Alaska Resource EDUCATION

Fueling Alaska's Workforce: Education that Connects Students to Industry

Legislative Lunch and Learn

March 25, 2025

Mission

Educate students about Alaska's natural resources.

Vision

Empower students to be informed stewards of Alaska's natural resources.

Values

- Innovation
- Collaboration
- Flexibility
- Fun

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STEM Educator

NEW YEAR, NEW LOGO!

1982-2009:

2009-2024:

2025:

K-12 EDUCATION

CLASSROOM VISITS

Guest teaching in schools across Alaska in person and on Zoom

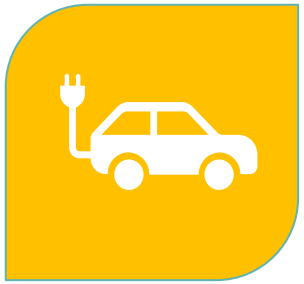
YOUTH PROGRAMS

Deeper explorations in after school programs, STEM nights, & camps

TEACHER TRAININGS

Educating teachers about our resources and how to implement them in the classroom

ROCKS & MINERALS



ENERGY

FORESTRY

WHAT ARE OUR NATURAL RESOURCES?

WHERE DO THEY COME FROM AND HOW DO WE GET THEM?

WHAT ARE THE ASSOCIATED CAREERS?

Spark

***Spark** interest in learning about Alaska's resources*

Ignite

***Ignite** passion for understanding connections to our resources*

Launch

***Launch** into the next phase with the knowledge to make informed decisions*

How do we extract and develop our resources?

What do we do once we are done with our resources?

How do we use our resources?

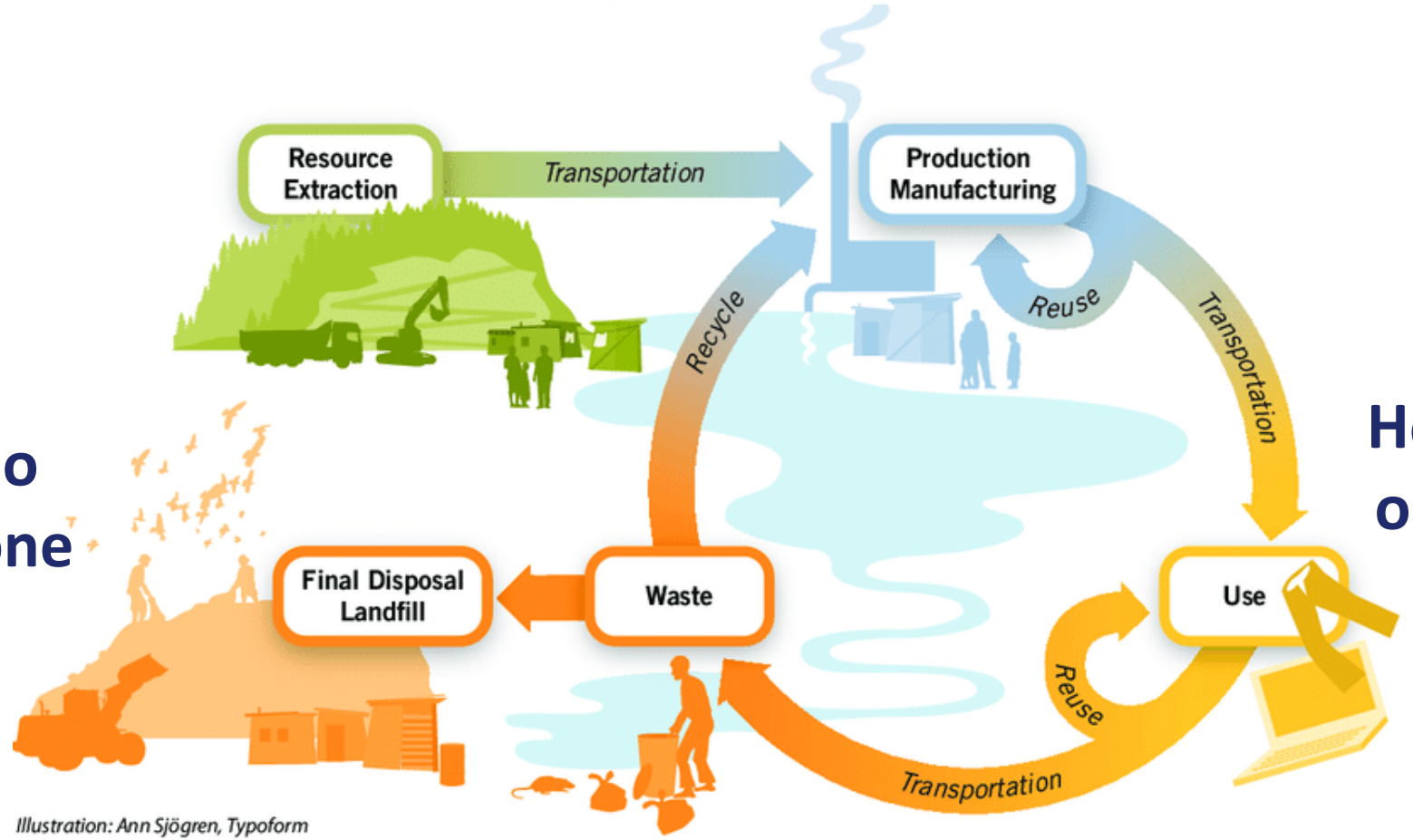


Illustration: Ann Sjögren, Typoform

How do we do all this responsibly and sustainably?

Essential Question:

How do we extract and develop our resources?

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Let’s go mining!

- Each community gets one **plot of earth**.
- Each member may select **one tool** to mine with: **shovel** (spoon), **excavator** (fork), or **pickaxe** (toothpick)
- On **signal** turn over permitted area [container], **remove lid**, and **start mining**.
- **WARNING: All tailings must remain on the lid.**

We need to protect the environment. Any spills outside the permitted lid area will result in substantial fines or possibly the shutting down of your mining operations!

1:00 minute to mine.

How well did you do?

- **Gold/yellow beads = gold = $600**
- **Black beads = coal = $300**
- **Orange beads = copper = $400**

- **Pink beads = cultural resource = -$500**
- **Sunflower seeds = reclamation = -$100**

Considerations

Do companies go mining with **no** previous information about the land or geology?

