



## Broadening Research Interest in Geoscience, Habitat, and Technology (BRIGHT)

### Investigation 9: FUTURECASTING

Grades 9-12

Time requirement: 45 minutes

#### Next Generation Science Standards (NGSS)

##### Science and Engineering Practices

##### Asking Questions and Defining Problems

- Ask questions
  - that arise from careful observation of phenomena, or unexpected results, to clarify and/or seek additional information.

##### Disciplinary Core Ideas

##### Earth and Space Science

- ESS2: Earth's Systems
  - ESS2.D: Weather and Climate
    - Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere.

##### Crosscutting Concepts

##### Stability and Change

- Much of science deals with constructing explanations of how things change and how they remain stable.

## OVERVIEW

Students develop and share short science fiction stories, e.g., to prepare them for developing final research projects.

## LEARNING OBJECTIVES

Students will be able to:

- create and share a micro-science-fiction prototype.

## INSTRUCTIONAL APPROACH

This investigation reinforces the creative aspect of science and scientific research. While valuable on its own, it could also serve as a warm-up exercise to help students come up with creative questions for their own research projects. Instructor should guide discussion and brainstorming:

- *How do we think our area of interest will change in the future? What data would a future scientist need from us now in order to understand such changes?*
- *What are natural and anthropogenic environmental changes and why should we care? How do we detect them?*

This investigation considers change over centuries, but encourage students to consider multiple timescales, e.g., human, evolutionary, geological.

While students create micro-science-fiction prototypes, we refer to the entire activity as futurecasting (a more informative description). The “micro” time limit helps boost creativity and discourage perfectionism.

## SCIENCE BACKGROUND

“What is Micro-Science-Fiction Prototyping? [μSFP](http://www.creative-science.org/activities/microsfp/) (Micro-SFP) is a combination of three concepts, first Science-Fiction Prototyping (a methodology that uses people’s imagination to write fictional stories to instantiate ideas for new products, businesses or political systems), second Micro-Fiction (a genre of writing ultra short stories as small as just 6 words) and finally, Twitter and Texting (a means of communicating meaningful messages in less than 140 and 160 characters).” (<http://www.creative-science.org/activities/microsfp/>)

## MATERIALS

- Rite in the Rain 4x6” notebooks, 1 per student
- Pencils, 1 per student
- Timer

## ACTIVITY

### Investigation

*45 minutes*

1. Brief group discussion:

- *Does science have to be serious?*
- *Who likes science fiction?*
- *What are the qualities of science fiction?*

2. Share examples of student stories from Juneau, Alaska (below). Ask students:

- *What do these stories have in common?*

List the elements students suggest in a visible place.

3. Let students know that they will do a brief writing exercise exploring possibilities in the future. In their notebooks, they will develop three quick stories or scenarios (in two minutes each, timed), including:

- Setting: our community, region, or field area 200 years in the future
- Protagonist: a future scientist
- Plot: action, something happens

4. Ensure students are ready to write and set the timer for two minutes. Give students a warning when they have 30 seconds remaining . When the timer goes off, they set their pencil aside and turn to a new page in their notebooks. Reassure students that it is OK not to finish their stories; the short time limit is intended to boost creativity and minimize perfectionism.

5. Give students two minutes to write a second microSFP. Repeat for a third microSFP.
6. Students find a partner and share their favorite microSFP, then work together to jot down a list of what kinds of data they could collect today to help future scientists understand the scenario they developed. Give students the option to share with the entire group after sharing with partners.

Story 3 6/25/18

• MCKENZIE Maxwell reached into her archeology bag and pulled out a copy of an ancient map leading to Tracy Arm. The Fjord where she was headed had at one point been home for mighty glaciers and beautiful waterfalls. Now, thanks to 700 years of human influenced climate change, the U shaped valley was just a dry trench full of dust and rubble. AS MCKENZIE examined her map, she thought about the ship that was supposedly buried here. According to legend, in the late 2050's when there was still ice on the planet, the entire face of S: Sawyer Glacier calved and caused a tsunami over 300 feet high. The cruise ship that was in the fjord, along with three whale watching boats were all capsized and sunk in under 2 minutes. Due to a radiation leak soon after on the Holkharf Bay Navy base, the fjord had been completely abandoned for over 200 years. By then,

Sci-Fi: Storics:

6-25-18

1. The Mountain goat rested peacefully on a small outcropping near the summit of Thunder Mt. 70 years ago the last of Juneau <sup>has been</sup> ~~was~~ swallowed up by the constantly rising ocean, leaving all humans to scramble, but not affecting the M. goat population at all.
2. Charlie the black lab was walking down main street with his owner when suddenly a spaceship came down and sucked all patagonia clothing away from the city. Since it was a overcast day this meant nearly everyone's outerwear was stolen from them.



