one or two areas than in others.

•We should strive to develop as fully each of these intelligences in students…

• …but also recognize where students' strengths lie and teach through those intelligences as often as possible, particularly when introducing new ideas.

STERNBERG'S INTELLIGENCES

ANALYTICAL	Linear – Schoolhouse Smart - Sequential
PRACTICAL	Streetsmart – Contextual – Focus on Use
CREATIVE	Innovator – Outside the Box – What If

An idea for assessing students according to Sternberg's intelligences would be to give the following scenario:

Imagine you are driving with your parents and they are listening to the radio. An interesting piece comes on about something you do not know. As you listen, you get more and more interested. What do you want to know?

Do you want to know all the little details that go into it?
Do you want to know how it is being used?
Do you want to know enough to use the information in new ways, for new purposes, to make new connections?

Students who choose the first question fall into the analytic intelligence, the second corresponds to practical and those who choose the final question are the creative learners.

Analytical Thinkers

Likes to break things into parts, likes to know how things work, enjoys facts as well as ideas, likes to argue, ataracted to logical thinking and logical ideas, likes to "think" as opposed to "doing," typically does well at school tasks, enjoys solving problems, can focus for long periods of time on a single task, ma balk at "creatve" assignments, likes to find one right "answer," may see thngs as black and white.

Needs: assignments that require thought as opposed to rote memorizaatin, extended assignments that allow for focused, long-term study, "problems" to fgure out, time to discuss ideas with others, support with how to present ideas in a non-argumentative way, support with listening to and accepting others' ideas, opportunities to struggle with open-ended questions that have no right/wrong answer.

For ANALYTICAL Thinkers

Analytical *= Linear – Schoolhouse Smart -- Sequential*

- Show the parts of _____ and how they work.
- Explain why _____ works the way it does.
- Diagram how _____ affects _____.
- Identify the key parts of _____.
- Present a step-by-step approach to _____.

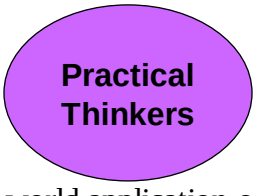
Analytical thinkers: "I Like…

- Analyzing characters when I'm reading or listening to a story
- Comparing and contrasting points of view
- Criticizing my own and others' work
- Thinking clearly and analytically
- Evaluating my and others' points of view
- Appealing to logic
- Judging my others' behavior
- Explaining difficult problems to others
- Solving Logical problems
- Making inferences and deriving conclusions
- Sorting and classifying
- Thinking about things

Sternberg & Grigorenko, 2000

Examples Across the Curriculum: Analytical

- Analyze the development of the character of Heathcliff in *Wuthering Heights.*
- Critique the design of the experiment (just gone over in class or in a reading) showing that certain plants grew better in dim light than in bright sunlight.
- Judge the artistic merits of Roy Lichtenstein's "comic-book art," discussing its strengths as well as its weaknesses as fine art.
- Compare and contrast the respective natures of the American Revolution and the French Revolution, pointing out ways both in which they were similar and those in which they were different.
- Evaluate the validity of the following solution to a mathematical problem and discuss weaknesses in the solution, if there are any.
- Assess the strategy used by the winning player in the tennis match you just observed, stating what techniques she used in order to defeat her opponent.



Likes to see the real world application of things, excellent at implementing plans, a "doer," highly effective in making things "happen," organized, less interested in ideas than in action likes to move and do when learning, can be an excellent leader, may struggle with creativity-for-creativity's-sake assignments, may resist completing assignments for which they see no real-world purpose, can work very well in group situation, may not be traditionally "book smart."

Needs: Hands-on activities, assignments that are connected to the real world, opportunities to share ideas with practitioners and experts, experiences with more creative, open-ended activities, support with being patient with activities for which they see no immediate application, opportunities to lead (even when they are not the highest achievers, these students can be highly effective at leading groups and delegating responsibilities).

