

Temple Grandin

PhD

Professor of Animal Science
Colorado State University

- Proponent for autism rights and neurodiversity movements, as well as the humane treatment of livestock with over 60 papers on animal behavior
- Was included in the annual list of Time's 100 most influential people in the world in 2010
- One of the first individuals to publicly disclose her autism diagnosis, helping to break stigmas and pave the way for others diagnosed on the spectrum and their families



**The World Needs
All the Different
Types of Minds**

Temple Grandin

PhD

Disclosures

- Dr. Temple Grandin has no relevant financial or non-financial relationships to disclose



**The World Needs
All the Different
Types of Minds**

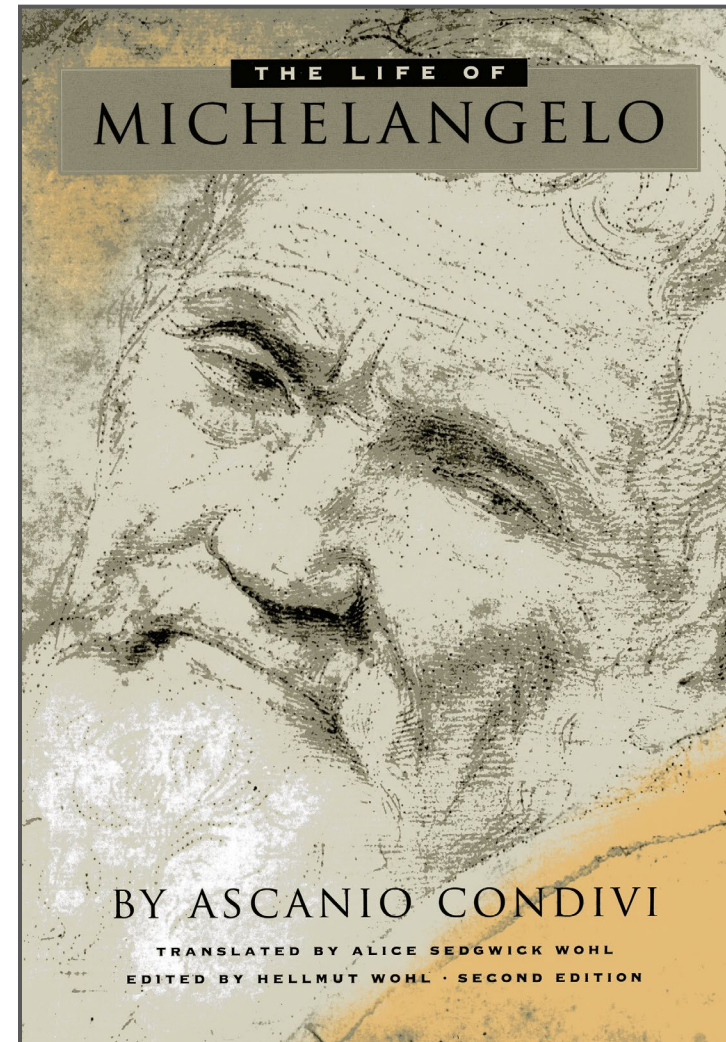
Learning Objectives

- Be able to list 4 types of thinking
- List at least 4 school classes that can promote creativity and problem-solving
- State the differences between math thinkers and visual thinkers
- List strategies for effectively working with minds that are different
- Be able to describe characteristics of the brain's visual thinking circuit that are associated with autism

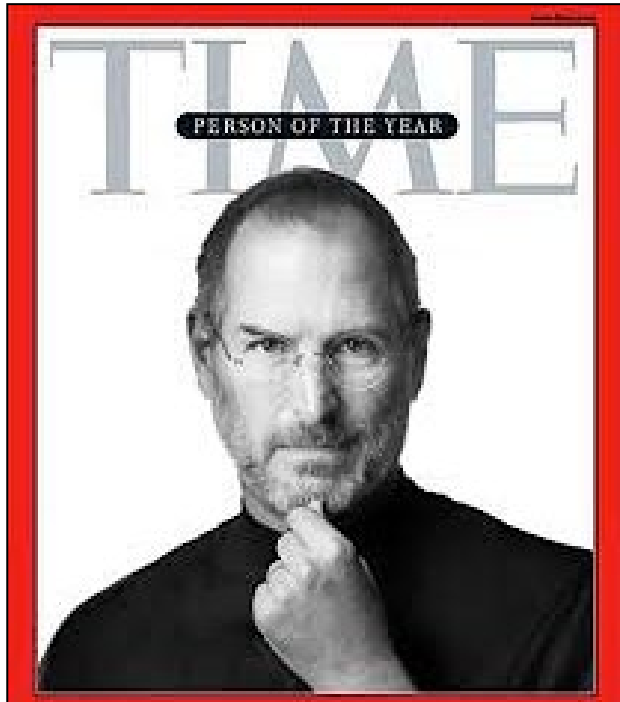
The World Needs All the Different Kinds of Minds

