The USDA Wellness Policy ..... “encourages a school environment that promotes students’ health, well being, and ability to learn by supporting healthy eating.”
The school wellness policy for Alaska’s Kodiak Island includes the consumption of fish.

Website: dnr.alaska.gov
Fish has DHA and EPA fatty acids.

DHA is a major component of brain tissue.
Researchers say the brain needs Fish:

• **FISH** helps heal the brain before + after injury

• **FISH** increases the number of healthy neurons

• **FISH** reduces inflammation in the brain

(Source: https://brainfoodbrainfood.com/category/concussion-tbi-therapy-dha/)
Won’t this work?
Vegetable oil is composed of mostly single bonds.
Vegetable Oil looks like this. It has carbon molecules (marshmallows) held together with mostly single bonds (toothpicks).

Vegetable Oil a weaker oil in brain tissue given the mostly single bonds (omega-6).
Fish Oil is composed of many double bonds
Fish oil looks like this. The carbons (marshmallows) are held together by **double bonds** (toothpicks) every third carbon (omega 3).

There are six **double bonds** in the stronger fish oil.
Long ago, humans consumed Vegetable oil to Fish oil in a 1:1 ratio.

Today, Vegetable oil to Fish oil consumption can be a 50:1 ratio!!
Many brains are only fed vegetable oil!!

Thank you for free photos to www.all-free-download.com and www.wlwt.com
But the brain NEEDS fish oil......

The brain is smart.

It will make brain tissue from the single bonded, vegetable oil.

This is likely a temporary measure while the brain waits for double bonded fish oil to arrive in the diet.
While the Vegetable Oil Brain may look the same, it does NOT WORK the same.

Vegetable oil structures FALL APART and make the brain JITTERY.

The Fish Oil Brain is STRONGER. Omega-3 double bonds allow for PROPER FUNCTION and INJURY RESILIENCE.
Why does this matter?
A real brain has the consistency of soft cheese. It can be cut with a spatula.
Inside a real brain are neurons. They look a lot like spaghetti. Neurons connect with each other to help the brain communicate within the body.
The brain neurons function a lot like the man-made Freeway System only neurons are *faster* and *smarter*. 
Brain neurons are high speed communication pathways, like freeways and Olympic ski runs!!
Skiers travel fast, when the ski run is *slippery, wide open, and clear.*

The same is true for brain **neurons**. When they are properly constructed and disease free, nerves can transmit up to **250mph**!!
If potholes exist, fast travel on freeways becomes more difficult.
Fast travel slows down on brain neurons when they are damaged or built with the wrong oils.
What happens during injury of the vegetable oil brain?
• Frequently, concussion will occur.

• Normally the brain floats in cerebral spinal fluid within the boney cranium.

• A concussion is when the brain sloshes from side to side typically hitting one side or sometimes both sides of the boney cranium, squishing the brain tissue and neurons.
Concussion is Injuring our Students:

• Traumatic Brain Injuries are the leading cause of death/disability worldwide. Costs are in the billions.
• Trauma is the leading cause of death for persons under age 44. Females are more susceptible than recognized.
• High concussion sports include football, wrestling, soccer, lacrosse, hockey, boxing and cheerleading. A professional football player receives an estimated “900 to 1500 blows to the head during a season” (concussion.treatment.com)
• Concussion affects sleeping, thinking, studying, concentration, mood, memory, attention, coordination, headache, and nausea.
Often, the injury is more apparent later:

- Dementia
- Alzheimer’s Disease
- Parkinson's Disease
- Chronic Traumatic Encephalopathy
- Tremor
- Depression
- Suicide
The double bonded fish oil structure withstands injury better than the single bonded vegetable oil structure.
Can we improve nutritional brain protection with fish and fish oil consumption??
How ??
* Eat Fish
* Take Fish Oil
* Eat Grass Fed Meat
Fish Oil Contains both DHA and EPA, omega – 3s.

DHA is most helpful to the brain.
Researchers recommend:
500mg – 1000mg (1 gram) per day of DHA + EPA

www.brainhealtheducation.org/resources/advances-in-tbi-management/
Researchers find that 1-4 grams per day of DHA + EPA are therapeutic

www.brainhealtheducation.org/resources/advances-in-tbi-management/
But, don’t we have enough nutrients in our diets??
Let’s Find Out!!