For PRACTICAL Thinkers

***Practical** = Street Smart – Contextual – Focus on Use*

•Demonstrate how someone uses _____ in their life or work.
•Show how we could apply _____ to solve this real life problem: _____.
•Based on your own experience, explain how _____ can be used.
•Here's a problem at school, _____.
•Using your knowledge of _____, develop a plan to address the problem

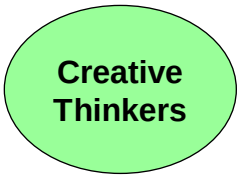
Practical thinkers: "I Like…

- Taking things apart and fixing them
- Learning through hands on activities
- Making and maintaining friends
- Understanding and respecting others
- Putting into practice things I learned
- Resolving conflicts
- Advising m friends on their problems
- Convincing someone to do something
- Learning by interacting with others
- Applying my knowledge
- Working and being with others
- Adapting to new situations

Sternberg & Grigorenko, 2000

Examples Across the Curriculum: Practical

- Apply the formula for computing compound interest to a problem people are likely to face when planning for retirement.
- Use your knowledge of German to greet a new acquaintance in Berlin.
- Put into practice what you have learned from teamwork in football to making a classroom team project succeed.
- Implement a business plan you have written in a simulated business environment.
- Employ the formula for distance, rate, and time to compute a distance.
- Render practical a proposed design for a new building that will not work in the aesthetic context of the surrounding buildings, all of which are at least 100 years old.
- Apply a lesson that a literary character learned to your life.



Attracted to novelty, likes to produce knowledge or ideas instead of consuming them, sees the world from a unique perspective, often prefers working alone, doesn't like to be rushed toward completion of tasks, often works in "bursts," with long periods of incubation (which can look like unproductiveness) followed by quick, highly productive working periods, often has unique sense of humor.

Needs: support with setting deadlines and timelines, open-ended assignments with structure, assignments that allow for creative thinking and novel products, support working with other students, frequent outlets for creative thought, support with turning "ideas" into "reality."

For CREATIVE Thinkers

Creative *= Innovator – Outside the Box – "What if?" – Improver*

•Find a new way to show _____.
•Use unusual materials to explain _____.
•Use humor to show _____.
•Explain (show) a new and better way to _____.
•Make connections between _____ and _____ to help us understand _____.
•Become a _____ and use your "new" perspective to help us think about _____.

Creative thinkers: "I Like…

- Designing new tings
- Coming up with ideas
- Using my imagination
- Playing make-believe and pretend games
- Thinking of alternative solutions
- Noticing things people usually tend to ignore
- Thinking in pictures and images
- Inventing (new recipes, words, games)
- Supposing that things were different
- Thinking about what would have happened if certain aspects of the world were different
- Composing (new songs, melodies)
- Acting and role playing

Sternberg & Grigorenko, 2000

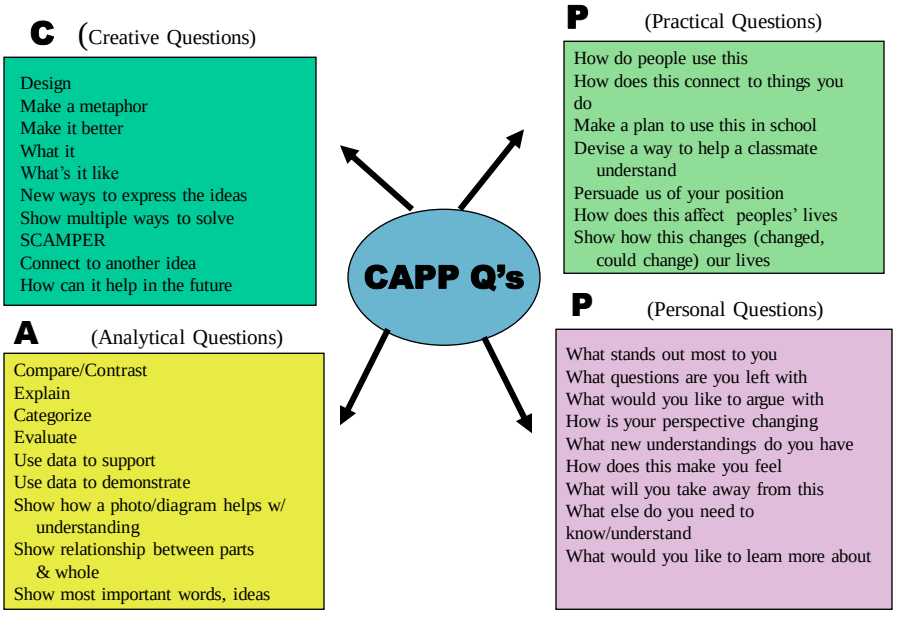
Examples Across the Curriculum: Creative