Temple Grandin,
Professor of Animal
Science

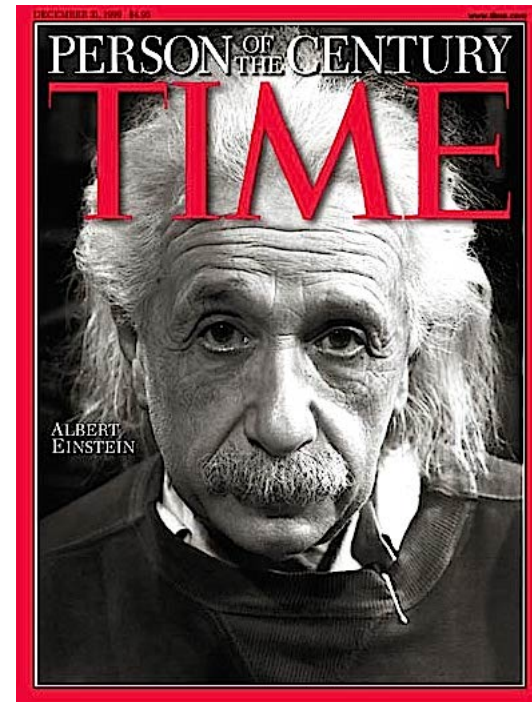
Colorado State
University



These Innovators Had Creative Hobbies

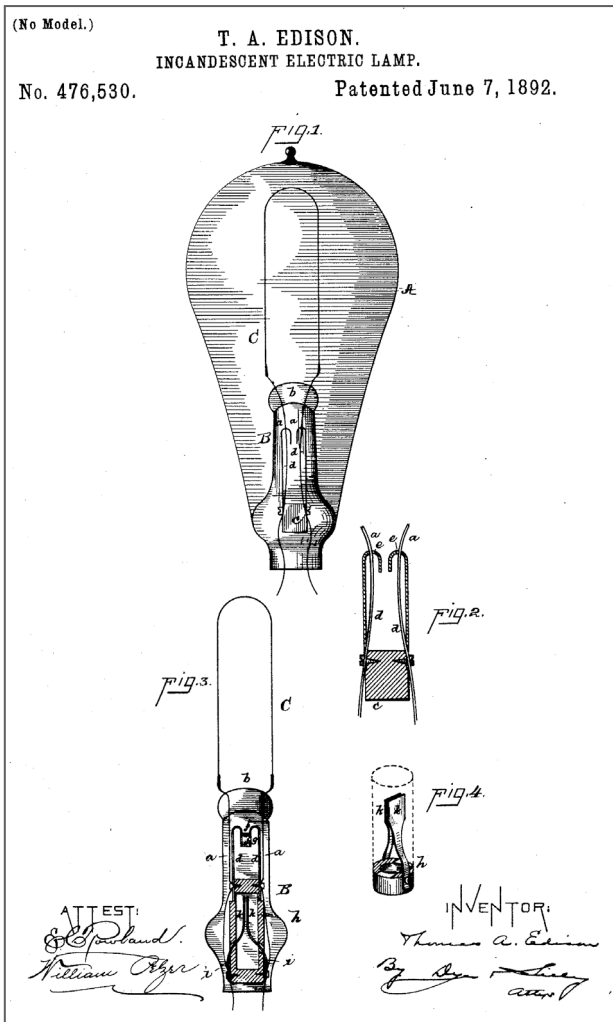


Bullied in school
Learned calligraphy



No speech until age 3
Played the violin

Thomas Edison



- Labeled addled by a teacher
- Hyperactive High School drop out
- Probably had autism