Do companies choose their plan and equipment according to the type of mining they are doing?

Do mining companies have to pay to restore the land when they are done?

Two of the **most important** considerations for our resource extraction industries:

Safety

Environment

Kinross hosts commemorative environmental restoration event with Trout Unlimited and the US Forest Service

Permit Pursuit

Environmental Baseline Discovery Lab

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Permit Pursuit

- Observe everything you see in your environment
- Collect the pertinent data using tools available

- Apply for your permits!

No Single Permit to Mine:
There are many permits & authorizations

Mine permitting is a mixture of State, Federal and local permitting requirements.

Each project is unique.

STATE

- Plan of Operations (DNR)
- Reclamation and Bonding (DNR)
- Waste Management Permits and Bonding (ADEC)
- CWA Section 402 APDES Water Discharge Permit
- Certification of ACOE Permits (ADEC)
- Sewage Treatment System Approval (ADEC)
- Air Quality Permits (ADEC)
- Fish Habitat and Fishway Permits (ADF&G)
- Water Rights (DNR)
- Right of Way/Access (DNR/DOT)
- Tidelands Leases (DNR)
- Dam Safety Certification (DNR)
- Cultural Resource Protection (DNR)
- Monitoring Plan (Surface/Groundwater/Wildlife) (DNR/DEC/DFG)

FEDERAL

- US EPA Air Quality Permit review
- US EPA Safe Drinking Water Act (UIC Permit)
- US ACOE S. 404 Dredge and Fill Permit
- US ACOE S. 10 Rivers and Harbors Act
- US ACOE S. 106 Historical & Cultural Resources Protection
- NMFS Threatened & Endangered Species Act Consultation
- NMFS Marine Mammal Protection Act
- NMFS Essential Fish Habitat
- NMFS Fish and Wildlife Coordination Act
- USFWS Threatened & Endangered Species Act Consultation
- USFWS Bald Eagle Protection Act Clearance
- USFWS Migratory Bird Protection
- USFWS Fish & Wildlife Coordination Act

Example: Fort Knox – 104 permits and 11,000 conditions

Essential Question:

How do we use our resources?

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Energy Source:

Where the energy came from in nature

Energy Type:

Useable energy form 💡

RENEWABLE SOURCES

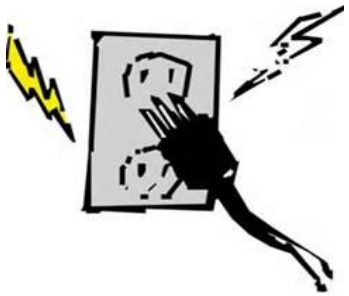
Sun (solar)

Wind

Water (Hydro)

Plants & Animals (Biomass)

