

Developing Critical Thinking Skills in the ABE Classroom



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Make Development of Critical Thinking Skills a Part of Every Class

As adult educators, many of us struggle with incorporating critical thinking skills into our lessons. When we think critically, we are engaging in intellectual strategies to solve problems and reach informed and logical decisions. Critical thinking is the identification and evaluation of evidence to guide decision making. A critical thinker uses broad in-depth analysis of evidence to make decisions and communicate his /her beliefs clearly and accurately (*Critical Thinking Co. www.criticalthinking.com*). We all agree that today's successful adult must develop these skills, but struggle with how and when to fit them into our limited time with students.

Perhaps the most effective way to develop critical thinking skills is to make them a part of every lesson. Teaching critical thinking is an ongoing process. It can't be limited to a few classroom sessions, but should be incorporated through a variety of questions, lessons and activities that focus on higher level thinking skills. One of the most lasting and important lesson we can share with our students is a strategy to solve the problems they encounter along life's often difficult journey.

"Education is what remains after one has forgotten everything one learned in school." - Albert Einstein



What Are Critical Thinking Skills?

There are many different definitions and a lot of information available about what critical thinking is and looks like. Included below is a sample of what I found to be the most usable descriptions. The most recognizable definition of critical thinking, for many educators, is probably Bloom's Taxonomy. It is included below along with the revised version developed in 2001 by Anderson and Krathwohl. This revised version will probably be the most usable for teachers and students because of the terminology changes from nouns to verbs.

Bloom's Taxonomy of Critical Thinking Skills

In the 1950s, educational psychologist Benjamin Bloom identified a hierarchy of cognitive skills. He emphasized the importance of understanding that each cognitive skill builds on previous skills. Following is a short descriptor of each of the six cognitive skills identified by Bloom.

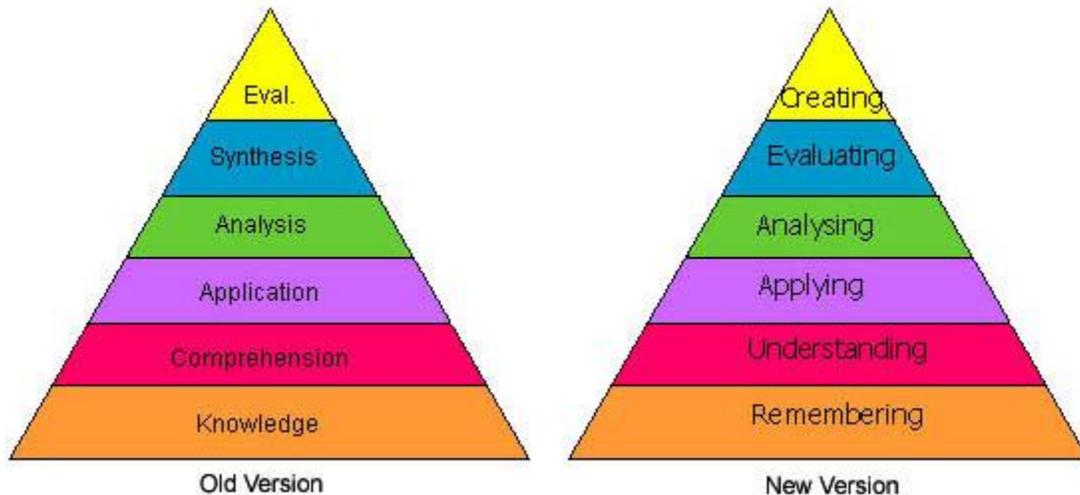
- **Knowledge**—the recall of information
- **Comprehension**—the translation or interpretation of knowledge
- **Application**—the application of knowledge to a new situation
- **Analysis**—the ability to break down information into parts and show relationships among the parts
- **Synthesis**—the ability to bring together elements of knowledge to form a new whole and build relationships for new situations
- **Evaluation**—the ability to make judgments about the value and sufficiency of information and methods for a specific purpose

Revised Bloom's Taxonomy

During the 1990's, a former student of Bloom's, Lorin Anderson, led a new assembly which met for the purpose of updating the taxonomy, hoping to add relevance for 21st century students and teachers. This time "representatives of three groups [were present]: cognitive psychologists, curriculum theorists and instructional researchers, and testing and assessment specialists" (Anderson, & Krathwohl, 2001, p. xxviii). Like the original group, they were also arduous and diligent in their pursuit of learning, spending six years to finalize their work. Published in 2001, the revision includes several seemingly minor yet actually quite significant changes. Several excellent sources are available which detail the revisions and reasons for the changes. A more concise summary appears here. The changes occur in three broad categories: terminology, structure, and emphasis.

Terminology Changes

Changes in terminology between the two versions are perhaps the most obvious differences and can also cause the most confusion. Basically, Bloom's six major categories were changed from noun to verb forms. Additionally, the lowest level of the original, knowledge was renamed and became remembering. Finally, comprehension and synthesis were retitled to understanding and creating. In an effort to minimize the confusion, comparison images appear below.



