



FOSTERING STEAM

NAEA Convention New York City

March 2, 2022

www.fosteringsteam.org

Today's STEAM Team

Laura Conner, University of Alaska Fairbanks

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Other project personnel

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Mareca Guthrie, University of Alaska Fairbanks

Angela Larson, Goldstream Group

Stephen Pompea, National Optical Astronomy Observatory

Today's participants

Introductions:

**Name, location,
teaching context**

Learning Outcomes

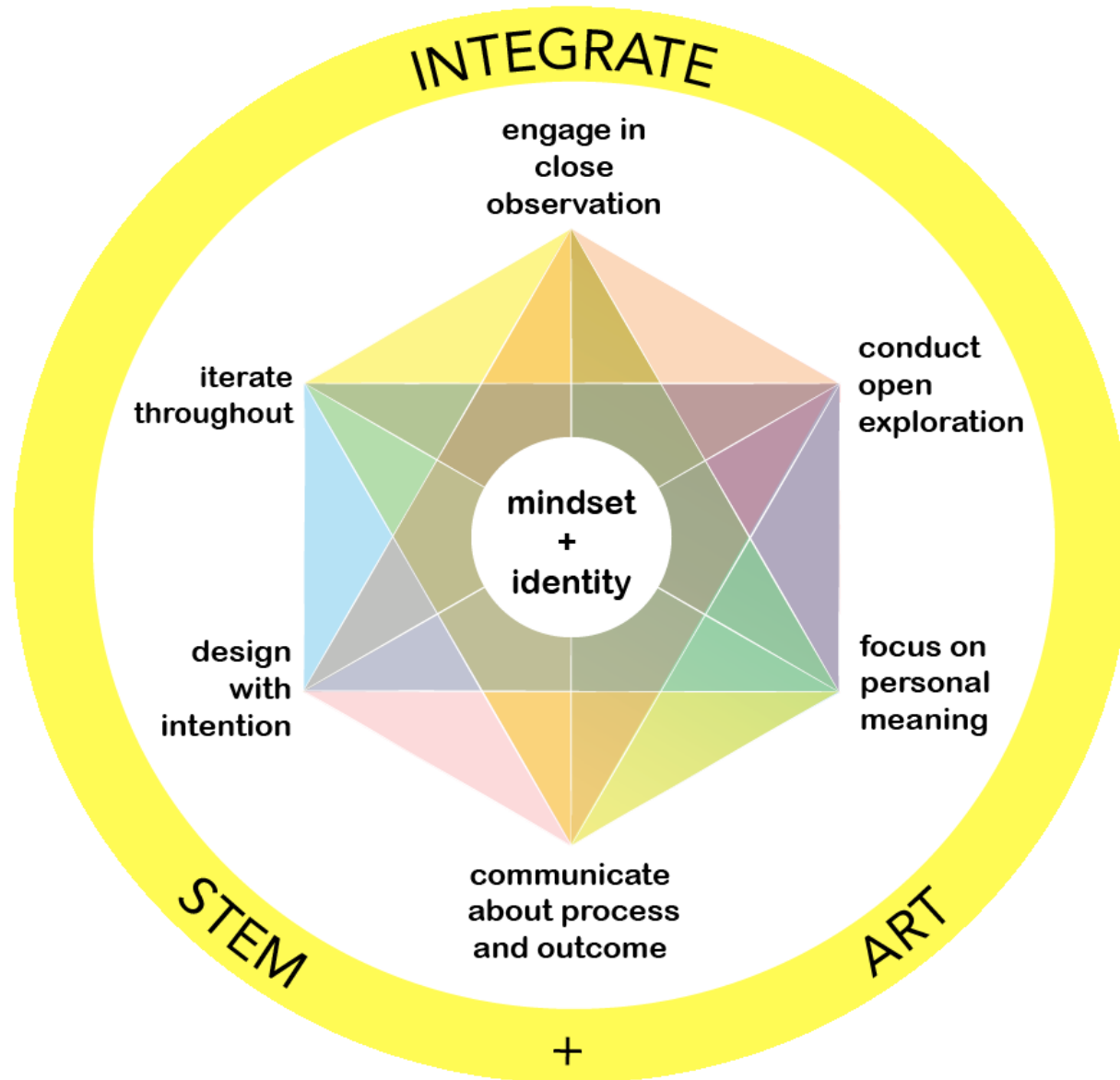
Participants will:

- **Participate in an activity that integrates science and art**
- **Reflect on ways that integrating science and art through STEAM practices supports learners' identity and mindset**

What is STEAM?

