

Lesson Plan: A Mealworm's Bright Night

By: Mandi de Witte



Target Grade: 1st

Teacher Prep Time: 45 minutes (if mealworm boxes are made)

Lesson Time: 120 minutes (we recommend doing this lesson over 2 or 3 days)

- Part 1:
 - 1a: 10 minutes – Introduction
 - 1b: 20 minutes – Lights at Night
 - 1c: 15 minutes – Natural Light and Animals
- Part 2:
 - 2a: 15 minutes – Mealworm Experiment Introduction
 - 2b: 15 minutes – Planning the Investigation
 - 2c: 20 minutes - Experiment
 - 2d: 20 minutes – Class Data Analysis and Conclusion

If needed, part 2d can be done at a later time, within 1-2 days.

Lesson Overview: Students will begin by discussing the natural patterns of darkness and light on Earth and discuss examples of artificial vs. natural light. Students will be introduced to various impacts of light on animals. Then, with the guidance of the teacher, students will work in small groups to design and carry out an experiment to test how light effects if mealworms will go towards a food source.

Learning Objectives:

- Students will be able to differentiate between natural and artificial light.
- Students will be able to design and carry out an investigation to determine if bright light will deter mealworms from going towards a food source.
- Students will be able to share their results and analyze both their own data as well as class data to draw a conclusion about the effect of light on mealworms.

NGSS: 1-PS4-4 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

- **Science and Engineering Practice**
 - #3 Planning and Carrying Out Investigations (for grades K-2)
 - With guidance, plan and conduct an investigation in collaboration with peers
 - Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.
 - Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.
- **Disciplinary Core Ideas**
 - PS4.C: Information Technologies and Instrumentation
 - People also use a variety of devices to communicate (send and receive information) over long distances.

- **Cross Cutting Concept**
 - #3 Scale, proportion, and quantity.
 - In grades K-2, students use relative scales (e.g., bigger and smaller; hotter and colder; faster and slower) to describe objects. They use standard units to measure length.
- **Environmental Principle and Concept**
 - #5: Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors.
 - Concept A: There is a spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions.

Where This Lesson Fits in: Prior to this lesson, students should have experienced instruction in both 1-ESS1-1 (use observations of the sun, moon, and stars to describe patterns that can be predicted) and 1-ESS1-2 (make observations at different times of year to relate the amount of daylight to the time of year) so that they have some background knowledge of the moon, sun, stars, and the amount of light in the day. This lesson does not include all that needs to be taught for the 1-PS4-4 performance expectation, rather it makes an important environmental science connection that when humans use light to communicate across a distance, it can have a negative impact on animals. I would suggest doing this lesson towards the end of the physical science unit on light and sound, and possibly as a connector to the life science unit.

Materials Needed: *groups of 3-4 recommended*

For the Class/Teacher:

- A mealworm’s bright night slideshow and spreadsheet (projector)
 - **Optional Variation:** *Pocket chart and sentence strips instead of class spreadsheet*
- One copy each of teacher resource pages: example results, data analysis questions, and choice cards
- Planet Earth 2: Cities (available on NetFlix) cued to 41:19
- 1 container dry oatmeal
- 1 box of plain, unsalted crackers
- 1-2 apples cut into small pieces
- If possible, try to schedule the experiment time when an instructional aide or parent volunteer is available to work with you to help the students set up and carry out their investigation
- **Optional:** “Data” and “Analyze” word wall cards

Per Student:

- A Mealworm’s Bright Night Lab Worksheet

Per Group:

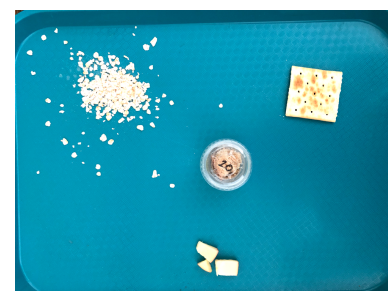
- 1 Pillbox (Weekly Classic Pill Planner Clear – 2XL dimensions 9 1 8 “x 1 3 4 “ × 1”) with 6, 0.7 cm holes drilled through all of the days, except Wednesday. Masking tape is put on the two ends of the pillbox. This keeps the mealworms contained to Sunday, Monday, and Tuesday or Thursday, Friday, and Saturday (Apothecary Products part number 6719)
 - *You may inquire about borrowing from the SciTrek program, scitrekadmin@chem.ucsb.edu*



- 1 MyChron Timer (Fisher Part Number: S65330) replacement batteries (Fisher Part Number: 50-212-755)
- 6 - 5oz Plastic Bowls (Smart and Final) with days of the week (except Wednesday) written on the bottom/side in Sharpie
- 3 - 1oz Containers with lids to hold mealworms (Smart and Final) (Be sure to poke holes in the lid using a paper clip and store mealworms with a small piece of bread)
- 60 mealworms (local pet food store) pre-counted and put into three 1-oz containers of 20 so that students do not need to count them.
- Up to 4 Flashlights
- 2 Trays (Smart and Final)

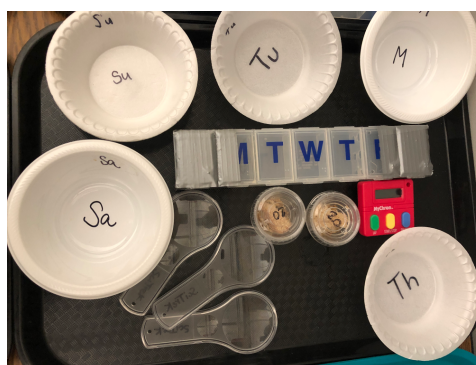
Teacher Prep:

- **Part 1 (Natural vs. Artificial Light)**
 - 1) Have slideshow and Planet Earth clip ready to show
- **Part 2 (Mealworm Investigations)**
 - 1) Have slideshow and spreadsheet ready to show. Be prepared with teacher resource pages: example results and data analysis questions and document camera.
 - 2) Make heterogenous groups of students, with 3-4 students per group.
 - 3) Make copies of the Mealworm lab sheet for each student.
 - 4) Purchase mealworms from a local pet food store several days prior to lesson and store in refrigerator with a small piece of bread. (Mealworms will last in the refrigerator for up to a few weeks.)
 - 5) Divide mealworms into cups of 20 mealworms each, enough for 3 cups per group of students. These can be stored in the refrigerator for up to a few weeks with a small piece of bread and holes poked in the lid. Remove mealworms from fridge about an hour prior to the lesson so that their metabolism has time to return to normal and remove the bread from their containers. Keep extra mealworms in their original container to replace any that may die.
 - 6) Use painter's tape or duct tape to make the compartments at the ends of the pillboxes dark.
 - 7) Create one observation tray per group containing one cracker, a small pile of dry oatmeal, and a small slice of apple, and one container of 20 mealworms.
 - 8) Create one investigation tray of materials per group: pillbox, two cups of 20 mealworms, timer, 6 labeled bowls. Have other materials that differ from group to group arranged at a back table for groups to come and get (food and flashlights)



Lesson Vocabulary:

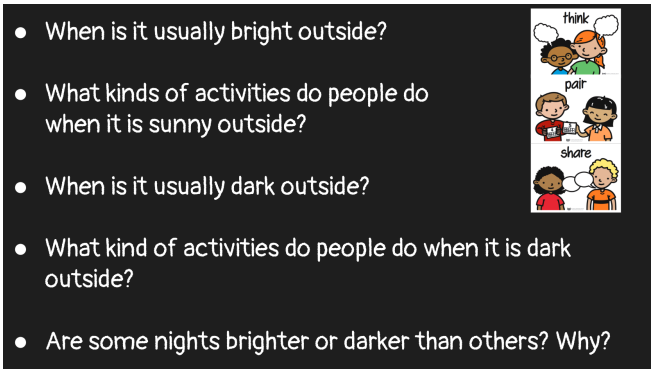
- Communicate
- Artificial Light
- Natural Light
- Nocturnal
- Brightness
- Predict
- Data
- Analyze