- Create an alternative ending to the short story you just read that represents a different ay things might have gone for the main characters in the story.
- Discover te fundamental physical principle that underlies all of the following problems, each of which dffers from the others in the "surface structure" of the problem but not in its "deep structure…"
- Imagine if the government of China keeps evolving over the course of the next 20 years in much the same way it has been evolving. What do you believe the government of China will be like in 20 years?
- Suppose that you were to design one additional instrument to be played in a symphony orchestra for future compositions. What might that instrument be like, and why?
- Predict changes that are likely to occur in the vocabulary or grammar of spoken Spanish in the border areas of the Rio Grande ver the next 100 years as a result of continuous interactions between Spanish and English speakers.
- Imagine what it feels like to be a parabola, and describe yourself and your life.
- Suppose Huck Finn had been named Helen Finn.

Tips for Teaching Triarchically

- Some of the time, teach analytically, helping students learn to analyze, evaluate, compare and contrast, critique and judge.
- Some of the time, teach practically, helping students learn to apply, use, utilize, contextualize, implement, and put into practice.
- Some of the time, teach creatively, helping student learn to create, invent, imagine, discover, explore and suppose.
- Much of the time, enable all students to capitalize on their strengths.
- Most of the time, enable all students to correct or compensate for their weaknesses.
- Make sure your assessments match your teaching, calling upon analytical, creative and practical as well as memory skills.
- Value the diverse patterns of abilities in all students.

Using Sternberg's Intelligences (Plus 1) To Enhance Reading Success



Biology – A Differentiated Lesson Using Sternberg's Intelligences

Learning Goals:

Know - Names of cell parts, functions of cell parts
Understand - A cell is a system with interrelated parts
Do – Analyze the interrelationships of cell parts/functions
Present understandings in a clear, useful, interesting and fresh way.

After whole class study of a cell, students choose one of the following sense-making activities.

Analytical: Use a cause/effect chain or some other format you develop to show how each part of a cell affects other parts as well as the whole. Use labels, directional markers, and other symbols as appropriate to ensure that someone who is pretty clueless about how a cell works will be enlightened after they study your work.

Sternberg/Biology (cont'd)

Practical: Look around you in your world or the broader world for systems that could serve as analogies for the cell.

Select your best analogy ("best" most clearly matched, most explanatory or enlightening).

Devise a way to make the analogy clear and visible to an audience of peers, ensuring that they will develop clearer and richer insights about how a cell works by sharing in your work.

Be sure to emphasize both the individual functions of cell parts and the interrelationships among the parts.

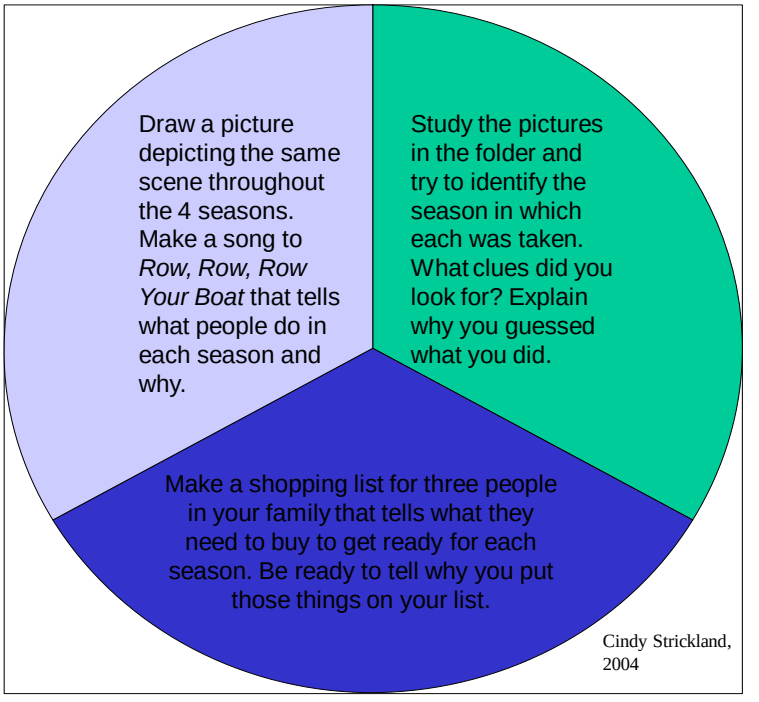
Sternberg/Biology (cont'd)