- **Science, Technology, Engineering, Art, Math**
- **We think of STEAM as *more* than combining art and STEM: our approach leverages some overlapping practices of both to deeply engage learners**
- **These practices help to develop STEAM-linked identities and support STEAM mindset**

Core STEAM Practices



STEAM Mindset

- **Based on Carol Dweck's notions of growth mindset:**
 - **Learners can hold fear-based or fixed mindsets** (*belief that one's intelligence or capabilities in some areas are fixed or immutable*)
 - **Learners can also hold growth mindsets** (*belief that one's intelligence or capabilities can grow with effort & practice*)
 - **Of course, it's not this simple!** (*people can hold fixed and growth mindsets simultaneously*)
- **We are supporting a STEAM mindset that is oriented towards growth:** (*belief that one's intelligence or capabilities can be developed with practice and support*)

Who does art? Who does science?

Envision a
scientist
doing their work

Envision an **artist**
doing their work

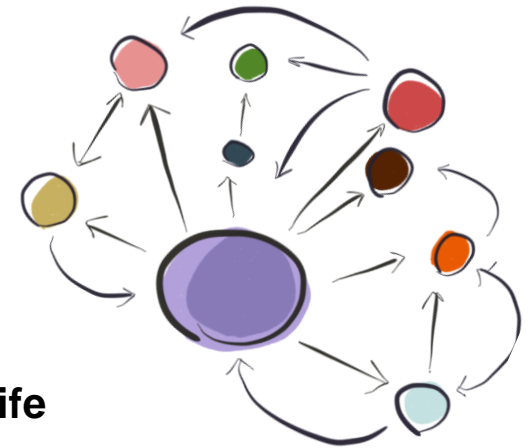
Turn and talk

- **What did you picture for the scientist? For the artist?**
- **Stereotypical images of artists and scientists: why does this matter for learners?**
- **Seeing yourself in a discipline is important for identity work (small steps towards identification)**

Fostering Mindset and Identity

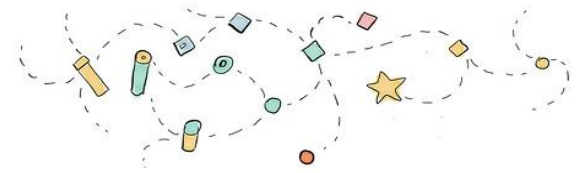
A few strategies for supporting STEAM identity work:

- **Allow opportunities for agency & choice**
- **Position learners as emerging experts**
- **Reflect on how STEM and art connect to everyday life**
- **Use STEAM practices**
- **Connect STEAM to learners' everyday lives and cultural practices**



A few strategies for fostering a STEAM mindset:

- **Model a STEAM mindset as the facilitator**
- **Maintain awareness of, and actively quiet, our own negative voice**
- **Reorient learners when they are expressing fear or negativity**



Investigation: Stop Motion Animation

How do animals use coloration to aid in their survival and reproduction?


This investigation emphasizes the STEAM practices of:

Focus on personal meaning

and

Communicating about process and outcome...