Geothermal



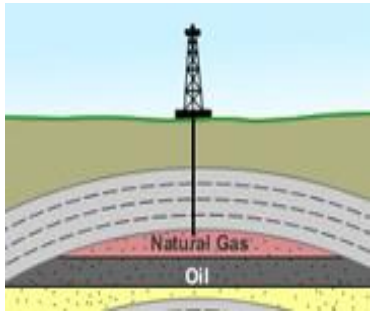
ELECTRICITY

FUEL

HEAT

NON-RENEWABLE SOURCES

Oil



Natural Gas

Coal

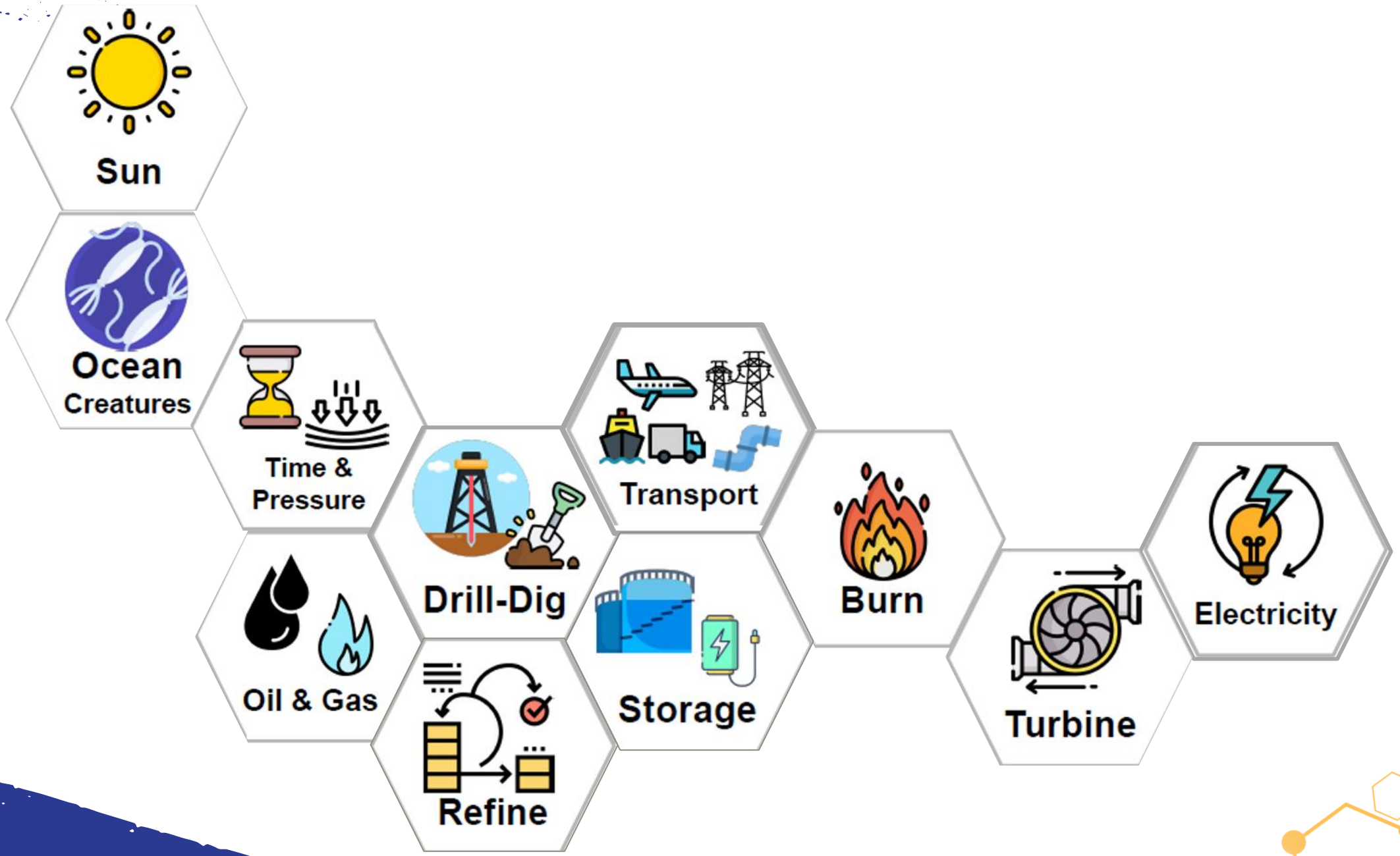
Energy Chains

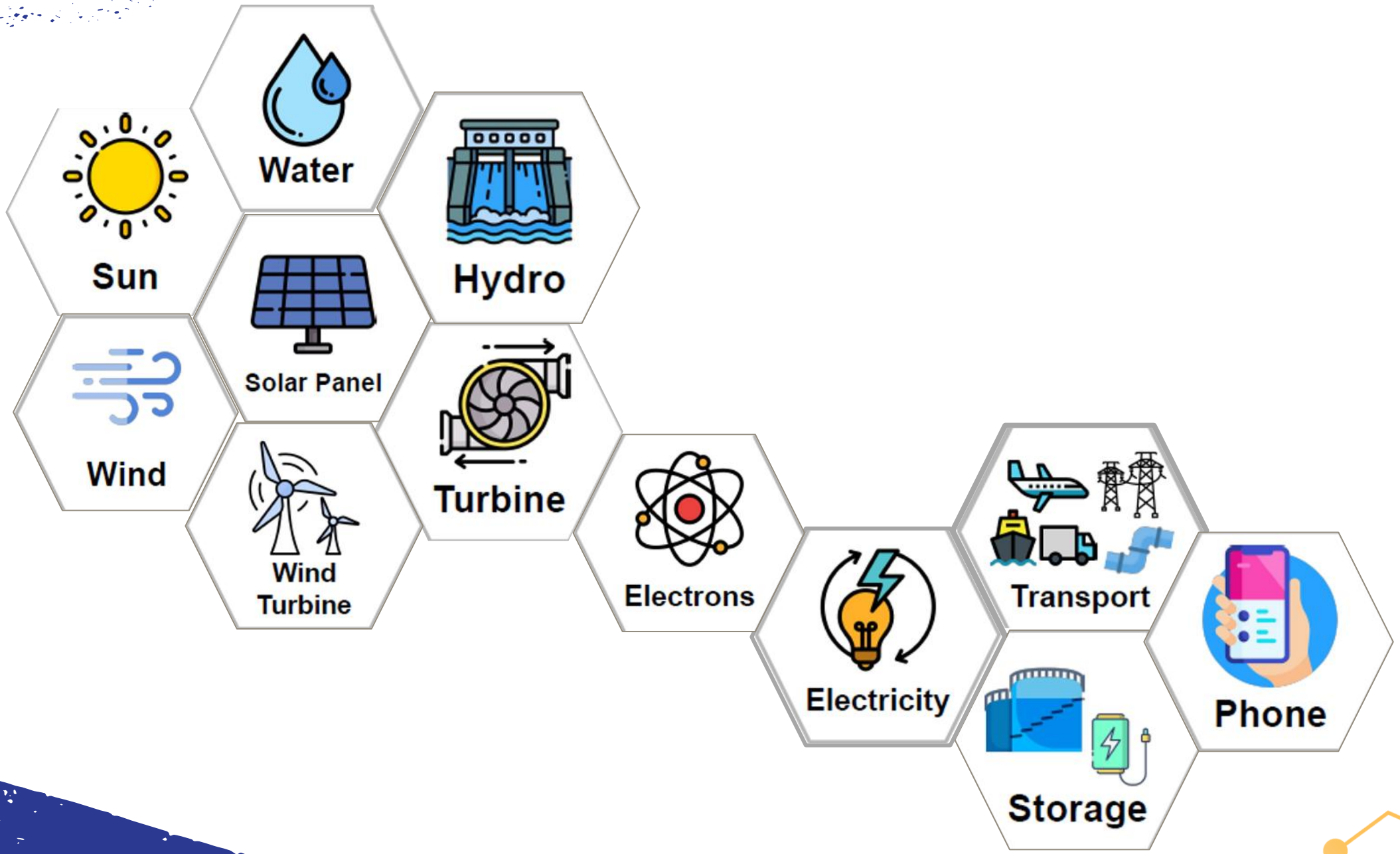
With your table group:

- **Explore the energy chain tiles.**
- **Decide how these images are connected to get to the "end" use of energy.**

✔ **No islands** ✔ **Use as many tiles as you can.**

Using a Cellphone 


Sun
Ocean Creatures
Time & Pressure
Oil & Gas
Drill-Dig
Refine
Transport
Storage
Burn
Turbine
Electricity


Water
Sun
Hydro
Solar Panel
Wind
Turbine
Wind Turbine
Electrons
Transport
Electricity
Phone
Storage

Essential Question:

What do we do once we are done with our resources?