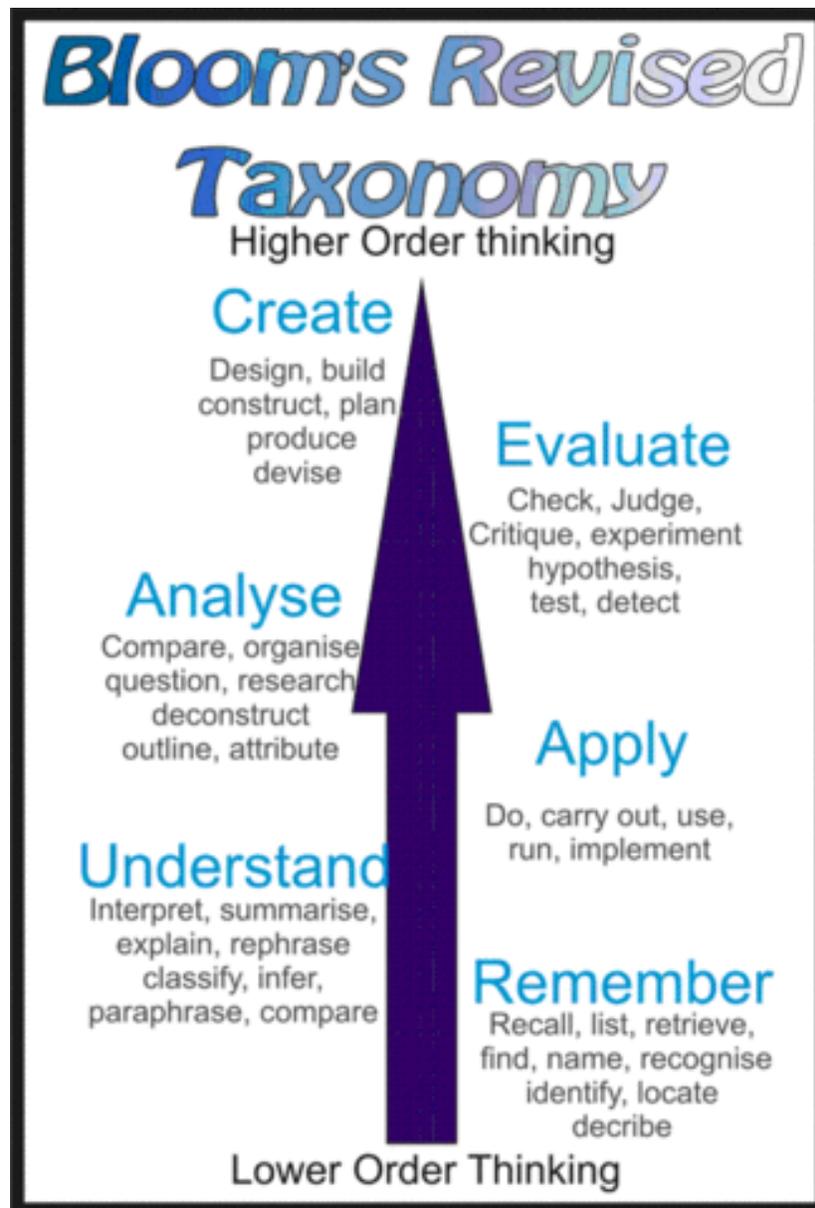
Caption: Terminology changes "The graphic is a representation of the NEW verbage associated with the long familiar Bloom's Taxonomy. Note the change from Nouns to Verbs [e.g., Application to Applying] to describe the different levels of the taxonomy. Note that the top two levels are essentially exchanged from the Old to the New version." (Schultz, 2005) (Evaluation moved from the top to Evaluating in the second from the top, Synthesis moved from second on top to the top as Creating.) Source: http://www.odu.edu/educ/roverbau/Bloom/blooms_taxonomy.htm

The new terms are defined as:

- **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory.
- **Understanding:** Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
- **Applying:** Carrying out or using a procedure through executing, or implementing.
- **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.

- **Evaluating:** Making judgments based on criteria and standards through checking and critiquing.
- **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing. (Anderson & Krathwohl, 2001, pp. 67-68)

This information was adapted from an article by Mary Forehand from the University of Georgia http://projects.coe.uga.edu/epltt/index.php?title=Bloom%27s_Taxonomy#end



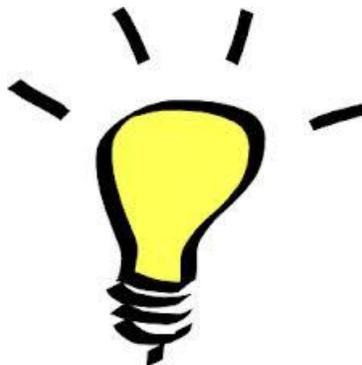
What Are Critical Thinking Skills? Litlink.ket.org

Litlink.ket.org, a PBS Literacy link, provides a different look at critical thinking skills. In *Peak Performance* (1997), S. Ferrett identified the primary attributes of a critical thinker.

As you read the list below, think about how your classroom can foster an environment that nurtures critical thinkers.

Critical thinkers

- Ask pertinent questions
- Assess statements and arguments
- Are able to admit a lack of understanding or information
- Have a sense of curiosity
- Are interested in finding new solutions
- Are able to clearly define a set of criteria for analyzing ideas
- Are willing to examine beliefs, assumptions, and opinions and weigh them against facts
- Listen carefully to others and are able to give feedback
- Suspend judgment until all facts have been gathered and considered
- Look for evidence to support assumptions and beliefs
- Are able to adjust opinions when new facts are found
- Look for proof
- Examine problems closely
- Are able to reject information that is incorrect or irrelevant
- See that critical thinking is a lifelong process of self-assessment



Asking Questions

Perhaps one of the easiest and most effective ways to incorporate critical thinking skills into classes and lessons is to be aware of the type of questions we ask students. Critical thinking questions can really help to develop and enhance thinking skills in a learner. Be sure to formulate questions that require students to use their higher level thinking skills to answer.

Guiding students as to how to formulate their own questions is also an important consideration in developing critical thinking skills. **The Right Question Institute (RQI)** provides information and teaching resources to help students develop and practice this skill. RQI is a non-profit educational organization offering a strategy for helping people learn to advocate for themselves, participate in decisions that affect them, and formulate effective questions. A bounty of resources and information is available at www.rightquestion.org.

The following questions can be applied to a variety of learning situations. Keep this list handy in order to be able to stimulate higher level thinking and critical literacy.

