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Using an Infusion Based Approach to Enrich Prescribed and Test-Driven Curricular Practices

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The goal is excellence, always. And engagement in the task is the means to achieve it.
Nancie Atwell (2015 Global Teacher of the Year)

One of the biggest challenges facing gifted education is how to balance the need to provide students with enrichment opportunities within the context of an overly prescribed or required curriculum. The emergence of standards in individual states and the new Common Core State Standards coupled with the almost overpowering influence of standardized testing has had the effect of squeezing highly engaging enrichment activities out of the curriculum. Many teachers have become so accustomed to requirements for "teaching-the-text" and overusing worksheets to grind up standardized test scores that they no longer have the opportunity or, in some cases, the know-how to deviate from prescribed material. Few would argue that standards-driven curriculum is not important; however, research has clearly and unequivocally shown that high engagement enrichment experiences do in fact, contribute to higher achievement scores *and* they also make school more meaningful and enjoyable for students (Dotterer & Lowe, 2011; Greenwood, 1991; Reyes et al., 2012; Wang & Holcombe, 2010).

In this article we present a strategy that teachers can use for achieving some balance between the required curriculum and a way of infusing enrichment activities into standards driven material. Teachers who have used this technique have commented about how it has made them feel more creative about their teaching and more like professionals rather than mere purveyors of other people's material. Some examples of exciting ideas developed by teachers are provided to illustrate how the technique has been used.

Q: How do bakers get the jelly in the jelly doughnut?
A: If you don't know the answer to this question take a look at the picture at the end of this article.

The Schoolwide Enrichment Model (SEM) uses an *infusion-based* approach to make prescribed curricular content more interesting and engaging. We do not criticize nor recommend "throwing out" basic curriculum, current practices, programs, or projects if they are currently producing positive results in *both* achievement and joyful learning. Rather, the SEM strikes a balance between traditional approaches to learning and approaches that promote thinking skills, hands-on learning, and creative productivity on the parts of all students. Our goals are to minimize boredom and "school turn-offs" and to improve achievement and creative productivity

by infusing what we call The Three Es (Enjoyment, Engagement, and Enthusiasm for Learning) into the culture and atmosphere of a school. We can do this by placing an easy-to-use teaching strategy into the tool bags of teachers.

Selection, Injection, and Extension

An Infusion Based Approach simply means that teachers will:

- review and ***select*** highly engaging enrichment-based activities related to particular topics,
- ***inject*** them into the curriculum to make the topics more interesting, and
- provide support and encouragement for individuals and small groups who would like to
- ***extend*** their pursuit of the enrichment activities.

Examples of Infusion Related to Prescribed Curricular Standards

Two Early Childhood teachers in North Carolina collaborated to design a unit steeped in experiential learning that clearly meets the demands of numerous state and National standards.[1] They discovered that infusing The Three Es into the classroom allowed them to *select* highly engaging enrichment activities related to particular topics, *inject* them into the curriculum to make them more interesting, and provide support and encouragement for individuals and small groups who would like to *extend* their pursuit of the enrichment activities. The teachers in this particular unit of study for kindergarten social studies students in general education classes discovered that the Enrichment Triad Model could be infused into their unit of study entitled *Global Explorations: A Multisensory, Multicultural Experience* while meeting the North Carolina Essential Standards, the North Carolina Foundations for Early Learning, as well as the 2014 National Core Arts Standards:

North Carolina Essential Standards – Kindergarten Social Studies

K.C.1 Understand How Individuals Are Similar and Different

- K.C.1.1 Explain similarities in self and others.
- K.C.1.2 Explain the elements of culture (how people speak, how people dress, foods they eat, etc.).

North Carolina Foundations for Early Learning

Developing a Sense of Self with Others

- Recognize, respect, and accept similarities and differences among people, including people with disabilities and those from varying cultures.

[1] We extend our thanks to Kelly Smith and her colleagues at Providence Day School and Gina Terry for sharing this example with us. We also thank Dr. Cindy Gilson for bringing it to our attention.

Social Connections

- Identify, value, and respect similarities and differences between themselves and others (gender, race, special needs, culture, language, history, and family structures).
- Demonstrate awareness of different cultures through exploration of customs and traditions, past and present.

Creative Expression

- Participate in art, music, drama, movement, dance, and other creative experiences.
- Use a variety of materials and activities for sensory experiences, exploration, creative expression, and representation.
- Develop awareness of different musical instruments, rhythms, and tonal patterns.
- Imitate and recall tonal patterns, songs, rhythms, and rhymes.
- Respond through movement and dance to various patterns of beat and rhythm.