Creative: Use unlikely stuff to depict the structure and function of the cell, with emphasis on interrelationships among each of the parts. You should select your materials carefully to reveal something important about the cell, it's parts, and their interrelationships your ahas should trigger ours.

or

Tell a story that helps us understand a cell as a system with interdependent actors or characters, a plot to carry out, a setting, and even a potential conflict. Use your own imagination and narrative preferences to help us gain insights into this remarkable system.
Students share their work in a 3 format – first triads of students who completed the same option, then triads with each of the 3 categories represented.

This is then followed by a teacher-led, whole class discussion of cells as systems, then a "Teacher Challenge" in which the teacher asks students to make analogies or other sorts of comparisons between cells, cell parts, or interrelationships and objects, photos, or examples produced by the teacher.



Tall Tales
Grade 3

Differentiation According to Sternberg's Intelligences

Know: *What makes a Tall Tale*
Definition of fact and exaggeration

Understand: *An exaggeration starts with a fact and stretches it.*
People sometimes exaggerate to make their stories or deeds seem more wonderful or scarier.

Do: *Distinguish fact and exaggeration*

Analytical Task

Listen to or read Johnny Appleseed and complete the organizer as you do.

Johnny Appleseed's	
Facts	Exaggerations

Practical Task

Think of a time when you or someone you know was sort of like the Johnny Appleseed story and told a tall tale about something that happened. Write or draw both the factual or true version of the story and the tall tale version.

Creative Task --- RAFT Assignment

Role	Audience	Format	Topic
Someone in our class	Our class	Diary entry	Let me tell you what happened while Johnny A.and I were on the way to school today….

Understanding Number

Analytic Task Make a number chart that shows all ways you can think of to show 5.

Practical Task Find as many things as you can at school and at home that have something to do with 5. Share what you find with us so we can see and understand what you did.

Creative Task Write and/or recite a riddle poem about 5 that helps us understand the number in many, unusual, and interesting ways.

Understanding Order of Operations

Analytic Task Make a chart that shows all ways you can think of to use order of operations to equal 18.

Practical Task A friend is convinced that order of operations do not matter in math. Think of as many ways to convince your friend that without using them, you won't necessarily get the correct answers! Give lots of examples.

Creative Task Write a book of riddles that involve order of operations. Show the solution and pictures on the page that follows each riddle.

Triarchic Theory

Distance = rate x time

1. Solve for d = r t (Analytical)
2. Design your own formula for d = r t (Creative)
3. Estimate the time it takes to fly from Charlottesville, Virginia to Madrid (Practical)

Yale Summer Psychology Program

Equations of Lines

- **Know**:
  - Forms of the equations of lines: General, Standard, Point – Slope, Vertical and Horizontal
- **Understand**:
  - All forms of equations of lines represent the same line.
  - Given an equation of a line in one form, any other form can be generated.
- **Do**:
  - Find other forms of equations of lines given one form.
  - Find the strengths, weaknesses and applications of each form of equation.

Equations of Lines

- **Analytical**

  Compare the various forms of equations of lines. You may make a flow chart, table or any other idea to present your findings to the class. Be sure ton consider advantages and disadvantages of each.

- **Practical:**

  Decide how and when each form of the equation of a line is best used. What are the strengths and weaknesses of each form? What specifically should you look for in order to decide which form to use? Find a way to present your conclusions to the class.

- **Creative:**

  Put each form of an equation of a line on trial. Prosecutors should try to convince the jury that the form is not needed, while the defense should defend its usefulness. Group members are the various equation forms and the prosecuting and defense attorneys. The rest of the class will be the jury, and the teacher will be the judge.

Evaluating Plot

Standard: Students will evaluate the quality of plot based on clear criteria

Analytical Task

•Experts suggest that an effective plot is: believable, has events that follow a logical and energizing sequence, has compelling characters and has a convincing resolution.

•Select a story that you believe <u>does</u> have an effective plot based on these three criteria as well as others you state. Provide specific support from the story for your positions.

