Lesson Plan: KWL Unit Starter and introduction to Lactose Intolerance

**Where in the Unit Sequence:** Week 1: Lesson 1

**Duration of Lesson:** (1) 40 minute period

**Objective:** So you and the students have identified what they know, think and wonder about lactose intolerance.

**Key Content:** What students know, think and wonder about lactose intolerance; The demographic statistics about which population groups are lactose intolerant by ethnic group.

**Key Vocabulary:** Lactose intolerance, lactase persistence, enzyme, lactase, lactose

**Key Skill (Standards).**

NGSS.2.1. Analyze and interpret data

CCSS.6.1 participating in a group discussion

**Detailed Facilitation Teacher will do**… Set the stage for the unit by using a KWL on large chart paper. Guide the students in a discussion about what they know think about lactose intolerance and record their ideas in the chart. Then project the statistics about demographic groups and lactose intolerance and discuss.

**Detailed Activities Students will do**: Students will participate in the discussion and contribute their ideas to be recorded. They will examine the demographic information and think about it .

**Assessment:** Teacher by observation of participation in the discussion

**Resources needed:** Projector slide of demographic data on lactose intolerance, large chart paper for the KWL.

**Homework:** Students should find out more about incidence of lactose intolerance in family members

**Teacher Notes:**

Discussion about the data:

After the KWL and showing the data, discuss lactose intolerance vs. Lactose tolerance in different populations and ethnic groups:

From the data ask the students who is lactose intolerant and who is not in the world; Identify lactase persistence as a mutation that affects a small portion of the world population; Ask if milk is a necessary food in the diet and whether it is in all diets around the world? Ask why they think dairy products are so prevalent in this country; Discuss the milk industry and its power; Tie this discussion back to the statistics on lactose intolerance and identify a pattern of dominant groups who are lactase persistent setting up a society that pushes milk on everyone; Ask what they think about this.

**Essential Questions for the Discussion:**

* What do you notice from the data tables about who is lactose intolerant and who is not?
* Why do you think so many people are lactose intolerant in minority groups?
* Do you think lactose intolerance is a medical disorder or is it normal in human beings?
* What do you think is the dairy industry’s position on this topic?
* If most students at this school were lactose intolerant, would that be an issue? If so in what way?

1. KWL Unit Starter:

Ask what students know about lactose intolerance and wonder about. Questions and wonderings about the natural world may arise like the following:

1. Why are so many people in my family and my community lactose intolerant?
2. What causes lactose intolerance?
3. Why do some people lactose intolerant?
4. Is lactose intolerance a health problem?

Record the students’ questions and keep them available in the classroom either on a large piece of paper or a place that won’t get erased to be able to refer back to them and add to them throughout the unit.

(Key Vocabulary: Lactose, Lactose intolerance)