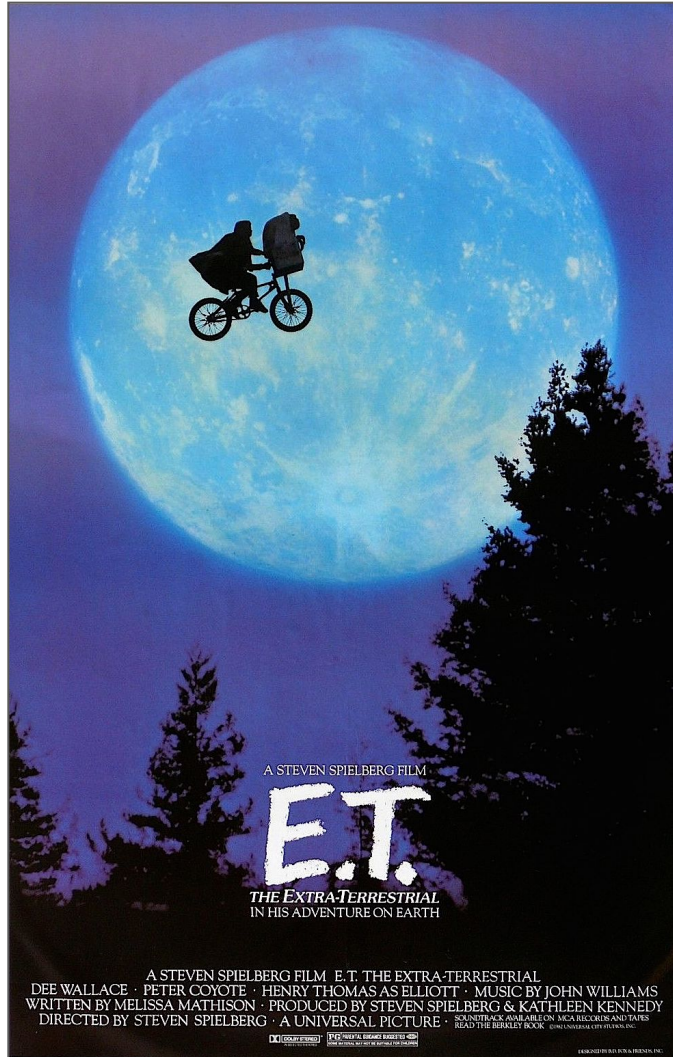
Jane Goodall



Credit Jane
Goodall Institute

- Had a two-year secretarial degree
- Obtained her Ph.D. without a Bachelor's Degree
- Difficulty remembering faces
- Loved solitude in the trees

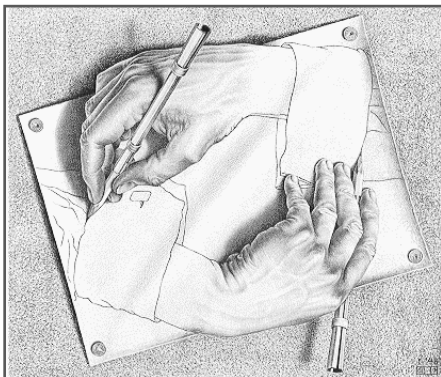
Stephen Spielberg



- Rejected from a top film school due to poor grades
- Bullied in school
- Dyslexic
- Childhood Super 8 Movie Camera

Four Different Types of Thinking

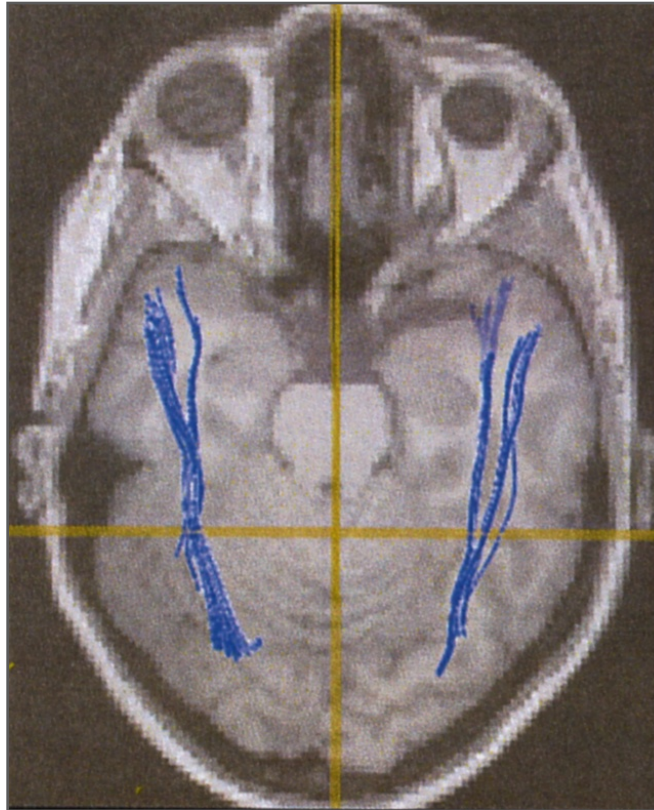
1. Photo Realistic Visual Thinking **Object Visualizer** – Poor at algebra
2. Pattern Thinker **Visual Spatial** Music and Math – Poor in reading
3. Verbal Facts Language Translation – Poor at drawing
4. Auditory Thinker – Visual perception fragmented