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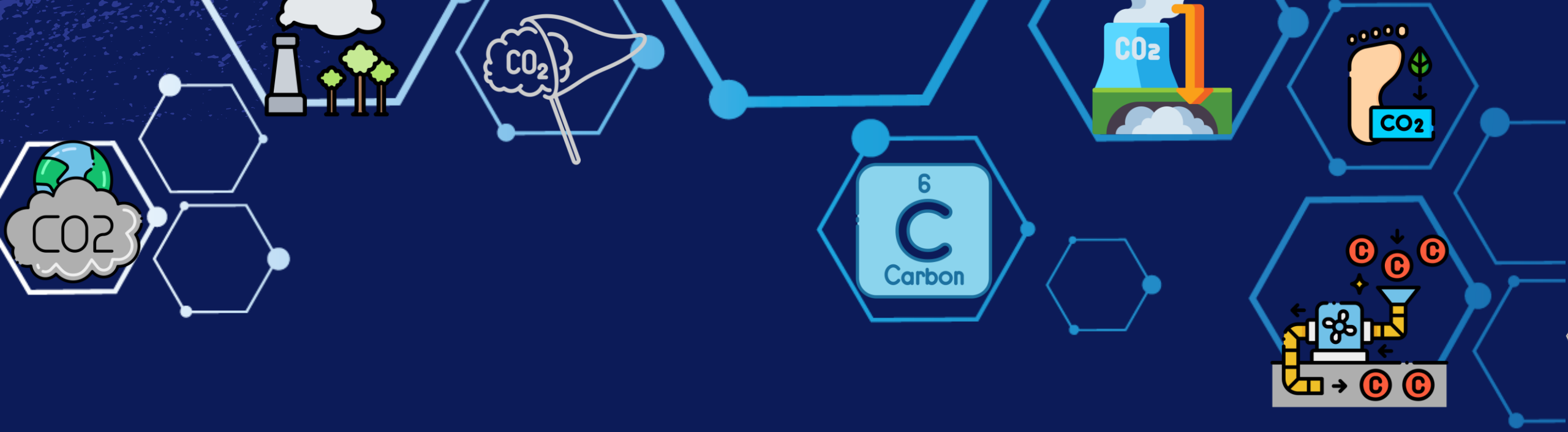

Carbon Capture & Storage (CCS)

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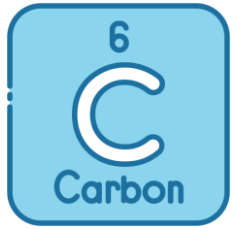
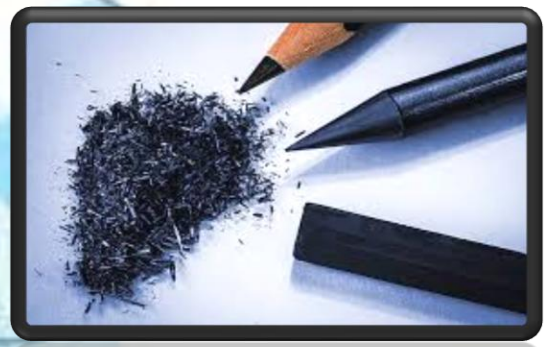
Q: What is carbon?



A: "Building Blocks of Life"

Plants



Soft = Graphite

Animals

Hard = Diamonds

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95% CO_2 Emissions
Occur Naturally

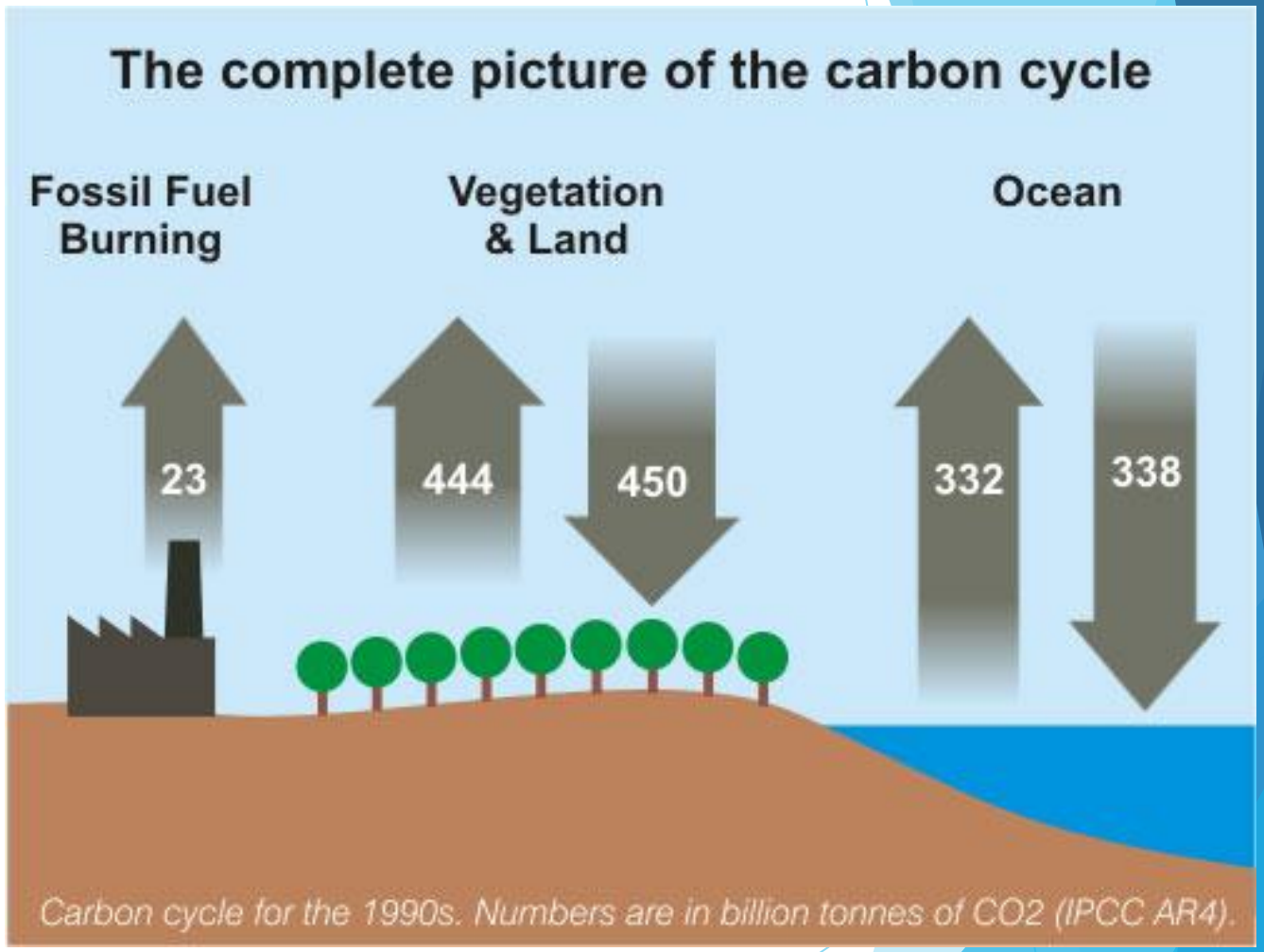
- Volcanic eruptions
- Forest fires
- Plant & animal respiration
- Decomposition of organics
- Ocean outgassing

More is absorbed than released.