Questions to Focus on Critical Literacy Higher Level Thinking

1. What could have happened if.....
2. What theme do you notice emerging?
3. How is this similar to.....
4. Compare this with something you've experienced that is similar.
5. What other outcomes could have happened?
6. How is this similar to.....
7. Why did the author makehappen?
8. What questions would you pose to the author?
9. What was the point of.....
10. What would you have done differently? Why?
11. How else could this story have ended?
12. What would your position have been with this problem?
13. How would you have responded to.....
14. How would you have handled
15. What change you would recommend? Why?
16. How would you feel if.....
17. Defend the author's position on.....
18. Discuss the importance of part when.....

19. What were the 3 most important events? Defend your answer.
20. Predict what could take place in a sequel.
21. What was the turning point? What makes you think this?
22. Compare a character with you.
23. What is the purpose? Why?
24. How could you improve.....
25. What needs to be improved.....
26. How could it have been done differently?
27. How could this change to meet the needs of a different audience?
28. What do you wonder about?
29. How has this influenced you?
30. What advice do you have for the author?
31. What point of view did the author take? Could there be different point of views?
What would they be?
32. What are the author's values, beliefs and attitudes? How do you know?
33. What is the audience being targeted? How do you know?
34. Could some people interpret this differently? How?
35. How do the images influence your thinking?
36. Are the images needed? Why or why not?

Knowledge (Remembering)

Useful Verbs	Sample Question Stems	Potential activities and products
tell list describe relate locate write find state name	What happened after...? How many...? Who was it that...? Can you name the...? Describe what happened at...? Who spoke to...? Can you tell why...? Find the meaning of...? What is...? Which is true or false...?	Make a list of the main events. Make a timeline of events. Make a facts chart. Write a list of any pieces of information you can remember. List all the ... in the story. Make a chart showing... Make an acrostic. Recite a poem.

Comprehension (Understanding)

Useful Verbs	Sample Question Stems	Potential activities and products
Explain interpret outline discuss distinguish predict restate translate compare describe	Can you write in your own words...? Can you write a brief outline...? What do you think could of happened next...? Who do you think...? What was the main idea...? Who was the key character...? Can you distinguish between...? What differences exist between...? Can you provide an example of what you mean...? Can you provide a definition for...?	Cut out or draw pictures to show a particular event. Illustrate what you think the main idea was. Make a cartoon strip showing the sequence of events. Retell the story in your words. Paint a picture of some aspect you like. Write a summary report of an event. Prepare a flow chart to illustrate the sequence of events.

Application

Useful Verbs	Sample Question Stems	Potential activities and products
Solve	Do you know another instance where...?	Construct a model to demonstrate how it will work.
show	Could this have happened in...?	Make a scrapbook about the areas of study.
use	Can you group by characteristics such as...?	Take a collection of photographs to demonstrate a particular point.
illustrate	What factors would you change if...?	Make up a puzzle game using the ideas from the study area.
construct	Can you apply the method used to some experience of your own...?	Make a clay model of an item in the material.
complete	What questions would you ask of...?	Design a market strategy for your product using a known strategy as a model.
examine	From the information given, can you develop a set of instructions about...?	Paint a mural using the same materials.
classify	Would this information be useful if you had a	Write a textbook about... for others.

Analysis

Useful Verbs	Sample Question Stems	Potential activities and products
Analyze	Which events could have happened...?	Design a questionnaire to gather information.
distinguish	I ... happened, what might the ending have been?	Write a commercial to sell a new product.
examine	How was this similar to...?	Conduct an investigation to produce information to support a view.
compare	What was the underlying theme of...?	Make a flow chart to show the critical stages.
contrast	What do you see as other possible outcomes?	Construct a graph to illustrate selected information.
investigate	Why did ... changes occur?	Make a jigsaw puzzle.
categorize	Can you compare your ... with that presented in...?	Make a family tree showing relationships.
identify	Can you explain what must have happened when...?	Write a biography of the study person.
explain	How is ... similar to ...?	Prepare a report about the area of study.
separate	What are some of the problems of...?	Arrange a party. Make all the arrangements and record the steps needed.
advertise	Can you distinguish between...?	Review a work of art in terms of form, color and texture.
	What were some of the motives behind...?	
	What was the turning point in the game?	

Synthesis (Creating)

Useful Verbs	Sample Question Stems	Potential activities and products
Create invent compose predict plan construct design imagine propose devise formulate	Can you design a ... to ...? Why not compose a song about...? Can you see a possible solution to...? If you had access to all resources how would you deal with...? Why don't you devise your own way to deal with...? What would happen if...? How many ways can you...? Can you create new and unusual uses for...? Can you write a new recipe for a tasty dish? can you develop a proposal which would...	Invent a machine to do a specific task. Design a building to house your study. Create a new product. Give it a name and plan a marketing campaign. Write about your feelings in relation to... Write a TV show, play, puppet show, role play, song or pantomime about...? Design a record, book, or magazine cover for...? Make up a new language code and write material using it. Sell an idea. Devise a way to... Compose a rhythm or put new words to a known melody.

Evaluation

Useful Verbs	Sample Question Stems	Potential activities and products
judge select choose decide justify debate verify argue recommend assess discuss rate prioritize determine	Is there a better solution to...? Judge the value of... Can you defend your position about...? Do you think ... is a good or a bad thing? How would you have handled...? What changes to ... would you recommend? Do you believe? Are you a ... person? How would you feel if...? How effective are...? What do you think about...?	Prepare a list of criteria to judge a ... show. Indicate priority and ratings. Conduct a debate about an issue of special interest. Make a booklet about 5 rules you see as important. Convince others. Form a panel to discuss views, eg "Learning at School." Write a letter to ... advising on changes needed at... Write a half yearly report. Prepare a case to present your view about...

Adapted from Dalton, J. & Smith, D. (1986) "Extending Children's Special Abilities – Strategies for primary classrooms" pp36-7

Can you...