There can be mixtures of these thinking types

Brain Scans of Large Visual Thinking Circuit

Control



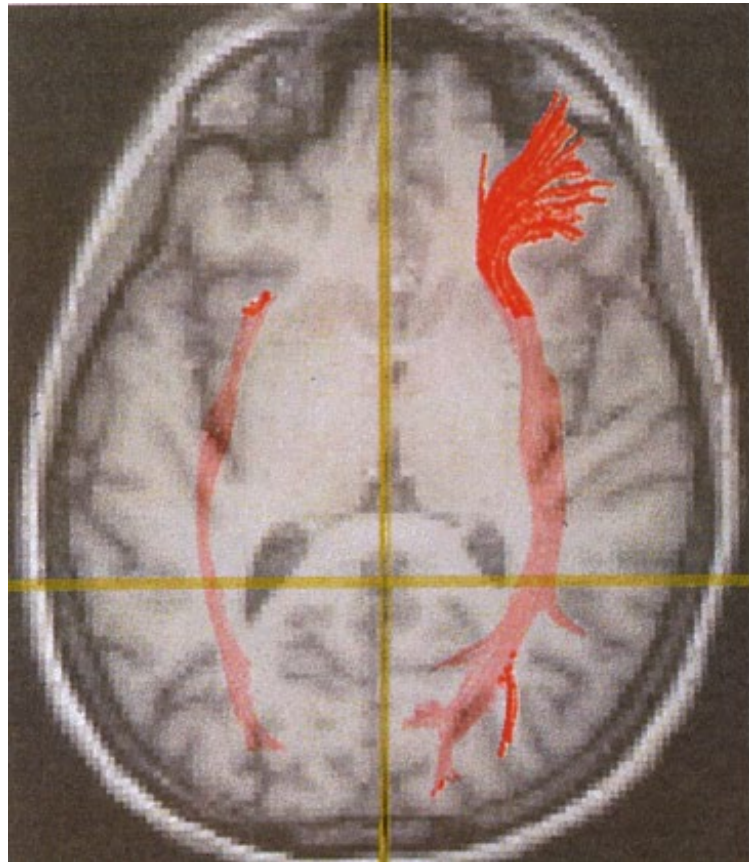
T. Grandin



Humphreys, Minshew, Behrmann, and Cibu, 2006

Brain Scans

T. Grandin

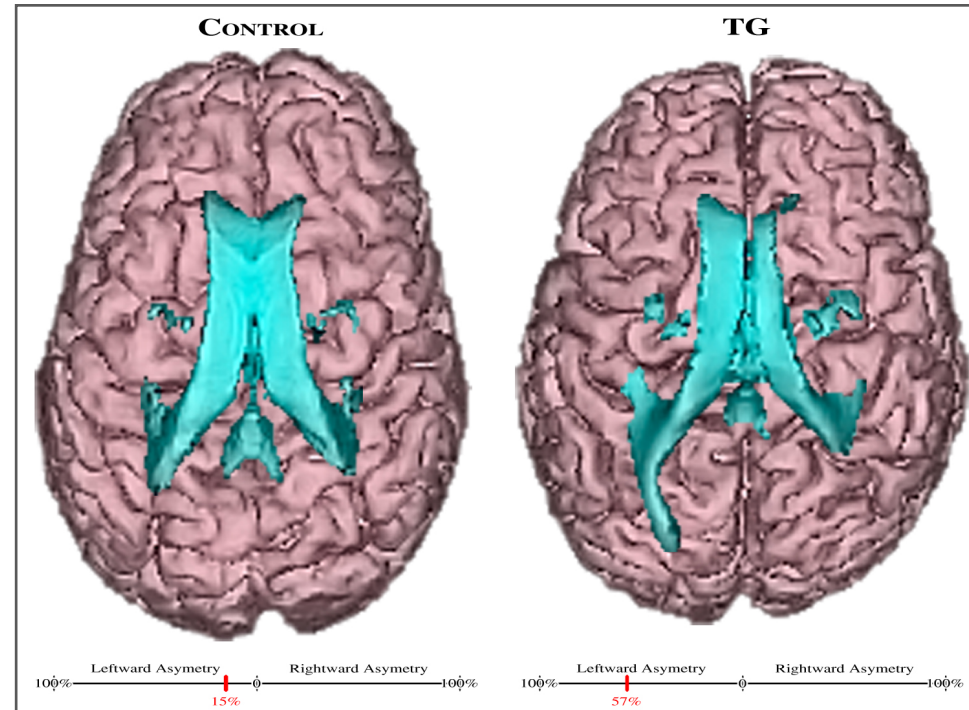


Control



Humphreys, Minshew, Behrmann, and Cibu, 2006

Abnormalities in Left Hemisphere