Motor Control

- Develop small muscle control and coordination.
- Experiment with hand-help tools that develop strength, control, and dexterity of small muscles (e.g. spoons, paintbrushes, crayons, markers, safety scissors, and a variety of technological tools, with adaptations as needed).
- Increase the ability to move their bodies in space (running, jumping, spinning).

From 2014 National Core Standards

- MU:Cr.1.1PreKa With substantial guidance, explore and experience a variety of music.
- MU:Cr2.1.PREKa With substantial guidance, explore favorite musical ideas (such as movements, vocalizations, or instrumental accompaniments).
- Visual Standards: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.
- VA:Cn11.1.1a Understand that people from different places and times have made art for a variety of reasons.
- Dance DA:Cn11.1.1:a. Watch and/or perform a dance from a different culture and discuss or demonstrate the types of movement danced.

The SEM, and in particular, the Enrichment Triad Model, provided these teachers with the tools that they needed in order to master each of the standards that North Carolina set forth. The students became engaged in the opportunity to explore three different countries during an integrated, month- long unit of study. Three separate classrooms were dedicated to this unit, each focusing on one of three countries—Greece, Brazil, and Japan—and the students spent one week in each. The exploration in each classroom was rich in details of the culture of each country, with a focus on "arts, language, traditions, music, movement, and food" (Smith & Terry, 2014). Each classroom had a combination of small group learning centers where students could explore individual and small group interests, as well as whole class lessons. In addition, prior to their journeys, the children created their own "passports" and "suitcases" and then spent their final days preparing to present what they had learned and discovered, based on their interests, to their parents during a Global Day celebration.

Type I Enrichment

The teachers planned ahead by preparing many Type I activities including: Websites and DVDs showing images, customs, and traditional celebrations (dances) from each country, as well as children's books (both fictional and reference) for students to explore including individual countries, travel, world, global citizenship, among others. Speakers were invited into classrooms, including the music teacher, dance teacher, travel agents, and presenters, who had visited or lived in one of the countries. Globes and maps, instruments and recordings of traditional music, and artifacts from countries for display and student exploration were located in each room. In addition, each classroom had Interest Development Centers that held a wide variety of materials and activities that engaged the students and stimulated their individual curiosities. Students toured these "countries" and carried "I Wonder" charts upon which they could write down their questions and ideas. At the end of each opportunity to be in a "country" classroom, the students gathered together with their charts to talk about what they had experienced during the day's "tour." The teacher would follow up with the students by asking:

- What did you learn about today?
- What did you find exciting or interesting?
- Do you have anything to add to the "I Wonder" chart today?

As the teachers moved from these Type I activities into Type II methodology, they had some important questions to ask themselves, and they needed to keep the standards in mind. During the Type I activities, the students had the opportunity to see and question the differences between themselves and other cultures and begin to dig more deeply into what they had discovered. To engage in Type II Enrichment, the students became active thinkers and the teachers became the trainers, facilitators, and discussion leaders (Maker & Schiever, 2005), what we sometimes refer to as the "guide-on-the-side."

There were some important questions that would help to guide the teachers in this enrichment and enable them to continue to meet the standards. Infusion of Type II Enrichment allowed for the teacher again to meet the standards and to keep students engaged in the work through the infusion based approach.

Type II Enrichment

What prior knowledge should students have to complete this lesson?

- Students will have introductory information about the three countries from Type I activities.
- Students will complete a brainstorming activity with the "I Wonder" chart.

What content or skills will students learn?

- Students will develop skills in the following domains: social, fine motor, gross motor, visual art, musical, aural, spatial awareness, language, writing, emergent reading, creative problem solving, and mathematical.

- Students will gain information in the following content areas: social studies (history, geography, cultural awareness), technology, music, visual art, dance, culinary arts, and foreign language.

How will you model the Type II Enrichment content or skills?

- The teacher will model the appropriate thinking and feeling processes during interactions with students by brainstorming, hypothesizing, making observations, and offering interpretations of data…in a minimal, but guiding way.

Describe any activities related to guided and independent practice.

- Each learning center will have activities with guided practice and completed examples where appropriate.

List at least 3 examples of open-ended questions that you will ask students during the Type II Enrichment.