One way to practice using critical thinking questions and skills is to use interesting photos or images. Following is an example. Use the photos on the next page to write your own higher level thinking questions.

Think Critically With Images



1. Describe what you see in this picture.
2. What is this person doing?
3. Why do you think this woman may be behaving like this?
4. What do you think she is feeling? Why do you think this?
5. Where do you think she is?
6. Do you think she acts like this all of the time?
7. What caption could you write for this picture?
8. What could she do to help herself?
9. Have you ever felt or acted like this?
10. How does this woman feel about computers?
11. What advice would you give this woman?



Brain Teasers

Another way to encourage creative thinking and develop higher level thinking skills is the use of “brain teasers”. This is the kind of activity that would work well with small groups and could lead to interesting discussions. These types of activities can also provide examples of “thinking outside the box” and demonstrate that problems can be solved in more than one way. The challenge is not to present activities that are *frustratingly* challenging.

One excellent source of brain teaser activities and worksheets can be found at www.teach-nology.com. You can find another by Googling... critical thinking activities in patterns, imagery, logic...you will find 170 pages of mathematical critical thinking activities and student worksheets in a PDF! There are also excellent, reproducible books to be found on the subject. *Brain Teasers! Over 180 Quick Activities & Worksheets That Make Kids Think* by Susan S. Petreshene is a great example.

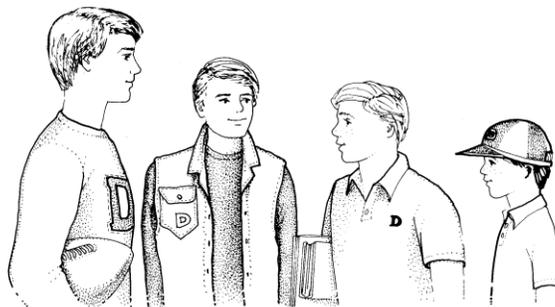
OH BROTHER!



None of the four Jones brothers is the same height.
No brother is taller than a brother who is older.
The brothers' names are Don, Dan, Dave, and Dick.

Read these three statements. Then answer the questions.
Dave is taller than Dan and Dick.
Don is older than Dave.
Dan is shorter than Dick.

1. Who is older, Dick or Dave? ____
2. Who is younger, Dave or Dan? ____
3. Which brother is older than Dan but younger than Dave? ____
4. Who is the oldest? ____
5. Who is the youngest? ____



Name _____

Date _____

The Quick Brain Teaser Pack- Version 1



1. Does England have a 4th of July?

2. 7 months have 31 days in them. 11 months have 30 days in them. How many months have 28 days in them?

3. How many birthdays does the average person have?

4. What is sweetened then soured, boiled then cooled?

5. A woman gives a hobo 50 cents; the woman is the hobo's sister, but the hobo is not the woman's brother. How can this be?

Name _____

Date _____

The Quick Brain Teaser Pack- Version 2



1. In an inning, how many outs are there?

2. What do you bring to the table and cut, but never eat?

3. Is it legal for a man from New Jersey to marry his widow's sister? Why or why not?

4. What is not inside or outside a house, yet no house would be complete without it?

5. Divide 30 by $\frac{1}{2}$ and add 10.

What answer do you get?

Name _____

Date _____

The Quick Brain Teaser Pack- Version 3



1. See if you can explain this one...

Two men play five games of chess. Each man wins the same number of games. There are no ties.

2. What is pronounced like a single letter, written with 3 letters, and most animals have two of them?

3. A man builds a rectangular house. All sides of the house are exposed to the south. A huge bear walks by. What color is the bear? Why?

4. What is the beginning of eternity, the end of time and space; the beginning of every end, and the end of every race?

5. What is lighter than a feather, but cannot be lifted?

Name _____

Date _____

Brain Teaser Pack Answer Key- Versions 1-3



Version 1

1. Yes. It comes after the 3rd of July.
2. 12
3. One
4. Iced tea with lemon.
5. The beggar is her sister.

Version 2

1. Six
2. A deck of cards.
3. No - because he is dead. There is an actual law that says you can't marry dead people.
4. A window.
5. 70

Version 3

1. They aren't playing each other.
2. Eye
3. White. The house is at the North Pole so it is a polar bear.
4. The letter E
5. A bubble

©This printable teacher worksheet is from www.teach-nology.com

Skills that Focus on Critical Thinking Development

Identifying Fact and Opinion

Having the ability to differentiate between facts and opinions is important for developing critical thinking skills. An opinion is what someone thinks is right and two people may have completely different opinions. Opinions are subjective. Facts are truths that can be proven. Facts don't change from person to person. An example of a fact is: fall begins on September 21. An opinion: fall is the most beautiful season of the year.

To demonstrate this skill, remind students that: **a fact is something that can be proven true with some form of evidence.** An **opinion** is not backed by facts. Opinions are often feelings or emotions.

- To practice this skill, ask students to write one fact and one opinion about **voting**.
- Write one fact and one opinion about **education**.
- Write one fact and one opinion about **taxes**.
- Write one fact and one opinion about **themselves**.

On the following pages are samples of free and printable worksheets that are available at www.teach-nology.com. Visit the website to download many more PDF printable worksheets.

Be sure to correct and discuss these worksheets as a group for best results.

Name _____

Date _____

Prove It!

Directions: Read each statement and then circle whether it is a fact or opinion. If it's a fact, explain how it can be proven. If it is an opinion, simply write that it cannot be proven.

