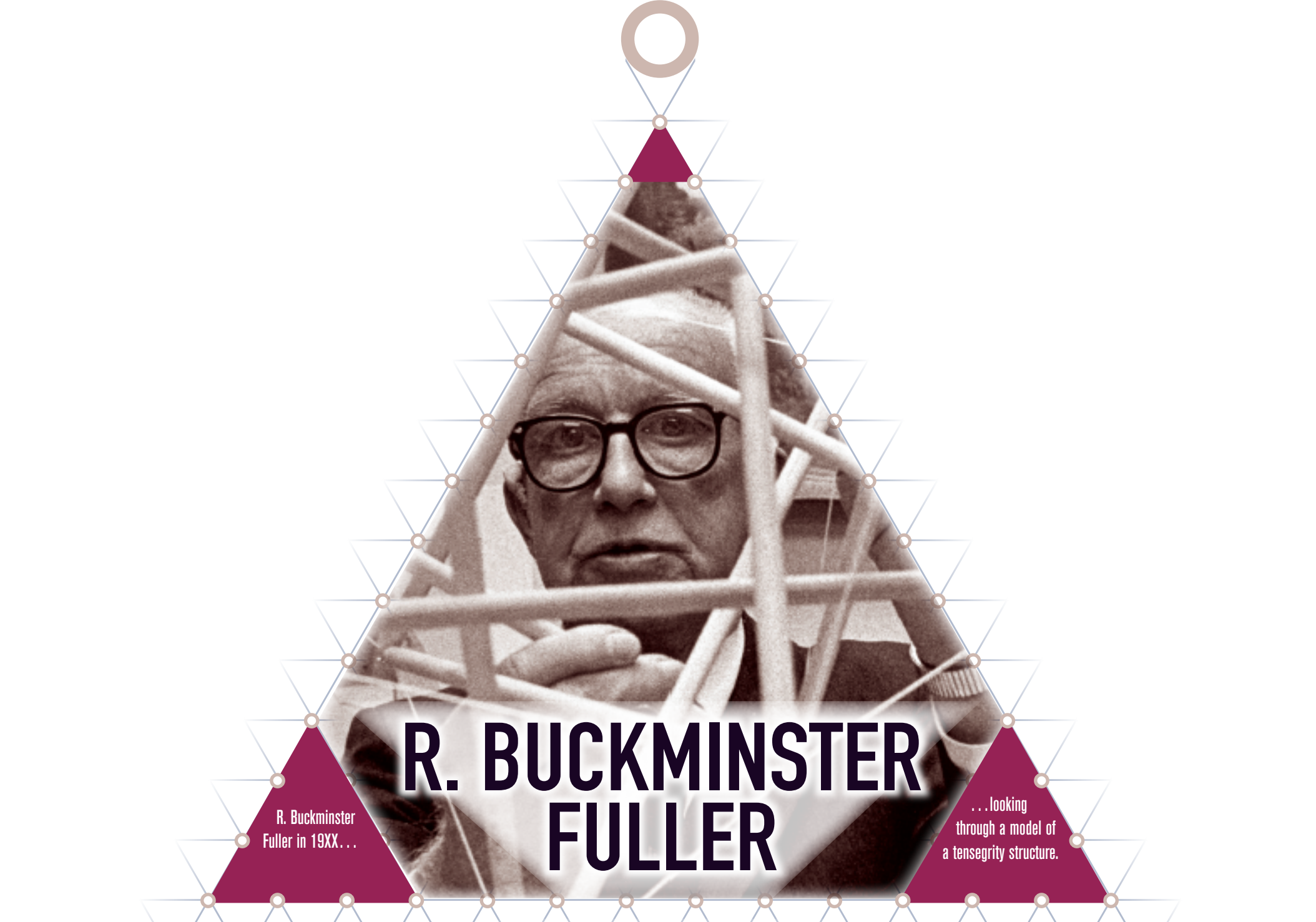

R. BUCKMINSTER FULLER
R. Buckminster Fuller in 19XX. . .
. . . looking through a model of a tensegrity structure.

Spaceship Earth

Materials: *paper and electronic reference materials, "The Lorax" by Dr. Seuss, toothpicks, gumdrops, newspapers, masking tape, straws, paper clips, "From a Distance" by Bette Midler, cassette or CD player, writing paper, envelopes, stamps*

SET INDUCTION

Literature Connection: Read "The Lorax," by Dr. Seuss. Discuss how the characters befoul their environment. What are the long-term repercussions of their actions? This could happen to our planet, too, if we don't work together to take care of our natural resources. By the end of this lesson, you will be able to describe which energy sources are earth-friendly. You will also build earth-friendly shelters.

Background Information: R. Buckminster Fuller's lifelong goal was to solve the world's problems by using technology to provide a quality lifestyle with minimal use of natural resources. Mr. Fuller believed that an accurate map of the world could be used to solve the world's population, pollution, and energy problems. So, he invented the Dymaxion Air-Ocean World Map by creating a mosaic of hundreds of satellite pictures to accurately represent the entire planet. Then he organized "World Game" activities to increase people's cooperative efforts to use the world's resources wisely. Mr. Fuller invented the term "Spaceship Earth" to encapsulate his vision of humanity working together to solve world problems. At this point, play "From a Distance" by Bette Midler. How do the lyrics of this song support Fuller's vision?

RENEWABLE RESOURCES

3 Brainstorm a list of natural resources. People deplete and pollute many of these resources in their quest to produce more energy. Which resources are used to produce energy? Which energy forms are earth-friendly?