Above: Observation tray

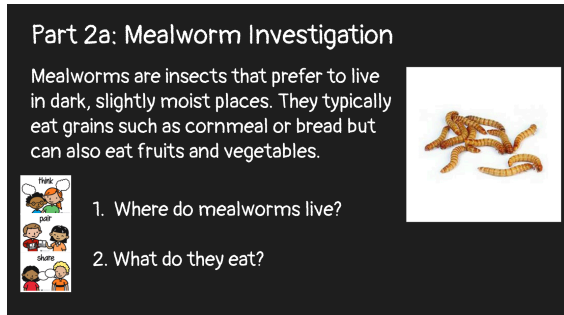
Left: Investigation Tray

Lesson Sequence:

<p>Part 1a: 10 minutes</p>	<p>Introduction</p> <p>1) Bring slideshow onto screen and gather all students onto rug. Having an “elbow” partner is recommended as there will be a lot of “think-pair-share” in this introductory activity. Review guidelines for “think-pair-share” using slide 2.</p> <p>2) On slide 3, use “think-pair-share” to discuss the 5 intro questions, by allowing students to think quietly first, talk with their elbow partner, then call on a non-volunteer to share out. Calling on 1-3 students per question should be sufficient. These questions should help students access their prior knowledge and prime them for the lesson.</p> <ul style="list-style-type: none">• When is it usually bright outside? Expected Student Response (ESR): “During the day time!” “When the sun is out.”• What kinds of activities do people do when it is sunny outside? ESR: “They go to school.” “They go to work.” They play outside.”• When is it usually dark outside? ESR: “At night time.” “When the sun goes down.”• What kind of activities do people do when it is dark outside? ESR: “They go to sleep.” “They watch TV.” “They eat dinner.”• Are some nights brighter than others? Why? ESR: “Sometimes the moon is full and then it is bright at night.” “The moon changes shape and it is brighter when the moon is bigger.” “It depends on the moon.” <p>3) Change to slide 4, and confirm that yes, daytime is when the sun is in the sky, and when there is the most light. It is dark at night time because the sun goes down, but since the shape of the moon changes throughout the month, some nights are brighter (when the moon is more full) and some nights are darker (when the moon is crescent shaped.)</p> <div data-bbox="776 373 1425 739" style="background-color: black; color: white; padding: 10px;"><ul style="list-style-type: none">• When is it usually bright outside?• What kinds of activities do people do when it is sunny outside?• When is it usually dark outside?• What kind of activities do people do when it is dark outside?• Are some nights brighter or darker than others? Why?</div>
<p>Part 1b: 20 minutes</p>	<p>Lights at Night</p> <p>1. Turn to slide 5. Explain that they will look at five different photographs. For each, they will describe what they SEE, and what it makes them THINK. As before, provide time for students to quietly think, share with a partner, then call on 1-3 students at random to share out. Spend about 2-5 minutes on each photograph. Prompt students to use the sentence frames “I see ____.” And “It makes me think ____”</p> <ul style="list-style-type: none">• Stoplight ESR: “I see a stoplight.” “I see a red and green light.” “It makes me think that cars are driving.” “It makes me think that some cars will go and others will stop.” “It makes me think that people driving cars will know when to go and when to stop.”