1. I can see the mountains from my window.

Fact or Opinion How can this be proven? _____

2. There are too many people on the planet.

Fact or Opinion How can this be proven? _____

3. My dog's name is Opie.

Fact or Opinion How can this be proven? _____

4. A rooster woke me up this morning.

Fact or Opinion How can this be proven? _____

5. Earth is the third planet from the sun.

Fact or Opinion How can this be proven? _____

6. My mother makes the best pancakes.

Fact or Opinion How can this be proven? _____

7. Niagara Falls is located along the border between Ontario and New York.

Fact or Opinion How can this be proven? _____

8. My aunt is the best musician in the orchestra.

Fact or Opinion How can this be proven? _____

9. My father is a mail carrier.

Fact or Opinion How can this be proven? _____

10. Smoking should be illegal.

Fact or Opinion How can this be proven? _____

11. Trains are a pleasant way to travel.

Fact or Opinion How can this be proven? _____

12. My hiking boots don't fit me anymore.

Fact or Opinion How can this be proven? _____

© This worksheet is from www.teach-nology.com

Name _____

Date _____

Identifying Fact and Opinion

A fact is something that is true or can be proven.

An opinion is knowledge based on feelings about a given topic.

Directions: Read each sentence. Decide whether each example is a fact or opinion. Write the word **fact** or **opinion** beside the appropriate sentence.

1. _____ Deserts are not as beautiful as forests.
2. _____ St. Patrick's Day is associated with the country of Ireland.
3. _____ Earth's largest ocean is the Pacific Ocean.
4. _____ Abraham Lincoln was the greatest president.
5. _____ Madrid is the capital of Spain.
6. _____ Leftover spaghetti is delicious.
7. _____ Honeybees are insects.
8. _____ Baseball is much more interesting than football.
9. _____ Blue is an attractive color.
10. _____ Brazil is on the continent of South America.
11. _____ My parents like classical music more than pop music.
12. _____ Lemons and limes look similar except for their color.
13. _____ Sunflowers are the prettiest flowers.
14. _____ We live in a brick house.
15. _____ My aunt is the funniest person I know.
16. _____ I'm expecting a phone call in ten minutes.
17. _____ All dinosaurs are extinct.
18. _____ Horses are the most beautiful animals in the world.
19. _____ Alaska is one of the fifty United States.
20. _____ I lost my best friend's book.

Name _____

Date _____

Explaining Fact and Opinion

Directions: Read each statement and then circle whether it is a fact or opinion. Explain your answer.

1. Broccoli contains a lot of vitamin C.

Fact or Opinion Explain: _____

2. The largest fish is the whale shark.

Fact or Opinion Explain: _____

3. Great Smoky Mountains National Park is the best national park.

Fact or Opinion Explain: _____

4. Water is two parts hydrogen to one part oxygen.

Fact or Opinion Explain: _____

5. Fall is the best season because of the spectacular colors.

Fact or Opinion Explain: _____

6. A telescope is a wise purchase.

Fact or Opinion Explain: _____

7. Insects and spiders are invertebrates.

Fact or Opinion Explain: _____

8. Riding in a hot air balloon would be a frightening experience.

Fact or Opinion Explain: _____

9. An adult human's skeleton has 206 bones.

Fact or Opinion Explain: _____

10. Ostriches are unable to fly, but they can run very fast.

Fact or Opinion Explain: _____

11. The blue whale is the largest animal ever to exist.

Fact or Opinion Explain: _____

12. Staying up late is a lot of fun.

Fact or Opinion Explain: _____

Compare and Contrast

Comparative analysis is a good exercise for developing critical thinking skills. When we compare something, we note what is the same between things. When we contrast something, we describe what is different. To demonstrate, ask students to compare and contrast spring and fall.

Consider writing about or discussing how the following are alike and different.

- watermelon and steak
- country music and rap
- rain and snow
- The United States of America and Mexico
- Democrats and republicans
- New Hampshire and New York

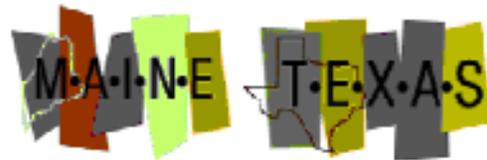
These types of topics make for great group brainstorming and writing as well as critical thinking development.

On the following page is an example of one of the excellent worksheets found on www.teach-nology.com.

Name _____ Date _____

Compare and Contrast States

Texas and Maine



Texas

Texas is the third largest state in the United States. It has over 25 million people living in it. Some of Texas's biggest cities include Dallas, Fort Worth, and Houston. The capital of Texas is Austin. Texas has many different types of geographies, including desert, mountains, and plains.

Maine

Maine is a state in the Northeast corner of the United States. The capital of Maine is Augusta. Maine has just over 1 million people living in it. The state animal is the moose. There are a lot of moose living in Maine. Maine has over 21,000 acres of state forests.

Based on the paragraphs above, what is the same between Maine and Texas?

- a.) Both Maine and Texas have more than 10 million people.
- b.) Both Maine and Texas have deserts.
- c.) Both Maine and Texas are states in the United States.
- d.) Both Maine and Texas have lots of trees.

Based on the paragraphs above, what is different between Maine and Texas?

- a.) Texas has many more people than Maine does.
- b.) Maine has a state animal and Texas doesn't.
- c.) Maine is bigger than Texas.
- d.) Augusta is bigger than Austin.

Extra idea: Look up the information for your state (population, bird, flower, etc.)