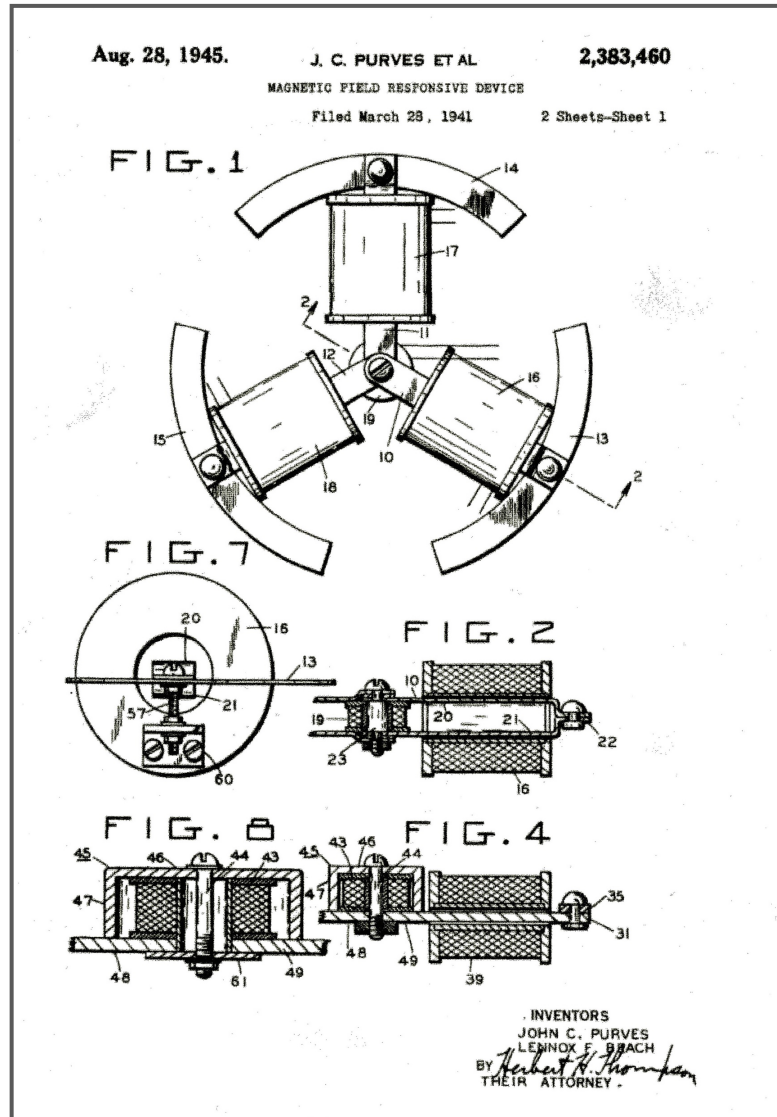
Working Memory and Algebra Department
Failed to Develop

University of Utah, 2010

How to Determine Types of Thinkers in Children

- ❑ **Visual Thinker** – Art, building things, and mechanical ability
- ❑ **Math Thinker** – Mathematics, building things, computer programming, music
- ❑ **Verbal Thinker** – Love facts, history