	<ul style="list-style-type: none"> • Lighthouse ESR: “I see a tower with a light on it.” “I see a lighthouse.” “I see a bright light.” “It makes me think the light will help people to see.” <ul style="list-style-type: none"> ▪ This one may need additional explaining by the teacher. “This tower is called a lighthouse. People put lighthouses on land near water, so that boats traveling at night time when it is dark do not run into the land.” • Airport ESR: “I see lots of little lights on the ground.” “I see a plane taking off into the sky.” “I see that the sky is light pink.” “It makes me think that it will help pilots see the ground.” “It makes me think that it helps the people working at the airport to see.” • Police ESR: “I see police cars.” “I see blue and red lights on the cars.” “It makes me think people are in trouble.” “It makes me think the police are coming to help.” “It makes me think that the police lights make people know to pull over.” • Store ESR: “I see light signs on a store.” “I see a restaurant.” “It makes me think that the store is open.” “It makes me think that I can go shopping at the store.” <p><i>[tip: if time is a constraint, only use 3 of the photos]</i></p> <ol style="list-style-type: none"> 2. Turn to slide 10. Explain that all of these photos had something in common and read the slide aloud to them. Ask students to practice saying “artificial light” all together. 3. Show and explain the pictures on slides 11, 12, and 13, and that humans have so many lights that we can see them from outer space! Reiterate that these lights help us see at night and to communicate across a distance.
<p>Part 1c: 15 minutes</p>	<p>Natural Light and Animals</p> <ol style="list-style-type: none"> 1. Turn to slide 14, read it aloud to them, and introduce natural light. Ask students to practice saying natural light. 2. Walk them through slides 15, 16, and 17, reading each aloud to them and giving them time to look at the photographs. Practice saying “nocturnal.” On slide 17, give students time to think-pair-share the question “What could happen to these animals if there is too much artificial light at nighttime?” <p>ESR: “They might have trouble hunting at night time if there is too much light.” “They might get confused and stay asleep too long.” “They might get scared.” “They might not be able to see as well.”</p> 3. Turn to slide 18, and explain that yes, some of the lights that humans use at night can hurt animals. Play the Planet Earth 2: Cities clip from 41:19 – 42:30. If desired, you can play the full clip from 41:19 – 45:33, but it might be a bit too emotionally heavy for first graders. (I do recommend watching the full clip for background info for the teacher however.) 4. After the video, go to slide 19 and allow students to think-pair-share. <p>ESR: “The lights were making the turtles go the wrong way.” “The turtles were walking towards the street instead of the water.” “The turtles walked towards the lights on the stores and cars instead of towards the moon over the ocean.”</p> <div data-bbox="885 1031 1421 1323" style="border: 1px solid black; padding: 5px;"> <p>Before we invented lights, people would rely on the moon to see at night time.</p> <p>We call this <u>natural light</u>.</p>  </div>

	<p>5. Conclude this introduction on slide 20, by explaining that tomorrow/later today we will do our own experiment to see how artificial light can impact mealworms!</p>
<p>Part 2a: 15 minutes</p>	<p>Mealworm Experiment – Introduction</p> <ol style="list-style-type: none"> 1. Have students sitting with their heterogeneous groups of 3-4 students. 2. Show students slide 21. Read the information at the top of the slide aloud with them. 3. Think-group-share questions 1 and 2, referring back to the answers in the paragraph on the slide. 4. Switch to slide 22. Tell students that they will first get to observe the mealworms. Remind them that mealworms are living animals and if they hurt them, they will not be able to participate in the rest of the activity. Also remind students that we do not eat anything when we do science. Ask one student per group to come to the back to receive an observation tray. (The tray with just one cup of worms and the 3 food types.) Allow each group time to observe the mealworms and the food. 5. Switch to slide 23 and think-group-share questions 3 and 4. ESR 3: “They are light brown.” “They have 6 little legs in the front only.” “Their body has lots of circular stripes.” ESR 4: “Yes they are moving towards all the food sources” 6. Collect the trays and mealworms back from the students. Remind them that mealworms like to live in the dark. Change to slide 24. Read the class question aloud together. Explain that we will design an experiment to see if the mealworms will still eat food if it is too bright. Switch to slide 25 and think-group-share questions 5 and 6. ESR 5: “They might not eat.” “They might be too scared to eat.” ESR 6: “They might die.” “They could starve.” 7. Switch to slide 26 and ask students, “How can we design an experiment to test this?” Give them time to discuss with their group. Walk around the room and talk to groups, asking probing questions such as “How long should the experiment be?” “How many mealworms do you think there should be?” “How can we test to see if they like light or dark?” 8. Engage the students in a class conversation on how we can design our experiment. Re-read the class question all together to remind students of the purpose. The main three goals of the discussion should be <ol style="list-style-type: none"> a. How to test light vs. dark ESR: “Have a dark area and a light area and see which one the worms walk towards.” “We should put food in the light to see if they eat it or stay in the dark” Ask them – “How can we make it light?” “How can we make it dark?” ESR: “We can use flashlights.” “We can use black paper to cover an area.” b. Scale: How many worms to use ESR: “We should use more than one worm because some worms might be different.” “We shouldn’t use too many worms because then it would be too hard to count.”