- Analysis – Compare and contrast elements of each culture: How are the dances similar? How are the languages and alphabet different?
- Evaluation – Assess experiences: What were your favorite/least favorite food samples? What art project did you enjoy the most/least?
- Interpretation – What part of the culture is most like your own?
- Hypothesizing – How do you think your life would be different if you were growing up in one of the other countries?

How will you assess student mastery of the Type II content or skills?

- Students will complete a follow up to the group's "I Wonder" chart entitled "Now I Know" through the process of a brief individual interview.

How will you add closure to your lessons?

- Have students identify and share which Type II process skills were learned and utilized at the end of each day.
- "GLOBAL DAY" will showcase products and activities from Learning Centers.

Once the teachers took the time to infuse Type II Enrichment into the one month integrated unit on different cultures, which would culminate in Global Day, showcasing their accomplishments for an authentic audience, they could see how many standards had been mastered through Type I and Type II activities and how they could utilize Type III enrichment in order to enable students to finish their projects and complete the list of standards that remained.

Type III Enrichment

- What will students do at this stage? Where will they work on their projects?

- What will your role be during this stage?
- How will you assess students' Type III Enrichment?
- How will students share their Type III Enrichment with a real-world audience?

In Type III, the student took on the role of the problem finder, data gatherer, producer, and inquirer and the teacher took on the role of the manager and became a resource for students. As the students dove into Type III Enrichment, the teacher's role turned to helping to "identify and refine student interests, to find an appropriate outlet for their products, to develop a laboratory environment, and to provide pedagogical assistance" (Maker & Schiever, 2005).

As the students geared up to work on refining their interests and discovering the best way to showcase their work, there were specific goals and resources that had to be identified:

At this stage:

- General interests of students must be refined and focused;
- Students must identify a real problem that can be solved;
- Students must apply proper investigative strategies; and,
- Students must be allowed to make their own decisions.

Where will students work on their projects?

- In the classroom;
- In the Outdoor Classroom (particularly if the investigation is related to nature);
- Research can be conducted in the music room if the investigation is related to music; and,
- In the art room, if more resources are necessary.
- *It all depends on where student interests lead and what type of research is necessary* (Smith & Terry, 2014).

Based on areas of interest, possible Type III projects included: presentations, designing a brochure, taking a poll of a favorite food or place, creating an advertisement or TV show, creating an interpretive dance or song, creating a short story or skit from the perspective of a child living in said country, sharing a library or personally-owned book about one of the countries, expanding learning stations to include an area not part of the lesson (such as indigenous animals, unique consumer products, popular sports, famous figures), creating a photo scrapbook of the classmates' experiences as they visit each room, constructing a diorama of a landmark or other scene from a country.

Students were assessed on their "level of readiness and interest in presenting to visitors on Global Day" (Smith & Terry, 2014). In addition, they had opportunities to prepare to showcase their findings to their fellow classmates and teachers, prior to Global Day. On the final day of presentations, those students who participated in Type III Enrichment presented their problem (what they researched), the solution (what they discovered), and their product (what they created) to their audience. Those students who did not complete a Type III product were stationed at various learning centers to provide information about what was located at each. In

this manner, all students, from those who were able to complete a Type III investigation to those who were not, had the opportunity to present, even if at different levels of understanding.

The following less formal but equally demonstrative examples show how an infusion based enrichment approach works in various subject areas.

- An elementary teacher was required to have her students memorize all the states and capitals of U.S. cities. To make the assignment more interesting she gave them an opportunity to select a project that had something to do with this topic and that was related to a personal interest. One group of students interested in music decided to develop a rap song for their state's official anthem. Another group interested in history decided to develop historic site maps, posters, and travel brochures for a state they had visited or would like to visit some day. A third group used state shaped cookie cutters to make an edible map of the U.S. using chocolate bits to designate the locations of each state's capital. This group of students was so enthusiastic that they extended their work by visiting other classrooms, sharing their cookies with other classes, and providing brief historical facts about some of the states.
- A middle grade math teacher had her students develop fictional fantasy baseball cards and analyze the players' statistics to draft and trade players while building their own teams. They drew caricatures of their players and a "Player Wheel" with geometric representations of players' strengths and weaknesses was created and used to play against other students' teams. A regular season schedule was set for the class, ending with a World Series game to decide the classroom champion.
- A high school AP Physics teacher assigned a year-long project that encouraged students to use all of the concepts they covered in his course for addressing a practical problem. The project asked students to apply everything they had learned in Physics. One group decided to
- study the topography of their area by launching a weather balloon carrying a video camera, a GPS tracking device, and various weather data gathering instruments high above the Earth's surface. They recorded the journey, prepared topographical maps, and analyzed data about temperature, air pressure, and humidity. At the end of each unit of study the teacher asked students how the principles and concepts they studied in the unit applied to their project, making learning more relevant and meaningful.
- A middle school social studies teacher covering Ancient Egypt used the GoQuest database to find a site that enabled students to conduct a virtual dissection and preservation of their own mummies. Tools for removing organs, labeling them, placing them in jars and gluing, wrapping and preserving their mummies enabled them to have hands-on experiences that made this topic more meaningful. Material in hypertext familiarized the students with Egyptian language and culture. The excitement of this activity created interest that had far reaching affects on interest and motivation that extended beyond simply covering the material in a textbook.