Functional Coloration

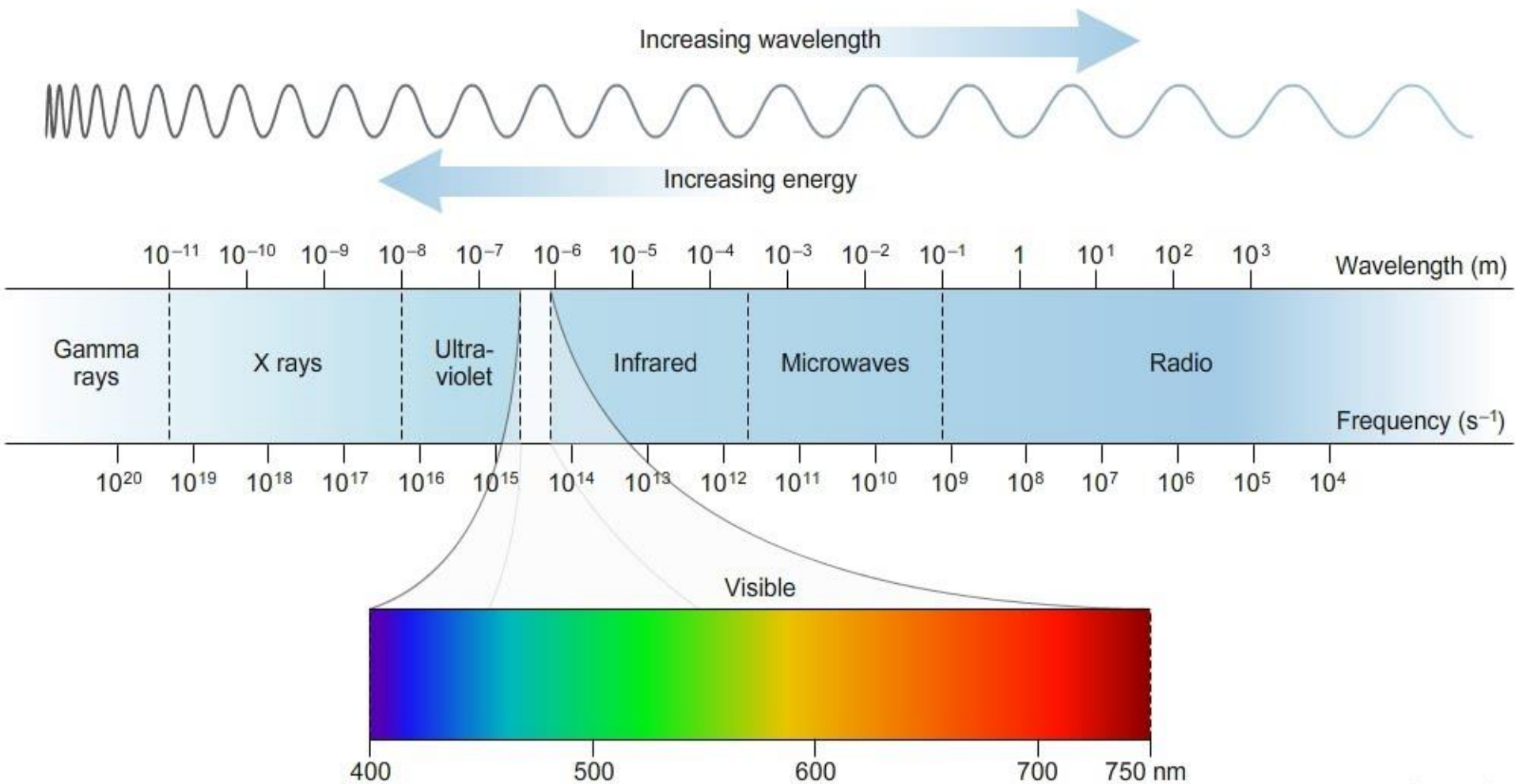


**Why do animals
have the colors that
they do?**

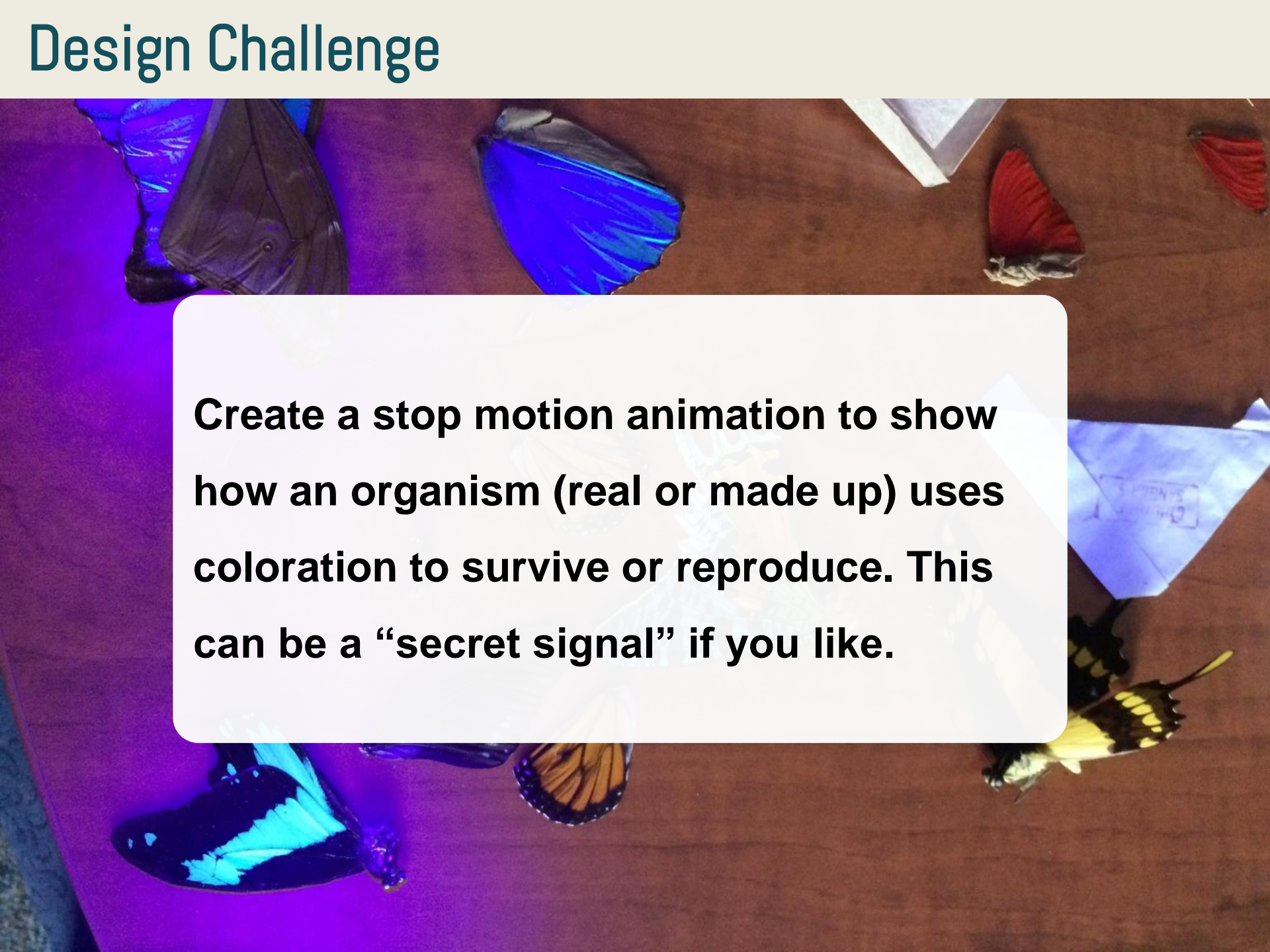
General categories

- **Camouflage**
- **Display**
- **Warning**
- **Mimicry**
- **Color can have multiple purposes, or be “secret”**

Electromagnetic Spectrum



Design Challenge



Create a stop motion animation to show how an organism (real or made up) uses coloration to survive or reproduce. This can be a “secret signal” if you like.

Stop Motion Animation



Storyboard



1 title



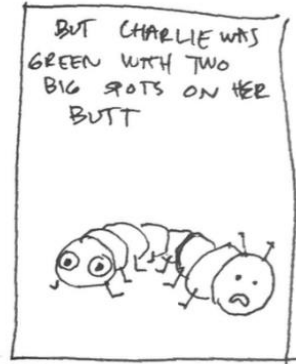
2 caterpillars
eating leaves



3 sad face



4 other caterpillars
lounging on
leaves



5 charlie
but



6 caterpillars
munch while
squawks arrive



7 hungry squawks



8 squawks
&
hiding charlie



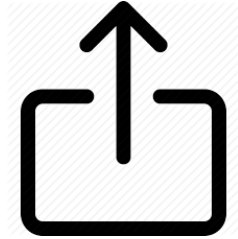