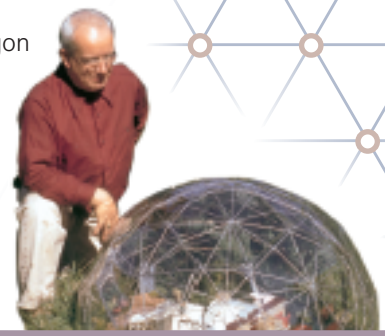
2 Fuller advocated renewable energy sources. Divide students into teams to research the advantages and disadvantages of using renewable energy sources to produce earth-friendly energy (i.e. solar power, water, wind, corn). Each team prepares an argument in favor of one earth-friendly energy source. Pair off the teams to conduct mini-debates. Then, have each team research a different energy source and repeat the mini-debate process two or more times. Finally, conduct a whole-class informal debate on which earth-friendly energy source is the best.

2 Students write persuasive letters comparing alternative energy sources and concluding which form is the best. Post these in the hallway or get permission to mail these letters to the editor of the local newspaper.

DOME OF THE BRAVE

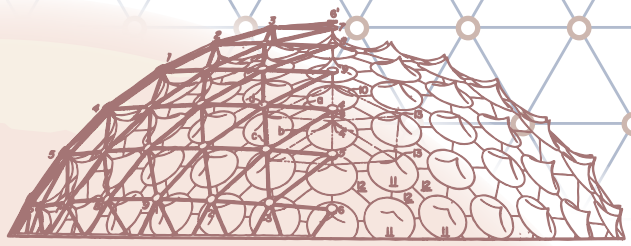
Background Information: This year marks the 50th anniversary of Mr. Fuller's most famous invention, the geodesic dome. These domes are made by dividing a sphere with equilateral triangles of various sizes; the more triangles that are used, the smoother the curve. Geodesic is Latin for "earth dividing". Geodesic domes enclose huge spaces without supporting columns, so they require less building materials and labor. Because of interior air currents, they are energy efficient. These domes can withstand earthquakes and winds up to 180 miles per hour! Because geodesic domes are so durable and energy efficient, Mr. Fuller proposed building giant domes, or megastructures, over entire land-based and underwater cities! Now there are over 300,000 geodesic domes throughout the world serving as homes, shelters, public structures (Ford Motor Company headquarters and Walt Disney World's Epcot Center), and radomes for radar equipment in Arctic regions.

Background Information: Construct geodesic domes. First, create a dodecagon, a 12-sided polygon with congruent segments and congruent angles. Interconnect equilateral triangles of various sizes until a dome shape is achieved. To create small domes, use toothpicks and gumdrops. Medium-sized domes can be constructed using straws and paperclips. Clubhouse-sized domes can be created using rolled up newspaper rods and masking tape.



see http://www.pbs.org/wgbh/buildingbig/educator/act_straw_ei.html

Mission to Mars



Materials: *reference materials, computer with Internet access, writing paper, construction materials, rocks, small box, shipping label, postage*

SET INDUCTION

Quickwrite: Do you think there is intelligent life somewhere else in the universe? Why or why not? Write, pair share, then volunteers share with the class.

Transition: R. Buckminster Fuller devoted his life to using technology to solve this world's problems. How would his inventions work on Mars? Invite students to share what they have heard about the Mars Rover program. President George W. Bush wants a team of scientists to visit Mars to conduct more research. During the next few days, we are going to pretend that you have been selected to be one of the scientists on that team. Your scientific mission will be to discover if there was ever any life on Mars. Your personal mission will be to survive the hostile Martian environment!

EXPLORING THE MARTIAN ENVIRONMENT

1 What is the Martian environment like? Create a K-W-L chart. In the "K" column, list facts students think they already Know about the environment on Mars. In the "W" column, list questions that students Want to answer. Then, conduct research about the red planet. At the end of each research segment, reconvene as an entire class to share newly-learned information. Write a star by accurate facts in the "K" column; cross off inaccurate information. Read questions in the "W" column. Write the answers to those questions in the "L" column to record what they have Learned. Add more questions to the "W" column to provide a purpose for additional research. Outstanding Internet resources include:

http://marsrovers.jpl.nasa.gov/home/ (Rover mission updates)
http://marsprogram.jpl.nasa.gov/funzone_flash.html
http://marsprogram.jpl.nasa.gov/classroom/resources.html (free teacher resources)

2 Brainstorm what humans need to survive on Mars. Which of these items is already in place? Which resources would need to be transported from Earth? How can students transport the people and supplies they'll need?

CREATING A COMMUNITY

1 Form teams of NASA "scientists". Each team designs an environment in which they can live when they are conducting further research on Mars. They should incorporate what they have learned about R. Buckminster Fuller's inventions and interests (i.e. dymaxion houses and vehicles, geodesic domes, renewable energy sources). Determine the best site for constructing the community. Make a "dymaxion" map of that location. Create models or dioramas of their scientific communities.

2 As students create their communities, have each team keep a log of questions, problems, and solutions, just as Christopher Columbus, Lewis and Clark, and Captain Kirk did during their explorations.

3 Have a share fair for classmates, other classes, and parents to share their model communities and learning experiences.

ROCK ON

NASA scientists want to learn more about the rocks on Earth to help them learn more about the rocks on Mars. Students are invited to send in rocks from their hometowns. NASA will post pictures of the rocks on the web, and send students a rock analysis, certificate, and Mars sticker for their contribution. This special rock collection will be available for study by world scientists. To participate in this exciting educational event, please access the directions and mailing address on this website:

http://marsrovers.jpl.nasa.gov/classroom/schoolhouse/

Sometimes I think we're alone. Sometimes I think we're not. In either case, the thought is staggering.

R. Buckminster Fuller

For further information on R. Buckminster Fuller, go to www.bfi.org

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