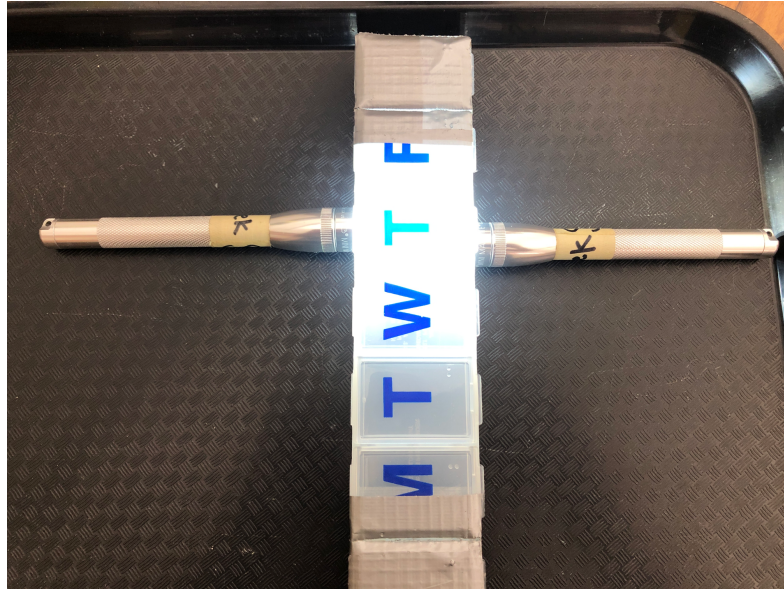
	<p>c. Scale: How much time ESR: “We should give them enough time to walk to the light or dark.” “ We shouldn’t give them too much time because it will take too long.” Make sure each group has the opportunity to share out and help guide the discussion with follow-up questions and ideas.</p>
Part 2b: 15 minutes	<p>Planning the Investigation</p> <ol style="list-style-type: none"> 1. Tell students that they had great ideas about planning the experiment. Switch to slide 27 and re-read the class question again to remind students of the goal. Tell students that before this lesson, you thought of a neat way to test if the worms will come out of the dark to eat. 2. Pass out student packets and have student put their name on the packet. Switch to the document camera to display the same worksheet 3. Ask students to turn to page 1 of their packets. Display on the screen and hold up one of the pillboxes. Explain and show that each pillbox compartment opens, and also has holes in it so that the worms can walk through from spot to spot. Show them that the tape will make it dark for the mealworms. The other compartment is clear and will let light pass through. Explain that these pillboxes will them do two tests at once to gather more data. We will start by putting the mealworms into the middle compartments (Monday and Friday) and see where they go. 4. Explain that there are two things the whole class needs to agree upon. Read each aloud to the class, and ask them to discuss with their group, and be ready to explain their choice <ol style="list-style-type: none"> a. Number of Worms – direct students towards 20 worms. Ask them why not 1 or 5 worms? ESR: “That is not enough worms to really show if they all will go to eat in the light or not.” “If one of the worms is slow and does not move then we need more to make a decision.” Ask them why not 100 worms? “100 worms would not fit in our compartment.” “100 worms would take too long to count.” b. Amount of time – direct students towards 5 minutes. Ask them why not 30 seconds? ESR: “30 seconds is not enough time for the worms to move to one area or the other.” Why not one hour? “One hour is too long and the mealworms we can see if the mealworms move faster than that.” c. Under the doc cam circle each choice and remind them that ALL groups will use 20 worms and 5 minutes. 5. Tell groups that they will now draw a card out of a bag that tells them what amount of light and food source they will use. They will then record these on their worksheet. 6. Read students the prediction sentence frame. Tell students that by themselves they will write down what they think the worms will do and why. Tell students that you want to know what they think, not their group, so they will stay quiet as they write down their prediction. Walk around and help students write as needed. 7. Call on 3 students at random to read their predictions to the class.