The Role of Technology in finding Resources for Infusion

This engagement and infusion approach works because teachers have the tools to implant highly engaging material into the standards-based curriculum and to use technology to locate

what we call Just-In-Time Information (J-I-T) that is relevant to their projects – exactly what adult researchers do as they go about the investigative and creative processes. The advent and easy access to the larger world of knowledge has provided opportunities to make formal learning a different process than it was a decade or two ago. Today's young people are digital learners and emerging masters of interactive media technology using cell phones and hand-held devices regularly to access J-I-T information (e.g., movie, bus, and TV schedules, sports scores, restaurants, etc.). Traditional ways of learning, even under the best of circumstances, cannot compete with students who find texting under their desks more engaging than listening to their teachers and professors or memorizing factual material for a forthcoming test.

Another development in technology that will aid infusion is the unlimited amount of information now available through the Internet. Thousands of free course-related materials are easily accessible through organizations such as the Kahn Academy, which has produced more than 4,000 videos on topics across all grade levels and several curricular areas. The Massive Open Online Courses sponsored by some of the best-known universities in the country, including MIT's OpenCourseWare program and Coursera, have produced thousands of courses that can be widely accessed without cost.

Changing the learning process has become a reality due to the unlimited access to the knowledge sources mentioned above. Teachers, however, can also become creative contributors to the resource stockpile and the producers of their own televised lectures, course related material, and media events. Free or inexpensive software now enables teachers to prepare and upload their own lectures and assignments for student use anytime and anywhere through the application of easy-to-use screen casting software (e.g., Camtasia Studio 8, Screenflow Software).

A program called Juno enables easy recording of high-quality audio/video clips without adding any extra work to a teacher's day. The program automatically adds titles and prepares files for uploading that can then be accessed by computers, tablets, smart phones, or interactive white boards. In addition, as mentioned above, content recorded by others is readily available in all subject areas. These resources enable teachers to easily turn their lectures and related lesson planning tools into audio and video podcasts and printed course and video materials that can then be uploaded for student access. We can capitalize on students' fascination and skills with technology and the availability of vast amounts of on-line material by giving teachers the license and ability to infuse creativity and thinking skills activities into standards driven curriculum.

While it is not practical to use infusion for every topic or course, this approach makes learning more engaging and creates an enthusiasm for learning that seldom results from covering curricular material in traditional ways. The guidelines for infusion are easy to follow:

- Select an activity that does not always have a single, predetermined correct answer.
- Find things that students do rather than sit and listen to.
- Give students choices that they will enjoy pursuing.
- Select activities that have various levels of challenge to which interested students can escalate.

Finding activities for infusion is now easier than ever. Internet-based search engines allow teachers to enter topics, subtopics, and sub-subtopics by subject area, grade level, and difficulty level. Thousands of high engagement activities that enable teachers to locate and infuse an almost endless array of exciting enrichment activities can be found with this new technology.

Preparing for the Infusion Process

In the example mentioned above related to learning the names of U.S. states and capitals, teachers used infusion activities in order to engage students' enthusiasm for learning. A traditional brainstorming technique[2] and the Creative Idea Generator presented in Figure 1 were infused into the lesson in order to engage students and to come up with as many ideas as possible for making the teaching of this topic more interesting. Guidelines for brainstorming were briefly discussed (see Appendix A) and teachers were asked to apply as many of the following criteria as possible to the brainstorming process.

1. The activity has a relationship to one or more regular curriculum topics.
2. There is not a single, predetermined correct answer or solution to the problem raised in the activity.
3. The activity consists of something students do rather than sit and listen to.
4. The activity is fun for most students.
5. The activity should lead to some form of product development on the parts of students.
6. The activity has various levels of challenge to which interested students can escalate if they would like to creatively extend the interest through follow-up activity.

