

The Purpose of B*E*S*T

We live in a fantastic technological age. We have more power and luxury at our disposal than any kings of old could imagine. At the touch of a button, we turn darkness into light. Our homes are comfortable, no matter what the weather. The world's greatest musicians and actors perform for us. We can instantly talk to anyone, no matter how far distant. And we can travel, faster than the fastest animal, wherever we wish to go.

It's all done through science and technology. But most of us have no idea how it all works. Isaac Asimov said, "Any sufficiently advanced technology is indistinguishable from magic." But that's a problem. If we treat technology as magic, it becomes mysterious, inscrutable, enigmatic; not understandable. And what is not understood, is misused. We can't fix it, we can't improve it, and we make serious mistakes in using it.

When I was a kid, I could take apart an old alarm clock, and see the gears. I could watch them move, and come to understand how it worked. I could fix a broken radio, by testing the tubes at the drugstore and plugging in replacements. I could fix my bike, with nothing but a screwdriver and a crescent wrench. I learned to pound a nail, and saw a board, and build my own tree house.

This direct hands-on learning-by-doing is what science is all about. It de-mystifies technology. It's no longer magic once you know how it works. You learn the power of critical thinking; that there are simple logical rules, and if you apply them correctly, things work. And, you develop the tool-using skills to actually build what you can imagine.

Kids like me grew up to be the scientists and engineers of today. We learned how things worked at a deep, fundamental level, and so could go on to fix, improve, design, and build still more wonderful devices.

Today's children live in a far different world. They can't learn anything about how a clock, or radio, or computer work by taking them apart. They can't fix a bike without a dozen specialized tools. It's likely that they have never touched a hammer or saw. And, they don't learn critical thinking; school generally teaches that correct answers come from an authority figure or from a book -- not from your own experiments or experience. Thus, they too often view science as fantasy, and technology as magic.

Today's children are the scientists and engineers of tomorrow. They face some monstrous problems; overpopulation, pollution, dwindling natural resources, deadly new diseases, climate changes, wars, starvation, etc. I believe it is vital to give them every opportunity to truly understand the science and technology that they will so vitally need to solve these problems.

Lee Hart

The B*E*S*T Philosophy

1. Learn by doing

- "I hear, I forget. I see, I remember. I do, I learn!" (Chinese proverb)
- Don't do it for them; demonstrate, but then take it apart so they can do it for themselves.
- Force yourself to shut up and watch when the student does something wrong. They are learning consequences.

2. Learn from mistakes

- The best lessons often come from mistakes.
- The earlier the mistake, the less serious the consequences.
- Let them fail, but encourage them to keep trying.
- The "win" after a string of failures is the one that is the most remembered.
- Nobody gets it right the first time!

3. Organize yourself

- Don't depend on outside forces (teachers, adults).
- Students will be allowed to fail if they don't try!

4. Think for yourself

- Correct answers don't just come from books or authority figures; you can discover them for yourself.

5. Be creative

- There are no right or wrong ways to build these cars; only what works.
- There are no authorities. Nobody knows the 'best' way to do it.
- Adults usually apply tried-and-tested solutions; kids don't know any solutions, so they have to invent them. That's what we want! Don't give them your solutions. Adults are frequently surprised by what actually works.

6. Tell or show them how, but don't tell give them the answer.

- The best answer is, "I don't know. How can we find out?"
- If they are stuck, give them several answers to choose between.

7. Use recycled materials

- Tom Edison said, "All you need to be a great inventor is a good imagination and a big pile of junk."
- Encourage them to throw something together quickly and cheaply to test ideas; build a more durable version only if the experiment works.

8. Keep it safe

- They are working with real tools, not toys.
- Use safety glasses.
- Supervise use of any power tools and cutting tools.
- Accidents happen, but structure things to keep them minor.