5% CO_2 Emissions
Human Caused

- Burning Fossil Fuels
- Land Use

Need ways to capture or use CO_2



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Carbon Footprint Experiment

1. Predict which color balloon will capture the **most carbon**?

2. On the signal . . . **lift** the balloon & gently **shake** the bottle to produce a chemical reaction.

3. **Measure** the circumference of the inflated balloon at its widest point.

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Match the balloon to the carbon footprint

Which footprint is which?

?

- **Coal** Power Plant
- **Natural Gas** Power Plant
- **Airplane** (or Car) Emissions
- Human Riding a **Bicycle**

Think-Pair-Share: What does this tell you about **carbon emissions**?

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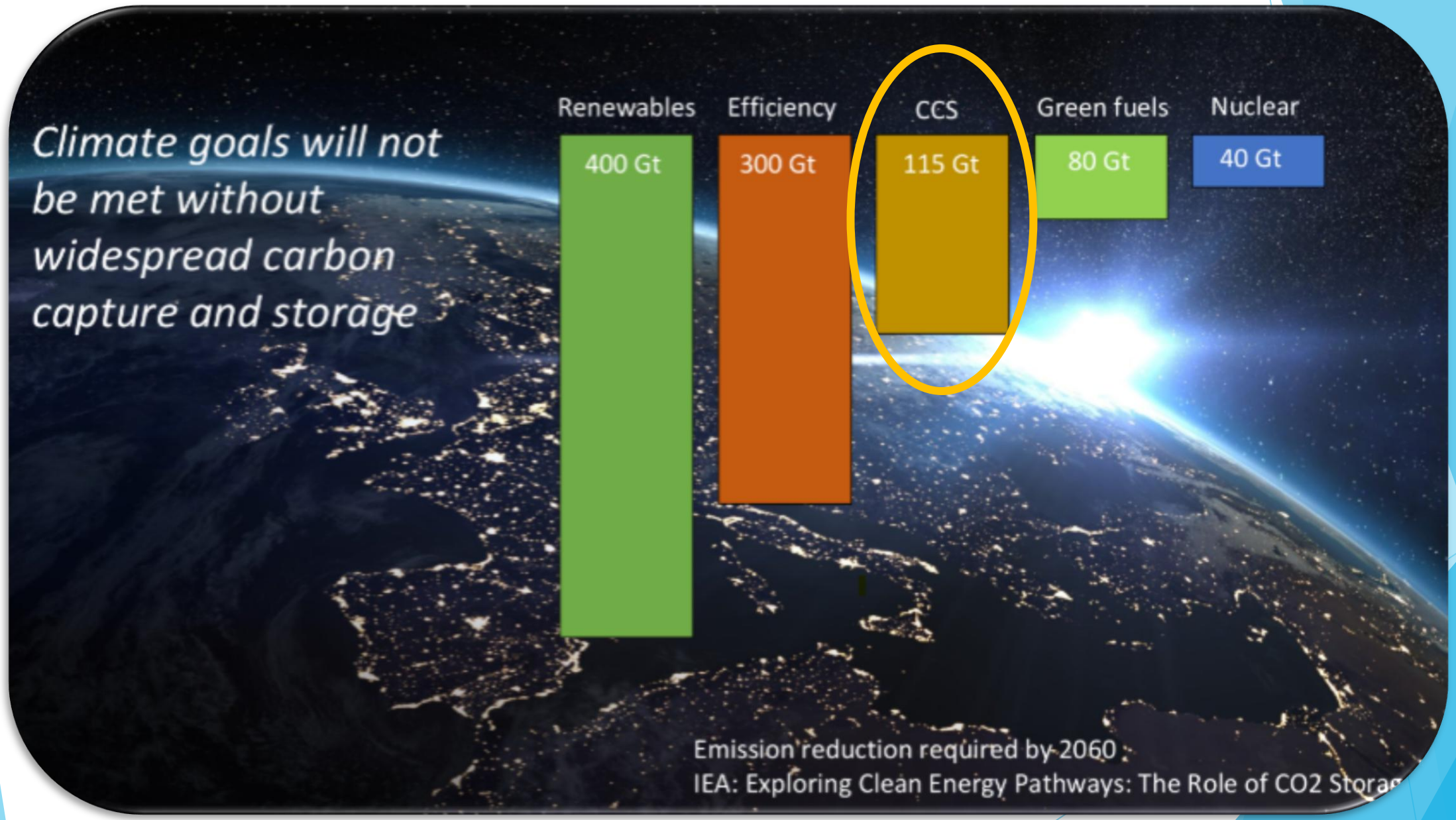
Carbon Capture & Storage Needed



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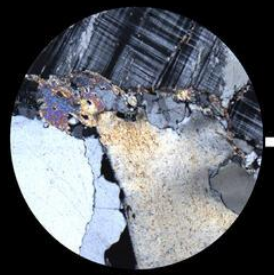
USGS
science for a changing world

U.S. Geological Survey studies underground rock layers. Scientists identify those that are most suitable for trapping and those that are good for storage. One consideration is space.

Microscope Views of Rocks:



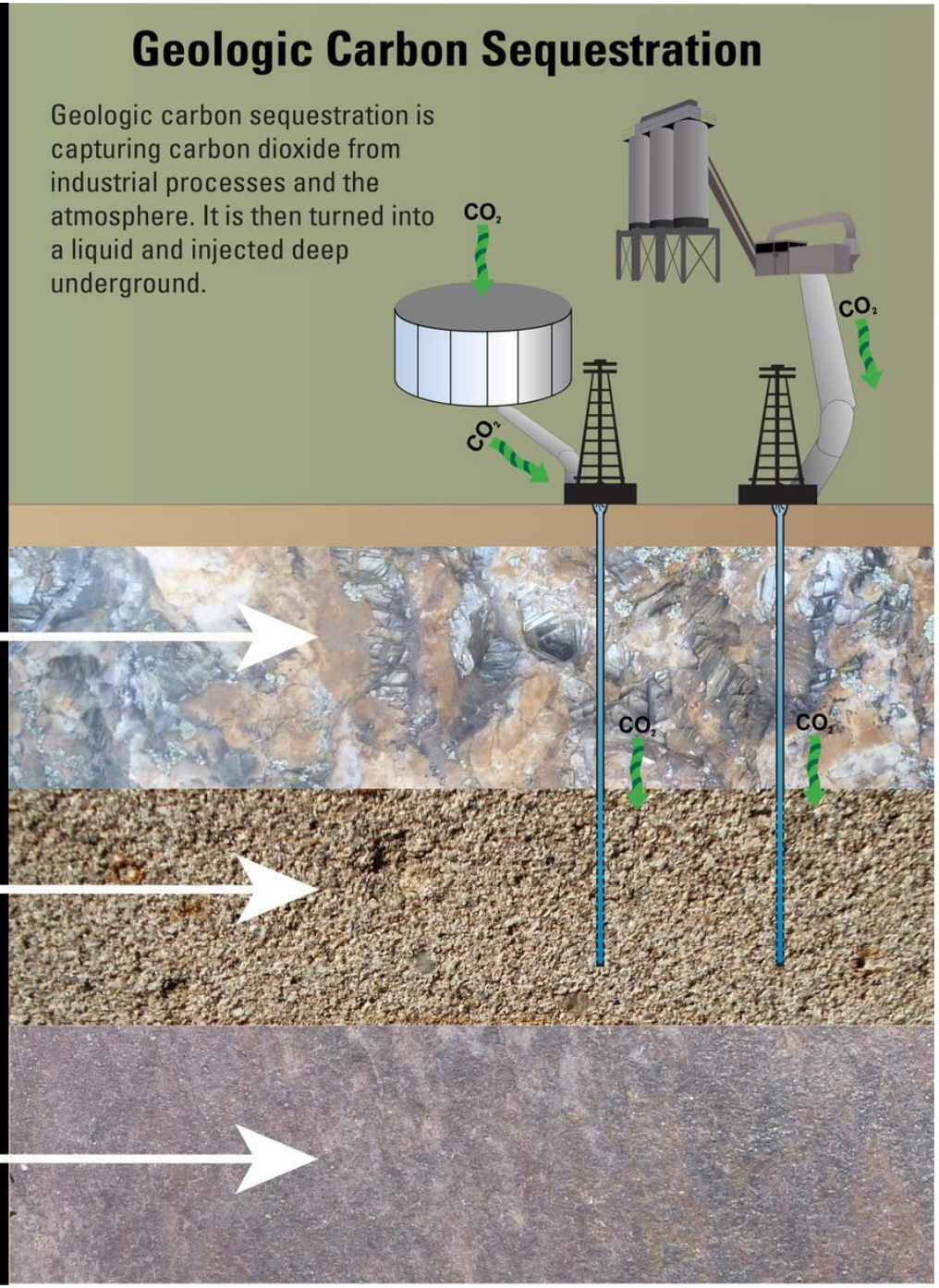
No empty space, good for trapping CO_2 below

Blue color represents empty space, good for storing CO_2

No empty space, good for sealing CO_2 above

Geologic Carbon Sequestration

Geologic carbon sequestration is capturing carbon dioxide from industrial processes and the atmosphere. It is then turned into a liquid and injected deep underground.



Design Challenge:

Most absorbent

storage for your liquid carbon

Limited Selection:

Up to

3 different items

Design Considerations:

- Porosity
- Permeability
- Cap Rock Placement

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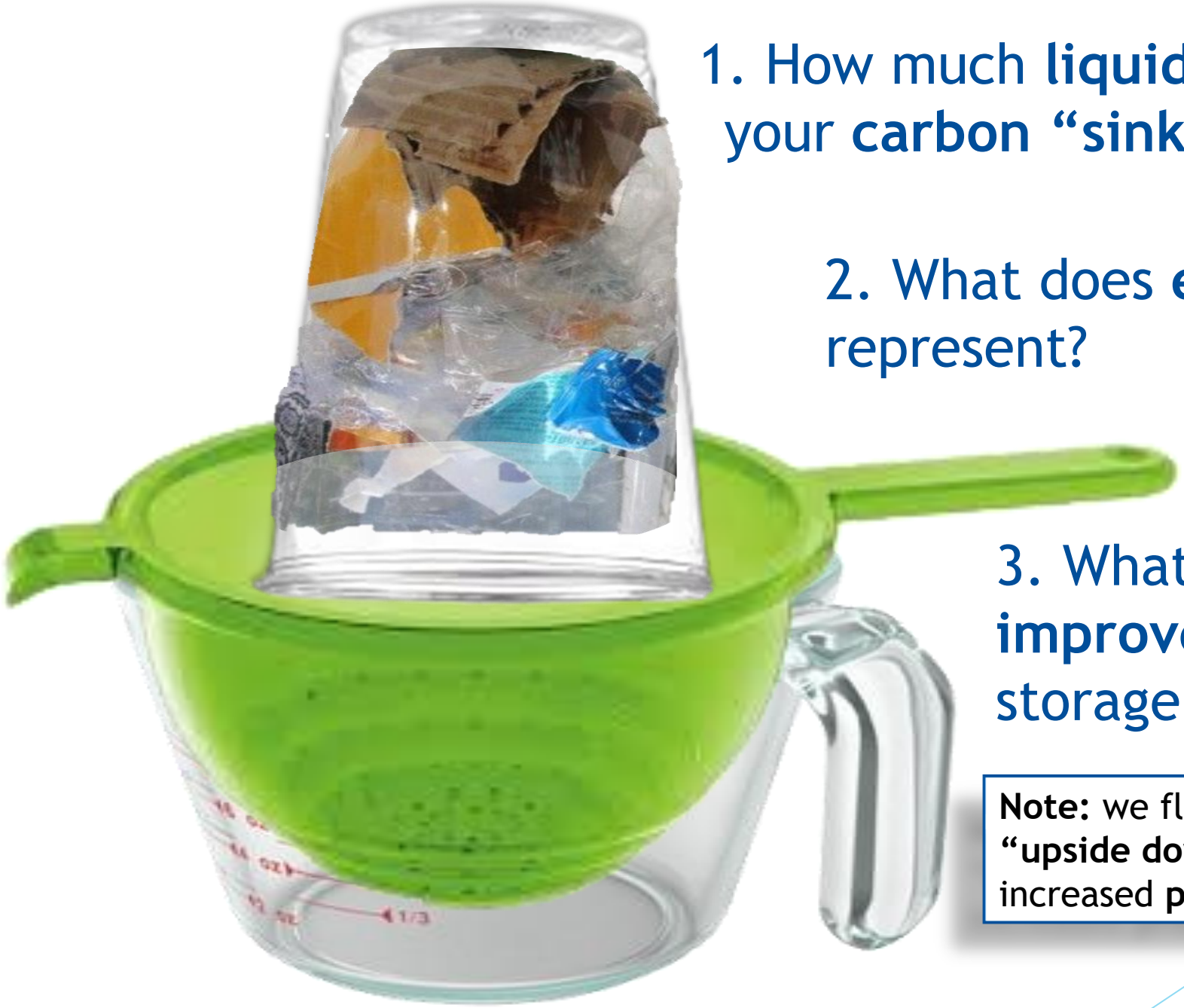