OR

•Select a story you believe has an effective plot in spite of the fact that it does <u>not</u> meet these criteria. Establish the criteria you believe made the story's plot effective. Make a case, using specific illustrations from the story, that "your" criteria describes an effective plot

Evaluating Plot (cont'd)

Practical Task

•A local TV station wants to air teen-produced digital videos based on well known works. Select and storyboard you choice for a video. Be sure your storyboards at least have a clear and believable plot structure, a logical sequence of events, compelling characters and a convincing resolution. Note other criteria on which you feel the plot's effectiveness should also be judged. Make a case that your choice is a winner based on these and other criteria you state.

Creative Task

•Propose an original story you fell has a clear and believable plot structure, a logical sequence of events, compelling characters, and a convincing resolution. You may write it, storyboard it, or make a flow chart of it. Find a way to demonstrate that your story achieves these criteria as well as

Plot

Learning Goals: Students will evaluate the quality of a plot based on clear criteria: a plot should – be believable, have events that follow a logical and energizing sequence, involve compelling characters, and have a convincing resolution.

- Analytical:
  - Select a story that you believe DOES have an effective plot based on these criteria as well as others you state. Provide specific support from the story for your positions.

    OR
  - Select a story you believe has an effective plot in spite of the fact that it does NOT meet these criteria. Establish the criteria you believe made the story's plot effective. Make a case, using specific illustrations from the story, that YOUR criteria describe as an effective plot.

Plot

Learning Goals: Students will evaluate the quality of a plot based on clear criteria: a plot should – be believable, have events that follow a logical and energizing sequence, involve compelling characters, and have a convincing resolution.

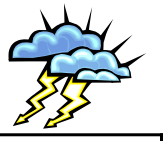
- Practical:
  - A local TV station wants to air teen-produced digital videos based on well-known works. Select and storyboard your choice for a video. Be sure your storyboards AT LEAST have a clear and believable plot structure, a logical sequence of events, compelling characters and a convincing resolution. Note other criteria on which you feel the plot's effectiveness should also be judged. Make a case that your choice is a winner based on these and the other criteria you state.

Plot

Learning Goals: Students will evaluate the quality of a plot based on clear criteria: a plot should – be believable, have events that follow a logical and energizing sequence, involve compelling characters, and have a convincing resolution.

- Creative:
  - Propose an original story you feel has a clear and believable plot structure, a logical sequence of events, compelling characters, and a convincing resolution. You may write it, storyboard it, or make a flow chart of it. Find a way to demonstrate that yur story achieves these criteria as well as any others you deem important.

Energy

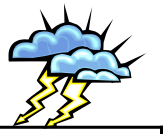


Lesson Goals → / Area of Intelligence ↓	Identify different energy sources	Analyze positive and negative aspects of energy sources	Make a convincing argument for / against an energy source
Analytical	Make a chart to compare and contrast the source, use, and impact of 3 of the following energy forms: mechanical, heat, chemical, electromagnetic, nuclear.	Chart the positive and negative aspects of 3 of the following energy forms: mechanical, heat, chemical, electromagnetic, nuclear.	Select one energy form and convince a teacher-selected audience of the benefit of using that energy source.
	Increased openness, independence	Multi-faceted	Transformation, increased complexity & independence
	Compare and contrast self-selected components of a variety of energy sources. Create a visual organizer for the information.	Evaluate and rate the components of various energy sources and determine an overall score for each.	Given what we know about Three Mile Island and the positive and negative aspects of nuclear energy, prepare a convincing argument for or against th use of nuclear energy.

Energy

Lesson Goals → / Area of Intelligence ↓	Identify different energy sources	Analyze positive and negative aspects of energy sources	Make a convincing argument for / against an energy source
Practical	Draw a pictorial map of our community and identify the source, use & impact in our city of 3 of the following energy forms: mechanical, heat, chemical, electromagnetic, nuclear.	Create a pamphlet to be distributed in your community describing positive & negative aspects of energy forms used in our city including mechanical, heat, chemical, electromagnetic, nuclear.	Which form of energy that is used n our city creates the most pollution? Write an editorial or design an advertisement showing your proposal to solve this problem.
	Increased independence, multi-faceted	~~Increased openness, independence~~	Increased complexity, independence, multi-faceted
	Create a map, chart, diagram, or illustration of our community. Identify components of the sources of energy we use in our community.	Make an advice list for consumers in using energy sources wisely: suggest ways t use "clean" energy sources in place of sources with negative impacts.	Which energy source used in our city causes the most problems? Devise a strategy plan of your solution to this problem to present to City Council.

