**PLEASE DO NOT FEEL THAT YOU HAVE TO USE ALL OF THESE IDEAS IN YOUR LESSONS. MY SUGGESTION IS TO SPEND ABOUT 5 MINUTES OF YOUR LESSON TIME ON EHV IN 2 LESSONS PER DAY TO START WITH, AND GRADUALLY BUILD UP. THIS WILL ALLOW YOU TIME TO CATCH UP WITH THE CONTENT THAT HAS TO BE COVERED.**

**Surface area of solid shapes**

Suggestion 1: A values message that can be discussed with students

Rectangles, squares, circles etc. are 2-dimensional shapes. When a third dimension, ie depth (height) is added to this they become 3-dimensional shapes.

In life everything important needs 3 dimensions to be complete:

- A block of land does not make a home because it is only 2-dimensional. To have a home we need something to be built upward, ie 3-dimensional. But a further dimension is still needed to make a house a home. A house is not a home less we have money, hard work and love. Love is the most important aspect that makes a home sweet home.
- Similarly we don't want ourselves to be only 2-dimensional. For example, we should not be 2-dimenional in our thoughts (ie ME and MY FAMILY. We should learn to think more widely. Our love should not be restricted to "myself and my family". We should learn to expand our love to the entire cosmos. Believe me, you will get back equal amounts of love. Every action has an equal and opposite reaction. You can only do that when you have depth of character and think in all dimensions.

Idea contributed by Mrs Sadhne Gulati, Sathya Sai School of Delhi

**Suggestion 2: Silent sitting to achieve the dual purpose of understanding the properties of the pyramid and thinking about a values message**

**p.44 The pyramid**

Show some pictures of pyramids made from blocks, such as the pyramids in Egypt. Then use the following silent sitting story (in English or translated into Tamil, depending on your medium of instruction and the students' language skills) to tell the history of the Egyptian pyramids and the following information about their significance:

Close your eyes and imagine that you are inside a pyramid. Imagine the base. What is its shape? How many angles does it have? What kind of angles are they? Now imagine each side. How many are there? What is their shape? Imagine the pyramid opened out flat. If you need to find the areas of these shapes, what formulae will you need to know.

A pyramid is extremely stable even during its building. No earthquake can destroy it. Repairs to parts already built are seldom required and the builder can work efficiently on the construction of the pyramid. Take a moment to imagine yourself as a pyramid, so strong and stable that nothing can upset you.

The pyramid represents the sense of harmony and unity within ourselves and with our environment. The individual building blocks of the pyramid are lessons we have already

successfully completed about ourselves. Take a moment to think about some of the things you have already learned about yourself. … Now think about the things that you would still like to improve about yourself…. As soon as the top of our pyramid has been built to the necessary height we can then be in harmony with ourselves and our environment. Now take a moment to think about how it will feel when you are in full harmony with yourself and your environment. When you are ready, open your eyes and bring your full attention into the classroom to continue the lesson about the pyramid.

<u>The following is some more optional information that you can give about the pyramid if you have</u> time

- The pyramid is only complete when all the building blocks are in place. For the achievement of lasting harmony a person must successfully complete all the lessons of human development. No single lesson can be avoided, otherwise at the end certain abilities for living the basic rights of existence would be missing.
- When building a pyramid a certain sensible sequence of events must be maintained. The large stones can only be placed at the bottom. The foundation must be built before the top.
- Also in the case of human beings a certain sequence of events must be maintained. If someone overtaxes himself with tasks (for example trying to build the top before the foundation) or if he doesn't try hard enough (for example only ever working on the foundation of the pyramid) he will not develop further.
- If defects are found in the part of the pyramid, which has already been built (for example if stones fall out), these defects will sooner or later have to be repaired. According to the type and extent of the defects it may also be necessary to first remove stones above or beside the defective ones in order to repair them. In extreme cases it may even be necessary to remove all the stones above the defective ones. To prevent further damage the defect will possibly have to be repaired before building upwards can continue again. Similarly, if we don't learn from our lessons in life, the lessons will be repeated over and over until we do learn.
- A pyramid does not build itself. Whoever wants to build a pyramid must really want to do it and of course he must also do it. Just to speak about it or to draw plans is not sufficient! If a person wants to develop further he must want this for himself and then actually carry it out for himself. It does not happen automatically.
- The building of a pyramid requires a lot of time and patience. Often the building can take several generations depending on the size of the structure.
- The pyramids of Egypt were chosen because they are an outer symbolism of man's inner quest. The spirituality of ancient Egypt was concerned with people seeking the Divine within themselves.