Grandfather Co-Invents Auto Pilot



Different Kinds of Minds Complemented Each Other

- Visual Thinker
- Mathematical Engineer

Schools Need to Keep Classes that Foster Creativity and Problem Solving

- Art, sewing, cooking
- Playing musical instruments
- Woodworking
- Theater
- Welding
- Auto Shop
- Creative writing

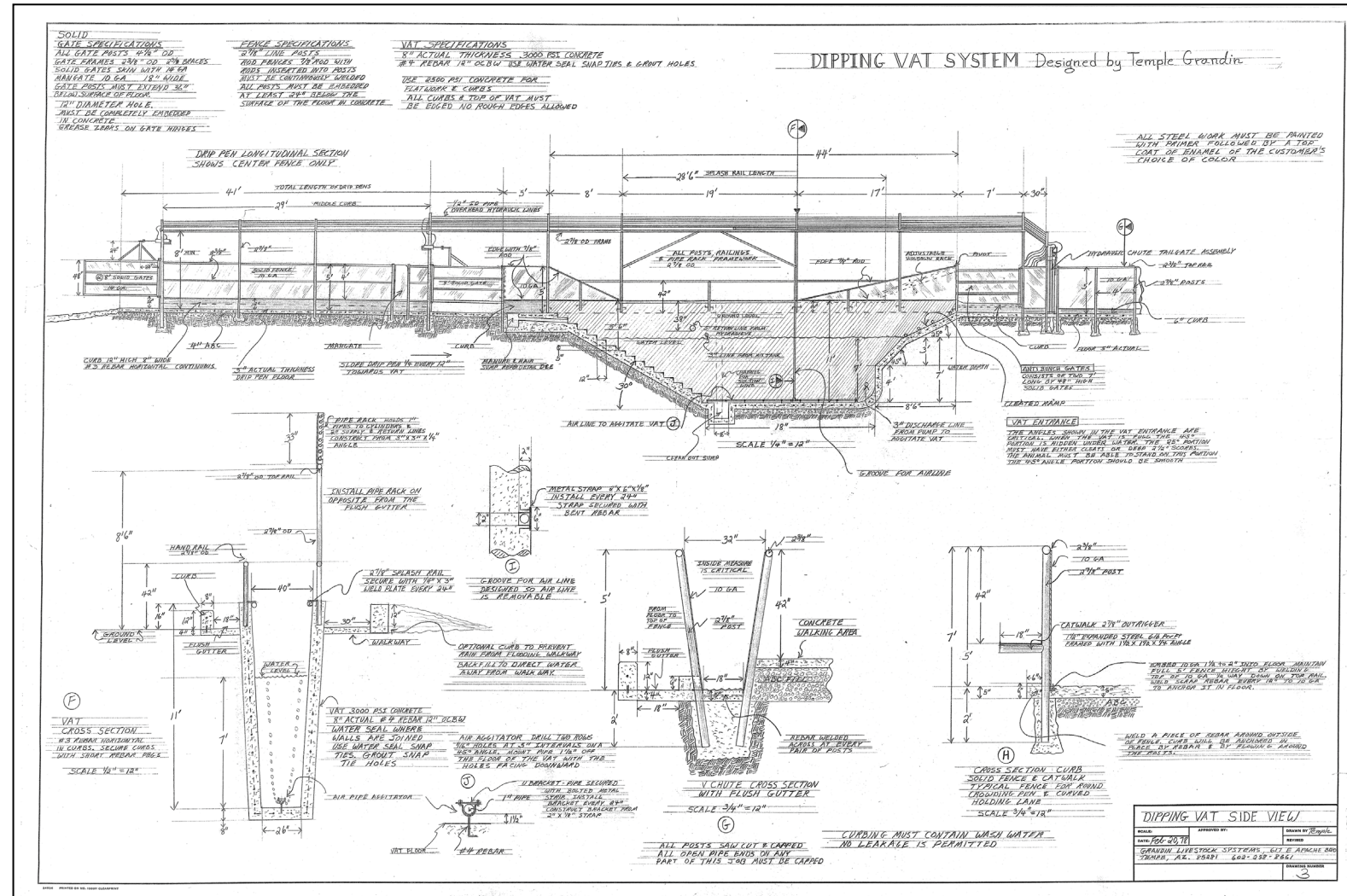
Arts Foster Scientific Success

- Nobel prize winners 50% more likely to have an arts and craft hobby compared to other scientists
- Painter, musician, actor, dancer, composer, poet, photographer or craftsman