## Story 1

- 1] ~~There~~ The apocalypse had been upon us for years. Slowly we were infested one by one, becoming less ourselves, and more... them. We discovered an anomaly in our brains, and we put it down as a new disease that quietly worked us into a madness from which we couldn't escape, until now.
- 2] Living in a smaller city, we were one of the last to be hit. Trying in vain to discover a cure, a way to rid ourselves of our extraterrestrial visitors, we weakened our brains from overuse. But it was all for nothing. Our civilization had been on the brink of a new technological age, but it seemed the intruders (as I now like to think of them) did not want us to reach that point.
- 3] Upon interrogation of a young infested one, we discovered they held no physical form and were

*Rite in the Rain*

only the thought of an alichi, there but not there simultaneously. They were simply using our adaptable human bodies as hosts for their kind.

- 4] So we took another approach to rid ourselves of them. As cruel as it may sound, we forced the infested to live in the ice caves of nearby glaciers. Our plan was not entirely fool proof, as the madness caused by something living in your brain, made the infested eat each other for food. Besides that small problem, we were also faced with the prospect that glaciers do calve, which would cause further deaths.
- 5] Upon releasing the infested, ~~the~~ the war for the planet had begun.

apping and every natural disaster you can think of through countries at a time. Anarchy reigned through the streets. But worst of all staying awake all night, keeping watch over loved ones, because if we all shut our eyes and fell asleep, we'd be dead by morning.



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*Rite in the Rain*

We see dead fish floating in the water. Seals decomposing. Sick trees. You don't hear birds either. Our home is destroyed, & nobody cares.

5] In fact, it's so bad that there is no longer oxygen left. Only the privileged get to breathe. If you are unable or unwilling to pay, you die. Our cities are encased in domes, from which man-made oxygen is filtered and released. Without it, we would all be dead, but we were made to be clever to survive when we weren't supposed to. Slowly we will build ourselves to a thriving civilization & conquer death once more.

## Extension

In addition to using futurecasting to generate potential research questions, students may choose one microSFP to revise and/or illustrate.

## Illustrating microSFPs

*1 hour*

## Materials

- 4x6” Rite in the Rain notebooks (with microSFPs), 1 per student
  - Scratch paper
  - Blank books, 1 per student  
(<http://www.barebooks.com/product/2501-landscape-blank-bare-book/>)
  - Magazines and calendars, assorted topics
  - Construction paper, assorted colors
  - Pencils, 1 per student
  - Colored pencils, several sets
  - Watercolor pencils, at least 1 set
  - Watercolor brushes, at least 1 set
  - Water cups, 1 per 2 students
  - Markers, at least 1 set
  - Oil pastels, at least 1 set
  - Sakura Pigma Micron pens, at least 1 set of 8 (various sizes)  
(<https://www.dickblick.com/items/20702-2089/>)
  - Glue sticks, 1 per 2 students
  - Scissors, 1 per 2 students
1. Let students know that they will use drawing and/or collage to illustrate one of their microSFPs written previously. If any students do not have their notebooks with microSFPs, give them two minutes to write a new one while the other students are deciding which microSFP (of three) to illustrate.
  2. Pass out blank books. Show students materials and encourage careful usage, including gentle pressure when drawing with the Micron pens. They are ideal for illustration, but



their fine nibs can bend or break under excessive pressure. Giving students options to choose from, e.g., drawing with multiple media and incorporating collage, builds creative agency.

3. Give students time to illustrate their microSFPs in the blank books. They may choose to include a title page and captions under each illustration.
4. If time allows, have students leave their books open to a favorite page, then circulate around and view each other's work in a gallery walk.



*Illustrating microSFPs. Photo by Gabrielle Vance*

## OTHER RESOURCES

“Using science fiction to explore business innovation”:

<https://www.digitalpulse.pwc.com.au/science-fiction-explore-business-innovation/>

“Nike and Boeing Are Paying Sci-Fi Writers to Predict Their Futures”:

<https://onezero.medium.com/nike-and-boeing-are-paying-sci-fi-writers-to-predict-their-futures-fdc4b6165fa4>

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