Part 2c:
20
minutes

Experiment

1. Explain that each group will now get to carry out their version of the experiment. Show students the pillbox one more time, and using the outline on their worksheet, remind them they will put their worms into the Monday and Friday compartments. Show them how they will set up the flashlights, if they are using them.







Sun	Mon	Tues	Wed	Thurs	Fri	Sat
DARK	START! 	LIGHT + FOOD	X	LIGHT + FOOD	START! 	DARK



2. Work as a whole class to develop a simple procedure. Ask students what they think they should do first after they have their materials. As they tell you what they need to do, write down each step on the board.
 - a. Put food in Tuesday and Thursday.
 - b. Set up light.
 - c. Put 20 worms in Monday and Wednesday.
 - d. Start timer and wait 5 minutes
 - e. Count mealworms

- Tell students that you are now going to show them how to count their mealworms. Put Mealworm Experiment Sample Data sheet under doc camera. Show students the pretend data picture. Practice counting the mealworms together and doing tally marks onto the results table. Then, answer 1 and 2 together. Note that students will ignore the worms that remained in the “start” compartments for their data analysis. (see example below)

Part 2c: Mealworm Experiment – Example Data FILL OUT
WITH CLASS

Sun	Mon START!	Tues LIGHT + FOOD	Wed	Thurs LIGHT + FOOD	Fri START!	Sat
DARK 			X			DARK 

Results: How many worms were in each compartment at the end?
Use tally marks to count your worms in each box.

Sun	Mon START!	Tues LIGHT + FOOD	Wed	Thurs LIGHT + FOOD	Fri START!	Sat
DARK ### ###	### 1		X		### 	### ###

1) How many total worms went into the dark? 20

2) How many total worms went into the light for food? 7

- Do choral repeat of procedure.
- Ask one student from each group to gather one of the pre-made trays (picture in teacher prep). Ask another student to meet you at the back table with their packet, to show which brightness level and food type they have. Have students carry materials back to their desk and wait to begin.
- Tell students we will do each step of the experiment together. Have the students choral read the first step from the list on the board. (Put food in Tuesday and Thursday). Tell them to go ahead and do that step, and when they finish to do the worm dance by lining their hands and putting them above their head to look like a worm and wiggling their head. This will be the signal that they are ready to move on. Repeat until you have made it through all steps.
- As the timers get close to 5 minutes, help the students get their counting bowls lined up and ready to help them count their worms.



8. Help students tally and count their data, and answer questions 1-5 on their results page. Tell groups to be ready to report out their data to the class.
9. As groups work on finishing their results page, walk around with a container to easily collect all of the mealworms. After they have their tallies, ask students to dump out the worms into the container and stack their counting bowls on their tray. Ask students to dump out the food from the pillbox into the trash and return their supplies to the back table. (You can stop, get the class's attention, and model this cleanup with one group to make cleanup easier.)