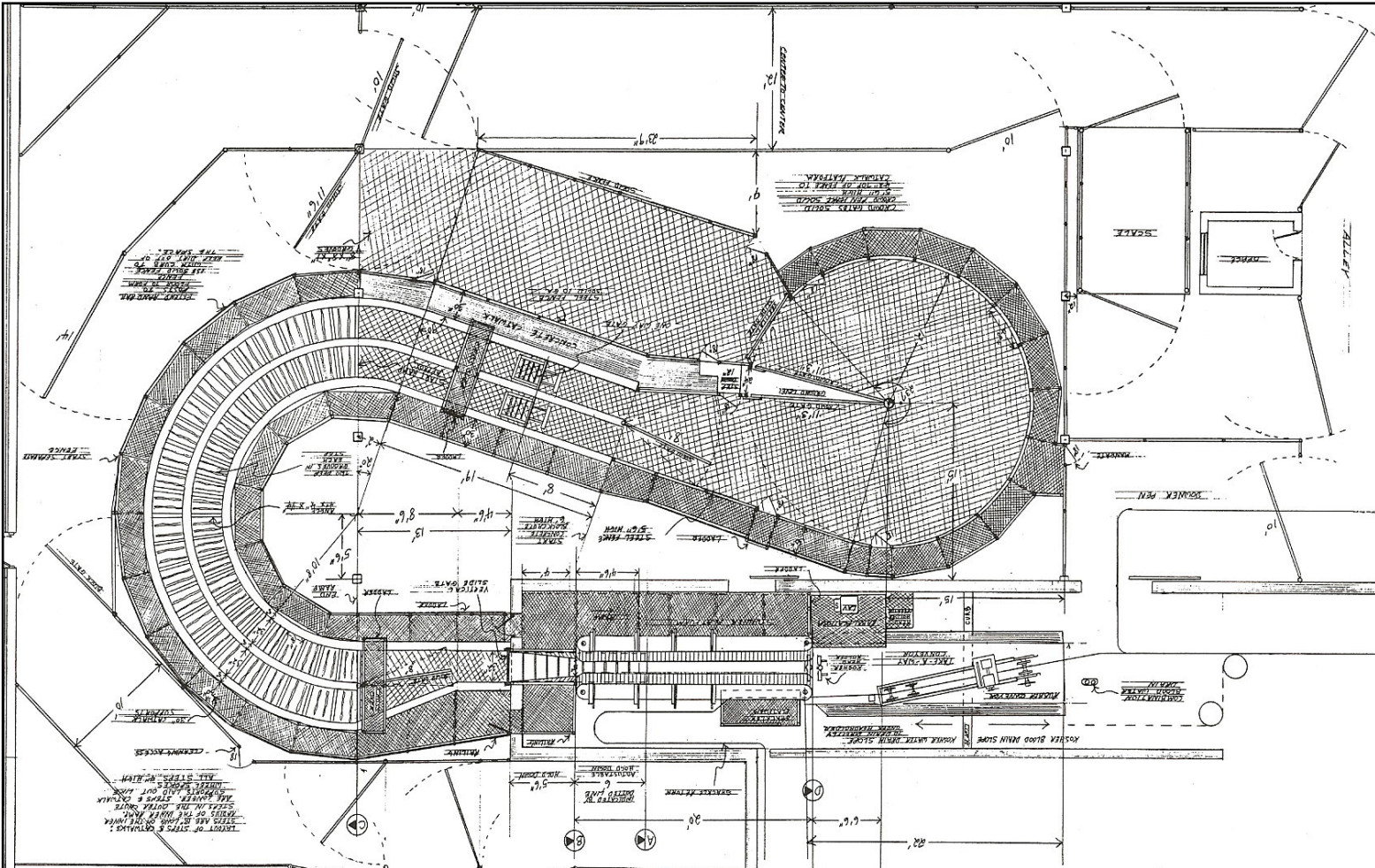
Robert Root Bernstein et al., 2008

**Since I was weird, I learned
how to impress potential
customers by showing a
portfolio of my work**

Sold my work by showing my portfolio



People Need to Touch in Order to Perceive



Picture From My Original Portfolio

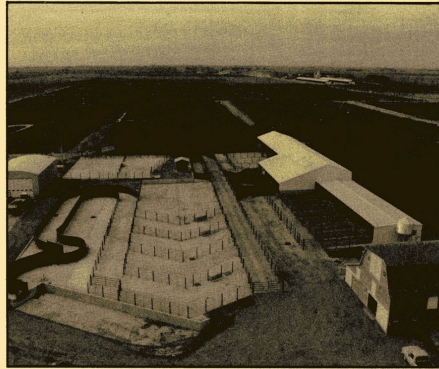


Replica Used in HBO Movie *Temple Grandin*



LIVESTOCK HANDLING SYSTEMS

A Well Designed Facility will help make your
Livestock Operation More Profitable.

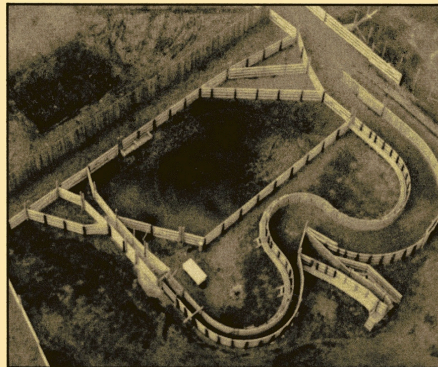


CUSTOM DESIGNED To Fit Your Operation:

Working, sorting, loading and hospital facility at A. Glenn Kluck Feedlots in Richland, Nebraska. The system has a curved level loading chute, herringbone sorting pens, scale, covered hospital pens, working circle and horse pens. Curved chutes and smooth traffic flow reduce stress and improve efficiency. The covered working circle is designed for easy washdown. Employees will do a better job of processing in clean facilities which protect them from the weather. Careful gentle processing will improve cattle performance.

CURVED WORKING CHUTES For Greater Efficiency:

A curved single file chute, round crowding pen and wide curved alley are labor saving and reduce stress at Alan Verishine's cow calf operation in Saskatoon, Canada. A handler working from the catwalk along the inner radius can move cattle easily into the round crowd pen and squeeze. Cattle can be sorted 3 ways after the squeeze chute. Grandin designs handling facilities for all types of ranch and feedlot operations.



Consultant & Designer of livestock handling facilities for feed lots, ranches, packing plants & auctions.

GRANDIN LIVESTOCK HANDLING SYSTEMS, INC.

Suite 3, 1401 Silver St.
Urbana, IL 61801 217-384-4815

NEW ADDRESS:

1205 W. Elizabeth Suite E122
Fort Collins, CO 80521

Put it on your phone

30 Second WOW