In the Spring of 2013, approximately 100 athletes were surveyed at a small high school in Temecula, CA using a food frequency questionnaire. Students were asked about the consumption of foods containing fish oil (DHA), amino acids and the vitamin B complex vitamins.
<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Survey</th>
<th>RDA</th>
<th>LOW INTAKE FOUND with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Omega 3 (DHA+EPA)</td>
<td>.67 g</td>
<td>.9 g</td>
<td>*Omega 3 fatty acids</td>
</tr>
<tr>
<td>• Amino Acids (protein)</td>
<td>57.5 g</td>
<td>46-52 g</td>
<td>*Vitamin B1 (Thiamin)</td>
</tr>
<tr>
<td>• Vitamin B1</td>
<td>.65mg</td>
<td>1-1.2mg</td>
<td>*Vitamin B5 (Pantothenic Acid)</td>
</tr>
<tr>
<td>• Vitamin B2</td>
<td>1.6mg</td>
<td>1-1.3mg</td>
<td></td>
</tr>
<tr>
<td>• Vitamin B3</td>
<td>14.2mg</td>
<td>14-16mg</td>
<td>*Vitamin B9 (Folate)</td>
</tr>
<tr>
<td>• Vitamin B5</td>
<td>3.4mg</td>
<td>5.0mg</td>
<td></td>
</tr>
<tr>
<td>• Vitamin B6</td>
<td>1.6mg</td>
<td>1.2-1.3mg</td>
<td></td>
</tr>
<tr>
<td>• Vitamin B9</td>
<td>313mg</td>
<td>400mg</td>
<td></td>
</tr>
<tr>
<td>• Vitamin B12</td>
<td>4.7ug</td>
<td>2.4ug</td>
<td></td>
</tr>
</tbody>
</table>
How much fish/fish oil do we need?

“Experts recommend 500–1000 mg (1 gram) EPA+DHA per day to avoid deficiency. “

“Therapeutic doses of EPA+DHA range from 1 to 4 grams.”

www.brainhealtheducation.org/resources/advances-in-tbi-management/
Where do we find DHA??

• GRASS FED BEEF

• MILK can have DHA added

• Fish Oil has DHA

• Fish has DHA
Grass fed cattle make DHA

Grain feeding cattle looses DHA

Thank you to www.pixabay.com For the free photos
DHA could be added to school lunch milk (32 mg/cup)
Fish Oil has DHA and EPA, and can be taken as a supplement.
Some fish oil is molecularly distilled to remove mercury and impurities.

Information on the Nordic Natural fish oil manufacturing process and triglyceride form.

DHA is found in most FISH:

4 ounces of white albacore tuna contains 600mg of DHA

2 ounces of salmon contains 700mg of DHA
The 2005 USDA omega-3 DHA FISH analyses:


<table>
<thead>
<tr>
<th>High DHA - grams per 100mg (3.5oz)</th>
<th>Low DHA - grams per 100mg (3.5oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Atlantic Salmon, farmed 1.457</td>
<td>• Pink Tuna, canned .2222</td>
</tr>
<tr>
<td>• Atlantic Salmon, wild 1.429</td>
<td>• Catfish .128</td>
</tr>
<tr>
<td>• Pollock .451</td>
<td>• Atlantic Cod .154</td>
</tr>
<tr>
<td>• Sea Bass .556</td>
<td>• Shrimp .144</td>
</tr>
<tr>
<td>• Swordfish .681</td>
<td>• Alaskan Crab .118</td>
</tr>
<tr>
<td>• Trout .671</td>
<td>• Cod .16</td>
</tr>
<tr>
<td>• White Tuna, canned water .629</td>
<td>• Orange Roughy 0</td>
</tr>
<tr>
<td></td>
<td>• Flounder/Sole .25</td>
</tr>
</tbody>
</table>
Cost for Entrees

- Beef Hamburger  .82
- Chicken Nuggets  .79
- Bean/Cheese Burrito  .80
- Chicken Thigh Strips  .48
- Burrito Bowl  1.30
- Wheat Pizza  .60
- Gluten Free Pizza  1.92

(Approximate costs)

Cost for FISH

- Grilled Trout - ClearSprings
- Grilled Salmon - Trident
- Albacore Tuna

- Two ounce serving cost range is $.85 - $1.00
Students LIKE Fish !!