9 squawk
sees
charlie



10 charlie
saves the
day

Saving video

Select



Select EXPORT MOVIE

Select SAVE VIDEO

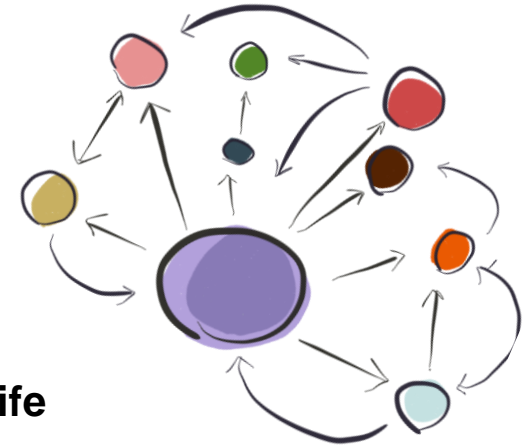
(this will save it to the camera roll)

Bring iPad up front, Airdrop to Perrin's computer

Fostering Mindset and Identity

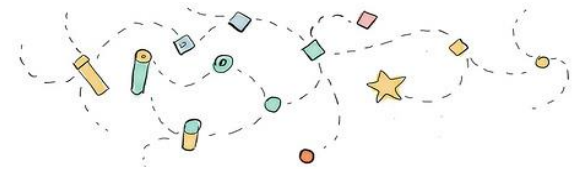
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Debrief Questions

STEAM in this activity:

- **What STEAM practices did you notice in this activity? How were they applied?**
- **What strategies in this activity did you notice that promoted a STEAM mindset?**
- **What strategies in this activity did you notice that supported learners identity?**



Thank You!

Questions?

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To access this and other
STEAM activities, visit:

www.fosteringSTEAM.org