Half the Cattle in North America are Handled in Systems I Designed



Aerial Photo of Early Major Project



First Dip Vat Project - 1976



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- Worried our educational system is screening out visual thinkers with strict algebra requirements
 - Visual Thinkers needed to prevent serious problems such as Fukushima reactor meltdown and aviation accidents
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FAA
Aviation Safety

EMERGENCY AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/

DATE: November 7, 2018

AD #: 2018-23-51

Emergency Airworthiness Directive (AD) 2018-23-51 is sent to owners and operators of The Boeing Company Model 737-8 and -9 airplanes.

Mathematicians **Calculate** Risk

Visual Thinkers **See** Both Risk and Solutions to Problems

Possible Impact with Terrain

A Visual Thinker Would See Ways the Small Fragile Sensor Could Break



We Have Lost the Skills to Build This



Who Builds Large Food Processing Plants?

- ❑ **Visual thinkers** – Design plant layout and build highly specialized mechanical equipment
- ❑ **Math Thinkers** – Engineers, boilers, refrigeration, calculate roof trusses
- ❑ **Retiring Visual Thinkers** - Not getting replaced

- Visual thinkers, AI, and some people with autism, ADHD or dyslexia are all bottom-up thinkers
- Concepts are formed from specific examples
- Top-down verbal thinkers tend to overgeneralize
- Sensory Based *not* Word Based notices detail

Tips for Working with Minds That are Different

- ✓ Never overload working memory
- ✓ Provide Pilot's Checklist for tasks with multiple steps
- ✓ Stretch them slightly out of their comfort zones
- ✓ Limit screen time
- ✓ Provide choices of hands-on activities

Ultimate Goal of Education

- Where is a student ten years after high school graduation?
 - Learn to be a life-long learner
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