Sort and Classify

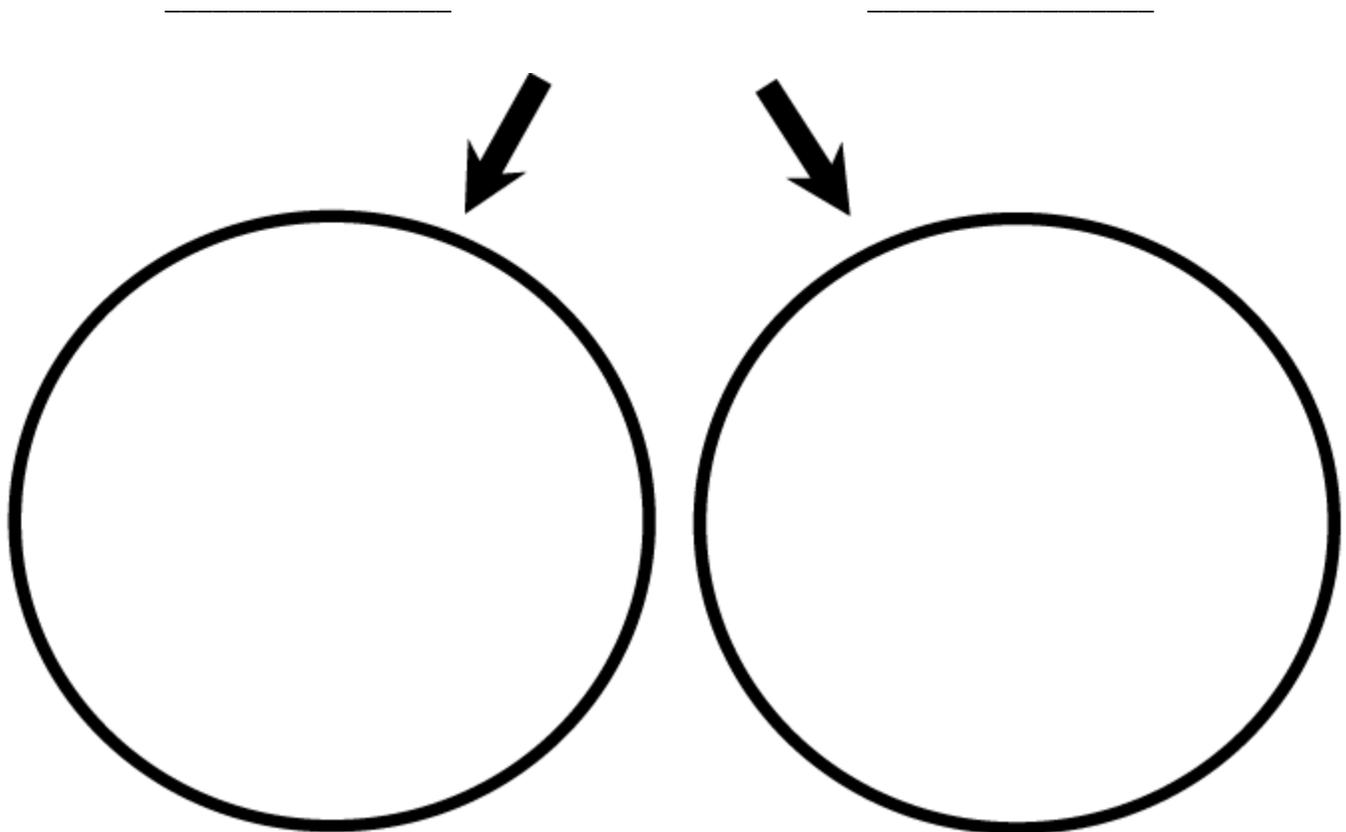
Categorizing objects on the basis of fixed criteria is also a good exercise for developing critical thinking skills. This can be demonstrated by giving students a list of cities, states, and or countries and having them sort them into a certain number of groups base on various criteria.