**<u>Example 3: Another example of silent sitting</u>**

**p.53 Sphere**

The purpose of this silent sitting is to be aware of the properties of a sphere and to think about how this shape can be used to help us to achieve the kind of inner peace that is not disturbed by whatever goes on around us in our lives

We use the idea put forward by a number of experienced psychologists (described by Phyllis Krystal in her video series *Cutting the Ties that Bind)*, of enclosing hyperactive children in a golden circle that helps them to define their boundaries, but extended the idea to a golden ball that enclosed them completely. The golden colour represents security and purity.

> Imagine that you are inside a golden ball. You are floating around in the ball, very safe and happy. The other children are in their balls too. Sometimes you bump gently against each other but you are inside your own ball and nobody else can come in. Your golden ball is your own special space where you can go whenever you like.

**Example 4: Some values messages about the sphere**

While talking about spheres it is relevant to include Pythagoras' (Greek mathematician, b. c. 580 BC, Samos, Ionia--d. c. 500, Metapontum, Lucania) famous theory about Harmony of the Spheres. Pythagoras and his followers were the first scientists to consider the Earth as a sphere, revolving with other spheres (ie the other planets) around another sphere (the sun). They explained that these spheres are all moving harmoniously with each other according to a numerical scheme. They suggested that there is a connection between the distances from the Earth to other spheres (other planets, the moon, the sun) that correspond to intervals in music that create musical harmony. Based on this theory they proposed that the harmony of the spheres in the universe may actually create music, even though it is not possible for us to hear this music with the human ear. The composer Johannes Kepler used the concept of the music of the spheres in his *Harmonice Mundi Harmony of the Worlds* in 1619.

In China people use harmony spheres (spheres that make harmonious tones as they are held in the hand and moved around) as a means of reducing stress and bringing about their own inner harmony. We need to talk to children about this concept of harmony in the universe and the importance of developing our own inner harmony. In the case of the Harmony of the Spheres in the Universe and the harmony in music, if something gets out of balance the result is unpleasant – similarly if we lose our own inner harmony the result is unpleasant for ourselves and for others around us.

Ask the students to suggest some things they can do in their daily lives to remain in harmony with themselves.

Bubbles: Bring some bubble-blowing sets into the classroom for students to experiment with. If we blow bubbles with a round frame we will get a sphere. What shape do you expect to get if you use a square frame? Will it be a cube? Pupils can try this to test their predictions. Why is the bubble still in the shape

of a sphere? (Because the bubble always forms the shape with the smallest surface area, ie the sphere.) **Note that this is a chance to introduce that the sphere has the smallest surface area of all solid shapes.**

What can we learn about life from observing these spherical bubbles? Investigate what happens when two bubbles meet. (They form a common wall). How is this like people? (Whenever we meet other people we form a common "wall". This wall might last for a short time with some people and a long time with others. Like the bubbles, we are still ourselves but part of us becomes part of the other person – we become one with the other person. Imagine what would happen if one bubble was able to join with every other bubble in the world at the same time, so that they all formed one big shape. (This could be the focus of a silent sitting visualization.) Imagine how it would be if we were able to form a common wall with every other person in the world at the same time, so we could all be one. How would this affect things like wars and disagreements?

[Ideas about the mathematics of bubbles from Nexus, Australian Television, 27/4/08]

**Example 5**

**Change the problem: One of the easiest ways to bring values messages into topics is to change the textbook problems. The new problems can be written on the board or shown on PPT or a worksheet. Once you have prepared them, you can use them over and over each time you teach this chapter.**

**Exercise 4.3 in the textbook:**

Imagine that you are going to make your own sphere as a safe place to retreat to. Decide what the diameter of the sphere will need to be so that you are comfortable inside it. [This means that the students will need to select a radius for their sphere that will accommodate their heights. Different students might have different radii.] Calculate how much gold cloth you will need to make your sphere. [Because different students will have different radii, they will get different answers. This will give you an opportunity to find that the formula works whatever the radius is.