Students were then given an opportunity to select an activity that they would like to pursue based on their individual interests and learning styles. Most students chose to work in groups, however a few students preferred to work on their own. Infusion activities cannot only make a traditional, memory-oriented topic more interesting; They can also present opportunities for developing creative, analytic, and investigative learning skills. Students learn cooperative, collaborative, and other executive function skills, strategies for acquiring J-I-T information, and most importantly, that learning is, in and of itself, an enjoyable process.

A Note on Problem Based Learning

Problem Based Learning (PBL) has gained a good deal of attention for making the curriculum for students more engaging. We are strong supporters of this approach to enhancing learning material in the regular (prescribed) curriculum. We do not, however, view it as creating the same experience as is the case with Type III Enrichment in the Triad Model. Generally speaking, and we know there are many variations on the use of PBL, teachers can use it to cover a standard curricular topic (e.g., Westward Expansion in U.S. History or Social Studies). There are expected outcomes that will probably show up on an end-of-unit test and perhaps even on a standardized achievement test. If the PBL approach makes the work more interesting and engaging, then such an approach has merit.

[2] Brainstorming is a group or individual creativity technique by which efforts are made to spontaneously list many ideas for addressing a particular problem. A brief list of Brainstorming tips is presented in Appendix A

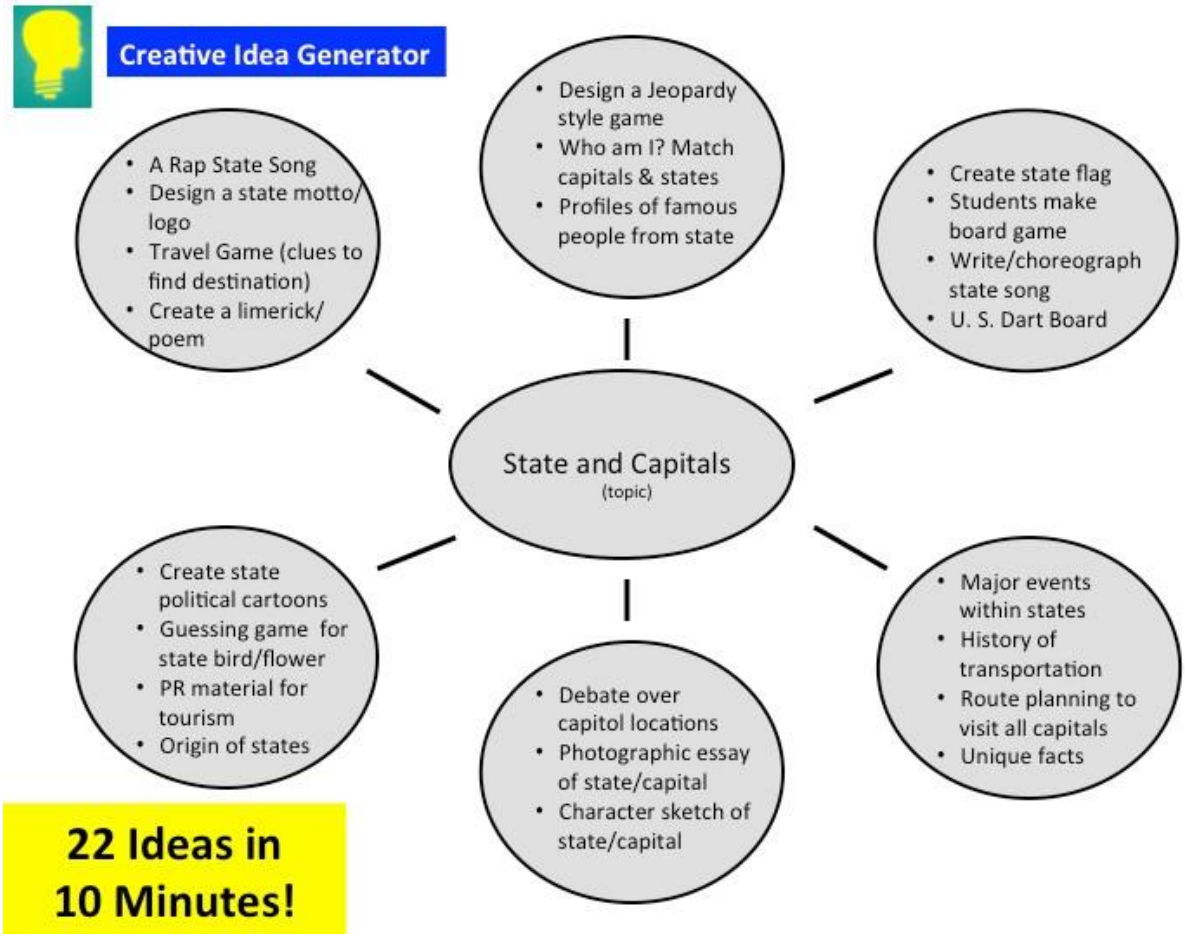

Figure 1. Creative Idea Generator

Type III Enrichment, however, is different because of the four requirements that make the problem more relevant to student interests and the investigative methods that students choose to select and pursue a topic of their own interest and methodology that further personalizes this approach to advanced level investigations or creative endeavors. The four requirements of a *bona fide* Type III Enrichment project are as follows:

1. Personalization of interest (the student(s) selects the topic);
2. Use of authentic methodology (involves some kind of original data gathering or creative expression);
3. No existing solution or "Right" answer; and,
4. Designed to have an impact on an audience other than or in addition to the teacher.

Summary

Someone once asked us what is the "value" of infusing these activities into the curriculum? We answered, "High engagement and involvement activities are remembered long after the facts, or dates, or formulas you learned in fourth period math or social studies are forgotten." An infusion based approach to education and learning allows teachers to find resources within the school, community, classroom, and in the people who reside within the