In Spring of 2016, a survey was conducted in an athletics-oriented high school in Murrieta, CA. The classroom received a brief presentation comparing vegetable oil with fish oil marshmallow structures. Then students completed an anonymous, written survey:

76% of students answered that ‘YES’ they like fish
16% of students indicated that ‘MAYBE’ they like fish
Only 8% of students indicated they don’t like fish

80% would try a TUNA FISH SANDWICH or FISHTACO
60% of students would try a TUNA SALAD
Did you know ??
That Child Nutrition Directors work in 90,000 Schools and Institutions.

https://schoolnutrition.org/AboutSchoolMeals/SchoolMealTrendsStats/
That School Nutrition Programs

Serve 41 Million Lunches/ Breakfasts Daily
That 56% of all school children are fed by School Nutrition Programs
For 13 years of their life!!

If schools served more fish?
Could we reduce the national concussion rate?
This could be a **FUN**

and ......

**DELICIOUS Wellness Project!!**
Tuna Sandwich Recipe

Tuna, onions, celery, sweet pickle relish, dressing, eggs, dry mustard and bread.
http://www.theicn.org/USDA_recipes/school_recipes/F-o8.pdf
Tuna and Noodles Recipe

Noodles, tuna, butter, celery, onions, milk, chicken stock, lemon juice, parsley, pepper.

Fiesta Wrap Recipe with Salmon

Add Salmon to quinoa, cheddar cheese, carrots, black beans, red bell peppers, red onions, chili powder, lime juice, curcumin, salt, wheat free-corn tortillas- recommended.

http://www.theicn.org/USDA_recipes/school_recipes/F-14rSchool.pdf
Mexicali Taco Boat with Fish

Add Fish to chili powder, onion powder, red pepper, black pepper, curcumin, garlic powder, salsa, sweet potato fries

http://www.theicn.org/USDA_recipes/New/Schools/Mexicali_Taco_Boat_50-100-RECIPE.pdf
Fajitas made with Fish

Add Fish to corn, onions, salsa, tomatoes, green peppers, curcumin, oregano, chili powder, garlic, pepper, sugar, white vinegar, cornstarch, vegetable oil

Baked Cajun Fish

Fish, lemon juice, butter, paprika, onion, red pepper, black pepper, oregano, thyme

Grilled Fish Tacos

Fish, chili powder, adobo and sazon seasoning, red bell pepper, onion, jalapeno pepper, cilantro, lemon juice

Baked Fish
Scandia

Fish, yogurt, cheddar cheese, pepper, parsley, lemon juice, hot pepper sauce, vegetable oil

Aztec Grain Salad with Fish Added

Recommend using nutritious brown rice, onions, mild green chiles, onions, jalapeno chiles, garlic, yogurt, milk, monterey/cheddar cheese, pinto beans, tomatoes, then add fish!

Will you need a school fish vendor?
Clear Springs specializes in **Trout**, but they also have **Mahi**, and **Swai**. [http://www.clearsprings.com/company/](http://www.clearsprings.com/company/)

Clear Springs’ **new products** coat fish with ancient grains, potato, and tortillas to provide **wheat gluten free options**.


General kitchen recipes are found at [http://freshfishkitchen.com](http://freshfishkitchen.com)
Trident Seafood specializes in Salmon, but they also have Cod, Pollock, Talapia, Flounder, and Mahi. 

http://www.tridentseafoods.com/Products/Detail?pid=8534f61ed09c-4fec-895f-8246bfd774ea

- Their Fiesta Salmon Bites and Salmon Burgers look delicious. Browse their products at: 
  http://www.tridentseafoods.com/Products/Browse

- They have general recipes at: 
  http://www.tridentseafoods.com/Recipes
Highliner Foods sells High Liner, Fisher Boy, Mirabel, Sea Cuisine, and C. Wirthy labels and products under High Liner, Icelandic Seafood and FPI labels.


Fish King Seafood:  http://www.fishkingseafood.com

King and Prince Seafood:  http://www.kpseafood.com
Slade Gorton:

- **Slade Gorton** sells pollock, tilapia, salmon, cod, sole and swai from IcyBay, GourmetBay and Sonoma Seafoods. [http://sladegorton.com](http://sladegorton.com).

- They also have **wheat gluten free** options: [http://sladegorton.com/food-service/gluten-free-foods](http://sladegorton.com/food-service/gluten-free-foods)
Can School Nutrition,

Level the Concussion Playing Field??
We would like to find out!!
A Special Thank You to the Bear Valley, Murrieta Valley and Yucaipa-Calimesa Unified School Districts for their encouragement, advice, and the nutrition internships they generously offer. Thank you to Photographer Posse for this beautiful photo of the Jordanelle Reservoir, Gold Star Foods, and ClearSprings Foods.
Jesus fed the masses with only 5 loaves of bread and 2 fish.

He uses ordinary people to accomplish the extraordinary!!