Following are examples and templates found on www.teach-nology.com

Name _____

Date _____

Sort Into 2 Groups Worksheet

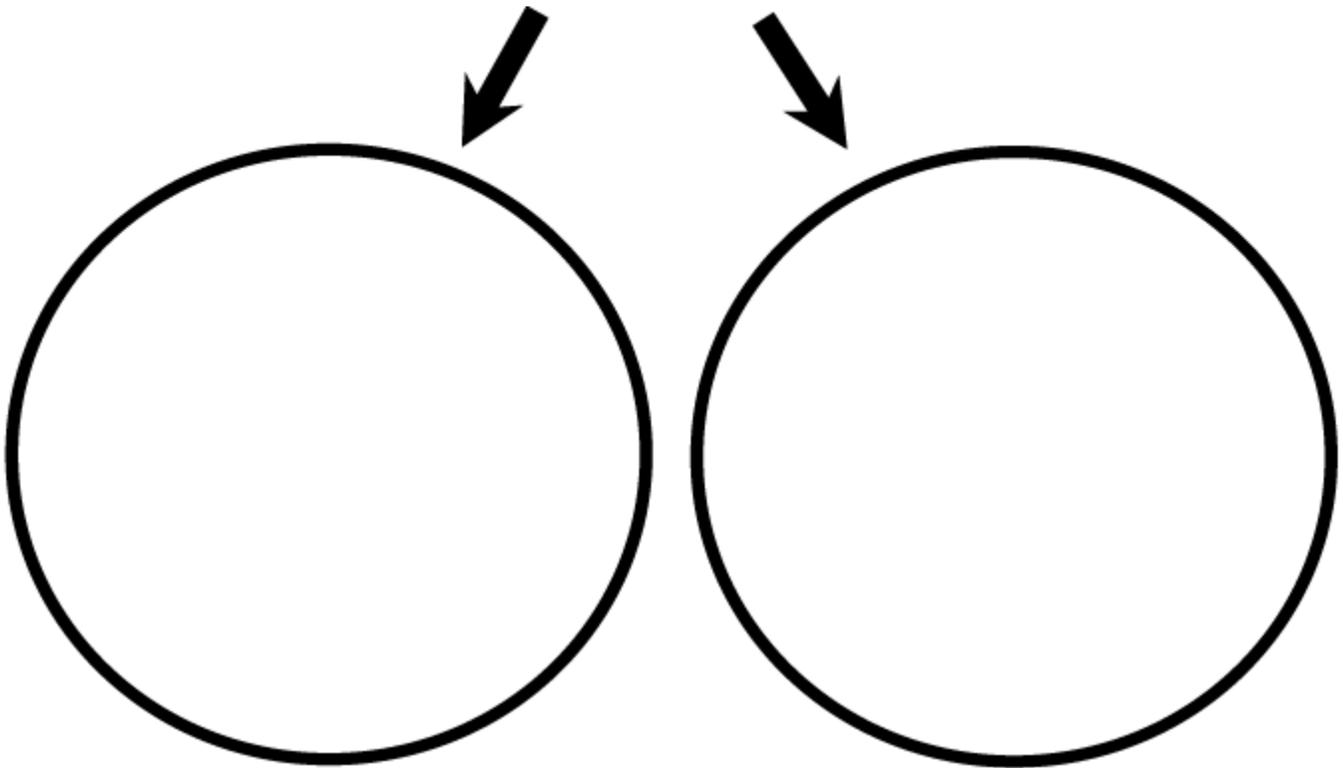


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Sorting and Classifying Worksheet

A. truck	B. yacht	C. car	D. submarine
E. biplane	F. train	G. tugboat	H. ferryboat
I. tractor	J. jet	K. motorcycle	L. jet ski

Directions: Sort these forms of transportation into two groups based on a single characteristic.



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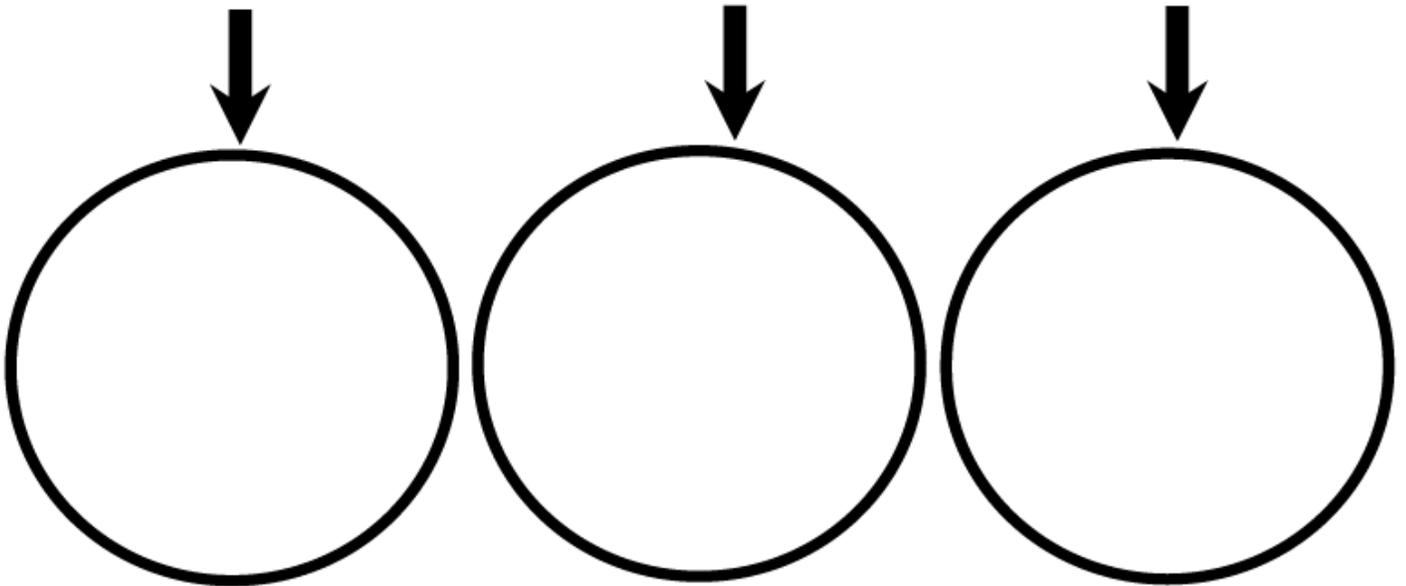
Name _____

Date _____

Sorting and Classifying Worksheet

A. Bear	B. Robin	C. Bobcat	D. Blue Jay
E. Dog	F. Cat	G. Crow	H. Sparrow
I. Deer	J. Bat	K. Gopher	L. Skunk

Directions: Sort these animals into three groups based on a single characteristic.



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Making Predictions

Have students pause and make predictions while reading when appropriate. This thinking skill can also be practiced by providing a few sentences and asking students to predict what will happen or write the ending. For example: Sean woke up exhausted this morning after working late. He looked out the window at the rain and thought about how hungry he was. It was time to get ready for school and Sean..... Have students share their predictions and discuss the different opinions and the logic behind them.

Inferring & Drawing Conclusions

To infer means to draw a conclusion based on evidence. An example of inference exercise: There's a plate of cookies in the kitchen. The only one to enter the kitchen was your dog. The cookies went missing. What do you think happened and why do you think that. Practicing these skills will help students develop their ability to analyze information.

What happened?



Using Inference

Sometimes someone will try to tell you something without coming right out and saying it. He will imply it. When you understand what is implied, you infer. Sometimes you can infer the truth even when the speaker or writer isn't trying to be helpful. That's called "reading between the lines."

See if you can infer an implied or hidden message in each of the following selections.

Turner almost wished that he hadn't listened to the radio. He went to the closet and grabbed his umbrella. He would feel silly carrying it to the bus stop on such a sunny morning.

1. Which probably happened?

- a. Turner realized that he had an unnatural fear of falling radio parts.
- b. Turner had promised himself to do something silly that morning.
- c. Turner had heard a weather forecast that predicted rain.
- d. Turner planned to trade his umbrella for a bus ride.

"Larry, as your boss, I must say it's been very interesting working with you," Miss Valdez said. "However, it seems that our company's needs and your performance style are not well matched. Therefore, it makes me very sad to have to ask you to resign your position effective today."