community that will enable them to *select* highly engaging enrichment based activities related to particular topics, *inject* them into the curriculum to make the topics more interesting, and provide support and encouragement for individuals and small groups who would like to *extend* their pursuit of enrichment activities. The Schoolwide Enrichment Model provides a framework to enrich the learning opportunities for students within a classroom where state standards or the CCSS are present and must be addressed and incorporated into the lessons. By infusing prescribed standards with the richness of what lies beyond the standards or textbook, the academic and creative experiences of students become three dimensional, as they recognize that the world is much bigger, and much more exciting than they could have ever imagined.

We began this article with a quote by Nancie Atwell, the winner of the Global Teacher of the Year Award, considered by many to be the Nobel Prize for educators. We end with her comment at the award ceremony about the importance of infusion.

> Teachers are people who can't imagine doing anything else; it's their passion. If there's nothing else you can ever imagine yourself doing, be a teacher. If you're passionate about *making a difference in this world, be a teacher. A passionate teacher will find ways to infuse creativity and fun into learning, even amid the demands of testing and curriculum. But if the* thought of teaching doesn't light you up—if you think it's just a job—don't go into education. *There are more than enough teachers like that already. Am I trying to discourage my students* from becoming educators? No. But I don't want to encourage someone to pursue a teaching *career if the thought of working with children, teaching from the heart and the intellect, and* making a difference in the lives of others doesn't light them up. No matter how bright a student is, no matter the GPA, we don't need people entering the field who aren't on fire. Because frankly, it's that fi*re that often lights our way when the horizon grows dark and ominous.*

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How Infusion Works





Appendix A
Guidelines for Brainstorming

1. Introduce the question to be brainstormed and review the rules of brainstorming:

    - All ideas are welcome;
    - No comments criticism or evaluation during the brainstorm;
    - The more ideas the better;
    - Don't worry about duplicate ideas at this point; and,
    - Piggybacking on each other's ideas is encouraged.

2. Explain what will be done with the brainstormed ideas. Write the question to be brainstormed at the top of the first page of flipchart paper.

3. If you wish, offer a one-minute "quiet period" before the brainstorm for people to think about the question and jot down a few ideas.

4. Begin the brainstorming:

    - Guide the brainstorm by recording ideas on a flipchart or whiteboard as they come. You may wish to designate a recorder. Stop any comments that evaluate ideas. Invite new ideas, and encourage the group to share their ideas freely. Help generate energy and free thinking through encouragement.
    - As the responses slow down, offer last chances for additional ideas, then stop the brainstorm. Ask the recorder for his or her ideas. Thank people for participating.

5. Ask for clarification of any ideas that are not clear to you or others.

6. Discuss ways that the ideas can be presented to students in appealing ways (e.g., dramatizations, role playing, artistic or pictorial representations, debates, games, friendly competitions, storytelling, digital graphics, 3-D printing, film making, Facebook or Twitter exchanges, community service projects, entrepreneurial endeavors, etc.).