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| Facts about Lactose Intolerance   * 75% of all African-American, Jewish, Mexican-American, and Native American adults are lactose intolerant. * 90% of Asian-American adults are lactose intolerant. * Lactose intolerance is least common among people with a northern European heritage-about 12%   <http://www.hopkinsmedicine.org/healthlibrary/conditions/digestive_disorders/lactose_intolerance_85,P00388/>  Overall, about 75 percent of the world's population, including 25 percent of those in the U.S., lose their lactase enzymes after weaning.7 The recognition of this fact has resulted in an important change in terminology: Those who could not digest milk were once called "lactose intolerant" or "lactase deficient." They are now regarded as normal, while those adults who retain the enzymes allowing them to digest milk are called "lactase persistent." <http://www.pcrm.org/health/diets/vegdiets/what-is-lactose-intolerance>  Distribution of Lactose Intolerance in different Human Groups |
| | Human group | Individuals examined | Intolerance (%) | | --- | --- | --- | | [Dutch](http://en.wikipedia.org/wiki/Dutch_people) | N/A | 1 | | [Danes](http://en.wikipedia.org/wiki/Danish_people) | N/A | 4 | | [Europeans in Australia](http://en.wikipedia.org/wiki/Anglo-Celtic_Australian) | 160 | 4 | | [Swedes](http://en.wikipedia.org/wiki/Swedish_people) | N/A | 5-7 | | [Basques](http://en.wikipedia.org/wiki/Basque_people) | 85 | 8.3 | | [British](http://en.wikipedia.org/wiki/Demographics_of_the_United_Kingdom) | N/A | 5–15 | | [Germans](http://en.wikipedia.org/wiki/German_people) | 1805 | 6-23 | | [Swiss](http://en.wikipedia.org/wiki/Swiss) | N/A | 10 | | [European Americans](http://en.wikipedia.org/wiki/European_Americans) | 245 | 12 | | [Tuareg](http://en.wikipedia.org/wiki/Tuareg_people) | N/A | 13 | | [Finns](http://en.wikipedia.org/wiki/Finnish_people) | N/A | 14-23 | | [Belorusians](http://en.wikipedia.org/wiki/Belorusians) | N/A | 15 | | [Russians](http://en.wikipedia.org/wiki/Russians) | N/A | 16 | | [Ukrainians](http://en.wikipedia.org/wiki/Ukrainians) | N/A | 13 | | [Austrians](http://en.wikipedia.org/wiki/Austrians) | N/A | 15–20 | | [Spaniards (non-Basque)](http://en.wikipedia.org/wiki/Spanish_people) | N/A | 15 | | [Northern French](http://en.wikipedia.org/wiki/French_people) | N/A | 17 | | Central [Italians](http://en.wikipedia.org/wiki/Italian_people) | 65 | 19 | | [Mexicans](http://en.wikipedia.org/wiki/Mexican_people) (nationwide) | N/A | 16 - 33 | | [Indians](http://en.wikipedia.org/wiki/Demographics_of_India) | N/A | 20 | | African [Tutsi](http://en.wikipedia.org/wiki/Tutsi) | N/A | 20 | | African [Fulani](http://en.wikipedia.org/wiki/Fulani) | N/A | 23 | | [Bedouins](http://en.wikipedia.org/wiki/Bedouin) | N/A | 25 | | [Portuguese](http://en.wikipedia.org/wiki/Portuguese_people) adults | 102 | 35 | | Southern [Italians](http://en.wikipedia.org/wiki/Italian_people) | 51 | 41 | | [African American](http://en.wikipedia.org/wiki/African_American) Children | N/A | 45 | | [Saami](http://en.wikipedia.org/wiki/Sami_people) (in Russia and Finland) | N/A | 25–60 | | Northern [Italians](http://en.wikipedia.org/wiki/Italian_people) | 89 | 52 | | North American [Hispanics](http://en.wikipedia.org/wiki/Hispanic) | N/A | 53 | | [Balkans](http://en.wikipedia.org/wiki/Balkans) | N/A | 55 | | [Mexican American](http://en.wikipedia.org/wiki/Mexican_American) Males | N/A | 55 | | [Cretans](http://en.wikipedia.org/wiki/Cretans) | N/A | 56 | | African [Maasai](http://en.wikipedia.org/wiki/Maasai_people) | 21 | 62 | | [Southern French](http://en.wikipedia.org/wiki/French_people) | N/A | 65 | | [Greek Cypriots](http://en.wikipedia.org/wiki/Greek_Cypriots) | N/A | 66 | | [Jews, Mizrahi (Iraq, Iran, etc.)](http://en.wikipedia.org/wiki/Mizrahi_Jews) | N/A | 85 | | [Jews, Ashkenazi](http://en.wikipedia.org/wiki/Ashkenazi_Jews) | N/A | 68.8 | | [Jews, Sephardic](http://en.wikipedia.org/wiki/Sephardi_Jews) | N/A | 62 | | [Jews, Yemenite](http://en.wikipedia.org/wiki/Yemenite_Jews) | N/A | 44 | | [Sicilians](http://en.wikipedia.org/wiki/Sicily#People) | 100 | 71 | | [Mestizos of Peru](http://en.wikipedia.org/w/index.php?title=Mestizos_of_Peru&action=edit&redlink=1) | N/A | >90 | | Rural [Mexicans](http://en.wikipedia.org/wiki/Mexicans) | N/A | 73.8 | | [African Americans](http://en.wikipedia.org/wiki/African_American) | 20 | 75 | | [Lebanese](http://en.wikipedia.org/wiki/Demographics_of_Lebanon) | 75 | 78 | | [Alaskan Inuit](http://en.wikipedia.org/wiki/Alaska_Natives) | N/A | 80 | | [Australian Aborigines](http://en.wikipedia.org/wiki/Australian_Aborigine) | 44 | 85 | | African [Bantu](http://en.wikipedia.org/wiki/Bantu_peoples) | 59 | 89 | | [Asian Americans](http://en.wikipedia.org/wiki/Asian_American) | N/A | 90 | | Northeastern [Han Chinese](http://en.wikipedia.org/wiki/Han_Chinese) | 248 | 92.3 | | [Chinese](http://en.wikipedia.org/wiki/Chinese_people) | 71 | 95 | | [Southeast Asians](http://en.wikipedia.org/wiki/Southeast_Asian) | N/A | 98 | | [Thais](http://en.wikipedia.org/wiki/Thai_people) | 134 | 98 | | [Native Americans](http://en.wikipedia.org/wiki/Native_Americans_in_the_United_States) | 24 | 100 |   <http://en.wikipedia.org/wiki/Lactase_persistence> |