If you need to break Part 2 into two chunks, this would be a good stopping point.

Part 2d:
20
minutes

Class Data Analysis and Conclusion

1. After cleanup, all students should be sitting back with their groups. Tell them to stay on page 2 of their packet so they can read aloud their results. Display the slideshow onto the screen, set to slide 28. Read aloud to students.
2. Use slides 29 through 32 to introduce the words **data** and **analyze**. You may also use the physical word wall cards (optional.) Have students practice saying each word with a hand motion. On slide 32, explain that we will analyze the class data together, and load the spreadsheet by clicking on its image on the slide.
3. Call on each group one at a time to share their data verbally by asking them to read questions 3 and 4 of their results. Record their results onto the spreadsheet as they read them aloud to you. (Optional Variation: Instead of a digital spreadsheet, students can write results onto sentence strips to organize onto a class pocket chart.) (Sample Data provided at end of lesson plan.)

Group	Brightness Level	Type of Food	Mealworms in the Dark	Mealworms in the Light
	▼	▼		
	▼	▼		
	▼	▼		
	▼	▼		
	▼	▼		

4. Keeping the spreadsheet on the screen, tell students we are going to analyze the data by looking at it closely. Use the teacher resource page: data analysis questions to read aloud the 8 questions one at time to the students to think-pair-share. (If you can do a split screen or if you have two screens, these questions are also on slides 33-35.)

- 1) Did all groups get the same results? *Help with this discussion students by pointing out patterns within the data table, and by using the sort and highlight tools.*

Data Analysis: Class Discussion Questions (talk only)

- 1) Did all groups get the same results?
- 2) How did the light affect the worms?
- 3) Did the brightness level of the light make a difference?
- 4) Did the type of food, oatmeal, apples, or crackers, make a difference?
- 5) If people put too much light into mealworms habitats, what might happen?
- 6) Why do people use light at night?
- 7) Many animals are affected by too much artificial light at night. What can people do to help?
- 8) Think back to the baby turtles on the beach. What can people do to help them?



ESR: “No, even though most worms stayed in the dark the numbers changed a little bit from group to group.” “Yes, most groups had the worms stay in the dark.” “Most of the worms stayed in the dark.”

- 2) How did the light affect the worms? *(Before you have students answer this question ask them how we could arrange the spreadsheet to make answering this easier. Lead them to understand that we should arrange the data by light amount. Use the sort tool to arrange the data by brightness level. If using a pocket chart, manually sort the sentence strips.)*

ESR: “There were fewer worms in the light than the dark.” “The worms went to the food under classroom light.” “The worms stayed in the dark.”

- 3) Did the brightness level of the light make a difference?

ESR: “The worms really did not like brightness level 3 with the 2 flashlights, it was so bright the worms did not go eat the food.” “The worms did not mind the classroom light very much and they went to eat the food in that level of light.”

- 4) Did the type of food, oatmeal, apples, or crackers, make a difference? *(Before you have students answer this question ask them how we could arrange the spreadsheet to make answering this easier. Lead them to understand that we should arrange the data by food type. Use the sort tool to arrange the data by food type. If using a pocket chart, manually sort the sentence strips.)*

ESR: “No, the light mattered more than the food.” “The worms liked the food only when in the classroom light but they liked all the food.”

- 5) If people put too much light into mealworms habitats, what might happen?

ESR: “The mealworms might starve.” “The mealworms will get scared.” “The mealworms might get eaten by birds.”

- 6) Why do people use light at night?

ESR: “So they can see.” “So we can drive and not get into accidents.” “So we can see the buildings and stores.” “So we don’t fall down.”

- 7) Many animals are affected by too much artificial light at night. What can people do to help?

ESR: “Turn off lights when you don’t need them.” “Use special lights that don’t bother the animals so much.”

- 8) Think back to the turtles on the beach. What can we do to help them?