2. What was Miss Valdez telling Larry?

- a. She would feel really bad if he decided to quit.
- b. He was being fired.
- c. He was getting a raise in pay.
- d. She really enjoyed having him in the office.

No, Honey, I don't want you to spend a lot of money on my birthday present. Just having you for a husband is the only gift I need. In fact, I'll just drive my old rusty bucket of bolts down to the mall and buy myself a little present. And if the poor old car doesn't break down, I'll be back soon.

3. What is the message?

- a. I don't want a gift.
- b. Buy me a new car.
- c. The mall is fun.
- d. I'll carry a bucket for you.

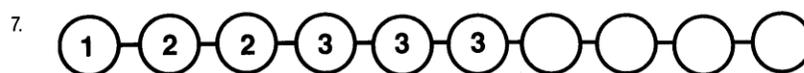
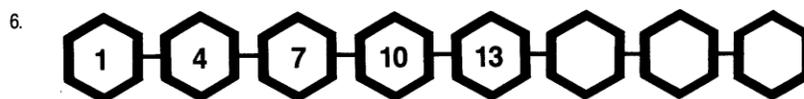
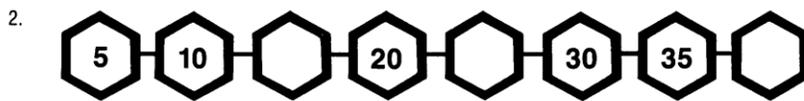
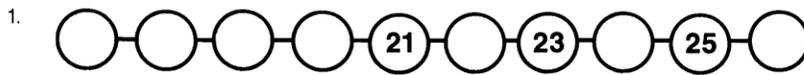
It's also important to help students develop their **mathematical** critical thinking skills. Good problem solving skills and number sense are essential to student success.

Following are examples of critical thinking exercises involving math. These samples are from ***Critical Thinking Activities in Patterns, Imagery, and Logic*** from Dale Seymour Publications. The whole book can be downloaded for free if you google the title or it can be ordered from amazon.com.

NUMBER PATTERNS



Find each pattern. Fill in the missing numbers in the row.



EDUCATED GUESSES

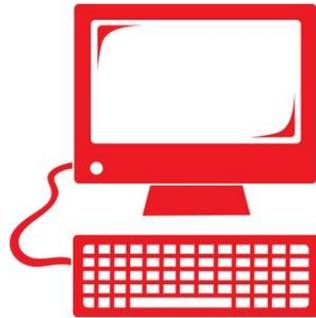


A conjecture is an educated guess. Make a conjecture about each set of equations below.

- Do these: $4 + 2 = \underline{\quad}$ $8 + 6 = \underline{\quad}$ $10 + 22 = \underline{\quad}$
Conjecture: The sum of two even numbers is $\underline{\quad}$. (odd or even)
 - Do these: $7 + 9 = \underline{\quad}$ $61 + 43 = \underline{\quad}$ $25 + 3 = \underline{\quad}$
Conjecture: The sum of two odd numbers is $\underline{\quad}$. (odd or even)
 - Do these: $7 + 8 = \underline{\quad}$ $14 + 19 = \underline{\quad}$ $31 + 40 = \underline{\quad}$
Conjecture: The sum of an odd number and an even number is $\underline{\quad}$. (odd or even)
 - Do these: $12 - 6 = \underline{\quad}$ $26 - 12 = \underline{\quad}$ $64 - 36 = \underline{\quad}$
Conjecture: The difference of two even numbers is $\underline{\quad}$. (odd or even)
 - Do these: $11 - 7 = \underline{\quad}$ $27 - 15 = \underline{\quad}$ $89 - 53 = \underline{\quad}$
Conjecture: The difference of two odd numbers is $\underline{\quad}$. (odd or even)
 - Do these: $9 - 6 = \underline{\quad}$ $24 - 13 = \underline{\quad}$ $55 - 28 = \underline{\quad}$
Conjecture: The difference of an odd number and an even number is $\underline{\quad}$. (odd or even)
 - Do these: $2 \times 6 = \underline{\quad}$ $34 \times 4 = \underline{\quad}$ $16 \times 8 = \underline{\quad}$
Conjecture: The product of two even numbers is $\underline{\quad}$. (odd or even)
 - Do these: $3 \times 3 = \underline{\quad}$ $11 \times 7 = \underline{\quad}$ $25 \times 3 = \underline{\quad}$
Conjecture: The product of two odd numbers is $\underline{\quad}$. (odd or even)
-

- The sum of three even numbers is $\underline{\quad}$. (odd or even)
- The sum of three odd numbers is $\underline{\quad}$. (odd or even)
- The sum of two odd numbers and one even number is $\underline{\quad}$. (odd or even)
- The sum of two even numbers and one odd number is $\underline{\quad}$. (odd or even)
- The product of three even numbers is $\underline{\quad}$. (odd or even)
- The product of three odd numbers is $\underline{\quad}$. (odd or even)

Critical Thinking Website Resources



One of the most useful websites to help teachers incorporate critical thinking skills in their classroom can be found at:

<http://larryferlazzo.edublogs.org/2009/05/25/the-best-resources-for-helping-teachers-use-blooms-taxonomy-in-the-classroom/>

Larry Ferlazzo has put together a list of websites, videos, links, visuals, tutorials and even apps on the topic of Bloom's Taxonomy and developing critical thinking skills in the classroom. You can also access this comprehensive information by googling: Larry Ferlazzo + Best Resources for Helping Teachers Use Bloom's Taxonomy in the Classroom. He has also put together a Best List on many other topics of interest to teachers.

One of the best places to find printable, multi-level student worksheets that focus on developing critical thinking skills is at:

www.educationworld.com

Click onto their Critical Thinking Library