1. How much **liquid CO_2** did your **carbon "sink" hold?**

2. What does **each layer** represent?

3. What could you do to **improve** this carbon storage **design?**

Note: we flip our carbon storage cups **"upside down"** and use **gravity** to simulate increased **pressure** found deep underground.

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How do we extract and develop our resources?

Jobs in Alaska

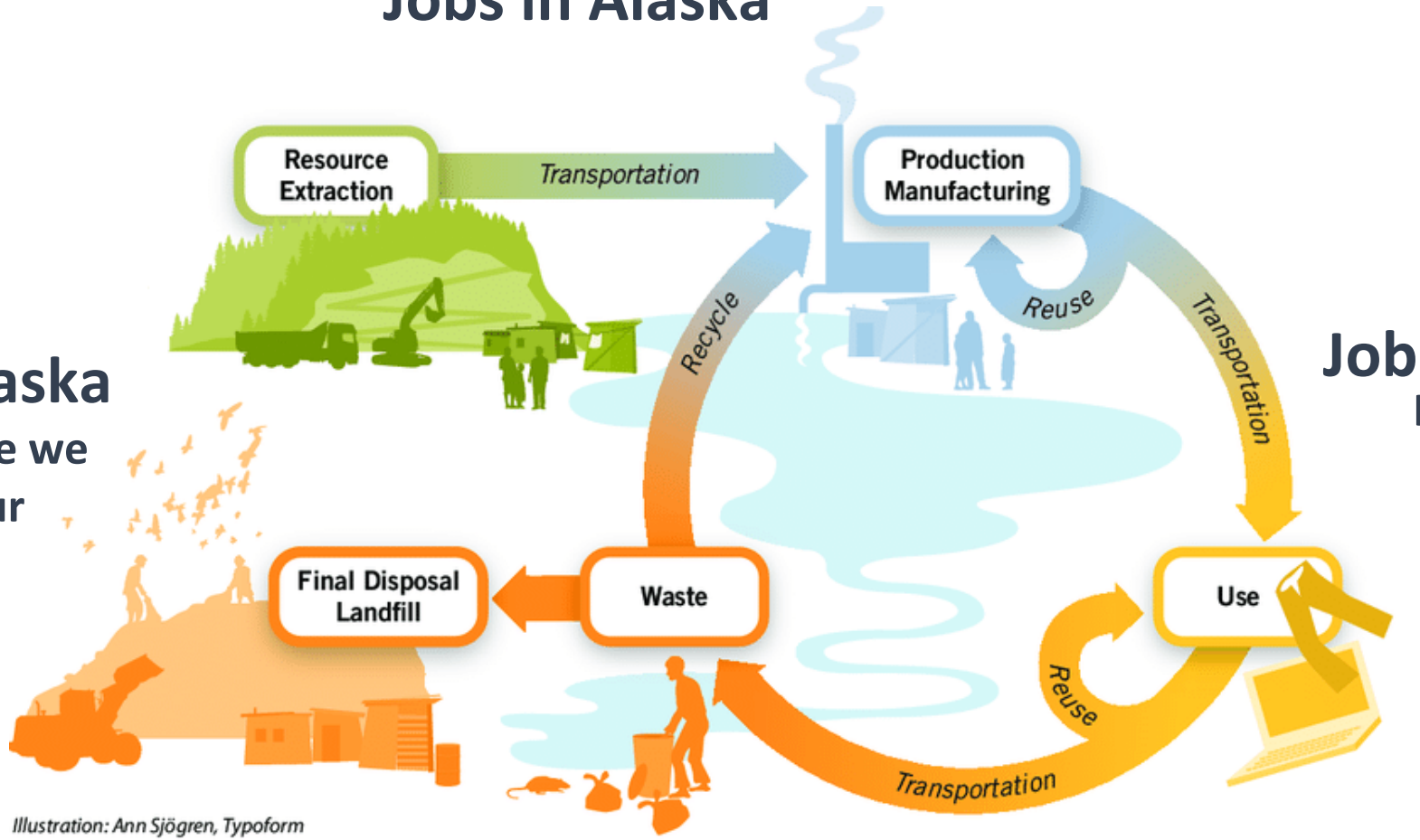


Illustration: Ann Sjögren, Typoform

Jobs in Alaska

What do we do once we are done with our resources?

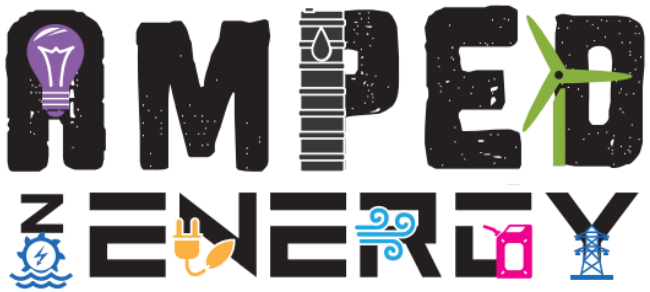
Jobs in Alaska

How do we use our resources?

Jobs in Alaska

How do we do all this <u>responsibly</u> and <u>sustainably</u>?