ESR: “Make a barrier on the sand so that the turtles don’t walk into the street.” “When we know the turtles are going to hatch ask the shops to dim their lights.” “When we know the turtles are going to

hatch have scientists there to help the turtles who are going the wrong way to turn around and go the right way.”

- End the discussion by explaining that many of the things that people do, including using lights at night, can have an impact on the living things around us, and that it is our job to make sure we keep humans safe, while also taking care of the environment.
- Direct students back to their packets and tell them to turn to page 3. Tell them that now we have analyzed the data as a group, they will now answer the 4 conclusion questions on their own. It may be helpful to keep the class spreadsheet on the screen for students to look at. Walk around to help.

Example Student Response, Worksheets:



A Mealworm's Bright Night

Name: **EXAMPLE STUDENT RESPONSE**

Class Question: Will mealworms eat if it's too bright?

The Experiment: Setup

Sun	Mon START!	Tues	Wed	Thurs	Fri START!	Sat
DARK		LIGHT + FOOD	X	LIGHT + FOOD		DARK

Class Setup: Circle what the whole class agrees to do for each part of the experiment.

• Number of Worms: 1 5 **20** 100

• Amount of Time: 30 seconds **5 minutes** 1 Hour

Group Setup: Pick your experiment cards. Circle what your group will do for each part of the experiment.

• Brightness Level: 1 Classroom Light **2 One Flashlight** 3 Two Flashlights
Least Bright Most Bright

• Food Type: **Dry Oatmeal** Apple Cracker

Prediction: I think more of the mealworms will travel towards the

FOOD / DARK (circle one) because they will want to eat and one flashlight is not too much light.

DARK because the ^{OR} light is too bright so they will not eat.

Results: How many worms were in each compartment at the end? Use tally marks to count your worms in each box.

Sun	Mon START!	Tues	Wed	Thurs	Fri START!	Sat
DARK	LIGHT + FOOD	LIGHT + FOOD	X	LIGHT + FOOD	LIGHT + FOOD	DARK
### ### 10	### 1 6	 4		 3	### 7	### ### 10

1) How many total worms went into the dark? 20

2) How many total worms went into the light for food? 7

3) Our group used brightness level 2 which was the LEAST / **MIDDLE** / MOST bright (circle one) and

DRY OATMEAL / APPLE / CRACKER (circle one) for food.

4) More worms went towards the **DARK** / FOOD (circle one) because

20 total worms went into the dark and

7 total worms went into the light for food.

5) Why do you think your worms acted this way? the light



stopped the worms from going towards the food. It was too bright for them.

Once you are done, help your teacher clean up!



Data Analysis: SHARE your findings to record on the class data sheet!

Analyze  **LOOK!**
To analyze is to look at closely.

Data  
Data is the information we collect from an experiment.

Independent Conclusion: (to be completed after class data analysis)

- 6) The group with the **most** mealworms who went into the **dark** used brightness level 3 and apple for food.
- 7) The group with the **most** mealworms who went towards the **light and food** used brightness level 1 and dry oatmeal for food.
- 8) Overall the class experiments usually showed that MORE / THE SAME / **(FEWER)** (circle one) mealworms went into the light for food than went into the dark.
- 9) **Class Question:** Will mealworms eat if it's too bright?

If it's too bright, mealworms will stay in the dark and not move towards the food.



Sample Data (this is real data gathered on 8/1/19)

Group	Brightness Level	Type of Food	Mealworms in the Dark	Mealworms in the Light/Food
1	1 (least bright)	Apple	36	2
9	1 (least bright)	Cracker	32	5
8	1 (least bright)	Dry Oatmeal	18	15
5	2	Apple	36	4
2	2	Cracker	34	6
7	2	Dry Oatmeal	25	9
3	3 (most bright)	Apple	34	0
6	3 (most bright)	Apple	38	0
4	3 (most bright)	Cracker	36	2
10	3 (most bright)	Dry Oatmeal	29	9