Energy



Lesson Goals → / Area of Intelligence ↓	Identify different energy sources	Analyze positive and negative aspects of energy sources	Make a convincing argument for / against an energy source
Creative	Draw a picture or other illustration showing the source, use & impact of 3 of the following energy forms: mechanical, heat, chemical, electromagnetic, nuclear.	Create a pamphlet that describes the positive and negative aspects of 3 of the following energy forms: mechanical, heat, chemical, electromagnetic, nuclear.	Write an explanation or draw a diagram showing how photosynthesis could be used by humans.
	Increased openness, independence	Increased openness, independence	Requires mental leap, transformation
	Find a way to show, depict, or describe the different components of a variety of energy sources.	Create a public service campaign showing the positive and negative aspects of several energy sources.	Some energy sources used by organisms are "clean" energy forms. Find a way one might be used by humans and convince us it would work.

Biology

KNOW

- Cell parts and functions

UNDERSTAND

- A cell is a system with interrelated parts

DO

- Analyze the interrelations of cell parts/functions
- Present understandings in clear, useful, interesting, and fresh way

Biology

Analytical

Use a cause/effect chain or some other format you develop to show how each part of a cell affects other parts as well as the whole. Use labels, directional markers, and other symbols as appropriate to ensure that someone who is pretty clueless about how a cell works will be enlightened after they study your work.

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Look around you in your world or the broader world for systems that could serve as analogies for the cell. Select your best analogy ("best" meaning most clearly matched, most explanatory or enlightening). Devise a way to make the analogy clear and visible to an audience of your peers, ensuring that they will develop clearer and richer insights about how a cell works by sharing in your work. Be sure to emphasize both the individual functions of cell parts and the interrelationships among the parts.

Biology

Creative

Use unlikely stuff to depict the structure and function of the cell, with emphasis on interrelationships among each of the parts. You should select your materials carefully to reveal something important about the cell, its parts, and/or their interrelationships. Your "ahas" should trigger ours.

Playwright Voice and Style

- Reflect on your own life and experiences to determine your own voice.

Analytic:

Make a list of themes, concepts and emotions that reflect your won voice. Explain how they relate to your life and experiences. Write a brief portion of a scene that demonstrates your voice and style.

Practical:

Which playwright most reflects your own voice and style? What are the similarities and differences? Are there similarities in your life and the life of the playwright that you can find to explain the similarities?

Creative:

Think of an experience in your life that has shaped who you have become. Explain how that experience could be woven into a play or scene of a play. What would the voice and style of the play or scene be, and why? If you want, write and direct a short scene that reflects your voice and style.

Dance Lesson

Differentiation by Learning Profile

(Sternberg)

Learning Sequence	Assessment
Discuss Enduring Understanding	Journal – Reflection and discussion
	Analytical: Give specific examples of different ways dance can communicate. Discuss how space can be manipulated to create different moods. Present your conclusions in a chart or list.
	Practical: Choose 4 moods that can be communicated through dance. Discuss how dance would communicate each mood, and include the use of space for each.
	Creative: Dance is a form of communication. Create a story filled with emotion to communicate, and describe what the dance would look like. Be sure to include how the dance manipulates space.
Word Cards / Choreography	Tier the activity for difficulty and challenge, or create a cubing activity: -- Melt, turn, shake, fall, stretch, burst, creep, roll, jump, twist, swing, float, slash, glide, push
"Images"	Adjust the number of levels and directions to challenge each student at their own level. Give specific requirements (that can vary in presentation and requirements) for how groups communicate focus of image.

Individual Assessment Ideas:

Choose a video to review the choreographer's use of space. Your review can take any form you want:

- Write prose
- Write a poem
- Recreate the dance with commentary and changes
- Use pictures (painted or photos) to explain your review
- Team with a partner and create a debate on the pros and cons of your video
- Write or find another piece of music that could be used in the same way as your video. Explain why.

Nanci Smith, 2002