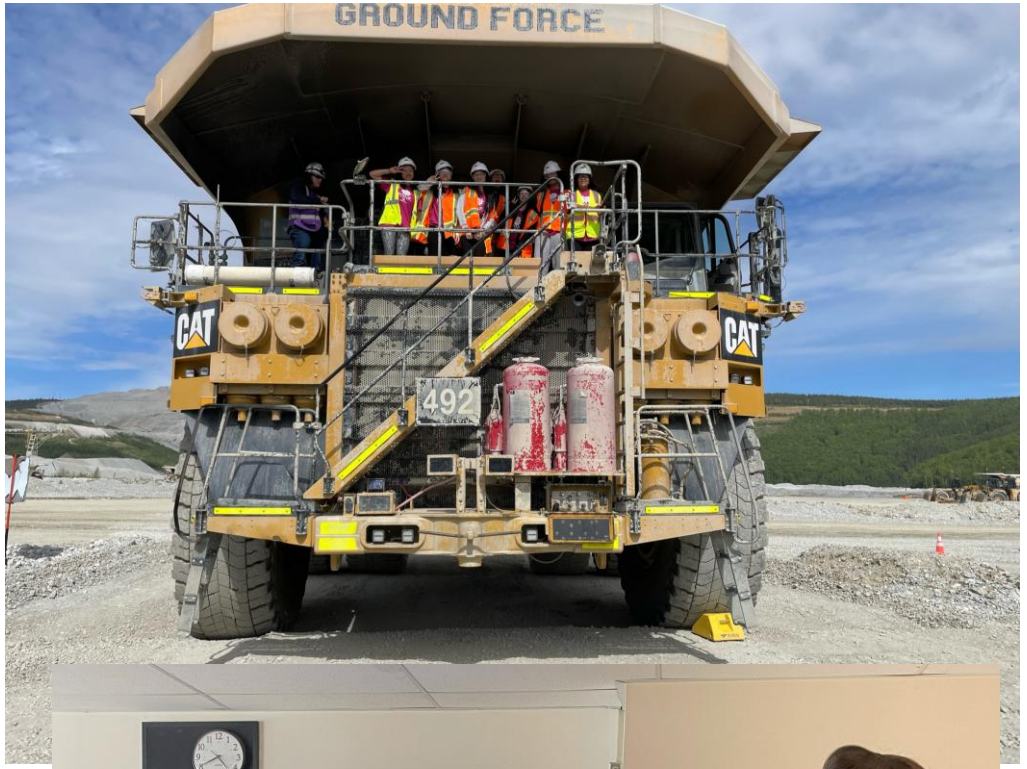
ARE bridges the gap between industry and education



OUR ALASKA

ARE Launch Initiatives


DENALI
INDUSTRIAL SUPPLY


GROUND FORCE
CAT
CAT
492


Surround yourself with women who would mention your name in a room full of opportunity.

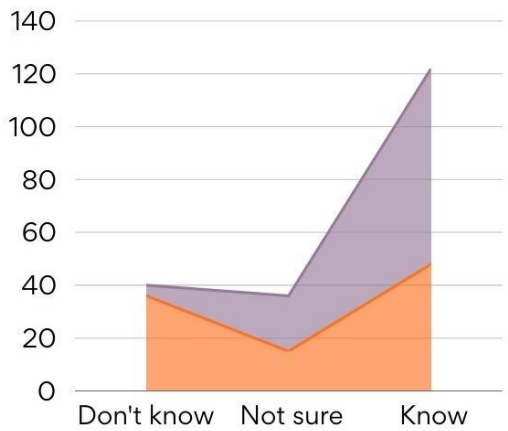
ALASKA RESOURCE EDUCATION | 2024

ARE Launch Program Data

PRE/POST STUDENT SURVEY

Impact of Natural Resources

Student understanding of the impact natural resources have on their lives

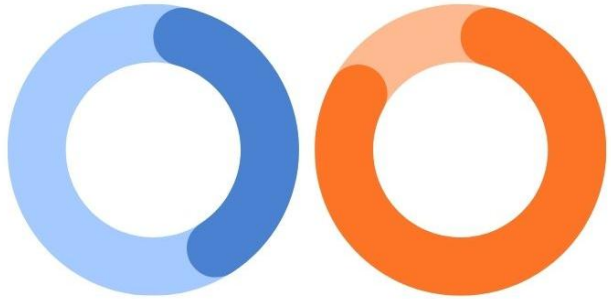


PRE

POST

Training Opportunities

Percentage of students who knew about training locations in Alaska



45%

Not aware Before

87%

Aware After

Career Awareness

Aware of careers : **83%**

Interested in a career: **21%**

Importance

Percentage of students who think learning about resources is important

Min : 0

Max : 100

Value : 88

"As someone newer to Alaska, and to modern resource extraction industries, I was ill-prepared to advise about related career paths. ***Now I can credibly offer insights and advice about job opportunities, work environments, and education paths****."*
– East High School teacher

"Ever since I was a little, I wanted to become a biologist and study wildlife, but I never thought it could be possible. This class has shown me ***it is possible*** *and there are* ***many job opportunities and different paths in Alaska****."*
– Dimond High School student

"I feel like my experiences really ***changed my perspectives on both natural resources and future careers available to me****. I also think that the opportunities we had allowed me to* ***gain confidence*** *asking questions and interacting with professionals."*
– POWR participant

Impact in 2024

8,092
Students Taught

22,317
Student Contact Hours

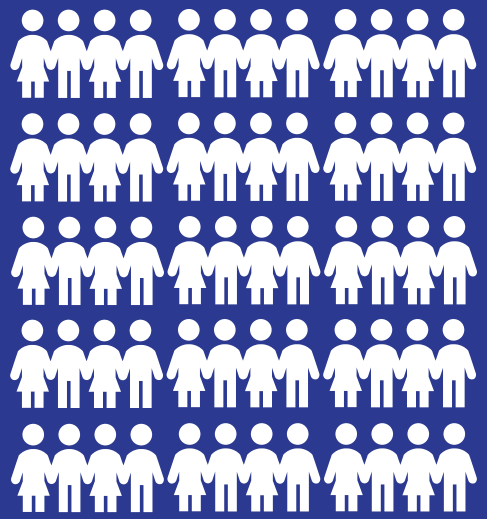
117
Teachers Taught

1,035
Teachers Contact Hours

5 Years in Review

2020-2024

39,000+
Students



600+
Teachers

50+
Communities

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Thank you!

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